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EDITORIAL

ABSENTEEISM AMONG MEDICAL STUDENTS: A GROWING DILEMMA IN OUR MEDICAL SCHOOLS

Muhammad Idrees

Department of Pathology, Khyber Medical College, Peshawar, Peshawar - Pakistan

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Students` commitment to learning courses such as Medicine is reflected by high attendance which enables them to grasp both basic and clinical subjects and equips them with adequate aptitude and skills to perform best in Medicine. [1 and 2] Since the COVID-19 pandemic, many medical colleges have shifted to online teaching and learning. While online classes offer convenience, they may also have nurtured the culture of decreased student engagement and participation and equally mitigated the value of a teacher. Easy access to online lectures, animations, and power point presentations could be another reason for the lack of interest in attending lectures. Students may be feeling disconnected from the curriculum or perceiving a lack of relevance in the material being taught, which might be one of the reasons contributing to their disengagement. This disengagement can be a leading cause of decreased attendance as students may not see the value in attending every class.

Absenteeism among medical students is mainly due to ineffective teaching, ill-defined curriculum, non-conducive learning environment, and inflexible timetables hampering quality learning. [3] Though we all claim to have successfully adopted modern-day teaching methods, in reality, medical colleges are still relying heavily on traditional lecture-based teaching methods, which are considered to be monotonous and less engaging for students. If the teaching methods are not interactive or fail to stimulate active learning, students may lose interest and choose not to attend classes. It is considered that the leadership of many medical schools has failed to engage, convince, assure, train, and equip teachers with student-centered learning methods. A mere enrollment in certificates and Master's courses in teaching and learning is presumably not helping.

An unclear curriculum may lack specific learning objectives, course objectives, a balanced workload allocation, recommended references, assessment alignment, and access to relevant materials and lesson plans. Students may become uncertain about what is expected of them as a result, which makes it challenging for them to set priorities and schedule their attendance appropriately. A poorly organized curriculum may result in frequent schedule modifications, last-minute cancellations, or sessions that run concurrently. It could be challenging for students to remember their classes, which could lead to absenteeism. If the curriculum is not in sync with the most recent advancements and practices in medicine, students may feel that the classes are useless or without any practical value. Medical education requires both theoretical understanding and practical experience. Undergraduate students may believe that attending particular lectures is not beneficial to their learning if the educational program does not provide sufficient opportunities for active preparation, clinical rotations, or reasonable meetings. As a result, individuals might feel less motivated to regularly attend lessons, which would increase absenteeism.

Large class numbers can impair effective student-teacher relations by making it challenging for students to actively participate in discussions and ask questions. The impersonal setting of the classroom may make regularly attending lessons less interesting and motivating. If a classroom has unfavorable physical features like poor ventilation, a lack of natural light, or unpleasant seating arrangements, it may be less conducive to learning. Because of this discomfort, students may prefer to study in more comfortable environments, which could lead to a drop in attendance.

Scholarships, grants, and other financial aid programs are all options for students looking for financial support. Due to their restricted availability or lack of knowledge of these programs, students who are financially challenged might not be able to utilize these resources. If they do not receive enough financial aid, it is harder for them to attend classes. Students from financially challenged households could have additional duties or obligations that demand their attention and time. They might need to work or pitch in around the house to help support their families financially. They might not be able to make it to

class as a result of these competing obligations.

For students with limited financial resources, it could be challenging to get access to necessary resources including textbooks, reference books, and internet resources. These tools are essential for comprehending and following the curriculum. Without adequate access, students could find it difficult to participate fully in class, which would reduce attendance. Practical sessions are a common part of medical education, thus it is important for students to have access to certain tools and study materials. Financially struggling students might not be able to buy these supplies, which would limit their ability to participate in practical lessons and ultimately result in decreased attendance.

Absenteeism can adversely affect academic performance and low attendance can demotivate teachers also to teach with keen interest. [4] It is pertinent to note that the reasons for decreasing student turnout may vary depending on the specific context of the medical college and the individual experiences of the students. To address this issue, colleges can consider implementing strategies such as promoting student well-being, incorporating more interactive teaching methods, improving curriculum relevance, rigorous training programs for teachers, and providing support systems to help students manage their workload effectively. We need to incorporate our cultural norms into Westernized learning techniques and ascertain the mandate of teachers by empowering them with firm and meaningful assessment authority. It should be crystal clear whether to treat them as school-going or professional students. An occasional bit of both is confusing for both the students and the faculty.

The curriculum should be designed with clear and measurable learning outcomes, up-to-date content, and a balanced integration of theoretical and practical components. Incorporating interactive teaching methods, providing access to relevant resources, and ensuring proper guidance and support can help enhance student engagement and reduce absenteeism in medical colleges in Pakistan. Creating a supportive and inclusive learning environment involves providing necessary infrastructure, implementing student-centered teaching approaches, enhancing faculty-student interactions, and offering support services that cater to students' academic and emotional needs. By improving the learning environment, educational institutions can help reduce absenteeism and promote student success in medical education in Pakistan.

Addressing these financial discrepancies is crucial to ensure equal opportunities for all medical students. Implementing policies that provide financial assistance, scholarships, or subsidized education for economically disadvantaged students can help mitigate these issues. Additionally, raising awareness about existing financial aid programs and offering support services tailored to the needs of financially struggling students can contribute to improving attendance rates and overall academic success.

REFERENCES

1. Alghamdi A, Yamani A, Khalil A, Albarkati A, Alrehili O, Salih M. Prevalence, Causes and Impacts of Absenteeism among Medical Students at UQU. J.Edu.2016; 6(1): 9-12
2. Daud S, Javaid F. Effect of Class Attendance of Medical Students Tests Performance. PJMHS.2012;(6):295-297.
3. Qureshi MI, Ahmad A. Medical Students' Perspective on Absenteeism and its remedies. Pak Armed ForcesMed J 2019; 69 (2): 332-39.
4. Joshi H, Monga S, Raina S. Exploring Factors of Absenteeism Among Students Attending Community Medicine Department. Indian J Community Health. 2022; 34(1):123-9.

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ORIGINAL ARTICLE

REPRODUCTIVE COERCION AND ITS EFFECTS ON WOMEN'S REPRODUCTIVE HEALTH OUTCOMES- A CROSS-SECTIONAL STUDY

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ABSTRACT

Objective: Reproductive coercion is a constellation of behaviors obstructing a woman's autonomy in reproductive decision-making. This contributes to unwanted reproductive health outcomes in terms of physical and mental morbidity and mortality. The objective was to quantitatively explore its contribution to reproductive health outcomes in women seeking health care for other reasons.

Materials and Methods: This was a cross-sectional analytical study where the data was collected on the Reproductive Coercion Scale (by Miller) from 424 patients. The independent variables were; worried about pregnancy, pregnancy testing, induced abortion, and unwanted pregnancy/birth and the dependent variable was the scale score of each item. Data was analyzed by Chi-Square/Fisher's Exact test at Statistical significance of $p \leq 0.05$.

Results: The mean age of women was 30.13 (SD=6.51) years. Half of the women 212 (50%) were between 20 to 30 years. The majority were housewives 403(95%), living in joint family systems 314 (74.1%), and uneducated 260 (61.3%). There was a significant difference between unwanted/being worried about not pregnant and threats to leave the wife if she did not get pregnant (p=0.03), compelled wife for unprotected sex (p=0.02), and deliberately removed condoms (p=0.02). A significant difference was reported with induced abortions; as the wife was advised against the use of contraceptives (p=0.01), compelled for pregnancy (p=0.03), deliberately barred use of condoms (p=0.03), deliberately removed condom during sex (P=0.05) and damaging condom on purpose (p=0.001). Significant responses were reported for unwanted pregnancy/birth against the items; leaving the wife for not getting pregnant (p=0.001), intentionally barred access to contraceptives (p=0.02), and deliberately damaged condoms (p=0.02).

Conclusion: Reproductive coercion is overtly denied but covertly reflected in the health-seeking behaviors of women with a significant impact on reproductive health outcomes.

Key Words: Induced abortion, Reproductive Coercion, Unwanted Pregnancy

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INTRODUCTION

Reproductive coercion (RC) is a concept describing the behaviors that obstructs a woman's autonomous decision making reproductive matters. [1] These are active and passive behaviors of partners interfering with contraceptive use and pregnancy decision-making. [2] A woman may experience one or both during her reproductive life. RC is considered a form of gender-based violence and is rooted in the culturally defined norms of gender roles and power imbalance between genders. It is considered a preventable public health problem. The reported prevalence of RC ranges from 9% to 74%. This wide range is based on different settings and demographics. [3, 4] RC was reported by 16% of women presenting for routine care to obstetrics or gynecologic services in one study. Women presenting to family planning clinics and seeking help for intimate partner violence reported higher prevalence. [5]

Among the rural and uneducated strata of Pakistan, one pregnancy is unwanted out of the 4.1 Total Fertility Rate. The unmet needs for family planning stand at 35%, falling 20% short of targeted needs, resulting in 890,000 induced abortions in Pakistan. [6] The social and cultural

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pressure from family and spouses for more children and women not allowed to seek and consult information about contraceptives without their husband's knowledge and approval further hinders contraceptive use. [7] Women may seek health care, especially emergency contraception, requests for pregnancy testing, and termination of pregnancy as a result of RC. [1]

The objective of this study was to quantitatively explore the contribution of Reproductive Coercion to reproductive health outcomes in women seeking health care at an Obstetrics and Gynaecology unit at a tertiary care hospital. The unwanted reproductive health outcomes contribute to significant physical and mental morbidity and mortality in women. [8] The acceptable and feasible interventions in both clinical and community settings may reduce RC and can prove a potential factor in effective strategies for improving women's reproductive health.

MATERIAL AND METHODS

This was a cross-sectional study conducted at Obstetrics and Gynecology Department, Khyber Teaching Hospital Peshawar from December 2021 to May 2022. Ethical approval was sought from Institutional Ethical Review Board, Khyber Medical College (No.1067/DME/KMC). Individual consent was sought from participants with explicit mention of the purpose of data collection. It was explained to the participants that the personal nature of the information is for research purposes and participants' identity and confidentiality will be maintained. Their decision to cease participation was respected if they felt uncomfortable at any stage of data collection. Demographic data was collected on a questionnaire. The following variables were collected; the age of the woman, education, parity, number of male and female children, living as an independent family or combined family, age of husband, education of husband, employment, use of any form of modern contraception over the past year and history of any abortion, number of abortions, reason of abortions, unplanned pregnancy. The reproductive Coercion Scale by Miller and colleagues (2010), a set of 9 questions with dichotomous responses, to measure reproductive coercion was used. [9] Sample size was calculated using Open Epi online software with the following assumptions, confidence level = 95%, anticipated proportions of reproductive coercion = 50%, Absolute precision = 50%, Making allowance for (10%) incomplete or missing data, the calculated sample size was 424. A convenient sampling technique was used. Data was collected from married women, currently of reproductive age (15–49 years), visiting antenatal, Gynaecology OPD, and admitted to the ward for health care seeking. Women seeking health care for primary and secondary infertility and those who had undergone sterilization (Bilateral Tubal Ligation, hysterectomy) and using Intra-Uterine Contraceptive Devices for contraception, were excluded.

Data was analyzed using software, Statistical Package for Social Sciences (SPSS)-25. Descriptive statistics were calculated as mean for the age of women and their spouses, frequency, and percentage for categories of age, education, living arrangement, and working status of women (Table-1). The frequency and percentage were calculated for outcome variables; being worried about pregnancy, taking pregnancy tests, and induced abortions. The independent variable was the RC score of each item and the dependent variables were; worried about unplanned pregnancy, pregnancy testing, induced abortion, and history of unwanted pregnancy/birth. Chi-square and Fisher's exact tests were used to find the associations of dependent variables with the independent variable (RC). Statistically, significance was defined as $p \leq 0.05$.

RESULTS

The mean age of women 30.13(SD = 6.51) was less than their spouse's mean age of 35.63 (SD = 7.18) by almost five years. Half of the women (212, 50%) were in the age range of 20 to 30 years, while the majority of men (227/53.5%) were in the age range of 30 to 40 years. Women were more (43/10.1%) in the age group less than 20 years as compared to very few men (3, 0.7%) in the same age category (Table-1). The majority of female (260/61.3%) study participants had never been to school while the partners in the same category were almost one-fourth of total participants (105/24.8%). The education in different categories of both genders is shown in Table-1. The majority of the women were housewives (403/95%) and the living arrangement was a joint family system (314/74.1%).

The mental worries about unplanned pregnancy over the past three months was reported by 96 (22.7%) women, which increased to 116 (27.4%) women when the period of inquiry was extended to over the past one year. To check unplanned pregnancy, 116 (27.4%) women underwent pregnancy testing which increased to 121 (28.5%) over the past one year. The induced abortion was reported by 32 (7.5%) women and unwanted pregnancy was reported by 93 (22%) women overall, as shown in Table-2. The partner forbidding use of contraception 50 (11.2%), having unprotected sex 35 (8.3%) and taking away contraceptives 25 (5.0%) were reported over the past three months. When the inquiry period was extended over the past one year, the frequency of these responses increased to 69 (16.3%), 42 (9.9%) and 35 (8%) respectively as shown in table-3. The frequency of the remaining items on RC scale are shown in table-3.

The participant's responses did not show a significant difference on all items of RC Scale when analyzed against their worries about unplanned pregnancies over the past three months (Table-3). There was statistically significant difference when inquired about testing for unwanted or being worried of not pregnant and threats to leave the wife if she did not get pregnant ($p = 0.03$), compelled wife to have sex without condoms ($p = 0.02$) and deliberately removed condoms ($p = 0.02$). The significant statistical difference was found in frequency of

Table 1: Demographic characteristics of the study participants

		Female = n (%)	Male = n (%)
Age category	Less than 20 years	43 (10.1%)	3 (0.7%)
	20 to < 30 years	212 (50%)	120 (28.3%)
	30 to < 40 years	153 (36.1%)	227 (53.5%)
	More than 40 years	16 (3.8%)	74 (17.5%)
	Total	424 (100%)	424 (100%)
Mean age	Mean age (years)	30.13(SD = 6.51)	35.63 (SD = 7.18)
	Age Range (years)	16-46	19-60
Education category	Never been to school	260 (61.3%)	105 (24.8%)
	≤ 5 years	27 (6.36%)	23 (5.4%)
	6 to 10 years	75 (17.6%)	151 (35.61%)
	12 to 14 years	57 (11.08%)	86 (20.28%)
	16 years and above	14 (3.3%)	59 (13.9%)
	Total	424 (100%)	424 (100%)
		Frequency	Percentage
Living Arrangement	Joint family	314	74.1%
	Independent family	110	25.9%
Working status of women	House wives	403	95%
	Working women	21	5%

Table 2: Descriptive statistics of four reproductive health outcomes

Reproductive health worries and outcome	Over the past three months n, (%)		Over the past one-year n, (%)	
	Yes	No	Yes	No
Worried about unplanned pregnancy	96 (22.6%)	328 (77.4%)	116 (27.4%)	308 (72.6%)
Checked pregnancy test	116 (27.4%)	308 (72.6%)	121 (28.5%)	303 (71.5%
Induced abortion	32 (7.5%)	392 (92.5%)	32 (7.5%)	392 (92.5%)
History of unwanted pregnancy (overall)	93 (22%)	331 (78%)	--	--

Table 3: Frequency distribution of responses to each item of RC Scale over the past three months and one year

Reproductive Coercion Scale items 9		Over the past three months		Over the past one year	
		Yes	No	Yes	No
1	"Told you not to use any birth control (like the pill, shot, ring, etc.)"	50 (11.2%)	374 (88.2%)	69 (16.3%)	355 (83.7%)
2	"Said he would leave you if you didn't get pregnant"	13 (03.1%)	411 (86.9%)	17 (04%)	407 (96%)
3	"Told you he would have a baby with someone else if you didn't get pregnant (threats of second marriage)"	10 (2.4%)	414 (97.6%)	13 (3.1%)	411 (96.9%)
4	"Taken your birth control (like pills) away from you or kept you from going to the clinic to get birth control"	25 (5.9%)	399 (94.1%)	35 (8%)	389 (92%)
5	"Made you have sex without a condom so you would get pregnant"	35 (8.3%)	389 (91.7%)	42 (9.9%)	382 (90.1%)
6	"Hurt you physically because you did not agree to get pregnant"	6 (1.4%)	418 (98.6%)	6 (1.4%)	418 (98.6%)
7	"Taken off the condom while you were having sex, so you would get pregnant"	12 (2.8%)	412 (97.2%)	28 (6.6%)	396 (93.4%)
8	"Put holes in the condom so you would get pregnant"	3 (0.7%)	421 (99.3%)	4 (0.9%)	420 (99.1%)
9	"Broken the condom on purpose while you were having sex so you would get pregnant"	4 (0.9%)	420 (99.1%)	5 (1.17%)	419 (98.8%)

Table 4: Results of Chi-Square/Fisher's Exact Test for the three health outcomes A, B, C and D as per each item of Reproductive Coercion scale over past three months

Reproductive Coercion Scale items9		A	B	C	D
		Worried about being pregnant (p value)	Did pregnancy test (P value)	Induced abortion (P value)	Unwanted pregnancy & birth (P value)
1	"Told you not to use any birth control (like the pill, shot, ring, etc.)"	0.68	0.22 (FE)	0.01 (FE)	1.0
2	"Said he would leave you if you didn't get pregnant"	0.56 (FE)	0.03	0.37 (FE)	0.001 (FE)
3	"Told you he would have a baby with someone else if you didn't get pregnant (threats of second marriage)"	0.40 (FE)	0.26 (FE)	0.03 (FE)	0.26 (FE)
4	"Taken your birth control (like pills) away from you or kept you from going to the clinic to get birth control"	0.32	0.28 (FE)	0.03 (FE)	0.02 (FE)
5	"Made you have sex without a condom so you would get pregnant"	1.0 (FE)	0.02 (FE)	0.19 (FE)	0.52 (FE)
6	"Hurt you physically because you did not agree to get pregnant"	0.59 (EF)	0.47 (FE)	0.62 (FE)	0.14 (FE)
7	"Taken off the condom while you were having sex, so you would get pregnant"	0.20 (FE)	0.02	0.05 (FE)	0.33 (FE)
8	"Put holes in the condom so you would get pregnant"	0.26 (FE)	0.17 (FE)	0.001 (FE)	0.02 (FE)
9	"Broken the condom on purpose while you were having sex so you would get pregnant"	0.77 (FE)	0.20	0.32 (FE)	1.0 (FE)

induced abortions when wife was advised against use of contraceptives ($p = 0.01$), compelled wife for pregnancy ($p = 0.03$), deliberately barred use of condoms ($p = 0.03$), deliberately removed condom during sex ($P = 0.05$) and damaging condom on purpose by putting holes in it ($p = 0.001$). The participants' responses were analyzed against unwanted pregnancy/birth, revealed statistically significant differences, said he would leave the wife for not getting pregnant ($p = 0.001$), intentionally barred access to contraceptives ($p = 0.02$) and deliberately put holes in condoms ($p = 0.02$) as shown in Table-4.

DISCUSSION

Several studies reported on pregnancy coercion, which for this study was taken as pressure not to become pregnant or to become pregnant. Forbidding a partner from using contraceptives resulted in induced abortion on the part of the female partner. [7, 10] The active or passive behavior of telling a partner not to use birth control, taking away contraceptives, expressing to leave the partner, or intentions of second marriage if she did not become pregnant resulted in significantly higher induced abortion. For this analysis, abortion coercion was considered as pressure not to terminate or to terminate, to control the outcome of pregnancy. [11] Two research studies reported findings on abortion coercion as 1 to 2% a low prevalence compared to 7.5% in our study. [10, 12] The increasing incidence of induced abortion over the past decade, in Pakistan is reported as 27 per 1000 women despite legal barriers. [13] The high prevalence is partly explained by the sociocultural pressures for more children and women are not empowered to gain access to or use contraceptives without family and partner's permission implicitly reflecting reproductive coercion. [7, 14, 15] This in turn poses a risk to women in health in terms of side effects and increase case fatality rates. [15,8, 16]

Though the participants responses did not reveal overt anxiety about being pregnant or not pregnant, an implicit indication of anxiety is revealed by taking pregnancy tests repeatedly (27.4%) if the partner expressed intentions to leave her or there were deliberate attempts at sabotaging condoms and having unprotected sex. Partner perpetrated reproductive coercion has been reported as most significant predictor of posttraumatic stress disorder (47.1%) ($P < 0.05$) over the past week and depression (69%). The mental health effects of reproductive coercion needs to be considered. [17, 3, 18, 19] The RC resulted in unwanted pregnancy and birth if the partner expressed intention to leave his wife, took away contraceptives or deliberately damaged the condom. The high prevalence of unwanted pregnancy has been related to unmet needs for contraception but the contribution of RC cannot be overlooked to this outcome [6]. Disagreement over use of contraception may reflect concerns about religious objection, family pressure and mistrust over safety of contraceptives as well as pregnancy coercion [6, 17, 20].

CONCLUSION

Certain health seeking behaviours among women attending Obstetrics and Gynecology services may implicitly reflect reproductive coercion on part of their partners. Along with other concerns this should be considered while evaluating health of these women. This is overtly denied

but covertly reflected by other health seeking behaviours of women with significant impact on reproductive health outcomes.

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REFERENCES

1. Fay K, Yee L. Reproductive coercion and women's health. J Midwifery Women Health. 2018;63(5):518-25.
2. ACOG Committee opinion no. 554: reproductive and sexual coercion. Obstet Gynecol. 2013;121(2 Pt 1):411-5.
3. Moore AM, Frohwirth L, Miller E. Male reproductive control of women who have experienced intimate partner violence in the United States. Soc Sci Med. 2010;70(11):1737-44.
4. Miller E, Decker MR, McCauley HL, Tancredi DJ, Levenson RR, Waldman J, et al. Pregnancy coercion, intimate partner violence and unintended pregnancy. Contraception. 2010;81(4):316-22.
5. Clark LE, Allen RH, Goyal V, Raker C, Gottlieb AS. Reproductive coercion and co-occurring intimate partner violence in obstetrics and gynecology patients. Am J obstet Gynecol. 2014;210(1):42.e1-8.
6. Sathar Z, Jain A, Ramarao S, ul Haque M, Kim J. Introducing client-centered reproductive health services in a Pakistani setting. Stud Fam Plann. 2005;36(3):221-34.
7. Khan M, Hashmani F, Ahmed O, Khan M, Ahmed S, Syed Sea. Quantitatively evaluating the effect of social barriers: a case-control study of family members' opposition and women's intention to use contraception in Pakistan. Emerging Themes Epidemiol. 2015;12(1):2-.
8. Shaikh Z, Abbassi RM, Rizwan N, Abbasi S. Morbidity and mortality due to unsafe abortion in Pakistan. Int J Gynaecol Obstet. 2010;110(1):47-9.
9. McCauley HL, Silverman JG, Jones KA, Tancredi DJ, Decker MR, McCormick MC, et al. Psychometric properties and refinement of the Reproductive Coercion Scale. Contraception. 2017;95(3):292-8.
10. Wu J, Guo S, Qu C. Domestic violence against women seeking induced abortion in China. Contraception. 2005;72(2):117-21.
11. Sutherland MA, Fantasia HC, Fontenot H. Reproductive coercion and partner violence among college women. J Obstet Gynecol Neonatal Nurs. 2015;44(2):218-27.
12. Raj A, Sabarwal S, Decker MR, Nair S, Jethva M, Krishnan S, et al. Abuse from in-laws during pregnancy and post-partum: qualitative and quantitative findings from low-income mothers of infants in Mumbai, India. Matern Child Health J. 2011;15(6):700-12.
13. Sathar Z, Singh S, Rashida G, Shah Z, Niazi R. Induced abortions and unintended pregnancies in pakistan. Stud Fam Plann. 2014;45(4):471-91.
14. Sheeran N, Vallury K, Sharman LS, Corbin B, Douglas H, Bernardino B, et al. Reproductive coercion and abuse among pregnancy counselling clients in Australia: trends and directions. Reproductive Health. 2022;19(1):170.
15. Kamran I, Arif MS, Vassos K. Concordance and discordance of couples living in a rural Pakistani village: perspectives on contraception and abortion--a qualitative study. Glob Public Health. 2011;6 Suppl 1:S38-51.
16. Shah N, Hossain N, Noonari M, Khan NH. Maternal mortality and morbidity of unsafe abortion in a university teaching hospital of Karachi, Pakistan. J Pak Med Assoc. 2011;61(6):582-6.
17. Grace KT, Anderson JC. Reproductive Coercion: A Systematic Review. Trauma Violence Abuse. 2018;19(4):371-90.
18. McCauley HL, Falb KL, Streich-Tilles T, Kpebo D, Gupta J. Mental health impacts of reproductive coercion among women in Côte d'Ivoire. Int J Gynaecol Obstet. 2014;127(1):55-9.
19. Alexander KA, Willie TC, McDonald-Mosley R, Campbell JC, Miller E, Decker MR. Associations Between Reproductive Coercion, Partner Violence, and Mental Health Symptoms Among Young Black Women in Baltimore, Maryland. J Interpers Violence. 2021;36(17-18):Np9839-np63.
20. McCauley HL, Dick RN, Tancredi DJ, Goldstein S, Blackburn S, Silverman JG, et al. Differences by sexual minority status in relationship abuse and sexual and reproductive health among adolescent females. J Adolesc Health. 2014;55(5):652-8.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Ghayur MS:	Concept, Critical appraisal, and Discussion Writing
Jamil J:	Data collection, compilation of results, formatting of the article
Sadia H:	Data Collection, Manuscript writing
Jamil M:	Manuscript Writing, Bibliography
Adeeb H:	Overall compilation of the article
Nadir S:	Supervision, Critical appraisal
Iftikhar B:	Manuscript Writing, Bibliography

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.

ORIGINAL ARTICLE

COMPARISON OF BLOOD PRESSURE AND HEART RATE AMONG ACTIVE AND PASSIVE CIGARETTE SMOKERS

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ABSTRACT

Objectives: To compare the effects of passive and active cigarette smokers on blood pressure and heart rate.

Material and methods: It was a cross-sectional study based in the Physiology department of Khyber Medical College, Peshawar. It was conducted from January 2022 to June 2022. Using non-probability convenient sampling, MBBS students and college employees were divided into three groups. Each group had a sample size of 50. Group 1 comprised of passive smokers, group 2 consisted of active smokers and Group 3 of nonsmokers. Heart rate and blood pressure, including Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure, and Pulse Pressure, were measured. Data was analyzed using SPSS 26.

RESULTS: In Group-1, all smokers were males. In Group-2 (nonsmokers), 42 were males (32.6%) and 8 (34.8%) were females and in Group-3 (passive smokers), 37 were males (28.7%) and 15 were females (65.2%). Using the Anova test, the difference in the mean values of systolic blood pressure (SBP) among the three groups was found to be highly significant (0.001), while that of diastolic blood pressure (DBP) was non-significant (0.291). The mean values of Heart Rate (HR) among the three groups were also significant (0.049).

CONCLUSION: Smoking affects blood pressure and heart rate, as the systolic blood pressure and heart rate of smokers in our study were raised.

KEYWORDS: Hypertension, Power Lab, Smokers

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INTRODUCTION

Exposure to passive smoking is linked with an increase in cardiovascular deaths. It was found that getting exposed to passive smoking for a long time can result in hypertension.[1] Hypertension is a fatal condition that can cause myocardial ischemia, cerebrovascular accidents, congestive cardiac failure, and chronic kidney disease. In one of the studies, it was determined that passive smoking can cause silent hypertension in people who don't smoke.[1] Smoking is the major culprit that can cause non-communicable diseases.[2] Active smoking has detrimental effects on individuals consuming it. About 85% of passive smoking is due to a side stream of smoke, as a result of burning from cigarette tips.[3] However, the relationship of tobacco consumption with blood pressure (BP) is still ambiguous, especially in youngsters.[4] An international study was conducted on active and passive smokers among young adults which concluded that both smoking and being exposed to it are positively related to an increased cardiac metabolic consequence and therefore precautionary measures are of paramount importance.[5] A study conducted among healthcare staff concluded that tobacco consumption was most common among male doctors.[6] Most of the time exposure to secondhand smoke does occur at workplaces, colleges, and residences.[7] Less literature is found regarding the enhanced risk of MI due to passive smoking.[8] On the hand active smoking is responsible for ischemic heart diseases and stroke as well.[9] Internationally findings are implicated in glucose intolerance as well.[10] Most of the research has medical students as their participants followed by medical doctors.[11] The prevalence in them is from 32.7 to 37%.[12] Park et. al. came to an interesting conclusion that SHS was found to cause hypertension in females only.[13] Nevertheless, passive smoking is absolutely dangerous and about 6 million people die from it each year globally.[14] Little is known in the literature about the relationship between exposure to passive smoking and high blood pressure in lifetime nonsmokers. Therefore, this study can be very useful which will enable the health authorities to make solid decisions and formulate constructive health guidelines, policies, and

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interventions to prevent smoking and its complications.[15] The rationale of our study is to observe the effects of active and passive smoking on cardiovascular health in students and staff of undergraduate medical college as very little work has been done on this issue. Also, very little comparative research has been done between active and passive smoking in our setup. The objective of the study was to compare the effects of passive and active cigarette smokers on blood pressure and heart rate.

MATERIAL AND METHODS

This comparative cross-sectional study was performed in Physiology Laboratory at Khyber medical college Peshawar from Jan.2022 to Jun 2022. Ethical approval was taken from the institution's research and ethical review board. Subjects included both staff and students of the college, comprising both genders. The study sample was calculated as 50 in each group using WHO software (open Epi tool) via Diastolic blood pressure in male smokers and non-smokers as 82.55+-11.26 mmHg and 80.44+-10.95mmHg (Mean +- SE) respectively keeping confidence interval as 95% and power as 90%.[15] Sampling was done through a non-probability convenient technique. Three groups were taken, where Group 1 comprised active smokers, group 2 were passive smokers and Group 3 nonsmokers based on the number of cigarettes smoked per day and smoking habits asked in the questionnaire. Group 3 had 52 subjects. Blood pressure, including systolic blood pressure, diastolic blood pressure, mean arterial pressure and pulse pressure was measured in all eligible participants. Healthy staff and students of Khyber medical college were enrolled. People not taking any medications which affect the heart rate and blood pressure were also included. Those with known hypertension and heart disease, chronic kidney disease, diabetes mellitus, or thyroid diseases were excluded. Study details were explained to the participants who met the inclusion criteria. Written informed consent was obtained. The participants underwent clinical assessment which included history (questionnaire), and clinical examination. Clinical examination included BMI, height, and weight. BP (systolic, diastolic, mean arterial pressure, pulse pressure) and heart rate were checked using Bio Pac student power lab. The Biopac Student Lab system is an integrated life science teaching solution that includes hardware, software, and curriculum materials that students use in undergraduate laboratories to record data from their bodies, animals, or tissue preparations.[16] After the data collection, analysis was done using SPSS v. 26. Quantitative data was presented as mean and standard deviation. Categorical data was presented as frequency and percentages. A One-way ANOVA test was applied to check the difference in the mean values of blood pressure and heart rate in all three groups.

RESULTS

Our findings revealed Group 1 included 50 (32.9%) active smokers, group 2 included 50 (32.9%) non-smokers and Group 3 included 52 (34.2%) passive smokers, based on smoking habits given in the questionnaire (Table-1).Table 2 shows the means and standard deviations of different parameters examined in all three groups, including age, height, weight, BMI, SBP, DBP, and heart rate. An ANOVA test was applied to check the difference in the mean values of blood pressure and heart rate in all three groups (Table 3). We can easily see in Table 3 that the difference in the mean values of systolic blood pressure (SBP) among the three groups is highly significant (0.001), The post-doc Tukey test showed that a significant difference ($P<0.05$) existed between each pair of groups.

Table 1: Demographic characteristics of the participants

	Frequency	Percent%	Gender (Male)	Percent %	Gender (Female)	Percent%
Smoker	50	32.9	50	38.3	0	0
Non-smoker	50	32.9	42	32.6	8	34.8
Passive smoker	52	34.2	37	34.8	15	65.2
Total	152	100.0	129	100	23	100

Table 2: Comparison of Health Parameters Among Smokers, Non-smokers, and Passive Smokers

No	Parameters	Smoker		Non-smoker		Passive Smoker	
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
1.	Age	27.40	7.605	20.80	2.942	22.02	5.472
2.	Height	1.6748	.07492	1.6898	.07517	1.6987	.09569
3.	Weight	65.460	6.1052	63.420	11.7423	61.558	14.0188
4.	BMI	23.9998	3.04616	21.8466	3.94006	20.7552	3.48483
5.	Systolic BP	124.400	10.6426	118.260	12.9785	115.058	13.0149
6.	Diastolic BP	80.520	6.6586	79.040	8.9282	77.904	9.2995
7.	Heart Rate	78.100	7.7440	77.720	8.1817	81.077	6.5435

Table 3: Analysis of Variance (ANOVA) Results for Blood Pressure and Heart Rate Measurements Among Different Groups

	df	Mean Square	F	Sig.
Systolic BP Between Groups	2	1144.198	7.597	.001
Diastolic BP Between Groups	2	87.590	1.244	.291
MAP Between Groups	2	114.595	1.287	.280
Heart Rate Between Groups	2	173.361	3.074	.049

DISCUSSION

We performed this study to observe the effects of active and passive smoking on cardiovascular health in healthcare professionals. In group 1, all the smokers were males. In group 2, 42 were males (32.6%) and 8 (34.8%) were females and in group 3, 37 were males (28.7%) and 15 were females (65.2%). The mean SBP in group 1 was 124.4± 10.6 mmHg, in group 2 was 118.26 ± 12.978 mmHg and in group 3 was 115.06 ± 13.01 mmHg (Mean ± SE). Mean DBP in smokers was 80.52 ± 6.66 mmHg (Mean ± SE), in nonsmokers, 79.04 ± 8.92 mmHg and in passive smokers, 77.904 ± 9.2995 mmHg. The mean heart rate in the smokers was 78.1 ± 7.74 (Mean ± SE), in the nonsmokers it was 77.720 ± 8.1817 and in the passive smokers, it was 81.077± 6.5435. The difference in the mean values of systolic blood pressure (SBP) among the three groups is highly significant (0.001), while that of diastolic blood pressure (DBP) is non-significant (0.291).

Multiple researches have been conducted to study the association between cigarette smoking and BP. According to some, there is zero relationship between smoking and BP.[17] While some studies suggested lower BP among cigarette smokers, than nonsmokers.[18] On the other hand some studies suggested that smoking increases BP.[19] Our study also shows a significant rise in SBP in the smoker group.

Papathanasiou et al conducted a cross-sectional study in Greece, which showed a rise in both systolic and diastolic blood pressure in smokers. According to the findings of their study, blood pressure was directly associated with male gender and increased body mass index. Our study showed a rise in systolic blood pressure, and no difference in diastolic blood pressure among the three groups.[20]

While many researches have shown that heart rate is acutely increased in smokers, our study didn't show much change in heart rate in general and also among the three groups.[21]

Unlike studies done in the West, our smoker group exclusively comprised males, and the SBP was found to be raised in male smokers.[22]

A study done by Yarlioglues in 2010 revealed a marked increase in blood pressure and heart rate of healthy females as a result of the acute effects of passive smoking, and these injurious effects remained positive even after a long time passed after exposure. Heart rate and SBP increased and then lowered at the same time interval, whereas DBP varied at different time intervals. In our study, we saw no significant difference in systolic or diastolic blood pressure or heart rate among the passive smoker group or the non-smoker group.[23]

However, as is generally advised, strict measures to prevent passive smoking should be prioritized not only in public places but also in private homes because females are mainly exposed to cigarette smoke at home due to the smoking habits of their husbands. Children must be especially protected from exposure to cigarette smoke both at home and outside.[9]

CONCLUSION

Smoking affects blood pressure, especially systolic blood pressure and heart rate. The systolic blood pressure in our smoker group was significantly higher than passive smokers and non-smokers.

REFERENCES

1. Yarlioglues M, Kaya MG, Ardic I, Calapkorur B, Dogdu O, Akpek M, et al. Acute effects of passive smoking on blood pressure and heart rate in healthy females. Blood Press Monit. 2010;15(5):251–6.

2. Salimzadeh H, Najafipour H, Mirzaiepour F, Navadeh S, Shadkam-Farrokhi M, Mirzazadeh A. Prevalence of Active and Passive Smoking among Adult Population: Findings of a Population-Based Survey in Kerman (KERCADRS), Iran. Addict Heal [Internet]. 2016 ;8(1):16–24. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27274789%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4836759

3. Park YS, Lee CH, Kim Y Il, Ahn CM, Kim JO, Park JH, et al. Association between secondhand smoke exposure and hypertension in never smokers: A cross-sectional survey using data from Korean National Health and Nutritional Examination Survey V, 2010-2012. BMJ Open. 2018;8(5):1–6.

4. Alomari MA, Al-Sheyab NA. Impact of waterpipe smoking on blood pressure and heart rate among adolescents: The Irbid-TRY. J Subst Use [Internet]. 2018;23(3):280–5. Available from: https://doi.org/10.1080/14659891.2017.1394379

5. Kelishadi R, Noori A, Qorbani M, Rahimzadeh S, Djalalinia S, Shafiee G, et al. Are active and passive smoking associated with cardiometabolic risk factors in adoles-

cents? The CASPIAN-III Study. Paediatr Int Child Health. 2016;36(3):181–8.

6. Ali IS, Shahid R. Knowledge about smoking-related health disorders among medical students of Rawalpindi Medical College, Rawalpindi. 2014;47(4):198–201.
7. Razzaque S, Aidrus F, Ghazal S, Kumar A, Ghauri MI. Secondhand Smoking Related Headache in Medical Colleges in Karachi, Pakistan. 2004;
8. Attard R, Dingli P, Doggen CJM, Cassar K, Farrugia R, Wettinger SB. The impact of passive and active smoking on inflammation, lipid profile, and the risk of myocardial infarction. Open Hear. 2017;4(2):1–8.
9. Yang Y, Liu F, Wang L, Li Q, Wang X, Chen JC, et al. Association of Husband Smoking With Wife's Hypertension Status in Over 5 Million Chinese Females Aged 20 to 49 Years. J Am Heart Assoc. 2017;6(3):1–15.
10. Ramadhan SH, Talal SK, Moner WA. The Effects of Passive and Active Smoking on Brachial and Radial Blood Pressure and Some Other Physical Factors in Healthy Young Adults. Sci J Univ Zakho. 2017;5(3):259.
11. Houston TK, Person SD, Pletcher MJ, Liu K, Iribarren C, Kiefe CI. Active and passive smoking and development of glucose intolerance among young adults in a prospective cohort: CARDIA study. Br Med J. 2006;332(7549):1064–7.
12. Access O. An overview of smoking practices in Pakistan. 2015;31(2):467–70.
13. Skipina TM, Soliman EZ, Upadhya B. Association between secondhand smoke exposure and hypertension: nearly as large as smoking. J Hypertens. 2020;38(10):1899–908.
14. Wei X, E. M, Yu S. A meta-analysis of passive smoking and risk of developing Type 2 Diabetes Mellitus. Diabetes Res Clin Pract [Internet]. 2015;107(1):9–14. Available from: http://dx.doi.org/10.1016/j.diabres.2014.09.019
15. Tamura T, Kadomatsu Y, Tsukamoto M, Okada R, Sasakabe T, Kawai S, et al. Association of exposure level to passive smoking with hypertension among lifetime nonsmokers in Japan: A cross-sectional study. Med (United States). 2018;97(48):1–7.
16. Okubo Y, Miyamoto T, Suwazono Y, Kobayashi E, Nogawa K. An association between smoking habits and blood pressure in normotensive Japanese men. Journal of human hypertension. 2002 Feb;16(2):91-6.
17. 1Alomari MA, Khabour OF, Alzoubi KH, Shqair DM, Eissenberg T. Central, and peripheral cardiovascular changes immediately after waterpipe smoking. Inhalation toxicology. 2014 Aug 1;26(10):579-87.
18. Bernabe-Ortiz A, Carrillo-Larco RM. Second-hand smoking, hypertension, and cardiovascular risk: findings from Peru. BMC Cardiovascular Disorders. 2021 Dec;21(1):1-8.
19. Papathanasiou G, Zerva E, Zacharis I, Papandreou M, Papageorgiou E, Tzima C, Georgakopoulos D, Evangelou A. Association of high blood pressure with body mass index, smoking and physical activity in healthy young adults. The open cardiovascular medicine J. 2015; 9:5.
20. Rhee MY, Na SH, Kim YK, Lee MM, Kim HY. Acute effects of cigarette smoking on arterial stiffness and blood pressure in male smokers with hypertension. American J hypertension. 2007 Jun 1;20(6):637-41.
21. Lawless MH, Harrison KA, Grandits GA, Eberly LE, Allen SS. Perceived stress and smoking-related behaviors and symptomatology in male and female smokers. Addictive behaviors. 2015 Dec 1; 51:80-3.
22. Yarlioglues M, Kaya MG, Ardic I, Calapkorur B, Dogdu O, Akpek M, Ozdogru M, Kalay N, Dogan A, Ozdogru I, Oguzhan A. Acute effects of passive smoking on blood pressure and heart rate in healthy females. Blood pressure monitoring. 2010 Oct 1;15(5):251-6.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Qaiser A: Concept, Design,

Shaid F: Acquisition and critical review

Salman H: Analysis and interpretation of data

Hamid N: Data collection

Ayub JU: Bibliography and proofreading

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.

ORIGINAL ARTICLE

PATELLA RESURFACING DOES NOT IMPROVE OUTCOMES IN PATIENTS WITH POSTOPERATIVE FLEXION CONTRACTURE AFTER PRIMARY TOTAL KNEE ARTHROPLASTY

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ABSTRACT

Objective: Biomechanical studies have shown that flexion contracture leads to higher patellofemoral compressive forces with potentially poorer outcomes. We studied the outcome of primary knee arthroplasty with or without patella resurfacing in patients presenting with postoperative flexion contracture to determine if patella resurfacing improves the outcome.

Materials and Methods: We retrospectively reviewed the registry data at the Singapore General Hospital from 1998-2014. Of 18074 primary knee replacements carried out, 665 knees were identified with postoperative flexion contracture greater than 10 degrees at two years follow-ups, out of which 562 knees were included in the study. One hundred and three patients were lost to follow-up. All infected cases were excluded from the study. Knees with patella resurfaced (n =227) were compared with knees with patella non-resurfaced (n= 335) using the Oxford Knee Score, Knee Society Clinical Scoring System, and SF-36. A hand-held goniometer was used for measurements by an independent assessor and a physiotherapist. Analysis of factors for prognostic importance was performed using R statistics.

Results: At two years follow-ups, the non-resurfaced patella group had significantly higher median knee flexion compared to the resurfaced group. Age, male gender, preoperative flexion, and patella resurfacing were found to be significant predictors for knee flexion at two years. Outcome scores did not differ significantly between the two groups.

Conclusion: No significant difference in outcome scores was observed in resurfaced versus non-resurfaced patella groups in patients with more than 10 degrees' postoperative flexion contracture after primary knee arthroplasty.

Keywords: patella resurfacing; flexion contracture

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INTRODUCTION

No topic is as hotly debated in adult reconstruction as the indications for patellar resurfacing in knee arthroplasty and whether it confers additional benefit at all in the long term. Quite a few trials and meta-analyses have been published to answer this critical question. The proponents of routine patellar resurfacing argue that it reduces the risk of anterior knee pain (2-25%) and the need for secondary resurfacing (up to 13%) with better functional outcomes.[1,2] These claims are opposed by critics of routine patellar resurfacing, pointing to complications associated with patellar resurfacing and making non-resurfaced patella a scapegoat for an inferiorly executed surgery. Barrack et al. contended that for patients presenting with anterior knee pain after knee arthroplasty with a non-resurfaced patella, secondary resurfacing would be offered as a remedy, hiking the reoperations rate in the non-resurfacing group.[3] Similarly, the recurrence of anterior knee pain following revisions in a study by Burnett et al. led them to suggest that underlying patient, implant, or surgical factors may all affect the presence of anterior knee pain regardless of whether the patella is resurfaced or not.[4] In contrast, Parvizi et al. concluded that non-resurfacing leads to less patient satisfaction, results in a higher incidence of anterior knee pain, and secondary resurfacing is required in almost 1/10 patients.[5] This indecisiveness on the part of the orthopedic surgeons' community is compounded by the availability of a myriad of designs of knee arthroplasty components and the question of which design is best remains unanswered.

Patellofemoral joint forces are a measure of the

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force of quadriceps contraction and the angle of flexion of the knee. At full extension, the quadriceps is relaxed and no forces are acting on the patellofemoral joint, with the knee flexed, quadriceps activity increases with resultant high patellofemoral compressive forces, commensurate with the angle of flexion. [6 and 7] Koh et al. suggested that mild to moderate postoperative flexion contracture (10-15 degrees) does not increase pain but adversely affects functional outcomes and quality of life. [8] Perry et al. in their landmark cadaveric study demonstrated that flexion contracture of up to 15 degrees may be tolerated, but beyond that, the patient is extremely handicapped. [9]

We chose a patient population of $>10^0$ flexion contracture because we thought that this cohort of patients will have uniformly inferior outcomes and we wanted to look for the association of patella resurfacing or non-resurfacing on outcome scores in this population. We suppose that patella resurfacing does not affect the outcome scores in patients presenting with $> 10^0$ fixed flexion contractures at 2 years' follow-up.

MATERIALS AND METHODS

Patients who had undergone knee arthroplasty at our hospital in Singapore from September 1998 to September 2014 with at least two years of follow-up were included in this study based on registry data. All infected cases (both preoperative and postoperative) were excluded. This study is not limited to any particular prosthetic design. A hand-held goniometer was used for measurements by an independent assessor and a physiotherapist. Postoperative flexion contracture of more than 10 degrees was deemed clinically significant. We identified 665 knees with flexion contracture greater than 10 degrees at two years' follow-ups out of 18074 primary knee replacements. One hundred and three cases (15.5%) were excluded due to loss of follow-up, so essentially the data was limited to 562 patients. 227 knees had patella resurfaced, while in 335 cases, a patellar implant was not used. Knee Society clinical rating system 10, Oxford knee score 11, and SF-36 (Physical & Mental) 12 were used as outcome assessment tools for two years. Our primary outcome measure was to look for the effect of patella resurfacing on outcome scores in patients with fixed flexion contractures of more than 10^0. The distribution of data was assessed for skewness using the Shapiro-Wilk test. For normally distributed continuous variables, Student's t-test was used while for continuous variables that are not normally distributed, Mann Whitney U-test was used. The chi-square test was used to analyze categorical variables. Data analysis was performed using R (Version 3.22). Analysis of factors for prognostic importance was performed using multiple regressions. All comparisons were two-tailed and a P-value less than 0.05 was considered statistically significant. Sub-group analyses were done post-hoc.

RESULTS

Patients with patella non-resurfaced were significantly older than the patients with patella resurfaced (P=.002). No significant differences were observed in other demographic variables (Table I). At the preoperative stage, patients with patella resurfaced had significantly higher SF-36 physical Component Scores as compared with patients with non-resurfaced patella (P=.034). This may be attributable to younger age in resurfaced patella group. No significant differences were observed in other preoperative variables (Table II). At two years follow-up, knees with non-resurfaced patella had greater knee flexion compared to resurfaced patella group (P<.001). Outcome scores showed no significant difference between the two groups (Table III). We used a multiple regression model to look for variables affecting flexion at two years. Age, male gender, preoperative flexion, and patella resurfacing were found to be significant predictors (Table IV).

DISCUSSION

The majority of North American surgeons (>90%) routinely resurface the patella. They cite several randomized controlled trials and meta-analyses detailing the lower risk of anterior knee pain and reoperations on the patella.[13] Vielgut et al. reported patella resurfacing percentages in Europe as 3% in Sweden, 2% in Norway, and 72% in Denmark.[14] A 2010 National joint registry data of the UK showed 67% of patellae were non-resurfaced while 54% of knees were resurfaced in Australia as per a joint registry in 2013. There are 1.7-12% incidence of stiffness after knee arthroplasty reported with fixed deformity reaching up to 17% 15–17. Aderinto et al. showed that fixed flexion deformity greater than 10 degrees occurred in 4% of patients at six months, but went down to 2% at five years. [18] Goudie et al. reported fixed flexion contracture incidence at 3.6% in their study of 811 primary knee arthroplasties at two years follow-ups. [19] Ritter et al. reported an incidence of flexion contracture at 3.6% in their study involving 5622

Table 1: Demographics for postoperative flexion contracture more than 10 degrees with patella resurfacing and non-resurfacing

	Non-resurfaced Patella	Resurfaced Patella	P-value
Age Median (Q*1, Q3), years	70 (63, 75)	67 (61, 73)	0.002
Gender (Female: Male)	251: 84	171: 56	0.992
Operated Side (Left: Right)	137: 198	100: 127	0.417
BMI Median (Q1, Q3), kg/m2	26.9 (24.7, 29.6)	26.7 (24, 29.2)	0.474

*interquartile range

Table 2: Preoperative range of motion and scores for postoperative flexion contracture more than 10 degrees with patella resurfacing and non-resurfacing

	Non-resurfaced Patella	Resurfaced Patella	P-value
Extension Median (Q*1, Q3), degrees	14 (9, 20)	13 (8, 20)	0.356
Flexion Median (Q1, Q3), degrees	115 (100.5, 125)	113(97, 125)	0.258
Alignment (Valgus: Varus)	97: 238	69: 158	0.785
Tibio-femoral alignment in standing Median (Q1, Q3), degrees	7 (4, 11)	7 (5, 10)	0.783
Knee Society Score: Function Median (Q1, Q3)	45 (35, 60)	50 (35, 60)	0.051
Knee Society Score: Knee Median (Q1, Q3)	29 (16, 48)	33(23, 47)	0.172
Oxford Knee Score Mean (SD)	38.1 (8.6)	37 (8.7)	0.16
SF-36 Physical Component Score Median (Q1,Q3)	28.2 (22.6, 34.6)	29.8(24, 39.2)	0.034
SF-36 Mental Component Score Median (Q1, Q3)	50.9 (42.1, 57.9)	50.7 (41.7, 58.3)	0.938

*interquartile range

Table 3: Postoperative two years range of motion and scores for postoperative flexion contracture more than 10 degrees with patella resurfacing and non-resurfacing

	Non-resurfaced Patella	Resurfaced Patella	P-value
Extension Median (Q*1, Q3), degrees	15 (12, 18)	15 (13, 18)	0.57
Flexion Median (Q1, Q3), degrees	112 (101, 121)	106 (93, 115.5)	<0.001
Alignment (Valgus: Varus)	321: 14	215: 12	0.683
Tibio-femoral alignment in standing Median (Q1, Q3), degrees	5 (5, 6)	5 (5, 6)	0.329
Knee Society Score: Function Median (Q1,Q3)	60 (45, 80)	65 (45, 80)	0.121
Knee Society Score: Knee Median (Q1, Q3)	81 (73, 87)	80 (71, 87)	0.613
Oxford Knee Score Median (Q1, Q3)	20 (17, 27)	20 (16, 25)	0.39
SF-36 Physical Component Score Median (Q1, Q3)	47.2 (31.6, 53.3)	49.1 (33.6, 53.1)	0.39
SF-36 Mental Component Score Median (Q1, Q3)	54.8 (46.7, 60.7)	56.4 (47.6, 62.9)	0.095

*interquartile range

knees. [20] Our study is limited to knees with greater than 10 degrees' flexion contracture two years after primary knee arthroplasty (in 3.7% of patients).

Two years postoperatively, patients with non-resurfaced patella continued to demonstrate significantly higher knee flexion as compared to patients with resurfaced patella. This is an important finding because Devers et al. have already described that higher knee flexion means greater patient satisfaction. [21] Burnett et al. found no significant difference (P=0.58) in the degree of flexion between the two groups after a follow-up of ten years where only a cruciate retaining implant was used in their study. [4] In our study, both cruciate-retaining and sacrificing implants were included. Wood et al. concluded in their research involving 220 knees using Miller-Galante prosthesis that there was no significant difference between resurfaced and non-resurfaced groups vis-a-vis knee scores and range of motion. [22]

As has been published before, the degree of flexion/range of motion is dependent on many factors like patellar thickness, preoperative contracture, surgical technique, obesity, implant, and rehabilitation among others. Avoiding overstuffing of the patellofemoral joint is important and is a crucial factor in gaining knee flexion. Abolghasemian et al. in a biomechanical and experimental analysis demonstrated a significant loss of flexion (p=.002) for each millimeter of thicker patella but they emphasized that the relationship was non-linear. [23] In contrast, Hsu et al. did not find any loss of knee flexion with thicker patellae in their cadaveric study. [24]

Outcome scores were not statistically different between resurfaced and non-resurfaced patella groups in our study. Feller et al. concluded at three years of follow-ups in a randomized study involving 38 patients that no significant benefit was observed after resurfacing the patella using HSS and Patella scores as outcome measures. [25] Pavlou et al. concluded based on 11 RCTs that their heterogeneous data showed no difference in Knee Society Scores (KSS) between the two groups. [26] Pilling et al. in their meta-analysis concluded that 9/10 patients were satisfied with the outcome of knee arthroplasty regardless of patellar resurfacing or retention. [27] It is to be emphasized that our study is limited to patients with postoperative contracture more than 10 degrees and yet results do not differ significantly from other studies.

Dissatisfaction rates after knee arthroplasty have

spanned a lot of literature of late with a particular focus on the patellofemoral joint. Focusing on anterior knee pain and the risk of reoperation by Parvizi et al. leads us to believe in universal patellar resurfacing unless contraindicated. [5] But focusing on outcome scores makes us skeptical of the superiority of resurfacing. In a review, Schindler described the results of 16 randomized controlled trials mentioning a mean KSS of 155 in non-resurfaced and 153 in resurfaced patellae. In this review, nine studies did not find a clinically significant difference between either group in function and perception of pain while two trials favored non-resurfacing and five studies showed superiority of resurfacing over non-resurfacing. [2] Interestingly, the outcome scores used in our study remained under debate. Aunan et al. published results of 129 knee arthroplasties who were followed for three years and concluded that Knee injury and Osteoarthritis Outcome Score (KOOS) indicate patella resurfacing to be superior. However, KSS, Oxford Knee Score (OKS), and Visual Analog Scale (VAS) for patient satisfaction did not show statistically significant differences between the two groups. [28] A more robust outcome assessment tool with a focus on the patella may be needed to solve this dilemma.

Literature on the merits and demerits of patella resurfacing is a center of debate for the last four decades. The earliest patellar designs were a disaster, accounting for almost 50% of revisions attributable to the patellar prosthesis, which has now been reduced to around 12%. [13 and 29] With the improved designs, the prevalence of patellofemoral complications now hovers around 4-5%. [30] As the designs and results of knee prostheses are being improved, patients with early osteoarthritis and younger patients are receiving the implant. The demands of physically active patients are different from the elderly population. Employing traditional outcome assessment tools for these active patients might lead to ambiguous results as suggested by Hossain et al. [31] In the Asian population, the management of patella in knee arthritis is largely dependent on the surgeons` training as pointed out by Abdel et al. [13] He lamented the lack of actual data on the management of patella in knee arthroplasty in Asia. As the debate on the role of resurfacing is going on, we wanted to give it another perspective and analyzed the outcomes of resurfacing or non-resurfacing of patella in patients with postoperative flexion contracture. Kainz et al. in their cadaveric study concluded that resurfacing increases the pressure across the patellofemoral joint and theoretically may result in anterior knee pain and poorer outcomes. [15] These results are contrary to our study, just as non-resurfacing has turned out to be non-superior, leading credence to the assertion by Barrack et al. that the occurrence of anterior knee pain is a dynamic process whether patellar resurfacing is carried out or not. [3] We may infer that proper soft tissue balancing and attention to patellofemoral tracking is what ultimately decides the outcome.

We were not able to assess the role of all of the factors, nevertheless, our multiple regression model for postoperative two years knee flexion pointed to age, male gender, preoperative flexion, and patella resurfacing as significant predictors. These are largely in sync with the previously published data. However, our results should be interpreted with caution due to the inadequate power of the study. The other limitation of this study is the limited number of patients included. It is a retrospective study based on registry data and we did not perform prior power calculations. Measurements with a hand-held goniometer might be prone to errors, especially in obese patients. The study data included all cases, whether done by fellowship-trained arthroplasty surgeons or non-arthroplasty surgeons that might have affected the results. Further, large-scale, prospective multicenter studies under the supervision of trained arthroplasty surgeons are needed to fill these gaps.

CONCLUSION

In patients with flexion contracture after primary knee arthroplasty, outcome scores were not affected by patella resurfacing at index surgery. Outcome assessment tools can be refined and made more objective with a focus on patella scores.

REFERENCES

1. Parvizi J, Mortazavi SMJ, Devulapalli C, Hozack WJ, Sharkey PF, Rothman RH. Secondary resurfacing of the patella after primary total knee arthroplasty does the anterior knee pain resolve? J Arthroplasty. 2012; 27: 21–6.
2. Schindler OS. The controversy of patellar resurfacing in total knee arthroplasty: Ibisne in medio tutissimus? Knee Surg Sports Traumatol Arthrosc Off J ESSKA. 2012; 20: 1227–44. doi:10.1007/s00167-012-1985-7.
3. Barrack RL, Bertot AJ, Wolfe MW, Waldman DA, Milicic M, Myers L. Patellar resurfacing in total knee arthroplasty. A prospective, randomized, double-blind study with five to seven years of follow-up. J Bone Joint Surg Am. 2001; 83–A:1 376–81.
4. Burnett RSJ, Boone JL, Rosenzweig SD, Steger-May K, Barrack RL. Patellar resurfacing compared with nonresurfacing in total knee arthroplasty. A concise follow-up of a randomized trial. J Bone Joint Surg Am. 2009; 91: 2562–7. doi:10.2106/JBJS.H.00109.
5. Parvizi J, Rapuri VR, Saleh KJ, Kuskowski MA, Sharkey PF, Mont MA. Failure to resurface the patella during total knee arthroplasty may result in more knee pain and secondary surgery. Clin Orthop. 2005; 438: 191–6.
6. Schindler OS, Scott WN. Basic kinematics and biomechanics of the patello-femoral joint. Part 1: The native patella. Acta Orthop Belg. 2011; 77: 421–31.
7. Schindler OS. Basic kinematics and biomechanics of the patellofemoral joint part 2: the patella in total knee arthroplasty. Acta Orthop Belg. 2012; 78: 11–29.
8. Koh IJ, Chang CB, Kang YG, Seong SC, Kim TK. Incidence, predictors, and effects of residual flexion contracture on clinical outcomes of total knee arthroplasty. J Arthroplasty. 2013; 28: 585–90. doi:10.1016/j.arth.2012.07.014.
9. Perry J, Antonelli D, Ford W. Analysis of knee-joint forces during flexed-knee stance. J Bone Joint Surg Am. 1975; 57: 961–7.

10. Insall JN, Dorr LD, Scott RD, Scott WN. Rationale of the Knee Society clinical rating system. Clin Orthop. 1989; 248: 13–4.

11. Dawson J, Fitzpatrick R, Murray D, Carr A. Questionnaire on the perceptions of patients about total knee replacement. J Bone Joint Surg Br. 1998; 80: 63–9.

12. Patel AA, Donegan D, Albert T. The 36-item short form. J Am Acad Orthop Surg. 2007; 15: 126–34.

13. Abdel MP, Parratte S, Budhiparama NC. The patella in total knee arthroplasty: to resurface or not is the question. Curr Rev Musculoskelet Med. 2014; 7: 117–24. doi:10.1007/s12178-014-9212-4.

14. Vielgut I, Kastner N, Pichler K, Holzer L, Glehr M, Gruber G, et al. Application and surgical technique of total knee arthroplasties: a systematic comparative analysis using worldwide registers. Int Orthop. 2013; 37: 1465–9. doi:10.1007/s00264-013-1933-2.

15. Kainz H, Reng W, Augat P, Wurm S. Influence of total knee arthroplasty on patellar kinematics and contact characteristics. Int Orthop. 2012; 36: 73–8. doi:10.1007/s00264-011-1270-2.

16. Xu C, Chu X, Wu H. Effects of patellar resurfacing on contact area and contact stress in total knee arthroplasty. The Knee. 2007; 14: 183–7. doi:10.1016/j.knee.2007.01.005.

17. Quah C, Swamy G, Lewis J, Kendrew J, Badhe N. Fixed flexion deformity following total knee arthroplasty. A prospective study of the natural history. The Knee. 2011. doi:10.1016/j.knee.2011.09.003.

18. Aderinto J, Brenkel IJ, Chan P. Natural history of fixed flexion deformity following total knee replacement: a prospective five-year study. J Bone Joint Surg Br. 2005; 87: 934–6. doi:10.1302/0301-620X.87B7.15586.

19. Goudie ST, Deakin AH, Ahmad A, Maheshwari R, Picard F. Flexion contracture following primary total knee arthroplasty: risk factors and outcomes. Orthopedics. 2011; 34: e855-859. doi:10.3928/01477447-20111021-18.

20. Ritter MA, Harty LD, Davis KE, Meding JB, Berend ME. Predicting range of motion after total knee arthroplasty. Clustering, log-linear regression, and regression tree analysis. J Bone Joint Surg Am. 2003; 85–A: 1278–85.

21. Devers BN, Conditt MA, Jamieson ML, Driscoll MD, Noble PC, Parsley BS. Does greater knee flexion increase patient function and satisfaction after total knee arthroplasty? J Arthroplasty. 2011; 26: 178–86. doi:10.1016/j.arth.2010.02.008.

22. Wood DJ, Smith AJ, Collopy D, White B, Brankov B, Bulsara MK. Patellar resurfacing in total knee arthroplasty: a prospective, randomized trial. J Bone Joint Surg Am. 2002; 84–A: 187–93.

23. Abolghasemian M, Samiezadeh S, Sternheim A, Bougherara H, Barnes CL, Backstein DJ. Effect of patellar thickness on knee flexion in total knee arthroplasty: a biomechanical and experimental study. J Arthroplasty. 2014; 29: 80–4.

24. Hsu HC, Luo ZP, Rand JA, An KN. Influence of patellar thickness on patellar tracking and patellofemoral contact characteristics after total knee arthroplasty. J Arthroplasty. 1996; 11: 69–80.

25. Feller JA, Bartlett RJ, Lang DM. Patellar resurfacing versus retention in total knee arthroplasty. J Bone Joint Surg Br. 1996; 78: 226–8.

26. Pavlou G, Meyer C, Leonidou A, As-Sultany M, West R, Tsiridis E. Patellar resurfacing in total knee arthroplasty: does design matter? A meta-analysis of 7075 cases. J Bone Joint Surg Am. 2011; 93: 1301–9. doi:10.2106/JBJS.J.00594.

27. Pilling RWD, Moulder E, Allgar V, Messner J, Sun Z, Mohsen A. Patellar resurfacing in primary total knee replacement: a meta-analysis. J Bone Joint Surg Am. 2012; 94: 2270–8. doi:10.2106/JBJS.K.01257.

28. Aunan E, Næss G, Clarke-Jenssen J, Sandvik L, Kibsgård TJ. Patellar resurfacing in total knee arthroplasty: functional outcome differs with different outcome scores: A randomized, double-blind study of 129 knees with 3 years of follow-up. Acta Orthop. 2016; 87: 158–64. doi:10.3109/17453674.2015.1111075.

29. Ranawat CS. The patellofemoral joint in total condylar knee arthroplasty. Pros and cons based on five- to ten-year follow-up observations. Clin Orthop. 1986: 93–9.

30. Nizard RS, Biau D, Porcher R, Ravaud P, Bizot P, Hannouche D, et al. A meta-analysis of patellar replacement in total knee arthroplasty. Clin Orthop. 2005: 196–203.

31. Hossain FS, Patel S, Fernandez MA, Konan S, Haddad FS. A performance based patient outcome score for active patients following total knee arthroplasty. Osteoarthritis Cartilage. 2013; 21: 51–9. doi:10.1016/j.joca.2012.09.019.

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Following authors have made substantial contributions to the manuscript as under

Bukhari SI:	Concept, Critical appraisal, and Discussion Writing
Yew A:	Data collection, compilation of results, formatting of the article
Pang HN:	Data Collection, Manuscript writing
Chia SL:	Manuscript Writing, Bibliography
Yeo SJ:	Overall compilation of the article
Lo NN:	Supervision, Critical appraisal

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.

ORIGINAL ARTICLE

FETAL OUTCOMES IN PREGNANCIES COMPLICATED BY OLIGOHYDRAMNIOS- EXPERIENCE AT A TERTIARY CARE HOSPITAL

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ABSTRACT

To find out the association between oligohydramnios and fetal outcome in terms of mode of delivery, the weight of the newborn baby, APGAR score at 1 and 5 minutes, and admission to the neonatology unit.

Materials & Methods: This prospective cohort study was conducted in Obstetrics and Gynaecology Department, Khyber Teaching Hospital, Peshawar from 1st June 2017 to 31st May 2018. Patients with singleton pregnancy and cephalic presentation with a period of gestation of about 37 weeks or above were included using a purposive non-probability sampling technique. A sample of 100 patients in Group A (exposed) whose AFI was < 5 in the absence of other associated risk factors were compared to 100 matched groups of subjects in Group B (non-exposed) with AFI 5—18. Pregnant women with gestational age <37 weeks, fetal congenital abnormalities, and pregnancies with co-morbidities like PIH, and pre-eclampsia were excluded from the study.

Results: The result comparison shows that Group A has a higher rate of labor induction and cesarean section than Group B. However, there was no statistically significant difference in the weight of the newborn, APGAR score at 1 and 5 minutes, and admission to the neonatology unit in both groups.

Conclusion: Oligohydramnios is associated with a higher rate of induction of labor and cesarean section, but it does not affect the weight of newborn babies, APGAR score at 1 and 5 minutes, and admission of the newborn to the neonatology unit.

Key Words: Oligohydramnios, Amniotic fluid, Cesarean section, Induction of labor, APGAR score, Perinatal outcome

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INTRODUCTION

The fluid around the fetus during pregnancy is called amniotic fluid. It performs multiple functions like it protects the fetus from external forces and infection, regulating the temperature around it, and also providing free-floating space to the growing fetus which helps in the growth of lungs, muscles, and bones under a normal amount of liquor[1]. It is measured in the form of mean vertical pool (MVP), amniotic fluid volume (AFV), and AFI[2]. The amount of amniotic fluid is less in early pregnancy and it increases during pregnancy with a peak of 800 ml around 34 weeks of gestation. After this, it decreases in amount to 500 ml at 40 weeks of gestation[3]. Amniotic fluid volume is regulated through a complex mechanism. Abnormalities in this mechanism may lead to either increase or a decrease in liquor volume which is undesirable[4]. Oligohydramnios is a decrease in amniotic fluid volume, MVP<2cm, AFV<200 ml, AFI<5, or AFI below the 5th percentile for the period of gestation is called oligohydramnios which complicates 0.5% - 5% of all pregnancies[5]. Diagnosis of Oligohydramnios is not a good sign as it is associated with adverse antepartum, intrapartum, and perinatal pregnancy outcomes, especially if develops during early pregnancy[6].

Oligohydramnios may either be caused by loss of amniotic fluid or underproduction of it. In some cases, the cause may be very simple, just maternal dehydration while in others can be complicated[7]. Congenital fetal urinary tract abnormalities may cause a decreased amount of liquor as well[8]. Utero-placental insufficiency due to maternal hypertension and chronic kidney disease may also cause oligohydramnios in a structurally normal fetus. Maternal intake of certain drugs like ACE inhibitors and prostaglandin synthase inhibitors (indomethacin) also causes less production of amniotic fluid. Loss of amniotic fluid due to pre-labour pre-term rupture of membranes (PPROM) also causes oligohydramnios[9]. Oligohydramnios is an indica-

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tor of adverse perinatal outcomes. The earlier it develops, the poorer the prognosis. Fetal complications include pulmonary hypoplasia, early IUGR, and iatrogenic prematurity due to early interventions in such pregnancies. Maternal complications are due to their relation to uncontrolled hypertensive disorders and chorio-amnionitis[10].

Management depends upon the severity of oligohydramnios, gestational age at diagnosis, and the underlying cause. Severe oligohydramnios is an indication for delivery. Pregnancies complicated with oligohydramnios have an increased risk of cesarean section and instrumental delivery due to fetal distress and meconium staining of liquor. [11] An increase in the cesarean section rate is not desirable as it compromises the maternal obstetrical future. With 1 cesarean section, the risk of repeat cesarean section is increased in subsequent pregnancies with its associated increased risk of placenta previa and morbidly adherent placenta. Performing a cesarean section due to anxiety of threat to fetal life should be avoided to reduce the cesarean section rate. It is only possible when we follow evidence-based practice. We need studies to establish an evidence-based practice. In Pakistan, very few studies are available on this topic. This study was done to find out the association of isolated oligohydramnios with cesarean section rate and fetal status as assessed by weight of the newborn baby, APGAR score at 1 and 5 minutes, and admission to the neonatology unit.

MATERIAL AND METHODS

This study was carried out in the Department of Obstetrics and Gynaecology, Unit A, Khyber Teaching Hospital Peshawar from 1st June 2017 to 31st May 2018. The study design was a prospective cohort with approval from the hospital's ethical committee. Patients having singleton alive pregnancy with cephalic presentation and a period of gestation of 37 weeks or above were included in the study. While, pregnant women with gestational age <37 weeks, fetal congenital abnormalities, and pregnancies complicated with PIH, pre-eclampsia. A sample of 100 patients whose AFI was <5 in the absence of associated risk factor (exposed) Group A was compared to 100 matched group of the subject with AFI 5 -18 (non-exposed) Group B. Purposive non-probability technique was used for sampling.

Personal and obstetrical information were recorded on pre-formed Proforma. Labour was monitored in both groups by use of a partogram. The mode of delivery was decided according to standard obstetric protocol. Mode of delivery, the weight of the newborn baby, APGAR score at 1 and 5 minutes, admission to the neonatology unit, and neonatal deaths were recorded. Data was entered in SPSS version 20. Descriptive statistical analysis was used to calculate frequencies, percentages, and SD for numerical data. Qualitative variables (mode of delivery, APGAR score, weight of the baby, NICU admission, and neonatal deaths) between the two groups were compared by chi-square test, and a P-value of less than 0.05 was taken as significant.

RESULTS

The duration of the study was 1 year. 100 patients in Group A with AFI <5 (exposed) were compared to 100 matched patients in Group B with AFI 5—18 (nonexposed). Both the cases and controls were matched according to age, BMI, parity, and other demographic characteristics. Primigravidae were 16% and multi-gravidae 84% in Group A while primigravidae were 13% and multi-gravidae were 87% in Group B. More than half (59%) of patients needed induction of labor in group A while labor was induced in only 5% of patients in group B. 34% of the patients had undergone a cesarean section in Group A while 4% ended up in a cesarean section in Group B. The difference was found to be statistically significant (p-value < 0.001).

The mean baby weight in Group A was 2.95 with an SD of 0.481, while in Group B mean baby weight was 3.001 with an SD of 0.4006. No statistically significant difference was found in baby weight in both groups (p-value 0.503). 25% of newborn babies in Group A had an APGAR score <7and 23% of newborn babies in Group B had an APGAR score<7. Apgar score >7 at 1 minute was found in 75% of newborn babies in Group A and 77% of newborn babies in Group B. 14% of newborn babies in Group A and 11% of newborn babies in Group B had an Apgar score <7 at 5 minutes. APGAR score >7 at 5 minutes was found in 86% of newborn babies in Group A and 89% of newborn babies in Group B. This difference between the 2 groups was not statistically significant. (p-value 0.741 and 0.521 respectively). 5 newborn babies needed NICU care in Group A while 3 newborn babies were sent to NICU in Group B (p-value 0.47). No neonatal deaths were recorded in either group.

DISCUSSION

We carried out our study at Khyber Teaching Hospital. It is a tertiary care hospital in the major city of the province of Khyber Pakhtunkhwa. It caters to a large population. It not only provides services to the nearby areas but also complicated patients referred from other districts are provided quality treatment here.

Results of our study show that the rate of induction and cesarean section in pregnancies complicated by oligohydramnios was significantly higher than pregnancies with the normal amount of liquor while the weight of the newborn baby, APGAR score at 1 and 5 minutes, admission to neonatology unit and neonatal deaths were similar in both groups. Similar results are reported by Asifa et al[12]. However, a study by Iqbal et al. [13] reveal that fetal outcome is worse in cases of oligohydramnios in terms of APGAR score and NICU admission. In Group A 59% of patients needed induction of labour compared to 5% in Group B.

Table 1: SHOWING COMPARISON OF FETAL OUTCOME BETWEEN GROUP A AND GROUP B

VARIABLES		GROUP A (EXPOSED) N (%)	GROUP B (UNEXPOSED) N (%)	CHI SQUARE (df)	P- VALUE
LABOR	SPONTANEOUS	59(59%)	95(95%)	36.59(1)	0.000
	INDUCED	41(41%)	5(5%)		
BABY WEIGHT (Kg)		2.959±0.4814	3.001±0.4006		0.503
MODE OF DELIVERY	CAESAREAN SECTION	34(34%)	4(4%)	40.65(6)	0.000
	NVD	33(33%)	61(61%)		
	NVD WITH EPISIOTOMY	19(19%)	27(27%)		
	FORCEPS DELIVERY	1(1%)	2(2%)		
	BREECH VAGINAL DELIVERY	12(12%)	2(2%)		
	VACUUM VAGINAL DELIVERY	1(1%)	2(2%)		
APGAR SCORE IN 1 MINUTE	<7	25(25%)	23(23%)	0.11(1)	0.741
	>7	75(75%)	77(77%)		
APGAR SCORE AT 5 MINUTE	<7	14(14%)	11(11%)	0.41(1)	0.521
	>7	86(86%)	89(89%)		
NICU ADMISSION	YES	5(5%)	3(3%)	0.52(1)	0.47
	NO	95(95%)	97(97%)		

This difference was found to be statistically significant with a p-value of 0.000. Locatelli et al observed similar results where 50% of patients with oligohydramnios needed induction of labour[14]. Approximately 8-fold increase in the cesarean section rate was found in Group A(34% vs. 4%). The majority of cesarean sections were performed for fetal distress followed by failed induction. Banu R found similar results.[15] The difference in weight of the newborn babies in both groups was not statistically significant. It is in contrast to the results reported by Locatelli [16] who reported low birth weight of newborn babies of pregnancies complicated by oligohydramnios.

The difference in APGAR scores at 1 and 5 minutes in both groups was not statistically significant, while a study conducted by Karya J et al reported low APGAR scores in women with oligohydromnios[17]. 5% of our newborn babies went to NICU in Group A and 3% in Group B. It is very low in comparison to the statistics reported by Prajapati S et al [18] where NICU admission was needed for 19% of the newborn babies. No deaths were reported in either group. Similar results are reported by Rainford et al [19]. Zhang J et al conducted the largest multicenter randomized Routine Antenatal Diagnostic Imaging with Ultrasound (RADIUS trial). It reinforces that reduced liquor volume is not associated with a higher risk of poor perinatal outcomes. [20] However, a recent multicenter prospective study in low and middle-income countries revealed that oligohydramnios is associated with adverse maternal and fetal outcomes. [21]

The strengths of the study are that it was a prospective, comparative study and carried out in a large public, tertiary care hospital where patients from all socio-economic and demographic groups are managed. Limitations of the study include its relatively small sample size and being a single-center study.

CONCLUSION

Oligohydramnios in the absence of other risk factors is not associated with a higher risk of adverse perinatal outcome. The rate of cesarean section and induction of labor is increased in pregnancies complicated by oligohydramnios.

REFERENCES

1. Jennifer A Tamblyn and R Katie Morris. Aberrant liquor volume. In: David M. Luesley, Mark D. Kilby. Obstetrics and Gynaecology. An evidence based text for the MRCOG. 3rd Edition. Boca Raton, London, New York: CRC Press, 2016, 292—299.

2. Pekar-Zlotin M, Kugler N, Accart Z, Nimrodi M, Melcer Y, Cuckle H, Maymon R. Oligohydramnios: how severe is severe?. The Journal of Maternal-fetal & Neonatal Medicine: the Official Journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians. 2021 Feb 28:1-7.

3. Hughes DS, Magann EF, Whittington JR, Wendel MP, Sandlin AT, Ounpraseuth ST. Accuracy of the ultrasound estimate of the amniotic fluid volume (amniotic fluid index and single deepest pocket) to identify actual low, normal, and high amniotic fluid volumes as determined by quantile regression. Journal of Ultrasound in Medicine. 2020 Feb;39(2):373-8.

4. Magann EF, Whittington JR, Morrison JC, Chauhan SP. Amniotic fluid volume assessment: eight lessons learned. International Journal of Women's Health. 2021 Aug 14:773-9.

5. Amir F, Ara G, Basharat A, Amir S. Fetomaternal Outcome In Women With Oligohydramnios Induced With Misoprostol. J Ayub Med Coll Abbottabad. 2019 Jul-Sep;31(3):407-410. PMID: 31535516.

6. Pergialiotis V, Bellos I, Fanaki M, Antsaklis A, Loutradis D, Daskalakis G. The impact of residual oligohydramnios following preterm premature rupture of membranes on adverse pregnancy outcomes: a meta-analysis. American Journal of Obstetrics & Gynecology. 2020 Jun 1;222(6):628-30.

7. Azarkish F, Janghorban R, Bozorgzadeh S, Arzani A, Balouchi R, Didehvar M. The effect of maternal intravenous hydration on amniotic fluid index in oligohydramnios. BMC Research Notes. 2022 Mar 7;15(1):95.

8. Liu Y, Shi H, Yu X, Xiang T, Fang Y, Xie X, Pan X, Li X, Sun Z, Zhang B, Fu S. Risk factors associated with renal and urinary tract anomalies delineated by an ultrasound screening program in infants. Frontiers in Pediatrics. 2022 Jan 24;9:728548.

9. Thomson AJ, on behalf of the Royal College of Obstetricians and Gynaecologists. Care of Women Presenting with Suspected Preterm Prelabour Rupture of Membranes from 24+0 Weeks of Gestation. BJOG 2019;126:e152–166

10. Morris R, Meller C, Tamblyn J et al. Association and prediction of amniotic fluid management for adverse pregnancy outcome: systematic review and meta-analysis. BJOG2014;121:686—99.

11. Liabsuetrakul T, Meher S, WHO Intrapartum Care Algorithms Working Group, Ciabati L, De Oliveira LL, Souza R, Browne J, Rijken M, Fawcus S, Hofmeyr J, Liabsuetrakul T. Intrapartum care algorithms for liquor abnormalities: oligohydramnios, meconium, blood and purulent discharge. BJOG: An International Journal of Obstetrics & Gynaecology. 2022 Apr 12.

12. Siraj A, Baqai S, Naseer S, Raja A. The effect of uncomplicated oligohydramnios on perinatal outcome. Pak Armed Forces Med J 2016;66(3):333—36.

13. Iqbal I, Asghar S, Nisa K, Rashid F, Quredhi KK, Iqbal RR, Asghar S, Nisa K, Rashid F, Quredhi KK, Riaz R. Case-Control Study on Fetal Outcomes in Isolated Oligohydramnios in Third Trimester. Journal of Rawalpindi Medical College. 2022 Mar 31;26(1).

14. Locatelli A, Zaqarella L, Toso L, Assi F, Ghiddini A, Biffi A. Serial assessment of AFI in uncomplicated term pregnancies: Prognostic value of amniotic fluid reduction. J Maternal Foetal Neonatal Med 2004; 15:233—6.

15. Banu R. Fetal and maternal outcome in oligohydramnios pregnancy (37-40 weeks). International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2021 Feb 1;10(2):606.

16. Locatelli A, Vergani P, Toso L, Verderio M, Pezzullo JC, Ghidini A. Perinatal outcome associated with oligohydramnios in uncomplicated term pregnancies. Arch Gynecol Obstet 2004; 269:130—3.

17. Karia J, Ninama P, Pateliya P, Karnavat R. Foeto-maternal outcome in oligohydramnios. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2022 Feb 1;11(2):482-6.

18. Prajapati S, Johar S. Feto-maternal outcome of oligohydramnios in tertiary care hospital. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2021 Nov 1;10(11):4101-7.

19. Rainford M, Adair R, Scialli AR, Ghidini A, Spong CY, Amniotic fluid index in the uncomplicated term pregnancies. Prediction of the outcome. J Report Med 2001;46:589—92.

20. Zhang J, Troendle J, Meikle S, Klebanoff MA, Rayburn WF. Isolated oligohydramnios is not associated with adverse perinatal outcome. BJOG 2004;111:220—5.

21. Figueroa L, McClure EM, Swanson J, Nathan R, Garces AL, Moore JL, Krebs NF, Hambidge KM, Bauserman M, Lokangaka A, Tshefu A. Oligohydramnios: a prospective study of fetal, neonatal and maternal outcomes in low-middle income countries. Reproductive Health. 2020 Dec;17(1):1-7

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Akhtar Z: Concept, Study design, Discussion, Manuscript writing

Afridi F: Analysis, Interpretation

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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.

ORIGINAL ARTICLE

PERCEIVED STRESS AMONG MEDICAL STUDENTS IN SERBIA DURING THE COVID-19 PANDEMIC

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ABSTRACT

Objective: To determine the level of perceived stress of students of the Medical Faculty in Novi Sad during the second year of the COVID-19 pandemic.

Material and method: This online cross-sectional survey, including 523 medical faculty students was conducted in February 2022. The Perceived Stress Scale was used to assess the level of perceived stress. Descriptive and inferential statistics were calculated using SPSS v22.

Results: The average score of the Perceived Stress Scale was 20.43 (SD ± 7.39), which suggests that students at the Faculty of Medicine of the University of Novi Sad experienced moderate levels of perceived stress in the second year of the COVID-19 pandemic. Female students experienced higher levels of perceived stress compared to male students. No significant difference was observed among the study programs or the year of study.

Conclusion: During the second year of the COVID-19 pandemic, medical students showed a moderate degree of perceived stress, whereas female students were significantly more affected. These results indicate the need for further assessment and promotion of students' mental well-being.

Keywords: students; COVID-19 pandemic; perceived stress; medical faculty.

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INTRODUCTION

Stress is a global phenomenon of modern lifestyles that has been found to adversely affect health and student learning, as well as many other aspects of life and work, and is therefore recognized as one of the most important issues of the modern world. [1] Stress can be defined in various ways, either as a stimulus, a response, or a combination of both. [2] According to Selye's (1976) definition, stress is a non-specific bodily response to any form of demand, while Holms and Rahe consider stress as a stimulus in itself that causes discomfort, and when its limits exceed tolerance, it can lead to psychological and physical issues. [3, 4] Stress is also defined as a body's reaction to change which is a physical, mental, or emotional response, which if positive, encourages and motivates individuals to successfully finish tasks, or if negative, causes depression and reduces productivity. [5]

The definition of stress, as proposed by Lazarus and Folkman, pertains to a unique relationship between an individual and their surroundings that the person perceives as challenging or surpassing their abilities, ultimately putting their well-being at risk. [6] Despite the situations that can have a stressful effect on most people, Individuals interpret and assess their personal circumstances based on their own subjective standards, and respond to them in their own, unique way. [2] During the Covid-19 pandemic and quarantine, people faced many emotional and physical consequences of social distancing, which affected the human psyche to varying degrees. [7, 8] It has led to a significant global crisis due to its rapid spread and high morbidity and mortality. [9] The rapid increase in morbidity and mortality as a result of the COVID-19 pandemic has caused stress among the entire population as well as among students and may have unwanted effects on both, their psychological well-being and academic life. [10] Globally, higher education institutions have closed their teaching bases, in whole or in part, to limit the rapid spread of SARS-CoV-2 infection. Universities have been forced to replace live classes with online classes, causing major changes in teaching and learning.

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The pandemic has had a detrimental impact on the educational credibility of medical study programs, particularly in terms of clinical instruction, which is a crucial component of medical education. [11] In addition, many faculties emphasize the irreplaceable value of attending live classes, pointing out the importance of real-time feedback and feedback that develops in class, which is difficult to achieve through online platforms. [12] Despite the prompt institutional response to COVID-19, which pledges to furnish academic assistance to students with minimal disturbance, the rapid and sudden restructuring may serve as a trigger for students who are already experiencing high levels of academic stress. [11] The learning process of medical graduates can be negatively affected by stress, resulting in inadequate academic performance This can further result in feelings of distress, depression, and an array of psychological issues. [14] Available studies conducted before the pandemic suggest that medical school students are more susceptible to mental health issues than the general population, with academic stress being recognized as the primary predictor. [5, 10, 12]

This study was conducted to assess the perceived stress among medical students during the second year of the COVID-19 pandemic.

MATERIAL AND METHODS

This cross-sectional study was conducted in February 2022, at the Faculty of Medicine in Novi Sad, Serbia. The sample consisted of 523 medicine, pharmacy, dentistry, nursing, medical rehabilitation, and special education and rehabilitation students, aged 18 to 37. The information was gathered using an online survey, which was distributed via various social media platforms such as Facebook, Instagram, and WhatsApp. The questionnaire consisted of two parts: 1) Demographic data: gender, age, year of study, and study program; 2) Perceived Stress Scale (PSS-10), which was created by Cohen et al. (1983), is the most widely used open-access psychological instrument for evaluating an individual's perception of stress. [15] It consists of 10 questions and students' answers to each were ranked on a five-point Likert scale from 0 to 5. The score of the questionnaire ranged from 0 to 40, where a lower score indicated a lower degree of perceived stress. Psychometric testing of the PSS-10 in existing studies showed that the questionnaire has good internal consistency. Cronbach alpha (α) values ranged from 0.82 to 0.84. [16, 17] All data were collected anonymously and voluntarily, and every participant provided informed consent. The study was approved by the ethical committee of the Faculty of Medicine in Novi Sad (February 2022; nr. 01-39/143/1). The software used for statistical data processing was Statistical Package for Social Sciences (version 23)

RESULTS

Out of the total of 523 students, 86% were female, the remaining 14% were male students and the average age of the students was 21.5 years. Most of the respondents were in their third (25%), fourth (24%), and first year (23%) of studies. Among study programs, general medicine and pharmacy students were in the majority, making up around 55% of the respondents, as shown in Table 1.

The average score of the perceived stress scale was 20.43 (SD ±7.39), which indicates a moderate level of stress among students of the Faculty of Medicine in Novi Sad during the second year of the COVID-19 pandemic. The Cronbach α coefficient of the scale in our research was 0.84, indicating good internal consistency. The students reported feeling stressed out and being unable to control anger when things don't go according to plan more often than not. However, they didn't report struggling with being on top of things and their confidence in dealing with problems and irritations in their lives. Table 2 shows detailed insight into the scores of the questionnaire. By comparing the PSS-10 scores according to gender, we obtained a statistically significant difference in the female students' score results (ANOVA; $p=0.000$; $p<0.05$). However, by comparing the scores according to the study program and year of study, statistically significant results weren't obtained. Test and significance results are shown in Table 1.

DISCUSSION

The COVID-19 pandemic has, until now, had a substantial impact on everyday life, both due to the mandatory physical distancing and self-isolation of the sick, as well as due to the practice of mandatory usage of masks and epidemiological measures that are in force. These comprehensive public health measures and social and physical isolation contribute to feelings of distress and elevated levels of anxiety and stress. [18] The rapid increase in morbidity and mortality contributes to the increase in stress levels, increasing uncertainty about what the future brings. [19]

The majority of the respondents of our study were female medical students, which was the case with most of the available literature except two studies, conducted in Poland and China, where male students made up more than 50% of the sample. [11, 20, 24-26] In our study, the first, third, and fourth year of study students were present in the highest number.

The Perceived Stress Scale is an excellent instrument for evaluating the experience of unpredictability, burden, and lack of control over events in life, therefore shows excellent psychometric properties. [30] The mean score of 20.43 ±(SD=7.39) in our study defines moderate levels of perceived stress among medical students, which aligned with most available studies. [18, 20, 22, 25, 30] However, a study conducted in China by Zhang et al. reports high levels of perceived stress among their students, which

Table 1: Distribution of PSS-10 results according to sex, year of study, and study program

	N	Percentage %	PSS-10 X ± SD	Test and significance
Gender				
Male	74	85.85	17.2 ± 7.3	p=0.000 (p<0.05)
Female	449	14.115	20.9 ± 7.4	
Year of Study				
1	122	23.14	20.34 ± 7.45	p=0.118 (p>0.05)
2	90	17.40	21.71 ± 7.08	
3	130	24.86	19.35 ± 7.27	
4	125	23.90	21.28 ± 7.19	
5	36	6.88	18.97 ± 8.46	
6	20	3.82	19.60 ± 8.28	
Study program				
General Medicine	166	31.74	19.92 ± 7.67	p=0.105 (p>0.05)
Pharmacy	126	24.09	21.71 ± 6.96	
Stomatology	59	11.28	20.88 ± 7.37	
Nursing				
4th-Year program	74	14.15	19.57 ± 7.26	
3rd-Year program	10	1.91	23.00 ± 6.85	
Medical rehabilitation	36	6.88	19.80 ± 7.65	
Special education and rehabilitation	34	6.50	21.03 ± 7.84	
Masters in Nursing	13	2.49	18.46 ± 5.32	
Doctorate studies	5	0.96	13.20 ± 6.90	

Table 2: Distribution of PSS-10 scores of individual questions.

	M	SD
1. In the last month, how often have you been upset because of something that happened unexpectedly?	2.46	±1.17
2. In the last month, how often have you felt that you were unable to control the important things in your life?	2.21	±1.28
3. In the last month, how often have you felt nervous and stressed?	3.00	±0.92
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	1.37	±1.06
5. In the last month, how often have you felt that things were going your way?	1.61	±1.14
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	2.25	±1.25
7. In the last month, how often have you been able to control irritations in your life?	1.30	±1.15
8. In the last month, how often have you felt that you were on top of things?	1.43	±1.12
9. In the last month, how often have you been angered because of things that happened that were outside of your control??	2.67	±1.10
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	2.14	±1.28
Perceived Stress Scale Total Score X ± SD	20.4 ± 7.4	

can be explained by the fact that in this country ever since the beginning of the pandemic a complete lockdown has been in force. [28]

A study conducted among students in 9 countries, by Ochnik et al., states higher levels of perceived stress, in comparison with moderate levels of anxiety and depression among students of the same study. [21] Along with these results, this cross-national study points out that female students are at a significantly greater risk of perceived stress across most of the surveyed countries. A statistically significant higher level of perceived stress

among female students was observed in our study as well. Most of the studies consulted reported similar findings of a significantly higher level of perceived stress among female students, as well as another study conducted in our country in 2021, among the students at the University of Niš, by Kostić et al. [22, 23, 29]

Our respondents mentioned frequent feelings of nervousness, stress, and anger due to things they couldn't control in the last month. However, they emphasize that their problems do not accumulate so often and in such amounts that they're impossible to overcome. The feeling that things rarely and never go according to plan was mentioned by only 20% of students. The study by Awoke et al. reports similar results, except a more frequent feeling that things are not going according to students' plans. [30]

In terms of statistical significance according to the year of study, such wasn't found in our research, the students showed moderate levels of perceived stress across all study years. Meanwhile, research by Torun et al. reports a higher level of perceived stress among senior medical students. [23] These results are explained by the structure of the medical study program in Turkey, which consists of three years of theoretical teaching (preclinical phase) and three years of exclusively practical teaching (clinical phase). [23] Due to the structure of the study programs, medical students in Serbia are exposed to clinical settings and practical teaching from the first year of their studies, which explains the distribution of most perceived stress among 2nd year in our study.

Guo`s research on a sample of 852 students of the Faculty of Medicine found a significantly higher degree of stress in students in the third and fourth years. [18] Similar study results were published by Sheroun et al., conducted among 427 healthcare students in India, where despite the moderate level of stress of the examined students (PSS-10=21.8), significantly high levels of stress among students in the fourth, final year of study were highlighted. [27]

One of the limitations that could affect the results of the research is related to the ongoing examination period at the time of conducting the data. Stress could certainly be further increased due to this fact. An additional limitation refers to the fact that of the total number of regular students of the Faculty of Medicine, University of Novi Sad (4871), only 523 of them filled out the questionnaire, and in the general demographic data, we did not record variables such as marital status, work relationship, material status, social, etc.

CONCLUSION

In the second year of the COVID-19 pandemic, students enrolled in the Faculty of Medicine at the University of Novi Sad displayed a moderate level of perceived stress. The statistically significant difference found in the levels of stress according to gender indicates that female students are at a greater risk of perceived stress. The PSS-10 questionnaire has shown to be an excellent tool for quick and easy assessment of parameters necessary for the timely planning of prevention and alleviation of stress among students. Hence, further assessment of feelings and experiences, as well as adequate strategies to improve the psychological well-being of the students are essential.

REFERENCES

1. Abd El-Aziz Mohamed Madian A, Mahmoud Abdelaziz M, Abo Elsoud Ahmed H. Level of Stress and Coping Strategies among Nursing Students at Damanhour University, Egypt. Am J Nurs Res. 2019;7(5):684-96.
2. Papathanasiou IV, Tsaras K, Neroliatsiou A, Roupa A. Stress: Concepts, Theoretical Models and Nursing Interventions. Am J Nurs Sci. 2015;4(2):45.
3. Selye, H. The Stress of Life. New York: McGraw-Hill;1976.
4. Hamadi HY, Zakari NMA, Jibreel E, AL Nami FN, Smida JAS, Ben Haddad HH. Stress and Coping Strategies among Nursing Students in Clinical Practice during COVID-19. Nurs Rep. 2021;11:629–39.
5. Halboub E, Nasser Alhajj M, Mohammed AlKhairat A, Madani Sahaqi A, Faeq Ali Quadri M. Perceived Stress among Undergraduate Dental Students about Gender, Clinical Training and Academic Performance. Acta Stomatol Croat. 2018;52(1):37-45.
6. Lazarus, RS, Folkman, S. Stress, Appraisal, and Coping. Berlin/Heidelberg, Germany: Springer Publishing Company; 1984.
7. AlAteeq D, Aljhani S, AlEesa D. Perceived stress among students in virtual classrooms during the COVID-19 outbreak in KSA. J Taibah Univ Sci. 2020;15(5):398-403.
8. Usher K, Bhullar N, Jackson D. Life in the pandemic: Social isolation and mental health. J Clin Nurs. 2020;29(15-16):2756-7.
9. Oducado RMF, Estoque H. Online Learning in Nursing Education During the COVID-19 Pandemic: Stress, Satisfaction, and Academic Performance. J Nurs Pract. 2021;4(2):143-5.
10. Abdulghani HM, Sattar K, Ahmad T, Akram A. Association of COVID-19 Pandemic with undergraduate Medical Students' Perceived Stress and Coping. Psychol Res Behav Manag. 2020;13:871-81.
11. O'Byrne L, Gavin B, Adamis D, Lim YX, McNicholas F. Levels of stress in medical students due to COVID-19. J Med Ethics. 2021;47:383–8.
12. Ferrel MN, Ryan JJ. The Impact of COVID-19 on Medical Education. Cureus. 2020;12(3):7492.
13. Fitzgerald A, Konrad S. Transition in learning during COVID-19: Student nurse anxiety, stress, and resource support. Nurs Forum. 2021;56(2):298-304.
14. Chadalawada U, Matli P. Assessment of stress among medical college students of Government Siddhartha Medical College, Vijayawada, Andhra Pradesh, India. Int J Med Sci Public Health. 2016;5(6):1240.

15. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983;24(4):385–96.

16. Eskin M, Harlak H, Demirkıran F, Dereboy Ç. The adaptation of the perceived stress scale Into Turkish: a reliability and validity analysis. New/Yeni Symposium J. 2013;51(3):132-40.

17. Aslan H, Pekince H. Nursing students' views on the COVID-19 pandemic and their perceived stress levels. Perspect Psychiatr Care. 2021;57(2):695-701.

18. Guo AA, Crum MA, Fowler LA. Assessing the Psychological Impacts of COVID-19 in Undergraduate Medical Students. Int J Environ Res Public Health. 2021;18(6):2952.

19. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. Cureus. 2020;12(4):7541.

20. Armean K, Popescu C, Armean S, Covaliu B, Armean P, Buzoianu A. Perceived Stress, Burnout and Anxiety and Fear Related To Covid-19 in Romanian Medical Students – Experience from the State of Emergency in Romania. Acta Medica Transilvanica. 2021;26(2):5-10.

21. Ochnik D, Rogowska A, Kuśnierz C, Jakubiak M, Schütz A, Held M et al. Mental health prevalence and predictors among university students in nine countries during the COVID-19 pandemic: a cross-national study. Sci Rep. 2021;11(1):18644.

22. Kostić J, Žikić O, Đorđević V, Krivokapić Ž. Perceived stress among university students in south-east Serbia during the COVID-19 outbreak. Ann Gen Psychiatry. 2021;20(1).

23. Torun F, Torun SD. The psychological impact of the COVID-19 pandemic on medical students in Turkey. Pak J Med Sci. 2020;36(6):1355-9.

24. Yang C, Chen A, Chen Y. College students' stress and health in the COVID-19 pandemic: The role of academic workload, separation from school, and fears of contagion. PLOS ONE. 2021;16(2):0246676.

25. Rogowska AM, Kuśnierz C, Bokszczanin A. Examining Anxiety, Life Satisfaction, General Health, Stress and Coping Styles During COVID-19 Pandemic in Polish Sample of University Students. Psychol Res Behav Manag. 2020;13:797-811.

26. Wang X, Lu L, Wang X, Qu M, Yuan L, Gao Y, Pan B. Relationships Between Cross-Cultural Adaption, Perceived Stress and Psychological Health Among International Undergraduate Students from a Medical University During the COVID-19 Pandemic: A Moderated Mediation Model. Front Psychiatry. 2021;12.

27. Sheroun D, Wankhar DD, Devrani A, Lissamma PV, Gita S, Chatterjee K. A Study to Assess the Perceived Stress and Coping Strategies among B.Sc. Nursing Students of Selected Colleges in Pune during COVID-19 Pandemic Lockdown. Int J Health Sci. 2020;5(2):280-8.

28. Zheng Q, Lin X, He L, Freudenreich T, Liu T. Impact of the Perceived Mental Stress During the COVID-19 Pandemic on Medical Students' Loneliness Feelings and Future Career Choice: A Preliminary Survey Study. Front Psychiatry. 2021;12.

29. Aslam K, Zaidi S, Urooj M, Sethi A. Covid-19 pandemic: how stressed the students and faculty are?. J Med Sci. 2021;29(03).

30. Awoke M, Mamo G, Abdu S, Terefe B. Perceived Stress and Coping Strategies Among Undergraduate Health Science Students of Jimma University Amid the COVID-19 Outbreak: Online Cross-Sectional Survey. Front Psychol. 2021;12.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Gajić M:	Concept, Critical appraisal, and Discussion Writing
Mikić M:	Data collection, compilation of results, formatting of the article
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Stanić M:	Supervision, Critical appraisal

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.

ORIGINAL ARTICLE

PROGRESSION OF MYOPIA AMONG THE STUDENTS OF KHYBER MEDICAL COLLEGE, PESHAWAR

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ABSTRACT

Objectives: To assess the progression of myopia in the medical students of Khyber Medical College (KMC), Peshawar, Pakistan.

Materials and methods: This cross-sectional descriptive study was conducted at Khyber Medical College from May to June 2022. Data was collected after obtaining approval from the Ethical Board. Responses from 203 students were collected. An online questionnaire was designed using Google Forms and was shared through the official WhatsApp groups of all five years of KMC via a simple random sampling technique was used. The progression of myopia was estimated by analyzing the increase in the dioptre number among myopic students. Various factors such as screen time, study hours, and family history were also taken into account. The responses were recorded and analyzed using SPSS version 22 software.

Results: Out of the 203 collected samples, 59.61% of the students were myopic, and among those myopic students, 53.39% noticed an increase in their dioptre number after admission to medical college. Additionally, various factors such as screen time, study hours, and family history were also considered. 50.4% of the myopic students reported their screen time to be 4-6 hours. Similarly, 64.4% of the myopic students had 1-3 hours as their reading time. Moreover, 75.2% of the myopic students had a positive family history of myopia.

Conclusion: Myopia is highly prevalent among medical students at Khyber Medical College. The study revealed a significant number of myopic students experiencing progression of myopia after admission to medical college.

Keywords: Myopia, dioptre, screen time, study hours

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INTRODUCTION

Myopia, also known as nearsightedness, is a disorder of the eye in which the image is formed in front of the retina instead of forming on it. It is characterized by the elongation of the eyeball. The affected person is unable to see distant objects clearly. It is reaching epidemic proportions in East Asia. [1] Both environmental and genetic risk factors cause myopia. [2] Myopia is a significant public health problem and its prevalence is increasing over time. [3] This is linked to increasing educational pressures and changes in lifestyle which have reduced the time children spend outside and have bounded them to stay indoors[4]. It affects 36.5% population in Pakistan and 11.4% of blindness is reported due to uncorrected refractive errors. [5] Nearsightedness (myopia) causes blurry vision when one is looking at distant objects. [6] Most commonly, simple or school myopia starts manifesting between 7 to 10 years and is bilateral. The greater the degree of myopia, the greater the visual defect. In small degrees of error, symptoms of eye strain are present. In progressive myopia, there may be pseudo-proptosis with a large pupil. [7] For students, focusing on the white/blackboard during lectures may be difficult. Most of the time myopia goes unnoticed and people simply ignore its symptoms. Interventions to slow the progression of myopia in children include multifocal spectacles, contact lenses, and pharmaceutical agents. [6]

Medical students spend prolonged periods on reading and close-up work. [8] They usually have to do late-night studies and have increased screen time. So they are at a greater risk of developing myopia. On the examination of the medical students at the University of Gondar, Ethiopia, the prevalence of myopia was found to be 16.7%. [9] While in a study conducted among the medical students at Services Institute of Medical Sciences, Lahore, the prevalence of myopia was found to be 83.6% which is a significantly large number and it reflects that it is very common among the medical students of Pakistan. [10] A survey conducted at Fatima Jinnah Medical University showed 61.2% of the medical students to be myopic. [11] Information regarding the progression of myopia is rising but data regarding it is deficient. Timely actions must be taken to limit the impact of this public health menace, especially in this computer-dependent era. Primordial and primary prevention must be taken to prevent myopia progression among medical students. Thus, the objective of our study was to

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assess the progression of myopia in medical students at Khyber Medical College.

MATERIALS AND METHODS

A Cross-Sectional descriptive study was conducted among the medical students at Khyber Medical College in the months of May and June 2022 among 203 medical students of KMC. The sample size was calculated by using the formula $n=[z^2*p(1-p)]/d^2$ where $z=1.96$, $p=0.836$ (from the same study conducted by the students of SIMS, Lahore), and $d=0.05$. There were no exclusion criteria. [10] Data was collected after the approval by the Ethical Board dated 26/04/22. An online questionnaire, containing queries regarding students' demographic data, refractive errors, family history, screen time, and reading hours, was generated using Google Forms. The questionnaire was then shared with the official WhatsApp groups of all five years of the college. The form was made available for two weeks. Online responses were generated which were then analyzed using SPSS version 22 software. Progression of myopia was estimated by a reported increase in diopter number of students after admission to KMC. Similarly, screen time (the number of hours per day spent using laptops, mobiles, and televisions), study hours (hours spent on reading hard copies), and family history were also considered.

RESULTS

Out of the 203 samples that were collected, 121(59.61%) students were myopic (Table 1). 63 (53.39%) noticed an increase in their diopter number after admission to medical college due to long hours of reading and screen time (table 1) while 14 students (6.9%) developed myopia after their admission to medical college. Most of the students reported screen time ranging between 4-6 hours while the reading hours ranged from 1 to 3 hours. Moreover, 75.2% of the myopic students had a positive family history of myopia of the total 121 myopic students, 56 (46.3 %) had no progression in their diopter number while 65 (53.7 %) had progressive myopia. Most of the students had their dioptre numbers ranging from -0.25 to -1D (see Figure 1).

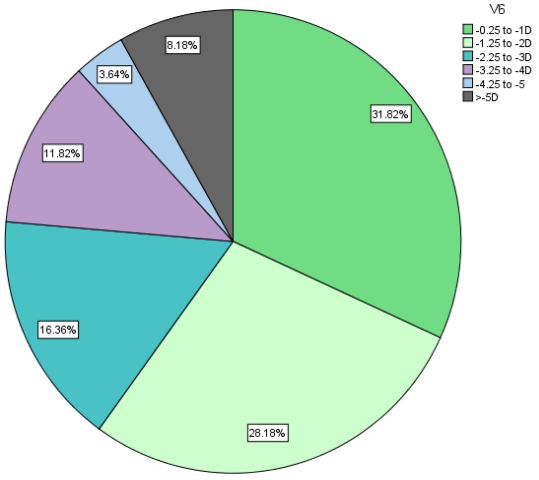

Fig 1: DISTRIBUTION OF DIOPTRE NUMBERS OF EYES IN MYOPIC STUDENTS

DISCUSSION

We selected medical students as our target population as they are prone to increased exposure to screens as well as long and exhausting hours of reading. The frequency of myopia calculated in our study is 121(59.6%). Our results were consistent with the research carried out in Saudi Arabia (53.5%). [12] Our study revealed a greater frequency of myopia than the medical students of Jazan University, Saudi Arabia which was 48.8%. [13] In contrast to our study, medical students in China showed a myopic percentage between 69.21%. [14] Moreover, according to research conducted at the Services Institute of Medical Sciences, Lahore, the occurrence of myopia among medical students came out to be 83.6% which is significantly greater than our findings. [10]

These variations in the frequency of myopia could be justified on the basis of different diagnostic criteria used, ethnicity variation, differences in lifestyle, and socioeconomic factors. The most probable reason is that these medical students spend less time outdoors. Research has identified a positive correlation between myopia and time spent outdoors. [15] Researchers have shown that the frequency of myopia reaches a high level during intense study periods like the ones experienced by medical students. [16] In our study, we observed that the majority of the students were spending more than 4 hours on electronic gadgets like smartphones, laptops, etc which is consistent with the study that suggests that 90% of digital device users experience digital eye strain. [17] In our study, 75% of the myopic students had a positive family history of myopia and previous reports have shown that myopic parents are more likely to have myopic children. While in a study the heritable parental myopia showed to be 66.57% for boys while 67.82% for girls. [18] This study is limited in terms of sample size, single-center, and limited to online survey design. Further, large-scale, multicenter cohort studies using objective instruments for diagnosing and quantifying myopia should be conducted to determine the true mag-

Table 1: Demographic information of myopic medical students

	GENDER		YEAR OF STUDY					FAMILY HISTORY		SCREEN TIME				READING HOURS		
	MALE	FEMALE	1st YR	2nd YR	3rd YR	4th YR	5th YR	PRESENT	ABSENT	3-1 hrs	6-4 hrs	10-7 hrs	>1 hrs	3-1 hrs	6-4 hrs	10-7 hrs
n	49	72	21	40	20	25	15	91	30	22	61	33	5	78	36	7
(%)	40.5	59.5	17.3	33.1	16.5	20.7	12.4	75.2	24.8	18.2	50.4	27.3	4.1	64.4	29.8	5.8

nitude of the problem.

CONCLUSION

A high frequency of myopia was found among medical students. The associated risk factors were increased use of electronic gadgets, especially smartphones, and laptops, and having a positive family history. Awareness programs regarding the prevention of myopia in medical students should be in place in all medical colleges upon college admission. Similarly, a healthy lifestyle like spending more time in outdoor activities should be encouraged.

REFERENCES

1. Baird PN, Saw SM, Lanca C, Guggenheim JA, Smith III EL, Zhou X, Matsui KO, Wu PC, Sankaridurg P, Chia A, Rosman M. Myopia. Nature reviews Disease primers. 2020 Dec 17;6(1):99.
2. Lashari MH, Ayub R, Akhtar MS, Ayaz M, Tasawar Z. Correlates of myopia in students of Bahauddin Zakariya University, Multan. JPMA. The Journal of the Pakistan Medical Association. 2017 Dec 1;67(12):1920-2.
3. Faiz-ur-Rab K, Saleem T, Ali M, Rao MH, Dareshani S, Akhter M. Prevalence of Myopia and its Associated Factors amongst Medical Students of Dow University of Health Sciences, Karachi .Ophthalmology Update. 2021 Apr 6;19(2):120-4.
4. Jan C, Li L, Keay L, Stafford RS, Congdon N, Morgan I. Prevention of myopia, China. Bulletin of the World Health Organization. 2020 Jun 6;98(6):435.
5. Hassan A, Ali S, Hassan H, Saeed S, Shahzad A. Burden of refractive errors in secondary school students, detected through visual screening. PJHMS. 2018 Jul 1;12:1208-0.
6. Walline JJ, Lindsley KB, Vedula SS, Cotter SA, Mutti DO, Ng SM, Twelker JD. Interventions to slow progression of myopia in children. Cochrane Database of Systematic Reviews. 2020(1).
7. Muhiddin HS, Mayasari AR, Umar BT, Sirajuddin J, Patellongi I, Islam IC, Ichsan AM. Choroidal Thickness in Correlation with Axial Length and Myopia Degree. Vision. 2022 Mar 2;6(1):16.
8. Salih AA. Prevalence and progression of refractive errors among El-Mustansiriyah medical students. EJMO. 2018;2:79-83.
9. Berhane MA, Demilew KZ, Assem AS. Myopia: An Increasing Problem for Medical Students at the University of Gondar. Clinical Ophthalmology. 2022 Jan 1:1529-39.
10. Malik MH, Mohydin M, Saeed A, Arif M, Malik MA, Mohydin S, Sami AM. Prevalence and Risk Factors of Myopia among Medical students. Pakistan Journal of Medical & Health Sciences. 2022 Mar 24;16(02):173-76.
11. KAYANI H, HIZB-UR-RAHMAN SA, JAVED M, JAHANGIR K. Prevalence of Myopia and Peripheral Retinal Degeneration in Medical Students of Fatima Jinnah Medical University. Journal of Fatima Jinnah Medical University. 2016;10(3).
12. Algorinees RM, Alqahtani NT, Aljarbou AM, AlShammari RS, Alrashidi AG. Prevalence of myopia and its related risk factors among medical students in Saudi Arabia. Adv Ophthalmol Vis Syst. 2017;6(1):00165.
13. Abuallut II, Alhulaibi AA, Alyamani AA, Almalki NM, Alrajhi AA, Alharbi AH, Mahfouz MS. Prevalence of refractive errors and its associated risk factors among medical students of Jazan University, Saudi Arabia: a cross-sectional study. Middle East African Journal of Ophthalmology. 2020 Oct;27(4):210.
14. Wang L, Du M, Yi H, Duan S, Guo W, Qin P, Hao Z, Sun J. Prevalence of and Factors Associated with Myopia in Inner Mongolia Medical Students in China, a cross-sectional study. BMC ophthalmology. 2017 Dec;17:1-7.
15. Singh NK, James RM, Yadav A, Kumar R, Asthana S, Labani S. Prevalence of myopia and associated risk factors in schoolchildren in North India. Optometry and Vision Science. 2019 Mar 1;96(3):200-5.
16. Al–Rashidi SH, Albahouth AA, Althwini WA, Alsohibani AA, Alnughaymishi AA, Alsaeed AA, Al-Rashidi FH, Almatrafi S. Prevalence refractive errors among Medical Students of Qassim University, Saudi Arabia: cross-sectional descriptive study. Open access Macedonian journal of medical sciences. 2018 May 5;6(5):940.
17. Coles-Brennan C, Sulley A, Young G. Management of digital eye strain. Clinical and experimental Optometry. 2019 Jan 1;102(1):18-29.
18. Shi H, Fu J, Liu X, Wang Y, Yong X, Jiang L, Ma S, Yin Z, Yao J, Yao X, Chen X. Influence of the interaction between parental myopia and poor eye habits when reading and writing and poor reading posture on prevalence of myopia in school students in Urumqi, China. BMC ophthalmology. 2021 Dec;21:1-9.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Usman A:	Concept, Critical appraisal, and Discussion Writing
Arif E:	Data collection, compilation of results, formatting of the article
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Alam A:	Manuscript Writing, Bibliography

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.

ORIGINAL ARTICLE

LEVONORGESTREL RELEASING INTRAUTERINE SYSTEM (MIRENA) FOR ABNORMAL UTERINE BLEEDING- A USEFUL TOOL IN THE COVID TIMES

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ABSTRACT

Objectives: To assess the effectiveness of the Levonorgestrel-releasing intrauterine system (LNG-IUS) in improving heavy menstrual bleeding (HMB) and evaluate satisfaction rates among women with heavy menstrual bleeding, treated with LNG–IUS.

Material and methods: This prospective observational study with a one-year follow-up included 73 women of reproductive age 20 – 50 years with complaints of heavy menstrual bleeding (HMB). They presented to the Gynae ward and the outpatient department (OPD) of Khyber Teaching Hospital, Peshawar, Pakistan. Patients with more than 3 cm fibroids, pelvic inflammatory disease, bleeding of unknown cause, and any known pelvic malignancy were excluded. LNG-IUS (Mirena) was inserted in OPD routinely and in Operation Theater under anesthesia where the cervix could not be dilated. Patients were followed up in OPD at one month, 3 months, six months, and one year. Improvement in symptoms, satisfaction level, and Hemoglobin (Hb) before and after the procedure was documented on a Proforma.

RESULTS: There was a progressive resolution in the amount of bleeding in patients followed at 1-month, 3-month, six months, and one year. The satisfaction rate was 92%. There was an improvement in Hb in 97% of patients. Only 04 out of 73 patients needed a hysterectomy.

CONCLUSION: Levonorgestrel-releasing intrauterine system (LNG-IUS) is an effective and tolerated treatment option for abnormal uterine bleeding. In the Covid times, it proved to be an effective first-line management of AUB. We recommend its use after careful selection of patients and also recommend a good counseling session before its use.

Keywords: Abnormal uterine bleeding, heavy menstrual bleeding, LNG – IUS.

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INTRODUCTION

As a team working in the Department of Obstetrics and Gynecology, we get a large number of patients of all ages with abnormal bleeding and their treatment ranges from medical to surgical depending on the severity of the problem. In the Covid times, there were continuous directives from the hospital administration to control elective admission and keep beds vacant for the Covid load. However, there was no decrease in the number of patients coming to the OPD for treatment of Abnormal Uterine Bleeding. This heavy and irregular bleeding harms the quality of life of a woman, affecting her physically and psychologically. [1] There is anemia with all its effects if this loss goes unchecked. [2]

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We need Mirena, the LNG – IUS to check this bleeding and avoid major surgery. However, large masses and extended pelvic pathology were dealt with through surgery like hysterectomy. Mirena is a device categorized as a long-acting reversible contraceptive, FDA-approved for the treatment of Abnormal Uterine Bleeding. [3] It contains the hormone levonorgestrel, which is released at a dose of 20 micrograms/ day to thin out the endometrial lining and stop the proliferation of the endometrium by estrogens. [4, 5] This not only affects the endometrium inside the uterine cavity but also elsewhere, hence adenomyosis and endometriosis are also affected. The fibroid is also a tumor responsive to estrogen and a small fibroid may also shrink on prolonged use of Mirena.

The procedure can be done as an outpatient, at any time of the cycle, and under anesthesia for those with a closed cervix or with previous surgeries. It is not contraindicated in previous cesarean sections or previous history of myomectomy. Its use decreases bleeding, pain, and suffering and over some time will lead to improvement of Hb, thus improving the quality of the patient's life. [6] With this mode of conservative treatment, hysterectomy is avoided. In a normal routine, 30% of hysterectomies are done due to abnormal uterine bleeding. [3] The objectives of this research are 1) to assess the effectiveness of the

Levonorgestrel-releasing intrauterine system (LNG-IUS) in improving heavy menstrual bleeding (HMB), and 2) to evaluate satisfaction rates among women with heavy menstrual bleeding, treated with Mirena (LNG– IUS),

MATERIAL AND METHODS

This prospective observational study was conducted in the Gynae "A" Unit of MTI Khyber Teaching Hospital for two years with effect from 01/07/2019 to 30/06/2021. The sampling technique was non-probability purposive sampling. seventy-three women of reproductive age 20 -45 years who presented to the Gynae outpatient department and OPD with abnormal menstrual bleeding, were included. Patients with fibroids larger than 3 cm, pelvic inflammatory disease, known pelvic malignancy, bleeding of unknown cause, poorly controlled diabetes, or cardiac disease were excluded. Before the start of the study, ethical approval was taken from the Hospital's ethical approval committee. Written informed consent was taken from the patients. After history taking, a pelvic examination to exclude infection and transvaginal ultrasound were done in all patients. Hemoglobin levels (Hb%) were done in all patients After careful selection, Mirena insertion was carried out by a consultant gynecologist or postgraduate resident (under supervision). It was carried out under aseptic conditions, routinely in OPD and a few in OT under anesthesia where the cervix could not be dilated, especially in those with previous multiple cesarian sections. Hysteroscopy and endometrial biopsy were done in 8 cases where ultrasound reported increased endometrial thickness or irregular growth of the endometrium.

Patients were followed up at one month, 3 months, 6 months, and 1 year either in person or through telephone. At every follow-up, improvement in HMB based on the patient's perception (patient-reported outcome) and satisfaction level (patient-reported outcome) were noted. Hb before and 6 months after the procedure was done. All the data were documented on a pre-designed Proforma. The data were analyzed in SPSS. Mean and standard deviation was calculated for quantitative variables like age, parity, and mean Hemoglobin levels. Frequency and percentage were calculated for categorical variables like improvement in symptoms, satisfaction level, and improvement in hemoglobin.

RESULTS

The total number of patients enrolled in this study was 73. The patients' age range was 25 – 50 years and the mean age was 35.5 (SD: +/_ 4.2) years. There was no loss to follow up. Those who could not come for a repeat Hb evaluation at 6 months were asked to get their Hb checked at a laboratory near their locality and communicate the result. The rest of the demographic details are given in Table 1. The types of uterine pathologies are listed in Table 2. There was a progressive decrease in the amount of bleeding and an increase in satisfaction rates, with a considerable positive impact seen after 6 months of use (Figure 1). In our study, 67 out of 73 (92%) patients were satisfied with the decrease in bleeding, by the end of one year. Hb improvement was registered in 71 (97%) patients by the end of one year. Mean Hb levels improved from 8.8g/dl to 10.5 g/dl. 4 out of 73 patients (5.47%) needed a hysterectomy due to non-improvement of symptoms. Two of these had expulsion of Mirena with heavy menstrual bleeding with clots. There was no uterine perforation or misplaced IUCD.

Table 1: Demographic details

	No. Of patients	Percentage
Age		
25 – 35 Years	2	2.7%
35 – 40 Years	43	59%
40 – 45 Years	21	28.7%
45 Years & Above	7	9.6%
Parity		
Nullipara	5	6.8%
1-3	15	20.5%
4-5	32	43.8%
>5	21	28.7%
No. of previous C sections		
None	47	64.3%
one	12	16.4%
two	8	10.9%
More than two	6	8.2%

Table 2: Distribution of Patients according to pathology

	No. Of patients	Percentage
Idiopathic HMB	33	45%
Fibroids (less than 3cm)	22	30%
Adenomyosis	15	21%
Simple endometrial hyperplasia	3	4%

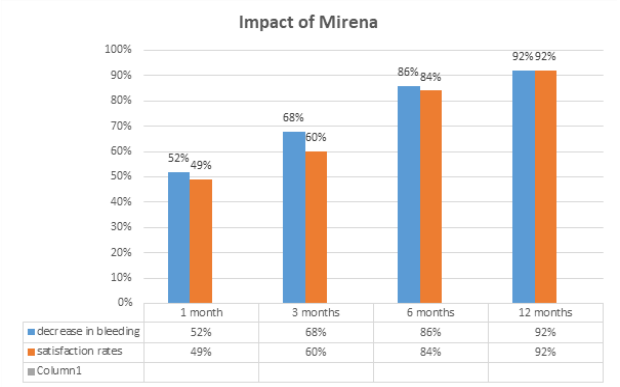

Fig 1: Effect of Mirena on the decrease in bleeding and satisfaction rates:

DISCUSSION

Abnormal uterine bleeding not only disturbs the patient psychologically but is often incapacitating, leads to anemia, and can severely affect the women's quality of life. Woman with menorrhagia (excess of 80 ml) shows iron deficiency and become anemic for which we used LNG – IUS. Cochrane database system review[7] has also discussed this in detail. Ninety-two percent of our patients were satisfied with a decrease in bleeding which was better than another study by Parag M. Hangeker et al. which reported overall satisfaction of 76%. [8]

A total of 4 out of 73 patients i.e., 5.47% needed a hysterectomy. Comparable results were reported by other studies. [9, 10] The age range as shown in the diagram is from 25 – 50 years of age with a mean age of 35.5 years in our patients. Other studies have shown use with good effectiveness and similar ranges. [11] Twenty-two out of 73 patients had small fibroids and Mirena was effective in 21 out of 22 patients. Other studies also report the successful use of Mirena in patients with myomas. [12, 13] Fifteen out of 73 of our patients had adenomyosis and were very satisfied with Mirena with good results. Other studies also discuss the use of Mirena in adenomyosis and one monitoring has been done by MRI. [14, 15] Although this study doesn't compare Mirena with other treatment options used for heavy menstrual bleeding, several studies have suggested that concerning heavy menstrual bleeding and improvement in quality of life, Mirena is better than oral progestogens and almost as good as endometrial ablative techniques. However, as compared to a hysterectomy, it is uncertain which treatment option is better. [16-20]

The strength of the study lies in the fact that it is the first study done in the COVID era evaluating the utility of Mirena at times when elective surgeries needed to be grossly curtailed. The limitations of the study include its small sample size, subjective methods of reporting outcomes (patient-reported outcomes/PRO), and being a non-randomized, single-center study. [21] More studies of larger magnitude and involving more centers are needed to get statistically significant results.

CONCLUSION

Mirena is an effective and well-tolerated treatment option for abnormal uterine bleeding. In the Covid times, it proved to be an effective first-line management of AUB. We recommend its use after carefully selecting patients and having a good counseling session before its use.

REFERENCES

1. Davies J, Kadir RA. Heavy menstrual bleeding: an update on management. Thromb. Res.. 2017 Mar 1;151:S70-7.
2. Mansour D, Hofmann A, Gemzell-Danielsson K. A review of clinical guidelines on the management of iron deficiency and iron-deficiency anemia in women with heavy menstrual bleeding. Adv Ther. 2021 Jan;38:201-25.
3. National Institute for Health and Care Excellence(NICE) Heavy menstrual bleeding: assessment and managementNG88.London:NICE;2018(Updated24May2021). Availablefrom:https://www.nice.org.uk/guidance/ng88
4. Anderson K. Odlind V. Rybo G. levonorgestrel-releasing and copper-releasing (Nova T) IUDs during five years of use: a randomized comparative trial. Contraception. 1994; 49 (1): 56-72.
5. Guttinger A. Critchley HQ. endometrial effects of intrauterine levonorgestrel. Contraception. 2007; 75:593-58.
6. Dhamangaonkar PC. Anuradha K. levonorgestrel intrauterine system (Mirena): an emerging tool for conservative treatment of abnormal uterine bleeding. J Midlife Health. 2015; 6(1): 26-30.
7. Lethaby A. Hussain M. Progesterone or progestogen–releasing intrauterine systems for heavy menstrual bleeding. Cochrane Database Syst Rev. 2015; (4); CD002126.
8. Hangekar PM, Mhaske G, ShekhawatG.Mirena: a novel alternative to hysterectomy. Int J Reprod Contracept Obstet Gynecol 2019;8:3005-8.
9. Vasudeva S. Malhotra G. Gulati SK. Chandel YS. Mirena and nuvaring in management in dysfunctional uterine bleeding. Int. J Conte Med Res. 2018; 5(4): D5-D9.
10. Ozdegirmenci O. Kayikcioglu F. Akgul MA. Kaplan M. Karcaaltincaba M. Haberal A, et al. Comparison of levonorgestrel intrauterine system versus hysterectomy on efficacy and quality of life in patients with adenomyosis. Fertil Steril 2011. 95:497-502.
11. Irvine GA. Campbell-Brown MB, Lumsden MA, Heikkila A. Walker JJ. Cameron IT. Randomized comparative trial of the levonorgestrel intrauterine system and norethisterone for treatment of idiopathic menorrhagia. Br J. Obstet Gynaecol. 1998; 105:592-8.
12. Aaole Bianchi, Surilvei Gao, Marwan Habiba; and Ginsepper Benagian. Utility of levonorgestrel-releasing intra-uterine system in the treatment of abnormal uterine bleeding and dysmenorrhea. A narrative review. J Clin. Med 2022, 11, 5836. https//doi.org/10.2290/jcm 11195836.
13. Grigorieva V, Chen-Mok M, Tarasova M, Mikhailov A. Use of a levonorgestrel-releasing intrauterine system to treat bleeding related to uterine leiomyomas. Fertil Steril. 2003 May;79(5):1194-8.
14. Bragheto AM, Caserta N, Bahamondes L, Petta CA. Effectiveness of the levonorgestrel-releasing intrauterine system in the treatment of adenomyosis diagnosed and monitored by magnetic resonance imaging. Contraception. 2007 Sep 1;76(3):195-9.
15. Cho S, Nam A, Kim H, Chay D, Park K, Cho DJ, Park Y, Lee B. Clinical effects of the levonorgestrel-releasing intrauterine device in patients with adenomyosis. Am J of Obstet Gynecol. 2008;198(4):373-e1.
16. Beelen P, van den Brink MJ, Herman MC, Geomini PM, Dekker JH, Duijnhoven RG, Mak N, van Meurs HS, Coppus SF, van der Steeg JW, Eising HP. Levonorgestrel-releasing intrauterine system versus endometrial ablation for heavy menstrual bleeding. Am J of Obst Gynecol. 2021 Feb 1;224(2):187-e1.

17. Loeven M, Brown E. Levonorgestrel-Releasing Intrauterine System for Reducing Heavy Menstrual Bleeding. Am Fam Physician. 2021 Aug 1;104(2):138-40.

18. Middleton LJ, Champaneria R, Daniels JP, Bhattacharya S, Cooper KG, Hilken NH, O'Donovan P, Gannon M, Gray R, Khan KS. Hysterectomy, endometrial destruction, and levonorgestrel-releasing intrauterine system (Mirena) for heavy menstrual bleeding: a systematic review and meta-analysis of data from individual patients. BMJ. 2010 Aug 16;341.

19. Ashraf MN, Habib-Ur-Rehman A, Shehzad Z, AlSharari SD, Murtaza G. Clinical efficacy of levonorgestrel and norethisterone for the treatment of chronic abnormal uterine bleeding. J Pak Med Assoc. 2017 Sep;67(9):1331-1338.

20. Bofill Rodriguez M, Dias S, Jordan V, Lethaby A, Lensen SF, Wise MR, Wilkinson J, Brown J, Farquhar C. Interventions for heavy menstrual bleeding; overview of Cochrane reviews and network meta-analysis. Cochrane Database Syst Rev. 2022 May 31;5(5): CD013180.

21. Magnay JL, O'Brien S, Gerlinger C, Seitz C. Pictorial methods to assess heavy menstrual bleeding in research and clinical practice: a systematic literature review. BMC Womens Health. 2020 Feb 10;20(1):24.

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Following authors have made substantial contributions to the manuscript as under

Naib JM: Data collection, conceptualization, writing, and overall supervision.

Afridi F: Literature search, Writting

Qadir M: Statistical analysis and bibliography.

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.

TRANEXAMIC ACID PLUS OXYTOCIN PROPHYLAXIS IN REDUCING BLOOD LOSS AND PREVENTING POSTPARTUM HEMORRHAGE DURING CESAREAN SECTION

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ABSTRACT

Objective: To find the efficacy of prophylactic tranexamic acid and Oxytocin in preventing postpartum hemorrhage during cesarean section as compared to uterotonic alone.

Materials and Methods: A randomized clinical trial that was single-center, double-blind placebo-controlled was conducted in the Department of Obstetrics and Gynaecology, Khyber Teaching Hospital, between 1st July 2021 to 31st December 2021. A total of 280 patients undergoing cesarean section were randomized to group A receiving tranexamic acid and uterotonic (oxytocin) and control group B having placebo and uterotonic(oxytocin) within three minutes of delivery of the baby. Blood loss after the cesarean section was calculated from blood volume and pre and post-operative hematocrit. The main outcome of the study was to establish the efficacy of tranexamic acid in decreasing the number of women with calculated estimated blood loss> 1000 ml. Secondary outcomes included differences in mean calculated blood loss, peripartum change in hematocrit, and postoperative blood transfusion in both groups. Data was analyzed by statistical package for social sciences(SPSS) version 23.0. Mean and standard deviation were calculated for numerical data and percentages, and frequencies for categorical variables. To see the effects of modifiers, post stratified t-test was used. P-value <0.05 was considered statistically significant.

Results: Both the groups were comparable for maternal age (28.4±4.5, 28.8±4.9) gestational age (37.71±1.61, 37.70±1.56), and parity (1.79±1.5, 2±1.6). Tranexamic acid significantly reduced the number of women with estimated calculated blood loss of > 1000 ml in group A to 10%(n=14) as compared to 18.6%(n=26) in group B (p-value<0.005). Secondary outcomes like mean calculated blood loss and postoperative blood transfusion were statistically insignificant between the two groups.

Conclusion: Pregnant women who received prophylactic uterotonic agents and tranexamic acid treatment within three minutes of cesarean delivery, resulted in a lesser number of women with calculated estimated blood loss > 1000 ml than placebo.

Key Words: Primary postpartum hemorrhage, Tranexamic acid, Cesarean section, Blood loss.

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INTRODUCTION

Primary post-partum hemorrhage remains the leading cause of maternal mortality and morbidity. Despite improvements in antenatal and obstetric care. It has traditionally been defined as blood loss of > 500ml after vaginal delivery and > 1000ml during cesarean delivery of the baby. [1, 2] As per the World Health Organization 2012 report, nearly 100000 mothers die every year because of PPH and 99% of these deaths occur in middle, low-income countries. In Pakistan, the prevalence of PPH is 34% leading to considerable morbidity and mortality of parturient mothers. [3]

The practice of cesarean delivery is increasing day by day with rates rising to 25-30%.[4]Globally, studies have shown that blood loss during vaginal delivery is considerably lesser as compared to cesarean section. [5] French studies showed that cesarean deliveries were associated with > 1000 mL blood loss in 11.6% of cases. [6]

World Health Organization (WHO) recommends prophylactic uterotonics such as oxytocin to prevent PPH. But PPH is unpredictable and the majority of the cases occur in the absence of risk factors.Uterotonic(oxytocin) alone might not effectively prevent PPH, secondary to other causes. [7]

Following the results from the World Maternal Antifibrinolytic Trial (WOMAN Trial) which established the

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therapeutic efficacy of tranexamic acid in reducing bleeding-related mortality in parturient mothers, the WHO has recommended the use of Tranexamic Acid (TXA) for the treatment of PPH. [5]

An antifibrinolytic drug, tranexamic acid acts on plasminogen molecules by blocking their lysine binding sites. After the delivery of the baby, tranexamic acid arrests bleeding by stopping the fibrinolytic system that is activated during placental separation.[6,7] During placental delivery fibrinolytic system is activated, and the effect persists for 6-10 hours postnatally, causing more bleeding that can be dealt with effectively by administering tranexamic acid. TXA not only reduces postpartum blood loss but also the need for blood transfusion and anemia.[8] The Royal College of Obstetricians and Gynaecologists currently recommends considering the use of prophylactic TXA only in women at high risk for PPH undergoing cesarean section (CS). [9] However, there is limited evidence for definitive recommendations of prophylactic TXA use in women of all risk profiles undergoing cesarean section. [10] Further high-quality randomized trials are required to confirm the safety and efficacy of TXA in preventing PPH in all women undergoing cesarean section.

Our study aim was to evaluate the effectiveness of prophylactic tranexamic acid administration along with conventional oxytocin in reducing calculated blood loss during cesarean section. Locally no such randomized clinical trial, using a validated method for measuring postpartum blood loss has been conducted. We hypothesize that tranexamic acid could be used in conjunction with traditional uterotonic drugs for preventing PPH in women undergoing cesarean delivery. Our study will help in yielding local data on the prophylactic efficacy of tranexamic acid in reducing postpartum blood loss & update the current guidelines on preventing PPH.

MATERIALS AND METHODS

A randomized control clinical trial was conducted in the Department of Obstetrics and Gynecology, Khyber teaching hospital between 1st July 2021-31 December 2021, after getting approval from the research & ethical review board (814/DME/KMC). A total of 405 patients were enrolled by the non-probability consecutive sampling method. The sample size was calculated using WHO sample size calculator version 2.0 taking 28.0 ± 5.53 mL blood loss in the tranexamic acid group vs. 37.12±8.97ml in the control group, along with a 95% confidence level of significance with 90% power of the test. [13] Pregnant women undergoing elective and emergency cesarean section were screened for eligibility by a research assistant who received training from the lead investigator before the start of the study. Study participants were informed that they could withdraw voluntarily from the trial at any time.

Predesigned proformas were filled out for each patient after taking informed written consent before and after the operation. The proforma included information on age, parity, weight, period of gestation, and an indication of elective and emergency cesarean section. Prenatal and post-natal hemoglobin and hematocrit were also recorded. Women having severe medical disorders, thrombocytopenia, anemia, allergy to tranexamic acid, history of venous thromboembolism, placenta-previa, abruption, and severe pre-eclampsia, failed operative vaginal delivery, retained the second twin were excluded from the study. Eligible patients, who consented were randomly allocated into two groups of 140 each by lottery method. Study group A(n=140) received 1 gm tranexamic acid (available at hospital pharmacy free of cost) intravenously within three minutes of delivery of the baby along with routine 10 IU intravenous oxytocin and control group B(n=140) received routine intravenous 10 IU oxytocin and placebo(10ml normal saline intravenously). The nurse practitioner supervised the randomization process. The anesthetist was instructed to administer oxytocin and tranexamic acid or normal saline/placebo depending on group allocation, followed by two hours of oxytocin infusion as per WHO protocol. Neither the lead investigator and operating obstetrician nor the patient knew about the group allocation. Post-operatively women were transferred from the operating theatre to the post-anesthesia recovery unit where the parturient mothers stayed for one hour before shifting to the postnatal chamber. Preoperative hematocrit was the hematocrit measured within ≤ seven days before delivery. Hematocrit obtained by venous blood sampling on postpartum day 2 was labeled as postoperative hematocrit. Any potential side effects of TXA were recorded during the patient's stay in the hospital's post-natal ward.

The main outcome of the study was to find the percentage of the patient in the study and placebo group with a calculated blood loss <1000ml using a validated formula. The imprecision of blood loss estimation during cesarean deliveries using a gravimetric method like pre-weighed pads, suction container volume, and visual estimation, lead us to search for some other validated methods to calculate blood loss. The amount of blood loss in milliliters was calculated by the formula used in a French trial, as calculated estimated blood loss = estimated blood volume × (preoperative hematocrit–postoperative hematocrit/ preoperative hematocrit (where estimated blood volume (mL) = weight (kg) × 85). [14] Secondary outcomes included peripartum change in hematocrit, mean calculated blood loss & postoperative blood transfusion in both groups. Data was analyzed by statistical package for social sciences (SPSS) version-23. Frequencies and percentages were calculated for categorical variables, and mean and standard deviation were calculated for numerical data. To see the effects of modifiers, post stratified t-test was used. P-value <0.05 was considered statistically significant.

RESULTS

Subject characteristics were similar in both groups (statistically insignificant differences between the two groups). The mean age was 28.4±4.5 in Group A and 28.8±4.9 in Group B. Mean parity and gestational age were 1.79±1.5 & 37.71±1.61 respectively in Group A. While group B showed mean parity of 2±1.6 and gestational age of 37.70±1.56.). Tranexamic acid significantly reduced the number of women with estimated calculated blood loss of > 1000 ml in group A(10%) as compared to 18.6%(n=26) in group B (p-value<0.005). Blood transfusion on Day 2 was seen in 14 patients in tranexamic acid group A as compared to 20 patients in placebo group B. Mean Calculated estimated blood loss in Tranexamic group A was 626.8±472 ml and 699±489 ml in placebo group B with a mean difference of 73 ml. Peripartum change in hematocrit was statistically insignificant.

DISCUSSION

Globally, cesarean section rates are soaring day by day ranging from 25-40%. [2] Obstetric hemorrhage is one of the most commonly occurring complications with significant maternal mortality and morbidity. [3, 4]

The WOMAN trial endorsed the effective role of TXA in treating PPH, during vaginal delivery & cesarean section [5, 6, 11]. Sixteen randomized trials have shown decreased blood loss in pregnant women who receive prophylactic tranexamic acid, during elective cesarean section, excluding emergency cesarean where blood loss is significantly higher. [12, 13, 14]

Our study showed that 10% of patients in the study group had postpartum blood loss of >1000ml as compared to 18.6% in the control group. These results are somewhat comparable to RCT in Karachi which showed a 10% incidence of postpartum hemorrhage in the study group as compared to 33% in the control group, despite of the difference in trial methodology. [15] A descriptive study in Peshawar endorsed the prophylactic efficacy of TXA

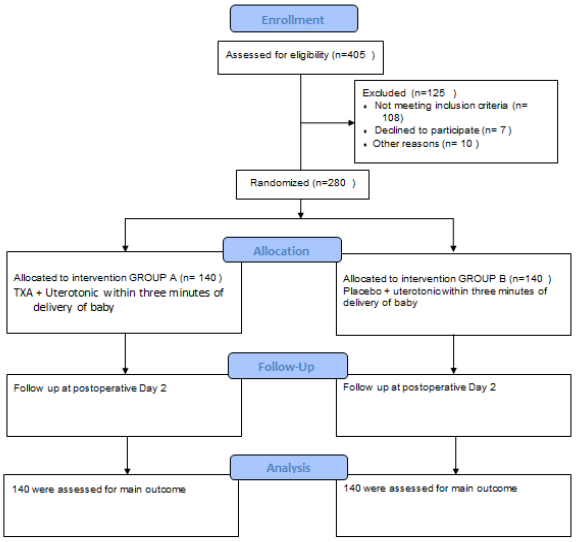

Fig 1: Randomization &Treatment: CONSORT Flow Diagram

Table 1: Baseline characteristics of patients(N=280)

Patient Characteristics	Group A (N=140)	Group B (N=140)	P-value
Mean Age±SD	28.4±4.5	28.8±4.9	0.510
Mean Parity±SD	1.79±1.5	2±1.6	0.168
Mean Gestational age in weeks±SD	37.71±1.61	37.70±1.56	0.941
Mean Weight±SD	78.9±11	78.7±13	0.913
Type of caesarean section			
Emergency	60	65	
Elective	**80**	75	

Table 2 Clinical Outcomes of Trial

Clinical Outcomes	Group A (N=140)	Group B (N=140)	P-value
Main Outcome			
PPH=No Of Patients/Total number Calculated Blood Loss>1000ml	14(10%)	26(18.6%)	0.040
Secondary Outcomes			
Mean Calculated blood loss in ml±SD	626.8±472	699±489	0.210
Mean peripartum change in hematocrit±SD	3.30±2.64	3.38±2.68	0.802
Additional Uterotonics for excessive bleeding--no/total no.(%)	3(2%)	7(5%)	0.198
Blood transfusion by day 2	14(10%)	20(14%)	0.272

during cesarean section for breech presentation, but the study design and gravimetric method of blood loss calculation differed significantly from our study. [16] A Turkish RCT also endorsed our study results by showing that 2.1% of patients in TXA had postpartum blood loss >1000ml as compared to 5.8% in the placebo group. [17]

It is important to ascertain the methodology used in different trials for assessing postpartum blood loss during & after cesarean section.[17,18]. Gravimetric methods like suction container volume or weighted pads for measuring postpartum blood loss are imprecise and prone to subjective bias. [20-22]

To circumvent such methodological flaws, we used a validated formula used in the French trial, for assessing blood loss. The reduction in the proportion of patients having blood loss of>1000ml in the study versus the control group in the TRAAP-2 trial(26.7% vs. 31.5%) is somewhat comparable to our study(10% vs. 18.6%) despite our small sample size. Both studies showed a reduced need for additional uterotonic drugs and blood transfusion in the study versus the control group. [18]

In contrast to our study, a mean difference of 141.6 ml between the study and control group was published in the meta-analysis by Wang et al. [19] Two Iranian studies showed a significant difference (132.7ml) in mean blood loss between tranexamic and control groups but used gravimetric methods to calculate blood loss. [20] Similar to these studies, our trial showed that the mean estimated calculated blood loss was 626.8±472 ml in tranexamic acid group A as compared to 699±489ml in placebo or control group B, with a mean difference of 73 ml. Although our mean difference in blood loss between the two groups is not statistically significant as reported in other studies possibly because of methodological differences (timing and dosage of TXA, type of cesarean section) and sample size variation. Nevertheless, the proportion of women undergoing cesarean delivery with calculated blood loss of more than 1000 ml, the need for blood transfusion, and supplementary uterotonic drugs are more or less comparable to the TRAAP-2 trial, employing a similar trial methodology.

The strength of our study is that it was a randomized clinical trial using a validated method to calculate postpartum blood loss. Our trial will contribute to the growing body of research suggesting the use of tranexamic acid along with time-tested uterotonic agents immediately after childbirth to prevent postpartum hemorrhage. Several limitations of the study need to be acknowledged which include the exclusion of anemic and high-risk obstetric women and the inclusion of emergency cesarean section in the trial. Extrapolation from single-center & small sample-sized studies would be possible only if multi-center and larger sample-size-driven studies are planned and executed across the globe for unified consensus and recommendation.

CONCLUSIONS

Prophylactic TXA & oxytocin should be considered in women undergoing cesarean section to reduce blood loss. Further studies are required to validate the role of TXA in women at high risk of PPH. Ideal dosing and timing of TXA administration, its cost-effectiveness, and adverse effect profile remain important associations to be explored in the future.

REFERENCES

1. Say L, Chou D, Gemmill A, Tuncalp O, Moller AB, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. Lancet Glob Health. 2014;2(6):e323–33.
2. WHO Recommendations for the Prevention and Treatment of Postpartum Haemorrhage. WHO guidelines approved by the guidelines review committee. Geneva: World Health Organization; 2012.
3. Shakur H, Roberts I, Bautista R, Caballero J, Coats T, et al. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patient with significant hemorrhage (CRASH-2): a randomized, placebo-controlled trial. Lancet. 2010;376:23–32
4. Afridi, F., Zubaida Akhtar, Ayesha Afridi, Qudsia Qazi, & Jamila M Naib. (2022). determining the indications of c-section based on WHO Robson classification—an experience in a tertiary care hospital in Peshawar. Journal of Medical Sciences, 30(02)
5. WHO Recommendation on Tranexamic Acid for the Treatment of Postpartum Haemorrhage. WHO guidelines approved by the guidelines review committee. Geneva 2017.
6. Sentilhes L, Merlot B, Madar H, Brun S, Sztark F, Deneux-Tharaux C. Postpartum hemorrhage: prevention and treatment. Expert Rev Hematol. 2016;9:1043–1061. DOI: 10.1080/17474086.2016.1245135.
7. Misme H, Dupont C, Cortet M, Rudigoz RC, Huissoud C. Distribution of blood loss during vaginal delivery and cesarean section. J Gynecol Obstet Biol Reprod. 2016;45:71–79. DOI: 10.1016/j.jgyn.2015.01.004
8. Ker K, Edwards P, Perel P, Shakur H, Roberts I. Effect of tranexamic acid on surgical bleeding: a systematic review and cumulative meta-analysis. BMJ. 2012;344:e3054.
9. Sentilhes L, Lasocki S, Ducloy-Bouthors AS, Deruelle P, Perrotin F, Goffinet F, et al. Tranexamic acid for the prevention and treatment of post-partum hemorrhage. Brit J Anaesth. 2015;114:576–587. doi: 10.1093/bja/aeu448.
10. Alam A, Choi S. Prophylactic use of tranexamic acid for postpartum bleeding outcomes: a systematic review and meta-analysis of randomized controlled trials. Transfus Med Rev. 2015;29(4):231–41
11. WOMAN Trial Collaborators. Effect of early tranexamic acid administration on mortality, hysterectomy, and other co-morbidities in women with post-partum hemorrhage (WOMAN): an international, randomized, double-blind, placebo-controlled trial. Lancet 2017;389:2105-16.

12. Xu J, Gao W, Ju Y. Tranexamic acid for the prevention of postpartum hemorrhage after cesarean section: a double-blind randomization trial. Arch Gynecol Obstet. 2013;287:463–468. DOI: 10.1007/s00404-012-2593-y.

13. Sekhawat L, Tabtabai A, Dalili M, Farajakhoda T, Tafti DA.Efficacy of tranexamic acid in reducing blood loss after cesarean section.Journal of Maternal-Fetal and neonatal medicine,January2009;22(1):72-75

14. Sentilhes L, Winer N, Azria E, Sénat MV, Le Ray C, Vardon D, for the Groupe de Recherche en Obstétrique et Gynécologie (GROG) et al. Tranexamic acid for the prevention of blood loss after vaginal delivery. N Engl J Med. 2018;379:731–742.

15. Afshan Shahid and Ayesha Khan.Tranexamic Acid in Decreasing Blood Loss During and after Caesarean Section. Journal of the College of Physicians and Surgeons Pakistan 2013, Vol. 23 (7): 459-462

16. Bibi S, Syed W, Khan AA. Efficacy of Tranexamic Acid in Reducing the Blood Loss During Cesarean Section in Primigravida Patients with Breech Presentation. Journal of Gandhara Medical and Dental Science. 2022 Apr 6;9(2):3-7.

17. Kemal Gungorduk, Gokhan Yıldırım, Osman Asıcıoğlu, Ozgu Celıkkol Gungorduk, Sinem Sudolmus, Cemal Ark. Efficacy of Intravenous Tranexamic Acid in Reducing Blood Loss after Elective Cesarean Section: A Prospective, Randomized, Double-Blind, Placebo-Controlled Study. Am J Perinatol 2011; 28(3): 233-240DOI: 10.1055/s-0030-1268238

18. L.Sentilhes et al.Tranexamic Acid for the Prevention of Blood Loss after Cesarean Delivery. N Engl J Med 2021; 384:1623-1634

19. Yongjun Wang, Siyuan Liu, Li He. Prophylactic use of tranexamic acid reduces blood loss and transfusion requirements in patients undergoing cesarean section: A meta-analysis. J Obstet Gynaecol Res. 2019 Aug;45(8):1562-1575.

20. Naeiji Z, Delshadiyan N, Saleh S, Moridi A, Rahmati N, Fathi M.Prophylactic use of tranexamic acid for decreasing the blood loss in elective cesarean section: A placebo-controlled randomized clinical trial. J Gynecol Obstet Hum Reprod. 2021 Jan;50(1):101973.

21. Urooj H, Shah M, Bukhari B, Rahim R. Comparison of the therapeutic effectiveness of oxytocin versus oxytocin plus tranexamic acid in the prevention of post-partum hemorrhage. journal of postgraduate medical institute. 2021 Jun 30;35(2):80-4.

22. Bibi S, Syed W, Khan AA. Efficacy of Tranexamic Acid in Reducing the Blood Loss During Cesarean Section in Primigravida Patients with Breech Presentation. Journal of Gandhara Medical and Dental Science. 2022 Apr 6;9(2):3-7.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Bangash AG: Concept, Critical appraisal, and Discussion Writing

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

Akhtar Z: Data Collection, Manuscript writing

Naz T: Manuscript Writing, Bibliography

Naib JM: Supervision, Critical appraisal

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.

ORIGINAL ARTICLE

PERCEPTION OF MEDICAL STUDENTS OF THEIR KNOWLEDGE ABOUT BIOSTATISTICS AND EPIDEMIOLOGY AND THE IMPACT OF PARTICIPATORY TEACHING METHODS

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ABSTRACT

Objective: Our study aimed to assess the perception of medical students about their knowledge of biostatistics and epidemiology before and after applying participatory teaching methods for teaching these topics.

Materials and methods: It was a correlational study conducted at Khyber Girls Medical College Peshawar, with a sample size of two hundred and ten. Using a simple random sampling technique, the students of fourth year M.B.B.S were taught the course Epidemiology and Biostatistics. The methodologies included a participatory teaching method, using a two-step approach. The first step aimed to make the students understand the basic concepts of Epidemiology and Biostatistics, with hands-on activity on how to use different websites to interpret the information. The second step involved database analysis with the production of a scientific report. In the end, a nine-item pre-validated questionnaire was used to check the difference of perception among the students, before and after the activities.

Results: A significant improvement in student's perception of their knowledge related to the taught subjects was found in certain areas which included the importance, usefulness, and basic concepts of Epidemiology and Biostatistics. The remaining items of the questionnaire didn't show any significant difference.

Conclusion: Participatory teaching had a strong impact on students' perception of understanding Epidemiology and Biostatistics.

Keywords: participatory teaching methods, biostatistics, Epidemiology

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INTRODUCTION

Epidemiology and Biostatistics are considered to be the pillars of medical research. Clinical reasoning and decision-making have to be justified with evidence-based research. Yet the most challenging part for the educationists and researchers is to make the undergraduate students acquire the required skills in these subjects. [1]

There are two schools of thoughts related to the teaching strategies for these important topics. Some educationists think that the teaching should be focused on concepts, while others have emphasized the importance of acquiring the skills of calculations and analysis with an in-depth understanding of the key concepts.

A few studies have shown that graduates of medical schools realize that statistics is an important subject, yet they find it very difficult rather they hardly understand the terminologies and interpretation of the statistical methods applied in various studies. [2] Because of the complicated nature of the subject and lack of proper training and teaching of Biostatistics, students use inappropriate methods to analyze the results. This affects the quality of the research studies that they conduct later on in their professional life. Insufficient knowledge of the subject also leads to erroneous calculation of the sample size, creating bias in the study. [3]

The focus of teaching biostatistics has changed from the cognitive domain to the affective and psychomotor domains. In other words, the approach to teaching these components should be multidimensional rather than involving only a single domain. [4]

Studies have shown the importance of students' attitudes toward the subject of biostatistics and how it affects their learning outcomes. Results of a meta-analysis

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showed that students at a medical school tend to show a positive attitude towards biostatistics if taught appropriately. At the same time, many studies have shown a change of attitude, and interest in research after finishing the courses. It can be inferred that the mathematical skill along with the student's attitude towards the subject affects the performance in biostatistics. [5]

Another exploratory study with focus group discussions showed that students expressed their need to learn about the subject during the early years of their degree program. According to the students, they lack confidence in the field of research and Biostatistics because of insufficient training in the respective fields. [6, 7]

Most of the students considered that the teaching strategies applied to learn the basic concepts should be small group discussions so that there is more interaction between student and teacher. Free access to full-text articles should be available along with the virtual environments. A lot of importance was given to the methodologies allowing the content into practice. [8]

With rapidly evolving teaching strategies, it has become inevitable to consider research beyond theoretical reflections. The pedagogical design should focus more on explaining the virtual methodologies. The use of technological tools and learning the methods to use them efficiently is the need of the day. The focus should not only be on the technologies, rather it should involve face-to-face activities along with virtual/distant learning techniques. [9]

Our study has focused on the teaching experience of Epidemiology and Biostatistics, which involved participatory teaching methodologies incorporating technological tools.

The objective of our study was to see the perception of medical students about their knowledge of biostatistics and epidemiology and observe the impact of participatory teaching methods for teaching these topics.

MATERIALS AND METHODS

It was a correlational study conducted at Khyber Girls Medical College Peshawar, with a sample size of two hundred and ten. Using a simple random sampling technique, the students of fourth year M.B.B.S were taught the course Epidemiology and Biostatistics. After getting ethical approval from the IREB Committee of Khyber Girls Medical College Peshawar, informed consent was taken from the students with the guarantee of anonymity.

The methodologies included a participatory teaching methodology, using a two-step approach. The first step aimed to make the students understand the basic concepts of Epidemiology and Biostatistics, with hands-on activity on how to use different websites to interpret the information. The second step involved database analysis with the production of a scientific report.

During this study, the students were asked to bring their laptops. Initially, a few introductory classes were taken by the faculty of the Community Medicine Department Khyber Girls Medical College. Then there were hands-on training sessions in which the students were divided into small groups comprising three to four students in each group. They were taught to apply different statistical analysis tests used in medical studies. The students also learned to critically interpret the results of different studies. By completing these two practical activities, the most important aspects of the course were carried out.

A nine-item pre-validated questionnaire was used to check the difference of perception among the students, before and after the activities. The questionnaire focused mainly on content related to statistics and epidemiology. The perception of the students about the course and their skills related to the knowledge application was checked by the experts. It was filled by the students voluntarily at the beginning fifteen minutes of the classes on two occasions, followed by on the day of the practical activities which was six months after the beginning of the course, and finally on the last day of this same course, about sixteen weeks later.

The questionnaire consisted of nine items with a rating scale of 1 to 4, 1 being "strongly disagree" to 4 "strongly agree". The first four items gathered information related to the usefulness ad importance of the course, the rest of the five items were related to the activities of the students covering the objectives of the course. By the end of the study session, the students appeared in two class tests, comprising of the taught theoretical content and its applications with forty MCQs and five SEQs with a weightage of forty percent MCQs and sixty percent SEQs. The correlation between this theoretical exam and previously conducted practical activities was studied. Eight students were excluded from the analysis as they did not appear in the test exams.

Frequencies were expressed as absolute numbers and percentages. Mean and standard deviation was calculated for the rating scale. For comparison of scores, the Student's t-test was calculated. For independent sample analysis of variance homogeneity, the Levene test was used. To find the correlation between the results of theory exams and hands-on activities, the arithmetic means of the two written exams and the grades in practical exams were calculated. The normality of the grade distribution was checked by the Kolmogorov-Smirnov test, and Pearson correlation was performed to check the correlation analysis. P values of less than 0.05 were considered to be significant.

RESULTS

Perception results In total, out of 210 students, one hundred and ninety-five students participated vol-

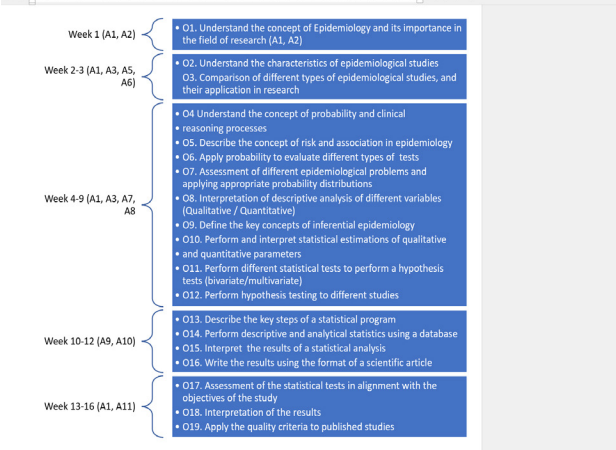

Fig 1: Multi-drug resistance of E. Coli (n= 179)

untarily. They completed the questionnaires before beginning the practical activities (response rate: 94%), and one hundred and thirty-five students did so after finishing the activities (response rate: 77.6%). The majority of the students agreed to the fact that the course conducted in the above-mentioned manner improved their knowledge, leading to a better understanding of the subject. Most of the students answered 3 and 4 which are ("agree") and ("strongly agree") respectively. (Table 1)

Average scores were compared as shown in table 2. Item no 1, 2 and 4 showed statistically significant results. Before and after results of students perception regarding their understanding of skills related to the course content tasks, increased significantly as shown in table 3.

Average scores of item 5 to 9 has been shown in the table no 3. The lowest score has been shown for item no 7 (average 2.33± 0.58 points), followed by item no 5 2.45± 0.57. After carrying practical activities these two scores showed significant improvement.

Table 1: Perception of students regarding the importance and usefulness of the subject

Mention the agreement status with the following statements:	Before n=135	After n=195
Epidemiology and Biostatistics are important for Medicine as a science	n=130 96.3%	n=189 97%
I believe that the knowledge and skills I have acquired in this course are fundamental for my professional performance in Medicine	n=118 87%	n=181 92%
I understand the relationship between Epidemiology and Biostatistics	n=128 94%	n=191 97%
I understand the main concepts of Epidemiology and Biostatistics	n=120 88%	n=190 97%

Table 2: Perception of students of their task related to the course content

Read and understand scientific articles	Before n=135	After n=195
Perform a basic statistical analysis	n=112 83%	n=191 97%
Sort the data of a statistical analysis	n=100 74%	n=180 92%
Write the results of a statistical analysis	n=90 67%	n=168 86%
Interpret the results of the statistical tests	n=119 88%	n=179 92%

Table 3: comparison of mean and standard deviation values before and after the practical activities completion

Read and understand scientific articles	Before n=135	After n=195	P-value
1.Epidemiology and Biostatistics are important for Medicine as a science	2.44 ± 0.52	2.60 ± 0.55	0.03
2.I believe that the knowledge and skills I have acquired in this course are fundamental for my professional performance in Medicine	2.66± 0.51	2.81± 0.55	0.02
3.I understand the relationship between Epidemiology and Biostatistics	2.26 ± 0.52	2.40 ± 0.54	0.05
4.I understand the main concepts of Epidemiology and Biostatistics	2.17 ± 0.47	2.31 ± 0.50	0.02
5.Read and understand scientific articles	2.84 ± 0.52	3.01 ± 0.53	0.12
6. Perform a basic statistical analysis	3.12 ± 0.66	2.99 ± 0.52	0.002
7.Sort the data of a statistical analysis	2.78± 0.67	3.07 ± 0.58	0.01
8. Write the results of a statistical analysis	3.18 ± 0.68	3.34 ± 0.69	0.05
9. Interpret the results of the statistical tests	3.01 ± 0.62	3.11 ± 0.64	0.07

DISCUSSION

Epidemiology and statistics are the backbone of research. During the initial years of medical school, teaching these subjects is a very difficult task. Yet it is very important to acquire knowledge related to statistical skills, to understand the importance of evidence-based medicine, and to understand the quality of scientific articles. [10] Exploration of learning experience related to epidemiology and biostatistics, which is a part of the M.B.B.S course was possible with the help of the above study. With the evolution of medical education from traditional to integrated systems of teaching, theoretical knowledge has been applied to real-life situations. In other words, the practical implications of real-life scenarios of clinical cases are considered more important than just theoretical knowledge. Keeping this in mind the students' perception was evaluated regarding the effects of practical activities on the skills related to the subject. [11]

The initial hands-on activity was conceptual. A website showing simulated epidemiological content was used. The second activity mainly concentrated on the analysis of the given statistical data and calculations using the software. The aim of these two activities was to balance the aspects of concepts and calculations while teaching and learning. [12] Afterward, a questionnaire was shared to find out what the students believed they had learned during the course. Between 75 and 80% of the students thought that they were able to carry out the basic statistical test and understand a scientific article. With the introduction of the practical activities, it was observed that students showed improvement in the following areas:[10]

Before starting this course and introducing the participatory teaching methodology, 90% of the students believed that Epidemiology and Biostatistics are important in Medicine. 85.6% of the students thought that whatever they learn during the course, would serve them in their professional life in the future. The importance of the course is reflected by the scores. After finishing the practical activities, the scores improved significantly in the above-mentioned items.[11] A study conducted in New Zealand showed that more than 95% of the study participants agreed that biostatistics is an important tool to learn research. In our study the question addressing the importance of statistics without combining it with epidemiology showed lower scores, suggesting that integrating statistics with epidemiology can help in the improvement of students' perception. [12]

After thoroughly searching through multiple websites, the authors were hardly able to find any publication that was based on students' perceptions of the course. Though there was some research done on the usage of websites and some others on blended teaching methodology in medical schools. [13] In a study conducted by Smucny and Epling, a website was used to develop diagnostic reasoning.[14] The participants of that study, rated it better as compared to other teaching activities, with the same objective. In another study, an online six weeks' course was tested on medical students. The course was related to the subject of surgery with lectures and videos as well as other activities. This course acquired quite good results as far as the perception of the students was concerned. In another study done on medical students, two groups were formed. One group went through face-to-face teaching methodology only. In the second group, a virtual blended methodology combining online with face-to-face teaching was used. The end result was the same as far as the grades were concerned. The students securing better results preferred the blended teaching methodology. From these results, it can be concluded that this kind of methodology can be a practical and effective alternative way of teaching rather than the traditional class for teaching statistics. [14]

The participatory method of teaching not only improves the area of knowledge but also helps the students to improve their soft skills which ultimately leads to better learning outcomes. [15] A study conducted in Switzerland, involving more than 700 students, analyzed the perception of students regarding the use of didactic websites in the taught courses. Seventy-five percent (75%) of the students responded as "agree" or "totally agree" with its usefulness for improving their understanding. [16]

Moreover, 87% of the students expressed a high degree of satisfaction with the use of the websites. This leads us to the conclusion that these tools can be of great help in terms of the student's learning processes.[17] In another study the students of a bachelor's degree program were assessed regarding various activities in statistics. The students' perception was that they learn better when there is more collaboration and involvement among the students. Similar results were obtained from our study.[18] Not only the blended methodology of teaching improved students' learning but also enhanced their teamwork quality. During this process, the presence of a facilitator is very important to resolve any issues arising during the class. [17] This will have a positive impact on the cognitive skills and attitudes of the students. In Biostatistics use of computers and different software is of vital importance. However, after a thorough literature search, we were able to find one study conducted in Italy, on the use of a teaching tool the EpiInfo package. the results of the study conducted on three hundred health professionals showed that the use of EpiInfo in teaching statistics facilitates the researchers to perform the investigations more easily and leads to a better understanding of the key concept of analytical studies. The software has free access, easy to use, along with the endorsement of recognized international institutions making it more user-friendly. [19]

CONCLUSIONS

The medical students perceive that the knowledge related to Epidemiology and Biostatistics should be taught using

a participatory teaching methodology. After completing the practical activities, it was observed that there was a marked improvement in student's perception of their ability to perform the analysis and interpret the results.

REFERENCES

1. Zhang Y, Shang L, Wang R, Zhao Q, Li C, Xu Y, et al. Attitudes toward statistics in medical postgraduates: Measuring, evaluating and monitoring. BMC Med Educ. 2012; 12(1). https://doi.org/10.1186/1472-6920-12-117 PMID: 23173770
2. Milic NM, Masic S, Milin-Lazovic J, Trajkovic G, Bukumiric Z, Savic M, et al. The importance of medical students' attitudes regarding cognitive competence for teaching applied statistics: Multi-site study and meta-analysis. PLoS One. 2016; 11(10). https://doi.org/10.1371/journal.pone.0164439 PMID: 27764123
3. Fielding S, Poobalan A, Prescott GJ, Marais D, Aucott L. Views of medical students: what, when and how do they want statistics taught? Scott Med J. 2015; 60(4):164±9. https://doi.org/10.1177/ 0036933015608329 PMID: 26403572
4. Iglesias M, Lozano I, MartõÂnez M. La utilizacioÂn de herramientas digitales en el desarrollo del aprendizaje colaborativo: anaÂ lisis de una experiencia en educacioÂn superior. Rev Docencia Univ. 2013; 11(2):333±351.
5. Valencia N, Huertas A, Baracaldo P. Los ambientes virtuales de aprendizaje: una revisioÂn de publicaciones entre 2003 y 2013, desde la perspectiva de la pedagogõÂa basada en la evidencia. Rev Colomb Educ. 2014; 66:73±102.
6. Epiville [Internet]. Epiville.ccnmtl.columbia.edu. 2018 [cited 16 February 2018]. http://epiville.ccnmtl. columbia.edu/about.html.
7. CDC [Internet]. Centers for Disease Control and Prevention. 2018 [cited 16 February 2018]. https:// www.cdc.gov
8. Smucny J, Epling JW. A web-based approach to teaching students about diagnostic reasoning. FamMed. 2004; 36(9):622±4. PMID: 15467936
9. Bernardo V, Ramos MP, Plapler H, De Figueiredo LFP, Nader HB, AncËão MS, et al. Web-based learning in undergraduate medical education: Development and assessment of an online course on experimental surgery. Int J Med Inform. 2004; 73(9±10):731±42. https://doi.org/10.1016/j.ijmedinf.2004.06. 002 PMID: 15325330
10. Milic NM, Trajkovic GZ, Bukumiric ZM, Cirkovic A, Nikolic IM, Milin JS, et al. Improving education in medical statistics: Implementing a blended learning model in the existing curriculum. PLoS One. 2016; 11(2). https://doi.org/10.1371/journal.pone.0148882. PMID: 26859832
11. Rubio Hurtado MJ, Ruiz-Bueno A, MartõÂnez-Olmo F. StudentsÂ perceptions of the usefulness of learning activities for the development of competencies. Rev Investig Educ. 2016; 34(1):221±40.
12. 12. Mannocci A, Bontempi C, Giraldi G, Chiaradia G, de Waure C, Sferrazza A, et al. EpiInfo as a research and teaching tool in epidemiology and statistics: strengths and weaknesses. Ig Sanita Pubbl. 2012; 68(1):85±96. PMID: 22507994
13. Gore A, Chavan P, Kadam Y, Dhumale G. Application of biostatistics in research by teaching faculty and final-year postgraduate students in colleges of modern medicine: A cross-sectional study. Int J Appl Basic Med Res [Internet]. 2012; 2(1):11. https://doi.org/10.4103/2229-516X.96792 PMID: 23776801
14. Weissgerber TL, Garovic VD, Milin-Lazovic JS, Winham SJ, Obradovic Z, Trzeciakowski JP, et al. Reinventing Biostatistics Education for Basic Scientists. PLoS Biol. 2016; 14(4). https://doi.org/10.1371/ journal.pbio.1002430 PMID: 27058055.
15. Appleton DDR. What statistics should we teach medical undergraduates and graduates? Stat Med. 1990; 9(9):1013±21. https://doi.org/10.1002/sim.4780090903 PMID: 2244075
16. Peters TJ. Comment on Appleton DR `What statistics should we teach medical undergraduates and graduates?Â. Stat Med. 1990; 9:1023±27.
17. Batanero C, Contreras M, Roa R. El sentido estadõÂstico y su desarrollo. NuÂmeros. 2013;(1991):7±18.
18. Stanisavljevic D, Trajkovic G, Marinkovic J, Bukumiric Z, Cirkovic A, Milic N. Assessing attitudes towards statistics among Medical students: Psychometric properties of the Serbian Version of the survey of attitudes towards statistics (SATS). PLoS ONE. 2014. https://doi.org/10.1371/journal.pone. 0112567 PMID: 25405489
19. Artino AR, La Rochelle JS, Durning SJ. Second-year medical students' motivational beliefs, emotions, and achievement. Med Educ. 2010; 44(12):1203±12. https://doi.org/10.1111/j.1365-2923.2010.03712. PMID: 21091760

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Afridi A: Conceiving idea, Data collection, statistical analysis.

Naqvi SSQ: Literature search, writing up the article & statistical analysis.

Mahmood A : Data collection, literature search, Bibliography

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.

ORIGINAL ARTICLE

ASSESSMENT OF AWARENESS AND PRACTICES REGARDING BREAST CANCER AND ITS SCREENING METHODS AMONGST SCHOOL TEACHERS OF A RURAL DISTRICT IN PAKISTAN

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ABSTRACT

Objectives: This survey was aimed to assess the knowledge and practices regarding breast cancer and its screening method among school teachers of district Swabi, Khyber Pakhtunkhwa, Pakistan

Materials and methods: This was a cross-sectional survey using 22 items of self-designed, validated, and translated questionnaire distributed amongst 177 public school female teachers distributed in February 2020 in the district of Swabi, Khyber Pakhtunkhwa (KP) province of Pakistan by using a purposive sampling method. Private school teachers and incomplete questionnaire responses were excluded. Baseline information about the age, educational status, marital status, and questionnaire was recorded on a printed proforma and was analyzed using SPSS-23.

Results: All 177 participants were females with an age range of 22-60 years and a mean age of 36 $^{+}_{-}$9.37. Qualification of participants ranged from masters to Ph. D, while the number of married teachers was about 2 times that of unmarried. Most of the respondents (95%) were aware of breast cancer due to varied sources like news, media, the internet, books, or via friends and family. Almost half of the respondents had heard about BSE and about 64% were aware of its significance. About 40% were aware that BSE should be started from puberty to age 30. About 70% of participants were perceiving BSE as a good practice to prevent breast cancer. About 60% had heard of mammography and most of them considered it a useful tool to prevent breast cancer.

Conclusion: Most of the participants of the study had knowledge of breast cancer gained via electronic and print media and 70 % were aware of BSE, while a small number of them were aware of mammography. This indicates that female school teachers, having better educational status, have enough knowledge and practice in breast cancer detection and prevention.

Keywords: Breast cancer, Breast Cancer Screening (BSE), Mammography.

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INTRODUCTION

Breast cancer is one of the most common cancers among women in both developed and developing countries. [1] According to WHO report in 2007, the total number of new cases of breast cancer diagnosed annually in the world exceeded one million. [2] Early detection of breast cancer plays a leading role in reducing mortality rates and improving the patient's prognosis. [3] Pakistan is one of the developing countries where this deadly disease is accelerating at a rapid pace. [4] The most important strategy is to detect and treat this cancer at an earlier stage. Ways of early detection include breast self-examination (BSE), breast clinical examination, mammography, and other ultrasonographic and radiological investigations. Mass campaigns about BSE are needed to achieve this purpose. [5] For this reason, there is a need to find out the awareness level and practices amongst different people and populations to enhance awareness levels in society. [6]

The objective of this research was to assess the awareness and practices regarding breast cancer and its screening methods amongst school teachers of district Swabi, Khyber Pakhtunkhwa, Pakistan. Our study is intended to answer the following question; what is the awareness level of school teachers about breast cancer and its screening methods in a rural district of KP, Pakistan? The answers to the question will help the stakeholders in strategizing the breast cancer prevention approaches in the population.

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MATERIALS AND METHODS

This was a cross-sectional survey conducted in the Swabi district, which is considered to be a rural district of KP having a population of about 2 million and consisting of more than 50 villages. About 500 female school teachers in public sector teaching institutes are working in the district. Data was collected from 8 government-run schools belonging to female students. A self-designed questionnaire, which was validated by having 22 items was distributed initially among 200 female teachers (although the sample size calculated via the WHO calculator was 177) to take care of the dropout cases. Some of the items were having "yes and no" responses while some were having 3-point Likert scale responses. We used a convenient sampling method and selected female school teachers in district Swabi (KP) to reveal the perceptions, knowledge, and practices of female school teachers regarding breast cancer, BSE, and its screening methods. This approach was applied due to the short time we had to complete our research project and also, due to the prevailing conditions of the COVID-19 pandemic. The questionnaire (Urdu version) was distributed in February 2020 by visiting the schools and personally explaining the methods of filling out survey forms to the teachers, and responses were collected on the spot. All female school teachers belonging to district Swabi who were willing to participate in the survey were included. Private school teachers were excluded from the study. The incomplete questionnaire was also excluded. Validation of the survey tool was done using the following steps:

The guidelines given by Siny Tsang in the article titled "Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine" were used for developing and translating our instrument. [7] Initially, a thorough literature search was conducted with relevant prior research and theory, which helped us identify four specific domains where problems and issues existed in screening for breast cancer and BSE. These domains included knowledge of breast cancer prevention, screening, BSE, and mammography. Secondly, one senior clinician and medical educationist were involved to develop an initial draft of 31 questions after detailed deliberation about the topic. After deliberation with the said expert, the questions were reduced to 25.In the next phase, the questionnaire was discussed with the supervisor and the subject expert, and he advised reducing these to 22. These 22 questions were translated with the help of an Urdu-versed colleague and a senior school teacher. The Urdu-translated version was backward translated to English with the help of a subject expert to improve the validity of the questionnaire. The next step was to pilot-test the questionnaire and continue collecting validity evidence. It was done among 11 teachers at a private school in Swabi before distributing the final questionnaire among the participants. The results of the pilot test have not been included in the original study. As a result of pilot testing, no changes were brought to the questionnaire. Data were collected through the questionnaire distributed among the teachers already described, during the official duty hours. Issues regarding the questionnaire was explained to participants personally to make the questions clear and get proper response. In the end, the questionnaires were collected personally from each teacher. Data were entered into SPSS version 23 and information was recorded with suitable codes. Wherever it was necessary for analysis, some of the variables were re-coded into new variables and relevant information was extracted. Demographic data including age, educational status, and marital status was recorded. The frequencies and percentages of response rates were described in tabulated form. Permission for conducting this research was obtained from the Ethical Review Committee of the North-West School of Medicine, Peshawar. Permission from the respective schools was taken in writing before the survey questionnaire was distributed.

RESULTS

A total of 177 participants responded to the survey questionnaire with a response rate of 88.5% (a total of 200 questionnaires were distributed). All were females with an age range of 22-60 years and a mean age of 36 ($^{+}_{-}$9.37) that ranged from 22 to 60 years. Qualification of participants ranged from masters to Ph. D, while the number of married teachers was about 2 times that of unmarried (see table-1). Table 2 shows the responses of participants to the first 4 questions. Most of the respondents (95%) were aware of breast cancer due to varied sources like news, media, the internet, books, or via friends and family. Many of them had experienced breast cancer in their families and close ones.

Almost half of the respondents had heard about BSE (see table-3) and about 64% were aware of its significance. But 80% of the participants never knew the method of BSE as they were never taught about it. About 40% were aware that BSE should be started from puberty to age 30. More than half of the participants did not know how often BSE should be performed. About 70% of participants were perceiving BSE as a good practice to prevent breast cancer. About 60% had heard of mammography (see table-4) and most of them considered it a useful tool to prevent breast cancer. Only 12 responders (6.8%) ever underwent mammography. Twenty participants were advised mammography but could not be performed due to non-availability or due to financial reasons. The mean knowledge score of all the participants was 2.83 (SD: 1.590), with a minimum of zero and a maximum of 7 scores. Knowledge scores of different groups based on their qualification was compared using ANOVA (Analysis of Variance). The knowledge score of those having MPhil degrees was slightly higher than the other groups, however, the difference was statistically not significant (p-value= 0.704). Moreover, the knowledge of participants was also compared based on their marital status and age. The results show a significant association of marital status with knowledge of school teachers regarding breast cancer and screening methods (P=0.005) showing that married school teachers were more likely to have good knowledge

regarding breast cancer and screening methods compared to single and widowed school teachers. The data is shown in Table 5.

Table 1: Educational qualification and marital status of participants

Variable	Level of education	Frequency	Percentage
Educational Qualification	Graduate	34	19.2
	Masters	126	71.2
	M.Phil.	15	8.5
	Ph. D	2	1.1
	Total	177	100
Marital status	Single	66	37.3
	Married	109	61.6
	widowed	2	1.1
	Total	177	100

Table 2: Knowledge of participants about breast cancer

Questions	Variables	Frequency	Percentage
Have you heard of breast cancer?	Variables	Frequency	Percentage
	Yes	169	95.5
	No	8	4.5
	Total	177	100
Source of information	Books	37	20.9
	Hospital	27	15.3
	Friend	30	16.9
	Internet	73	41.2
	Any other source	10	5.6
	Total	177	100
Has any of your family members been diagnosed with breast cancer?	Yes	38	21.5
	No	138	78.0
	Total	176	99.5
If yes, then what is your relation?	Mother	2	5.2
	Sister	3	8
	Cousin	14	36.8
	Others	19	50
	Total	38	100

Table 3: Knowledge and practices of BSE

Questions	Variables	Frequency	Percentage
Have you heard of Breast Self-Examination?	Yes	90	50.8
	No	87	49.2
	Total	177	100
Do you know that BSE is a useful tool for early detection of breast cancer.	Yes	113	63.8
	No	63	35.6
	Total	177	100.0
Have you been taught how to do BSE?	Yes	34	19.2
	No	141	79.7
	Total	175	98.9
If the answer to the question above is yes, who taught you?	Nurse	4	11.7
	Doctor	10	29.5
	Others	20	58.8
	Out of 34	34	100
At what age should BSE be started?	At the age of puberty	48	27.1
	Between 20-30 years	30	16.9
	After 40 years	16	9
	No idea	83	47
	Total	177	100
How often should BSE be done?	Daily	8	4.5
	Weekly	13	7.3
	Monthly	39	22.0
	Yearly	16	9.0
	No idea	101	57.1
	Total	177	100
BSE should be done by:	Doctor	141	79.6
	Nurse	6	3.4
	Self	24	13.6
	Any other person	6	3.4
	Total	177	100
If you discover any abnormality during BSE, what will you do?	Laboratory tests	39	22.0
	Appointment with a doctor	134	75.7
	Nothing	4	2.3
	Total	177	100
Do you practice BSE?	Yes	44	24.9
	No	133	75.1
	Total	177	100
If yes, then how often?	Weekly	9	20.5
	Monthly	21	47.7
	Sometimes	11	25
	Rarely	3	6.8
	Out of 44	44	100
Do you think BSE is a good practice?	yes	127	71.8
	no	49	27.1
	Total	176	100

Table 4: Knowledge about Mammography

Questions	Variables	Frequency	Percentage
Have you heard of mammography	Yes	69	39.0
	No	106	59.9
	Total	175	98.9
Is mammography is a useful tool for the early detection of breast cancer?	Yes	100	56.5
	No	71	40.1
	Total	171	96.6
Have you ever undergone a mammography?	Yes	12	6.8
	No	163	92.1
	Total	175	98.9
If no to question above (despite being advised by the doctor), then why not?	Financial constraints	4	20
	Mammography was not available	16	80
	Total	20	100

Table 5: Comparison of Means and SD of Knowledge Scores among different Demographic Groups

GROUP	N	MEAN (+ SD)	P- VALUE	95% CI
All Participants	177	2.83 (1.590)		
Educational Qualification				
Masters	126	2.76 (1.627)	0.704	2.48 – 3.05
M.Phil.	15	3.27 (1.387)		2.50 – 4.03
Ph.D.	2	3.00 (2.828)		-22.41 – 28.41
Graduate	34	2.88 (1.513)		2.35 – 3.41
Marital status				
Married	109	3.11 (1.493)	.005	2.83-3.39
Single	66	2.42 (1.655)		2.02-2.83
Widowed	2	1.00 (.000)		1.0 -1.00
Age				
<30years	66	2.79	0.962	2.42 – 3.16
30-50 years	95	2.85		2.52 – 3.19
>50 years	16	2.88		1.96 – 3.79

*95% CI: 95% Confidence Interval, SD: Standard Deviation

DISCUSSION

Breast cancer is considered to be one of the most prevalent cancers in females even in our country. So far, the awareness level amongst our population is limited. [8] We presumed that female teachers will be more aware of this deadly disease and will be knowing preventive strategies like BSE and mammography. With this intent, we selected the population of a rural district to identify the awareness level and knowledge about the prevention of breast cancer. Media, like TV, the internet, social media, and newspapers are considered to be the main source of dissemination of knowledge about breast cancers. This was apparent from the results of our study, that more than 95% of participants were aware through these sources. Similar mass media campaigns have raised awareness levels amongst many South Asian women. [9] Nowadays, society is becoming more aware of BSE due to these sources. [10] A study conducted in Turkey revealed that 98% of school students were not aware of BSE. [11] This is in contrast to our study, where 19% of school teachers knew the techniques and significance of BSE. [12] The reason for this difference between the other 2 studies and ours is probably due to the age and educational status difference. The other studies included only students while our study participants belong to different ages (from young to old).

Regarding perceptions about the utility of BSE in preventing breast cancer, our study revealed that 70% of participants thought that it is a method of early detection of breast cancer. This is in contrast to another study in the Iranian population, where half of the study participants revealed that BSE can detect and prevent breast cancer. [13] Regarding the level of awareness about mammography, our study revealed that 60% of participants have some knowledge about it. It ranges from 5% to 80% in Asian and North African countries. [14-17]

Some of the limitations of our study are sampling from a single district and limited survey items. The awareness could have been more explicitly explained with in-depth analysis through qualitative research. Further large-scale studies in multiple centers are needed to quantify the magnitude of the problem effectively.

CONCLUSION

Most of the participants of the study had knowledge of breast cancer gained via electronic and print media and 70 % were aware of BSE. Although, a few were aware of the technique. About 1/3rd of participants were aware of the age of the start of BSE. A small number of participants were aware of the mammography. This indicates that female school teachers, having better educational status, have enough knowledge and practice in breast cancer detection and prevention.

The relevant agencies belonging to the government and private organizations should attempt to utilize the services of female school teachers in creating awareness among the general public, particularly in rural setups. There is a need to train this population to educate females of different ages of rural as well as urban backgrounds

about BSE, clinical examination, and mammography. This will go a long way in the early detection and prevention of breast cancer in the country.

REFERENCES

1. Rocha-Brischiliari SC, De Oliveira RR, Andrade L, et al. The rise in mortality from breast cancer in young women: Trend analysis in Brazil. PLoS One 2017; 12: 1–13.
2. Fitzmaurice C, Dicker D, Pain A, et al. The Global Burden of Cancer 2013. JAMA Oncol 2015; 1: 505–527.
3. Rahimzadeh M, Baghestani AR, Gohari MR, et al. Estimation of the cure rate in Iranian breast cancer patients. Asian Pacific J Cancer Prev 2014; 15: 4839–4842.
4. Khaliq S, Hameed A, Khaliq T, et al. p53 Mutations, polymorphisms, and haplotypes in Pakistani ethnic groups and breast cancer patients. Genet Test 2000; 4: 23–29.
5. Jemal A, Center MM, DeSantis C, et al. Global patterns of cancer incidence and mortality rates and trends. Cancer Epidemiol Biomarkers Prev 2010; 19: 1893–1907.
6. Weir HK, Thun MJ, Hankey BF, et al. Annual report to the nation on the status of cancer, 1975-2000, featuring the uses of surveillance data for cancer prevention and control. J Natl Cancer Inst 2003; 95: 1276–1299.
7. 7. Tsang S, Royse CF, Terkawi AS. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. Saudi J anesth. 2017 May 1;11(5):80.
8. Elmore JG, Armstrong K, Lehman CD, et al. Clinician's Corner Screening for Breast Cancer. 2005; 293: 1245–1256.
9. Berg AO. Screening for breast cancer: Recommendations and rationale. Am Fam Physician 2002; 65: 2537–2544.
10. Mandelblatt J, Saha S, Teutsch S, Hoerger T, Siu AL, Atkins D, Klein J, Helfand M; Cost Work Group of the U.S. Preventive Services Task Force. The cost-effectiveness of screening mammography beyond age 65 years: a systematic review for the U.S. Preventive Services Task Force. Ann Intern Med. 2003 Nov 18;139(10):835-42. doi: 10.7326/0003-4819-139-10-200311180-00011. PMID: 14623621.
11. Karayurt Ö, Özmen D, Çetinkaya AÇ. Awareness of breast cancer risk factors and practice of breast self-examination among high school students in Turkey. BMC Public Health 2008; 8: 1–8.
12. Parsa P, Shobeiri F, Parsa N. Breast Cancer Prevention Knowledge and Breast Self-Examination Practices Among Iranian Women. Maturitas 2012; 71: S32.
13. Nelson HD, O'Meara ES, Kerlikowske K, et al. Factors associated with rates of false-positive and false-negative results from digital mammography screening: An analysis of registry data. Ann Intern Med 2016; 164: 226–235.
14. Auvinen A, Elovainio L, Hakama M. Breast self-examination and survival from breast cancer. Breast Cancer Res Treat 1996; 38: 161– 168.
15. Tessaro I, Herman C. Changes in public health nurses' knowledge and perception of counseling and clinical skills for breast and cervical cancer control. Cancer Nurs 2000; 23: 401–405.
16. Harvey BJ, Miller AB, Baines CJ, et al. Effect of breast self-examination techniques on the risk of death from breast cancer. Cmaj 1997; 157: 1205–1212.
17. Al-Dubai SAR, Qureshi AM, Saif-Ali R, et al. Awareness and knowledge of breast cancer and mammography among a group of Malaysian women in shah alam. Asian Pacific J Cancer Prev 2011; 12: 2531–2538.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Ahmed M:	Data Collection, Writing, SPSS
Fatima B:	Data Collection, Review
Ali W:	Concept, Review, Statistical Analysis
Amin N:	Review, Writing
Gul H:	Review, Writing
Hussain M:	Data Collection
Haq A:	Review, Writing
Fatima S:	Review, 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.

ORIGINAL ARTICLE

MANUAL VACUUM ASPIRATOR (MVA)- A SAFE AND EFFECTIVE ALTERNATIVE TO CONVENTIONAL CURETTAGE IN THE SURGICAL MANAGEMENT OF 1ST TRIMESTER MISCARRIAGES

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ABSTRACT

Objective: To compare the efficacy of manual vacuum aspiration and conventional evacuation & curettage (ENC) for first-trimester miscarriage management.

Materials and Methods: This quasi-experimental study was carried out at the Department of Gynecology and Obstetrics, Khyber Teaching Hospital, Peshawar, Pakistan from October 2022 to March 2023 including 150 patients with first trimester miscarriage dividing them into two groups (MVA and ENC) having equal number of patients. Efficacy in both groups was compared.

Results: The mean age in the MVA group (group A) was 27.81±6.31years while in the ENC group (group B) it was 26.50±6.27 years. The mean gestational age in group A was 5.82±2.82 weeks while in group B it was 5.95±2.9 weeks. MVA was effective in 88% of participants while ENC was effective in 93.33% of participants (p-value, 261), which is not statistically significant.

Conclusion: Surgical uterine evacuation utilizing MVA under local anesthetic is safe and successful, and it should be considered to minimize a lengthy hospital stay. MVA can be a viable alternative to surgical curettage like ENC. It is safe, cost-effective, and simple to conduct, eliminating general anesthetic, the requirement for theatre access, and an unnecessary hospital stay.

Keywords: Manual Vacuum Aspiration, Evacuation, Curettage, miscarriage, efficacy.

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INTRODUCTION

The term “spontaneous abortion” or miscarriage are having the same meaning and are interchangeable. It means pregnancy loss before 24 weeks of gestation without using any intentional intervention whether surgical or medicinal to end the pregnancy. [1] Miscarriage is the leading cause of pregnancy loss. [2] One out of every four women faces this in her lifetime. [3] More than 92% of all miscarriages occur in the first 12 weeks of gestation and the chances of miscarriage reduce with increasing duration of gestation thereafter. [4] According to local data of Pakistan, the yearly miscarriage rate in women aged 15 to 49 years is 29 per 1000. [5] Miscarriage, particularly incomplete and undetected miscarriage, affects roughly 15% of clinically diagnosed pregnancies and 890,000 women each year. [6]

Despite advancements in health technology, complications of miscarriage account for 10-13 percent of maternal deaths in underdeveloped nations. [7] Miscarriage can be treated medically or surgically. Surgical procedures have typically been utilized to treat early miscarriages. Sharp metal curettage is used in dilatation and curettage, which is frequently performed in an operating room under regional or general anesthetic. Sharp curettage is frequently performed following cervical dilation. [8] Manual vacuum extraction (MVA) is a surgical procedure that offers an alternative to established surgical methods. MVA is a uterine evacuation procedure that is safe, cost-effective, easy, and portable, and may be performed under local anesthetic. [9, 10] It may be conducted in any venue, including a clinic, ER, or operation theater. All healthcare workers including paramedical staff can perform it. To create the vacuum required for the aspiration of conception products, a 60 ml hand-held syringe is used. MVA was first reported in the 1970s, primarily for the treatment of incomplete miscarriage, but its application has since expanded to include the treatment of missed miscarriage, molar pregnancy, pregnancy termination, and endometri-

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al sampling. [11, 12] Manual vacuum aspiration is commonly employed in the United States, Asia, and Europe, but its application in Pakistan is limited. Vacuum aspiration is typically seen to be less risky than D&C as the latter can lead to various complications like cervical injuries, uterine perforation, significant blood loss, and pelvic infections. Though MVA is simple to use, physicians are unaware of its capabilities. [13, 14] There is currently relatively little local data on the issue. So, we conducted this study to compare the effectiveness of manual vacuum aspiration (MVA) against conventional evacuation and curettage (ENC) in first-trimester pregnancy losses.

MATERIALS AND METHODS

This study was carried out at the Department of Obstetrics and Gynecology, Khyber Teaching Hospital, Peshawar, Pakistan from October 2022 to March 2023 after taking permission from ethical committee No. 725/DME/KMC dated 05-10-2022. 150 women of any parity, having miscarriage with gestational age less than 12 weeks by LMP and age 18 to 35 years were included in the study by taking informed consent. They were equally and randomly divided into two groups, 75 being in the manual vacuum aspiration group (group A) and 75 in the conventional curettage group (group B). Women with ectopic pregnancy on ultrasound, molar pregnancy, and having a fever (temperature > 37.7^0 F) were excluded.

In group A, manual vacuum aspiration was carried out with a 60-cc syringe having a double-locking valve mechanism. The syringe was 'charged' to create a vacuum. A cervical block was applied under direct vision using a Cusco's speculum in the cervix. The cervix was kept patent by holding its anterior lip with the help of the Volsellum. A cannula with an appropriate size was inserted in the uterus and then it was attached to the charged syringe. Aspiration of the intrauterine contents is done through the syringe and cannula. The syringe was emptied into a bowl. The process was repeated several times until the uterine cavity was empty. In group B, conventional evacuation and curettage (ENC) was done under general anesthesia, with a sharp curette under an aseptic technique to evacuate the uterus or with moderate sedation and analgesia according to physician discretion. All patients were called for follow-up on the 7th day for transvaginal ultrasonography and efficacy was noted for each procedure. Normal endometrial thickness of less than 4 mm with no echogenic intra-cavity lesion, no echogenic foci associated with acoustic shadowing, and no fluid in the uterine cavity was considered efficacy. The data obtained was analyzed with a statistical analysis program (SPSS version 25). Frequency and percentage were calculated for qualitative variables. Mean ±SD was calculated for quantitative variables. The chi-square test was applied to compare efficacy in both groups taking a P value ≤ 0.05 as significant.

RESULTS

Out of a total of 150, 75 patients received treatment with MVA and 75 patients received treatment with ENC. The mean age in the MVA group (group A) was 27.81±6.31years while in the ENC group (group B) it was 26.50±6.27 years. The mean gestational age in group A was 5.82±2.82 weeks and it was 5.95±2.9 weeks in group B. Out of total 75 participants in group A, 7 (9.33%) women were primigravida, 59 (78.67%) women were multigravida and 9 (12%) women were grand-multigravida while in group B, 10 (13.33%) women were primigravida, 59 (78.67%) women were multigravida and 6 (8%) women were grand-multigravida. MVA was effective in 88% of participants while ENC was effective in 93.33% of participants (p-value, 261), which is not statistically significant [Fig. 1]. The efficacy of MVA in different age groups is given in figure 1.

MVA was effective in 6 Primigravida, 53 multigravidas, and 8 grand-multigravida while ENC was effective in 7 Primigravida, 58 multigravidas, and 5 grand-multigravida but these were not statistically significant [table-1 and 2]. MVA was effective in 45 women and 21 women with gestational age 1 to 7 weeks and 8 to 12 weeks respectively, while ENC was effective in 47 women and 23 women with gestational age 1 to 7 weeks and 8 to 12 weeks respectively. Again, these were also not statistically signif-

Table 1: Distribution of efficacy according to age groups

Age group	Efficacy	Group A	Group B	P value
≤ 20 years	Effective	15	17	0.931547
	Non-effective	1	1	
	Total	16	18	
21-30 years	Effective	20	28	0.745851
	Non-effective	2	2	
	Total	22	30	
≥ 30 years	Effective	31	25	0.292649
	Non-effective	6	2	
	Total	37	27	

Table 2: Distribution of efficacy according to parity

Parity	Efficacy	Group A	Group B	P value
Primigravida	Effective	6	7	
	Non-effective	1	3	
	Total	7	10	
Multigravida	Effective	53	58	
	Non-effective	6	1	
	Total	59	59	
Grand-multigravida	Effective	8	5	
	Non-effective	1	1	
	Total	9	6	

Table 3: Distribution of efficacy according to gestational age

Gravidity	Efficacy	Group A	Group B	P value
1-7 weeks	**Effective**	**45**	**47**	
	Non effective	**7**	**3**	
	Total	**52**	**50**	
8-12 weeks	**Effective**	**21**	**23**	
	Non effective	**2**	**2**	
	Total	23	25	

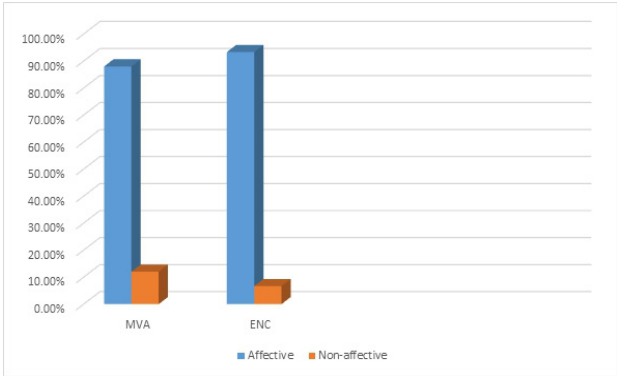

Fig 1: Distribution of efficacy in both groups

icant [table 3].

DISCUSSION

Many authors think that uterine evacuation in early pregnancy losses can be easily done via manual aspiration through syringing of the uterus (MVA) and it can be an alternative procedure to ENC, with the advantages of using analgesics or paracervical block instead of general anesthesia, a lower rate of complications, a shorter stay in hospital and lower hospital expenses. [15,16] Manual vacuum aspiration is becoming a preferred treatment in remote rural areas since it is acceptable, cost-effective, and less unpleasant. Despite being simple, affordable, and straightforward to use, its adoption has been limited since most doctors are unfamiliar with its application. MVA has been utilized in our institution for so many years and we have found it to be effective, safe, inexpensive, and simple to apply. In the current study, the mean age was 27.81±6.31years and 26.50±6.27 years in the MVA group and ENC group respectively. The age range in our study is comparable with the study conducted by Fatima Y et al who observed that patients in MVA and ENC groups are having ages 29.35± 6.4 and 28.04± 6.19 respectively. [17]

We observed the mean gestational age in the MVA group to be 5.82±2.82 weeks while in the ENC group, it was 5.95±2.9 weeks. Farooq F et al observed that the mean gestational age was 8.46±1.88 weeks and 8.32±1.56 weeks in ENC and MVA groups' respectively. [18] Fatima Y et al also showed nearly the same observation by obtaining the mean gestational age in the ENC group to be 8.46±1.88 weeks and the MVA group to be 8.32 ±1.56 weeks.[17] Our observations are comparatively different from both of the studies as both of them used a small sample size.

We observed that MVA was effective in 88% of participants while ENC was effective in 93.33% of participants with first-trimester miscarriage (p-value, 0.261). In a similar study, Ara J et al. found that the efficacy was 98% for MVA and 94% for ENC (p-value, 0.61). [19] The results of our study are not comparable to the study by Ara J et al because the sample size of our study is much bigger than other similar studies.

The above discussion shows that MVA is as effective as standard ENC. As it needs no general anesthesia

and operation theater, it can be easily performed even in basic rural health units. MVA might be considered frequently as an alternate option for managing early pregnancy loss and minimizing maternal morbidity and death, particularly in the hands of less trained personnel.

CONCLUSION

Surgical uterine evacuation utilizing MVA under local anesthetic is safe and successful, and it should be considered to minimize a lengthy hospital stay. MVA can be a viable alternative to surgical curettage like ENC. It is safe, cost-effective, and simple to conduct, eliminating general anesthetic, the requirement for theatre access, and an unnecessary hospital stay.

REFERENCES

1. Griebel GP, Halvorsen J, Golemon TB, Day AA. Management of spontaneous abortion. Am Fam Phy. 2005;72(7):1243-50.
2. Khaskheli M. Evaluation of early pregnancy loss. Pak J Med Res. 2002;41:70-2.
3. Say L, Kulier R, Gulmezoglu M, Campana A. Medical versus surgical methods for first-trimester termination of pregnancy. Cochrane Database Syst Rev 2005;25:CD003037.
4. Brosens JJ, Bennett PR, Abrahams VM, Ramhorst R, Coomarasamy A, Quenby S, et al. Maternal selection of human embryos in early gestation: insights from recurrent miscarriage. Semin Cell Develop Biol. 2022;131(1):14-24
5. Sattar ZA, Singh S, Fikree FF. Estimating the incidence of abortion in Pakistan. Stud Fam Plann 2007;38:11-22.
6. Greenslade F, Benson J, Winkler J, Henderson V, Leonard A. Summary of clinical and programmatic experience with manual vacuum aspiration. Adv Abort Care 1993;3:1-4.
7. Ahsan A, Jafary SN. Unsafe abortion: global picture and situation in Pakistan. J Pak Med Assoc. 2008;58:660-1.
8. Ghosh J, Papadopoulou A, Devall AJ, Jeffery HC, Beeson LE, Do V, et al. Methods for managing miscarriage: a network meta-analysis. Cochrane Database Syst Rev. 2021;6(6): CD012602.
9. Das C.M, Srichand P, Khursheed F, Shaikh F. Assessment of efficacy and safety of manual vacuum aspiration. JLUMS 2010;9:130-3.
10. Shelley JM, Healy D, Grover S. A randomized trial of surgical, medical and expectant management of first-trimester spontaneous miscarriage. Aust N Z J Obestet Gynaecol. 2005;45:122-7.
11. Milingos D, Mathur M, Smith N, Ashoke P. Manual vacuum a safe alternative for surgical management of early pregnancy loss. Br J Obstet gynecol. 2009;116:1268-71.
12. Hamlin J, Moller B. Manual vacuum aspiration, a safe and effective alternative in early pregnancy termination. Acta Obstet Gynecol Scand. 2001;80:563-7.
13. Ansari R, Rathore S, Mustafa B. Manual vacuum aspiration: a safe and effective alternative for the Surgical Management of Early Pregnancy Loss. Ann Abbasi Shaheed Hosp Karachi Med Dent Coll. 2014;19(1):28-31.
14. Shaheen U, Yasmin S, Liaqat N, Rafique S. Manual vacuum aspiration (M.V.A) Versus conventional evacuation and curettage in early pregnancy loss. Pak J Med Heal Sci. 2021;15(8):2213-5.
15. Chen BA, Creinin MD. Contemporary management of early pregnancy failure. Clin Obstet Gynecol. 2007;50(1):67–88.
16. Bird ST, Harvey SM, Nichols MD, Edelman A. Comparing the acceptability of manual vacuum aspiration and electric vacuum aspiration as methods of early abortion. J Am Med Womens Assoc. 2001;56:124–6.
17. Fatima Y, Firdos S, Ali M. Comparison of manual vacuum aspiration versus DNC in first trimmer pregnancy failures in terms of efficacy and safety at peripheral hospital settings of Balochistan. J Soc Obstet Gynaecol Pak. 2020;10(2):106-9.
18. Farooq F, Javed L, Mumtaz A, Naveed N. Comparison of manual vacuum aspiration, and dilatation and curettage in the treatment of early pregnancy failure. J Ayub Med Coll Abbottabad. 2011;23(3):28-31.
19. Ara J, Iftekhar T, Ijaz S, Qazi NH, Sultana N. Comparison of manual vacuum aspiration versus conventional evacuation of retained products. Ann Pak Inst Med Sci. 2018;14(1):90-2.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Akhtar N:	Concept, Critical appraisal, and Discussion Writing
Iqbal M:	Data collection, compilation of results, formatting of the article
Naz T :	Data Collection, Manuscript 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.

ORIGINAL ARTICLE

TRENDS IN POISONING CASES: AN AUTOPSY-BASED STUDY AT KHYBER MEDICAL COLLEGE, PESHAWAR

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ABSTRACT

Objectives: To determine trends of poisoning cases in autopsy examinations conducted at Khyber Medical College, Peshawar.

Materials and Methods: This descriptive cross-sectional study enrolled 262 cases of poisoning presented for autopsy at the Department of Forensic Medicine, Khyber Medical College from 1st January 2018 to 31st December 2022. All poison-based autopsy cases of any age and gender were included in the study. Cases with Incomplete documentation and referred from other districts were excluded from the study.

Results: Our study showed males 228/262 (87%) were more prevalent than females 34/262 (13%). Moreover, 21-30 years of age were 82/262 (31.3%)individuals. Out of 262 subjects, 50.4% (n=132) were poisoned with a single drug, though 49.6% (n=130) were having multiple drugs. The poisons found in the study were morphine (58.0%, 152), methamphetamines (34.4%, 90), benzodiazepines (34.4%, 90), Tetrahydrocannabinol (19.8%, 52), amphetamines, (15.6%, 41), phosphine (8.8%, 23), Tricyclic antidepressants (8.4%, 22), carbon monoxide (3.8%, 10), methyl alcohol (1.5%, 4), ethyl alcohol (1.1%, 3), propranolol (0.8%, 2), arsenic (0.4%, 1) and tissue paper (0.4%, 1). The trends of poisoning have been looked through the period of 5 years, indicating the use of morphine, amphetamines, and methamphetamines were escalating in the meantime, whereas the frequency of usage of benzodiazepines remain sustained

Conclusion: Our study concluded that poisoning was found more prevalent in males in the middle age group. In addition, the analysis of the last five years revealed that trends of morphine and methamphetamine poisoning increased while phosphine was found to be decreased for the cause of death determination.

Keywords: Trends, Poisoning, Autopsy, Peshawar

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INTRODUCTION

Poisoning refers to basically injury or death due to swallowing, inhaling, touching, or injecting various drugs, chemicals, venoms, or gases [1]. For a long time, various poisonous substances known to lead to a very large number of deaths in various societies. Poisons have been the subject of concern for a long time. Poisons had a great impact on human events since ancient times. Over time important poisons of the day have changed to some degree, and toxic substances continue to challenge our everyday lives. Traditionally, arsenic is the favorite poison for homicide and opium for suicide, though there is an increased incidence of the use of organophosphorus insecticides for suicide [2,3]. Death due to poisoning has been known since times. Poisoning is a major concern all over the world, although its type and associated morbidity and mortality vary from country to country [4].

According to law, all deaths due to poisons are recorded as unnatural deaths and a case of death that is suspected or a clear case of poisoning must undergo autopsy (5,6). Low cost and easy availability of poisons have a major role in suicide and accidental poisoning in many developing countries like Pakistan [7]. Most of the time fatal poisoning is due to organo-phosphorus compounds (pesticide/ insecticides) [8]. According to WHO in 1999 more than 3 million cases of poisoning has been reported worldwide and out of which many cases ended in deaths mainly in farmers [9-11]. The reason is the vast exposure to poisonous toxins during cultivation and handling. Hence treatment and people preventive steps are in controlling poisoning-related death in any community [8,9]. Comprehensive data has revealed that among developed countries death due to poisoning is low but in developing countries, it is very high and it is the fourth most common cause of mortality especially in rural areas [6,7,8]. Ingestion of Organophosphorus Compound (OPC) as an attempt for suicide purposes are major problem probably because of

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the easy availability of pesticides [10,11]. This occurs due to the extensive use of poisons in the agriculture field and because of the unregulated sale of these products over the country in Pakistan. In our area same situation prevails and difficult to say which kind of poison is more frequently causing deaths. So this study was conducted on various parameters of poisoning such as type of poisoning, gender, frequency, and age group involved, among autopsy cases. Nowadays trends are changing from organophosphorus poisoning to amphetamines and methamphetamines because of its easy availability. It is alarming that most middle age individuals are poisoned and death occurred.

The data of this study shall help have dedicated data of poisoning based on autopsy in the Department. This data can further be utilized for preventive and curative measures which involve early treatment, awareness among masses, and utilization of law & enforcement agencies for law making.

The objective of this study is to determine trends of poisoning cases in autopsy examinations conducted at Khyber Medical College, Peshawar.

MATERIALS AND METHODS

This Cross-Sectional Chart Review was conducted at the Department of Forensic Medicine, Khyber Medical College, Peshawar from 01st January 2018 to 31st December 2022 (Five years of data) All cases reported at the department in the said study duration was sample size. All poison-based autopsy cases of any age and gender were included in the study. Cases with Incomplete documentation and referred from other districts were excluded from the study.

The data as per the study sample was collected after taking Ethical/Institutional approval for the said study. After following principle guidelines, and maintaining the ethical concerns and confidentiality of the participant, a pre-designed Performa was used to extract the data. The pre-designed Performa had a demographic component and closed-ended questions regarding the trends of poisoning in the autopsy cases presented at the Department of Forensic Medicine. GCMS is gold standard in forensic toxicology both for qualitative and quantitative analysis. Only qualitative analysis is included in this study. The data was extracted in Microsoft Excel software and SPSS v.25.0 for analysis. SPSS v.25.0 was used for analysis. Categorical variables were analyzed descriptively in the form of frequency and percentages. Numerical variables were analyzed descriptively in the form of mean and stand deviation. Post-stratification two categories were associated with Chi-Square Test. Analysis was presented in the form of tables and figures.

RESULTS

In our study, a total of 262 poisoned cases were studied out of which 228 (87%) were male and 34 (13%) were female. Middle age group of 21-30 years individuals were poisoned more than others followed by 31-40years of age.

In this study, we are looking for the inclinations of poisoning, out of 262 subjects 50.4% (n=132) were poisoned with a single drug, though 49.6% (n=130) were having multiple drugs. The poisons found in the study were morphine (58.0%, 152), methamphetamines (34.4%, 90), benzodiazepines (34.4%, 90), Tetrahydrocannabinol (19.8%, 52), amphetamines, (15.6%, 41), phosphine (8.8%, 23), Tricyclic antidepressants (8.4%, 22), carbon monoxide (3.8%, 10), methyl alcohol (1.5%, 4), ethyl alcohol (1.1%, 3), propranolol (0.8%, 2), arsenic (0.4%, 1) and tissue paper (0.4%, 1).

However, the postmortem interval in subjects was seen, 21.0% (55) were in between 1 to 4 hours, 27.9% (73) were in between 4 to 8 hours, 35.5% (93) were in between 8 to 16 hours, 7.6% (20) were in between 16 to 24 hours, 5.0% (13) were between 24-48 hours and 3.1% (8) were more than 48 hours. The trends of poisoning have been looked through the period of 5 years, indicating the use of morphine, amphetamines, and methamphetamines escalating in the meantime, whereas the frequency of usage of benzodiazepines remains sustained; details in Table 3.

DISCUSSION

To our knowledge, it's a study to focus on the regional trends of poisoning on autopsy in Khyber Pakhtunkhwa. All manners of poisoning based on suicidal, homicidal, or accidental events are included. The study had a total number of 262 subjects of which 87.0% were males, which was consistent with many studies [12,13,14]. in this part of the world where the male gender dominates and a huge burden lies on them, so they are more susceptible to poisoning. The peak deaths were in the age groups of more than 20 years to 50 years, as this is the period in which they are more productive in life, so incline to-

Table 1: OVERALL DEMOGRAPHIC INFORMATION INCLUDED IN THE STUDY

Variables	n=262	Percentage (%)
Gender		
Male	228	87.0
Female	34	13.0
Age in groups		
< 21 years	11	4.2
21-30 years	82	31.3
31-40 years	77	29.4
41-50 years	48	18.3
51-60 years	29	11.1
> 60 years	15	5.7

Table 2: DIFFERENT POISONS WITH FREQUENCIES

Poisons	Single n=132 (%)	Multiple n=130 (%)	Total n=262 (%)
Amphetamine	2 (1.5)	39 (30.0)	41 (15.6)
Arsenic	1 (0.8)	0 (0)	1 (0.4)
Benzodiazepines	25 (18.9)	65 (50.0)	90 (34.4)
Carbon monoxide	10 (7.5)	0 (0)	10 (3.8)
Ethyl alcohol	1 (0.8)	2 (1.5)	3 (1.1)
Methamphetamine	8 (6.1)	82 (63.1)	90 (34.4)
Morphine	44 (33.3)	108 (83.1)	152 (58.0)
Methyl alcohol	4 (3.0)	0 (0)	4 (1.5)
Phosphine	23 (17.4)	0 (0)	23 (8.8)
Propranolol	2 (1.5)	0 (0)	2 (0.8)
Tricyclic antidepressant	3 (2.3)	19 (14.6)	22 (8.4)
Tetrahydrocannabinol	11 (8.3)	41 (31.5)	52 (19.8)
Tissue Paper	0 (0)	1 (0.8)	1 (0.4)

Table 3: TRENDS OF POISONING THROUGH 5 YEAR-PERIODS

Poisons	Years									
	2018		2019		2020		2021		2022	
	Frequency N=45 (%)		Frequency N=60 (%)		Frequency N=58 (%)		Frequency N=48 (%)		Frequency N=51 (%)	
Amphetamine	4	8.9	11	18.3	8	14	10	20.8	8	15.7
Arsenic	0	0	0	0	0	0	0	0	1	2.0
Benzodiazepines	20	44.4	20	33.3	16	27.6	15	31.2	19	37.3
Carbon monoxide	4	8.9	2	3.3	2	3.4	0	0	2	3.9
Ethyl Alcohol	1	2.2	0	0	1	1.7	1	2.1	0	0
Methamphetamines	3	6.7	20	33.3	22	37.9	26	54.2	19	37.3
Morphine	13	28.9	34	56.7	41	70.7	31	64.6	33	64.7
Methyl Alcohol	0	0	0	0	2	3.4	0	0	2	3.9
Phosphine	7	15.6	7	11.7	6	10.3	2	4.2	1	2.0
Propranolol	0	0	0	0	1	1.7	0	0	1	2.0
Tricyclic antidepressants	1	2.2	7	11.7	4	6.9	4	8.3	6	11.8
Tetrahydrocannabinol	9	20	14	23.3	6	10.3	11	22.9	12	23.5
Tissue Paper	0	0	1	1.7	0	0	0	0	0	0

wards poisoning due to occupational hazards, accidental threats, social disputes, and jealousy, and mental stress, seen in a lot of studies conducted [14-17].

As it is an autopsy-based study, the testing of samples showed multiple poisons in samples which came out to be 49.6%, while the rest were cases of single poisoning. Most of the cases of multiple poisons were a combination of morphine, methamphetamines, Tetrahydrocannabinol, and benzodiazepines. The most common poison either single or in multiple cases was morphine (58%) succeeded by benzodiazepines (34.4%) and methamphetamines (34.4%), which is contrary to a study in Pakistan where organophosphate was the most common [17] as well as in India [13,18] and in China [19]. Morphine, methamphetamines, amphetamines, and Tetrahydrocannabinol are recreational drugs, but their extravagance use harms one's life. These are illegally used by the youth to cope with their daily stress, which unintentionally leads to toxicity ending up in death. On the other hand, benzodiazepine misuse is increased in the study showing that people having depression and insomnia overuse it, neglecting the adverse events relating to it. Moreover, carbon monoxide poisoning is prevalent because of its production in cars, industries, generator use, and household stoves as well, this is also consistent with a study in Turkey [20].

Now, we are here to discuss the trends of these poisons over the 5 years, in which the use of stupefying agents was topmost and escalating in the meantime. The

morphine and cannabis abuse and methamphetamines hype is an alarming sign in the region engulfing the mind of youngsters, especially. This is due to illicit drug trafficking, lack of law enforcement agencies, and adverse impacts of social media. Drug abuse is responsible for decreased job output and attendance, increased health care costs, and intensification of domestic violence and violent crimes. Drug addiction is a preventable disease [21]. However, the misuse of benzodiazepine was steady throughout the 5 years, with the fact of increased depression and anxiety in the population due to inflation and economic crisis in the country, domestic and social norms, and competitive behaviors. Another reason pointing to its toxicity is that it's misused after medical prescription. People with a history of benzodiazepine prescription had four times higher odds of misusing benzodiazepines and the primary source of misused benzodiazepines was from family or friends [22]. Many sporadic cases of ethyl alcohol, methyl alcohol, and Tricyclic antidepressants have appeared as shown in the data. Nowadays trends are changing mostly morphine followed by amphetamines poisoning is more prevalent as shown in our study. Peshawar being the capital city has more poisoning cases than other cities.

CONCLUSION

Our study concluded that poisoning was found more prevalent in males in the middle age group. In addition, the analysis of the last five years revealed that trends of morphine and methamphetamine poisoning increased while phosphine was found to be decreased for the cause of death determination.

RECOMMENDATIONS

Our analysis clearly indicates that future studies must incorporate a quantitative analysis of poisons to gain a better understanding of the associations with variables. It is imperative to take immediate action against the most prevalent poisons, namely morphine, methamphetamines, and benzodiazepines, by reducing their availability and implementing rigorous checks during sales. This article serves as the foundation for further research on the contributing factors to poisoning trends.

REFERENCES

1. Chaudhary BL, Singh D, Tirpude BH. Trends of poisoning in the Kasturba hospital, MGIMS, Sevagram. Int. J Med Toxicol. Legal Med.2005;7(2):13-7.
2. Dogra TD, Rudra A editors. Lyon's Medical Jurisprudence & Toxicology. 11th edition; Delhi(India): Delhi Law House;2007:1065-1079.
3. Ali SMA, Munir U, Asghar I. Pattern of child abuse in a district of southern Punjab. JSZMC 2019;10(1): 1598-1600.
4. Sinha US, Kapoor AK, Agnihotri AK, Srivastava PC. A profile of poisoning cases admitted in SRN Hospital, Allahabad with special reference to Aluminium Phosphide poisoning. JFMT.1999;16(1):40-3.
5. Hayden K, Norton M. Darcy. Occupational exposure to pesticides increases the risk of incident AD Coache County study. Neurol. 2010:74(19):1524-30.
6. Basic information on clothianidin registration status and related information US.EPA 27 July 2012.
7. Gilden R, Huffing K, Satter B. Pesticide and Health risks jobs Gynecol, Neonatal nurse 2010:39(1):103-10.
8. Van macle. Fabry G. Lanton Ac, Hoet Puson P (June 2010) Child Leukemia and parental occupational exposure to pesticides a systematic review and analysis cancer. Cancer Causes Control. 2010 Jun;21(6):787-809.
9. Elif D, Akgür SA, Oztürk P, Sen F. Fatal poisonings in the Aegean region of Turkey. Vet Hum Toxicol. 2003 Mar;45(2):106-8
10. Akram R, Ashiq R. Acute poisoning due to commercial pesticide in Multan. J Pak Med Sci. 2002:18(3):227- 31.
11. Jeyaratvan J. Acute pesticide poisoning major global health problem world health status. World Health Stat Q. 1990;43(3)139-44.
12. Akram R, Ashiq R. Acute poisoning due to commercial pesticide in Multan. J Pak Med Sci. 2002:18(3):227- 31.
13. Chaudhary BL, Singh D, Tirpude BH. Trends of poisoning in the Kasturba hospital, MGIMS, Sevagram. Int. J Med Toxicol Legal Med. 2005;7(2):13–7.
14. Singh SP, Aggarwal AD, Oberoi SS, Aggarwal KK, Thind AS, Bhullar DS, et al. Study of poisoning trends in north India--a perspective concerning world statistics. J Forensic Leg Med [Internet]. 2013;20(1):14–8. Available from: http://dx.doi.org/10.1016/j.jflm.2012.04.034
15. Fedakar R, Türkmen N. Fatal poisonings in the south Marmara region of Turkey. Electron J Gen Med [Internet]. 2008;5(1):1–8. Available from: http://dx.doi.org/10.29333/ejgm/82566
16. Hanssens Y, Deleu D, Taqi A. Etiologic and demographic characteristics of poisoning: a prospective hospital-based study in Oman. J Toxicol Clin Toxicol [Internet]. 2001;39(4):371–80. Available from: http://dx.doi.org/10.1081/clt-100105158
17. Khan NU, Khan UR, Feroze A, Khan SA, Ali N, Ejaz K, et al. Trends of acute poisoning: 22 years experience from a tertiary care hospital in Karachi, Pakistan. J Pak Med Assoc. 2016;66(10):1237–42.
18. Goswami O, Mahanta P, Kalita D, Konwar R, Yadav DS. A three-year study on acute poisoning cases brought for medico-legal autopsy in a north-eastern city of India. Open Access Emerg Med [Internet]. 2021;13:45–50. Available from: http://dx.doi.org/10.2147/OAEM.S297083
19. Zhou L, Liu L, Chang L, Li L. Poisoning deaths in Central China (Hubei): A 10-year retrospective study of forensic autopsy cases: Poisoning deaths in central China. J Forensic Sci [Internet]. 2011;56 Suppl 1:S234-237. Available from: http://dx.doi.org/10.1111/j.1556-4029.2010.01625.x

20. Fedakar, R. and Türkmen, N. (2008) "Fatal poisonings in the South Marmara region of Turkey," Electronic Journal of General Medicine, 5(1), pp. 1–8. Available at: https://doi.org/10.29333/ejgm/82566.

21. Nessa, A., Latif, S. A., Siddiqui, N. I., Hussain, M. A., & Hossain, M. A. (2008). Drug abuse and addiction. Mymensingh medical journal: MMJ, 17(2), 227–235.

22. McHugh RK, Peckham AD, Björgvinsson T, Korte FM, Beard C. Benzodiazepine misuse among adults receiving psychiatric treatment. J Psychiatr Res [Internet]. 2020;128:33–7. Available from: http://dx.doi.org/10.1016/j.jpsychires.2020.05.020

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ORIGINAL ARTICLE

MYOCARDITIS IN CHILDREN PRESENTING WITH MEASLES- DATA FROM A TERTIARY CARE HOSPITAL IN PAKISTAN

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ABSTRACT

Objectives: Measles is one of the most familiar contagious diseases in children associated with numerous systemic complications. The aim of this study is to find the frequency of Myocarditis in children suffering from measles.

Materials and Methods: This cross-sectional study was conducted in the department of pediatrics, MTI Lady Reading Hospital Peshawar from 6th December 2019 to 5th June 2020. Ninety-six patients of both genders and ages ranging from 1-12 years having measles for more than one week were enrolled in the study after informed consent. Ethical approval for the study was obtained from the Ethical Review Board. Patient demographic data were collected on a structured proforma and the frequency of children having clinical presentation of myocarditis was recorded. Data were entered and analyzed using SPSS 22.

Results: The frequency of Myocarditis was 7.3% in children presented with Measles. The mean age was 6.6± 3.06 years. There were 47.9% males and 52.1% females. Most patients belonged to middle socioeconomic status i.e. 61.5%. Maternal education was 49% in the 6-10 age group. In sampled population, 46.9% belonged to urban areas and 5.1% belonged to rural areas. There were 18.8% vaccinated children and 81.3% were not vaccinated for measles. Myocarditis was significantly associated with the younger age group (p-value 0.028), however, there was no difference in gender (p-value 0.781). Children with low socioeconomic status had significantly higher frequency (p-value 0.05) of myocarditis.

Conclusion: Myocarditis is commonly presented in children having measles especially patients in younger age groups and belonging to poor socioeconomic status.

Keywords: Children, Low socioeconomic status, Measles, Myocarditis

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INTRODUCTION

Measles is a contagious and rapidly spreading disease caused by the Measles virus. [1] It is a major public health problem and a leading cause of morbidity and mortality. [2] It is characterized by high fever associated with cough, coryza, and conjunctivitis. [3] Measles virus belongs to the family of Paramyxoviridae and genus Morbillivirus, which is a single-stranded, lipid-enveloped RNA virus. The virus enters the host body through the respiratory tract or conjunctivae by droplet aerosols from infected persons. [4-6] According to the World Health Organization (WHO), measles is the leading cause of childhood mortality with around 140,000 deaths annually where almost 95% occur in low-income countries with poor health infrastructure. [7] In a study conducted in Pakistan, 14000 measles cases were reported in 2021 with 210 patients dying of it. [5, 8, 9]. Measles infection is associated with many complications like bronchopneumonia, otitis media, encephalitis, diarrhea, croup, febrile seizures, and myocarditis. [10, 11]

Complications of measles are more likely to occur in persons younger than 5 years or older than 20 years, and complication rates are increased in persons with immune deficiency disorders, malnutrition, vitamin A deficiency, and inadequate vaccination. Immunocompromised children and adults are at increased risk for severe infections and super-infections. [12]

Myocarditis is the inflammation of the myocardium in association with myocellular necrosis and degeneration that is typically caused by a viral infection such as measles. It can either be focal or diffuse and can lead to cardiac dysfunction. [13] Previously published literature reported that complication of measles such as myocarditis is not rare in developing countries. where there is a high prevalence of malnourished and unvaccinated children. [14-16] Results of a recent study conducted by Hussain S et

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al. showed that myocarditis is present in 4.16% of the children infected with measles and 100% of the patients with myocarditis were malnourished and unvaccinated. [15]

The prevalence of measles is very high in Pakistan especially Khyber Pakhtunkhwa province [16]. There is a significant number of children who are unvaccinated and malnourished. [17] Hence, it is of great concern for healthcare professionals to estimate the prevalence of myocarditis in these children, which is a fatal complication. This would help the physicians to devise strategies for early diagnosis of such fatal complications. If study results showed a high frequency of myocarditis in children with measles, routine cardiac enzyme and ECG testing for myocarditis will be recommended. Prompt management of myocarditis in these children would result in a reduction in morbidity and mortality associated with it.

MATERIAL AND METHODS

This cross-sectional study was conducted in the Pediatrics department of Lady Reading Hospital Peshawar. The study duration was 6 months from December 6, 2019, to June 5, 2020. Prior to conducting the study, approval was taken from the hospital ethics committee. Patients were enrolled from the pediatric wards of Lady Reading Hospital, Peshawar. Informed written consent was obtained from all the parents/guardians. A total of 96 patients of both gender and age 1 month to 12 years having measles for more than one-week duration were included in the study because cardiac complications do not appear in the first week of infection. All the children underwent a complete history and clinical examination. Measles was diagnosed clinically if the child had a fever and a generalized maculopapular rash and was further confirmed by measles serological testing. X-Ray chest PA view was done. Twelve lead ECGs were recorded and blood samples were drawn for estimating the level of cardiac enzyme (troponin-I). All the demographic details including age, gender, vaccination status, parents' education, residence, socioeconomic condition, and study results were recorded using data collection proforma.

Data were entered and analyzed on computer software Statistical Package for Social Sciences version 22. Quantitative variables like age were measured as mean ± SD. Frequencies and percentages were calculated for all qualitative variables like gender, socioeconomic status, maternal education status, residential status, vaccination status, and myocarditis. Effect modifiers like age, gender, socioeconomic, maternal education, residential, and vaccination status were controlled by the stratification. Post-stratification chi-square test was applied and p-value ≤0.05 was considered as significant.

RESULTS

The demographic parameters of the study population including age, gender, socioeconomic status, vaccination status, and residence are summarized in table-1. Children in the upper age group were found more susceptible measles (52%) while younger children (1-6 years) had lower frequency (44%) of measles. A high percentage of myocarditis was observed in poor and middle-class children of less educated parents however children of highly educated and economically good families had lower frequency. However, no mortality was recorded due to myocarditis during the study duration. Stratification of myocarditis with respect to gender, age residence, vaccination status, socioeconomic status, and maternal education is

Table 1: Demographics of the study population (n=96)

Age Distribution	Number	Percentage
1-6 years	44	(45.8%)
7-12 years	52	(54.2%)
Gender		
Male	46	(57%)
Female	50	(43%)
Maternal Education		
≤ 5 years of education	24	(25%)
6-10 years of education	47	(49%)
11-12 years of education	19	(19.8%)
> 12yrs of education	6	(6.3%)
Socioeconomic status		
poor	30	(31.3%)
Middle class	59	(61.5%)
Rich	7	(7.3%)
Residence		
Rural	45	(46.9%)
Urban	51	(53.1%)
Vaccination status		
Vaccinated	18	(18%)
Unvaccinated	78	(82%)

Table 2: Stratification of myocarditis with respect to various parameters

Myocarditis	Age (1-6 : 7 -12)	Gender Male : Female	Vaccination status vaccinated : unvaccinated	Parent education ≤5yrs:6 10yrs:11 12yrs:>12yrs	Socioeconomic Status Poor : middle : rich	Residence Rural : urban
Present	6:1	3 : 4	1: 6	2:4:1:0	5 : 2 : 0	1 : 6
Not Present	38:51	43 : 46	17 : 72	22 : 43:18:6	25 : 57 : 7	44 : 45
p-value	0.028	0.781	0.75	0.86	0.05	0.07

given in table 2. Children under the age of 6 years and rural families were having myocarditis more than others.

Similarly, older children were having significantly more myocarditis however the results were non-significant for maternal education, residential status, and vaccination status as shown in table-2

DISCUSSION

The incidence of cardiac complications in children following measles is not well reported in the literature, however serious complications related to cardiac function such as myocarditis cannot be ignored. This study was carried out to look at the frequency of myocarditis in children presenting with measles.

In the present study, the mean age of study participants was 6.6± 3.06 years. There were more females (52.1%) than males. Most patients belonged to middle socioeconomic status i.e. 61.5 followed by poor class 31.3% and 7.3% belonged to the high class. Maternal education was 6-10 years of education in 49% of mothers and 25% of mothers had less than 5 years of education. In sampled population, 46.9% belonged to urban areas and 5.1% belonged to rural areas. Myocarditis was present in 7.3% of children. There were 18.8% vaccinated children and 81.3% were not vaccinated for measles. Data stratification for age was significant, myocarditis was significantly associated with the younger age group, p-value of 0.028 significant. Data stratification was not significant for gender, with a p-value of 0.781. Myocarditis was present in children belonging to the poor class, p-value of 0.05. Data stratification was not significant for maternal education, residential status, and vaccination status.

Similar results were published in a study from the Polish Journal of Microbiology, where 52% of patients were females, although their mean age was 15.06 (± 9.4) months, while 48 % were males with a mean age of 15.94 (± 9.7) months. [10] Similarly, the parents' educational status was assessed and 43% were uneducated, while 28% had secondary education and 22% had only primary education. As far as the socio-economic status of the patients is concerned, 50% belonged to low-income families, while 38% were from the middle class and 7% from the upper class. In male patients, myocarditis was present in 4.1% of patients and, in female patients' myocarditis was present in 1.9%, making a total frequency of 6% in the studied population which is close to our study.

A study conducted by Khan et al. showed that among 302 measles patients,180 (60%) were males, and 122 (40%) were females. The mean age of children was 26.8 months and the majority 138(45.69%) were between 1-3 years' age. They showed that myocarditis was present in 0.66% of children which is quite less than the present study. [18] This difference could possibly be due to the high vaccination frequency in their population as myocarditis is more common in the unvaccinated children. The population selected by Khan et al. were having high vaccination rate as compared to our study population so the rate of myocarditis was lower than our study.

CONCLUSION

Myocarditis affects the function of the heart and is a common complication of measles. It is especially present in patients of younger age groups and belonging to poor class socioeconomic status. Similarly, measles vaccination is important as myocarditis was more in un-vaccinated children.

REFERENCES

1. Nandi A, Shet A, Behrman JR, Black MM, Bloom DE, Laxminarayan RJV. Anthropometric, cognitive, and schooling benefits of measles vaccination: Longitudinal cohort analysis in Ethiopia, India, and Vietnam. Vaccine. 2019; 37(31):4336-43.
2. Khan T, Qazi J. Measles outbreaks in Pakistan: causes of the tragedy and future implications. Epidemiol Reports. 2014; 2(1):1.
3. Mizumoto K, Kobayashi T, Chowell GJE. Transmission potential of modified measles during an outbreak, Japan, March-May 2018. Euro Surveill. 2018; 23(24):1800239.
4. Laksono BM, De Vries RD, McQuaid S, Duprex WP, De Swart RL. Measles virus-host invasion and pathogenesis. Viruses. 2016; 8(8):210.
5. Ludlow M, McQuaid S, Milner D, de Swart RL, Duprex WP. Pathological consequences of systemic measles virus infection. J Pathol. 2015; 235(2):253-65.
6. Rabia M, Samiya N, Shabir A, Kamran S. Measles–Immunization status and outcome. J Rawalpindi Med Coll. 2014; 18(2):205-8.
7. Niazi AK, Sadaf R. Measles Epidemic in Pakistan: In Search of Solutions. Annals Med Health Sci Res. 2014; 4(1):1-2.
8. Wesolowski A, Winter A, Tatem AJ, Qureshi T, Engø-Monsen K, Buckee CO, et al. Measles outbreak risk in Pakistan: exploring the potential of combining vaccination coverage and incidence data with novel data streams to strengthen control. Epidemiol Infect. 2018; 146(12):1575-83.
9. Islam A, Younas Z, Qadri KFI, Alelwani W, Rauf M, Qadri IJ. The Battle against Measles in Pakistan-the Current Scenario. Gastroenterology Med Res. 2019; 3(2):1-3.
10. Ilyas M, Afzal S, Ahmad J, Alghamdi S, Khurram M. The resurgence of measles infection and its associated complications in early childhood at a tertiary care hospital in Peshawar, Pakistan. Polish J Microbiol. 2020; 69(2):177.
11. Mere MO, Goodson JL, Chandio AK, Rana MS, Hasan Q, Teleb N, et al. Progress toward measles elimination—Pakistan, 2000–2018. MMWR Morb Mortal Wkly Rep. 2019; 68(22):505-10.
12. Donadel M, Stanescu A, Pistol A, Stewart B, Butu C, Jankovic D, et al. Risk factors for measles deaths among children during a Nationwide measles outbreak–Roma-

nia. BMC Infect Dis. 2016–2018. 2021; 21(1):1-10.

13. Bester JC. Measles and measles vaccination: a review. JAMA Pediatr. 2016; 170(12):1209-15.
14. Kumari L, Kumar R. Clinical and laboratory profile of children admitted with measles in a tertiary care teaching hospital. J Child Health. 2018; 5(6):428-31.
15. Hussain S, Yasir M, Tarar SH, Sabir MUD. Measles: demographic profile and associated morbidities of measles cases admitted in a teaching hospital. Pak Armed Force Med J. 2016; 66(1):92-7.
16. Golpour A, Patriki D, Hanson PJ, McManus B, Heidecker B. Epidemiological impact of myocarditis. J Clin Med. 2021; 10(4):603.
17. Rafi M, Khan A, Ahmad K, Khan A. How Religious and Cultural Doctrines Affect Child Vaccination: An Analysis of Parents' Understanding of Child Vaccination in Khyber Pakhtunkhwa, Pakistan. J Hospital Librarianship. 2021; 21(4):307-18.
18. Khan I U, Khattak AA, Muhammad A. Complications of Measles in Hospitalized Children. Khyber Med University J. 2013; 5(1): 27-30.

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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.

ORIGINAL ARTICLE

SAFETY OF MISOPROSTOL IN SECOND TRIMESTER MISCARRIAGES IN PATIENTS WITH PREVIOUS UTERINE SCARS

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ABSTRACT

Objective: To assess the safety of Misoprostol in mid-trimester miscarriages in patients with previous scars.

Materials and Methods: This was a cross-sectional comparative study conducted in the Department of Gynaecology and Obstetrics, Lady Reading Hospital, from January 2021 to December 2021. Two-hundred patients with second-trimester miscarriages were included in the study. They were divided into two groups, 100 patients with no previous scar as the control group and another 100 patients with a previous scar as the study group. Patients having an incomplete abortion, gestational trophoblastic disease, and more than one scar were excluded from the study. Misoprostol doses were kept vaginally in both groups. The doses were kept according to the gestational period of 13 to 24 weeks following the local protocol which was comparable with the FIGO protocol. Data analysis was done using SPSS-24.

Results: The Demographic features of patients of the two groups, were comparable for maternal Age (26±5.3 Years versus 25±4.9 years), Gestational Age in weeks of (18±1.3 weeks versus117±1.6 weeks) Gravidity (4.5±1.6 versus 4.9±1.2) and of Parity (3.4 ±1.4 versus 3.6 ±1.1) which showed no significant difference with respect to age, parity and gestational age. The period needed for successful TOP was 18 hours in the control group whereas it was 36 hours in the scarred uterus with half doses. Successful termination was observed in 61% of the study group with the scared uterus and 72% in the control group.

Conclusion: Our study concluded that misoprostol is safe and effective in the termination of second-trimester miscarriages with a scarred uterus.

Keywords: Misoprostol, Miscarriage, Previous Uterine Scar

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INTRODUCTION

It is of great importance in modern obstetrics to diagnose cases of missed miscarriages and structural abnormalities and offer Termination of pregnancy (TOP) in these cases. [1] Two options are there to offer termination of pregnancy: one medical and the second surgical termination. Surgical termination has a higher risk of maternal morbidity and mortality. [2] Misoprostol is a prostaglandin analog PE1 and one of the safest methods for medical termination of pregnancy and priming the cervix before surgical termination. According to the American College of Obstetrics and Gynaecology, misoprostol is the treatment of choice for ripening of the cervix. [3] There are many risk factors involved in the termination of pregnancy. The most important of these is the previous uterine scar which leads to serious complications like uterine rupture, infections, fistulas, severe blood loss, and death. So, the method of termination should be carefully selected to avoid such complications. [4] Some studies have reported serious complications with misoprostol before the third trimester while other studies have reported safety with the use of misoprostol. [5]

The safety of the use of misoprostol has been questioned in women with previous uterine scars. The data on the safety of misoprostol in the second trimester with previous scar is limited and no local studies have been done to date, so this study was planned. The conclusion of the study will render with local statistics and will pave the way for further research.

MATERIALS AND METHODS

This was a descriptive cross-sectional comparative study conducted in the Department of Gynaecology and Obstetrics, Lady Reading Hospital, from January 2021 to December 2021. The ethical approval of the study was taken from the hospital's ethical committee. Written informed consent was taken from all the couples included in the study. Patients were admitted and a detailed Proforma was filled regarding the history of the patient, including demographic features, period of gestation, high-risk factors,

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and previous surgeries, clinical examination was done and routine Laboratory investigations and ultrasound were performed. The sample size was 200 calculated with the WHO formula taking the prevalence of miscarriages in pregnancy as 7%, confidence interval 95%, and margin of error 5%. The patients were distributed in the two groups by lottery consecutive sampling.

100 patients with no previous scar were put in the control group and another 100 patients with previous scar were put in the study group. The patients having incomplete miscarriages, with gestational trophoblastic disease and more than one scar were excluded from the study. Misoprostol doses were kept vaginally in both groups. The doses were kept according to the gestational period of 13 to 24 weeks following the local protocol which was comparable with the FIGO protocol. Full doses of 200 micrograms 6 hourly were kept from 13 to 17 weeks and doses of 100 micrograms 6 hourly were kept from 18 to 24 weeks for 24 hours and half of these amounts were kept in the study group with previous scar according to local ward protocol which has also been recommended by FIGO as shown in table 1 (FIGO recommends to alter the dose according to local protocol for patients with scarred uterus).

Data was entered in SPSS 24; Mean ±SD was calculated for continuous variables like age, period of gestation, and parity. Post-stratification analysis was done using a paired independent t-test to calculate the p-value which was taken as ≤ 0.05 to be significant. The primary outcome was success rate observed in both groups in terms of doses used and period for termination and the secondary outcome was the complication rate in both groups.

RESULTS

A total of 200 patients were included in the study. They were divided into two groups. One group had 100 patients as control with no scarred uterus and the other group included 100 patients with scarred uterus. The demographic features of patients of the two groups with the control and study group were comparable for maternal Age (26±5.3 Years versus 25± 4.9 years with a p-value of 0.860), Gestational Age in weeks of (18±1.3 weeks versus17±weeks+1.4 with a p-value of 0.554) Gravidity (4.5 ± 1.6 versus 4.9 ± 1.2 with a p-value of 0.844) and of Parity (3.4 ±1.4 versus 3.6±1.1 with a p-value of 0.842) and showed no significant difference concerning age, parity and gestational age as can be seen in Table 2. Successful termination was observed in 61% of the study group with the scared uterus and 72% in the control group. The p-value of 0.03 showed that TOP was more successful in patients in the control group without previous C-sections as compared to the study group, which was attributed to half doses taken in the control group hence these patients were subjected to a second cycle as shown in Table 3. The time period needed in hours for expulsion was 18±2.3 hours in the control group and 36±3.5 hours in the scarred uterus with a p-value of 0.04 showing almost double the time needed for expulsion in the scarred uterus with half doses. The doses needed for the control group were 3 doses per cycle and for the study group were 6 doses as shown in table 4.

Surgical intervention was needed in 18% of the control group and 19% in the study group due to vaginal bleeding and incomplete abortion as can be seen in Table 3. Side effects rates in the two groups were comparable with no significant difference with no major complication of uterine rupture seen in both groups.

Table 1: Departmental protocol for per vaginal dose administration of Misoprostol comparable with the FIGO protocol

Gestational Age	Misoprostol Without Previous Scar	Misoprostol With Previous Scar
13-17 weeks	200 μgm 6 hourly	100 μgm 6 hourly
18—24 weeks	100 μgm 6 hourly	50 μgm 6 hourly

Table 2: Demographic features of patients (n=200)

Variable	Control group (n=100)	Study group (n=100)	P value
Age	26±5.3 Years	25±4.9 years	0.860
Gestational Age	18 ±1.3 weeks	17.3±1.4 weeks	0.554
Gravida	4.5±1.6	4.9±1.2	0.844
Parity	3.4±1.4	3.6±1.1	0.842

Table 3: The Outcome of Misoprostol in Termination of Pregnancy

Outcomes	Control group	Study group	P value
Successful Termination	72%	61%	0.03
Surgical Intervention			
Excessive PV bleeding	12%	13%	0.832
Incomplete Abortion	6%	6%	0.722

Table 4: Efficacy parameters in termination of pregnancy

Efficacy Parameters	Control group (hours)	Study group (hours)	P value
Time period	18±2.3	36±3.5	0.04
Doses	3.44±1.04	6.06±0.96	0.05

Table 5: Complications

Complications	Control group	Study group	P value
Uterine rupture	0	0	0
Heavy vaginal bleeding	18%	19%	0.09
Failed induction	1o%	2o%	0.06

DISCUSSION

According to WHO, the cesarean section (CS) rate is on the rise in both developed and developing countries. Mid-trimester miscarriage makes up 10 -15 % of all miscarriages. [6]

For termination of pregnancy, both medical and surgical methods are available. A lot of work has been done in the past 10 years on misoprostol use in miscarriages but its safety in previous C-sections in mid-trimester through the vaginal route needs further large trials for its safety to be proven. [7]

In this study, we compared the two groups, the success rate was 72% in the control group and 61% in the study group with the previous C-section.

Our results showed similar findings to the study by Ashraf and Gulec and his colleague which showed a high success with no significant rates of complications. [7,8] In contrast to this Iftikhar B et al. noted high rates of complications like abdominal pain, heavy uterine bleeding, and failure of induction rate in mid-trimester miscarriage terminations. [9] In a meta-analysis done by WUHL et al. concluded that termination of miscarriages in the second trimester is safe with misoprostol but in special cases like previous C-sections the doses can be altered for patient safety which is also recommended by FIGO. [10] The success rate of mid-trimester abortion with misoprostol decreases with an increase in the number of previous CS. A systemic review by Berghella et al. showed that termination in more than one CS decreases the success rate with the increase in complication rate whereas the success rate is high with the prior one CS. [11]

The decision for the mid-trimester abortion in patients with previous CS should be on a case-to-case basis, and careful monitoring should be done during such a procedure. Uterine rupture is a drastic complication of abortion in scar uterus, with an incidence of 0.4%, however, no comparative study is done to date to confirm this. [11] In our study, uterine rupture was not observed. Our findings were similar to Shah et al. in which no uterine rupture or other major complication was noted. [12] It has been suggested by many studies that low-dose misoprostol can be used in women with scarred uterus however case reports have been published in which silent ruptures had taken place in primigravida patients but in those cases, higher doses had been kept in. [13]

The period from administration to the expulsion of products was significantly different in both groups. The time period for the control group was 18 hours and for the study group with the previous scar was 36 hours which is attributed to half doses used in the scar group. This was comparable with studies done by Mauzani et al. [14] In another study done by Shah N, the expulsion time was reduced to 13 hours as doses were given frequently at 3 hours intervals. [15]

FIGO recommends adjusting misoprostol doses in cases with previous C section according to local protocols but in a systemic review by Andrikopaulaou M et al. when routine doses with misoprostol were given in cases of second-trimester miscarriages with previous scar there was no increase in uterine rupture and the incidence of uterine rupture remained 0.47% same as in cases with no scar. [16] Also, a study done by El Sharkwy IA revealed the safety of misoprostol in patients with more than one C-section. [17]

CONCLUSION

Our results showed that the use of low-dose misoprostol is safe and effective in second-trimester miscarriages in patients with scarred uterus, taking double time to achieve success but is not associated with increased morbidity. This study will lead the way to further local research and protocols in patients with the scarred uterus in which previously low thresholds for hysterotomies were kept and hence were exposing the patients to further scars.

REFERENCES

1. El-Refaey H, Hinshaw K, Templeton A. The abortifacient effect of misoprostol in the second trimester. A randomized comparison with gemeprost in patients pre-treated with mifepristone (RU 486). Hum Reprod 1993; 8: 1744–1746
2. Huang MC, Hsieh CH, Huang JP, Tsai HT, Lee MS. Comparison of sequential vaginal and sublingual misoprostol after a vaginal loading dose for second-trimester abortion. Taiwanese Journal of Obstetrics and Gynecology. 2017 Jun 1;56(3):312-4.
3. Induction of Labour. ACOG practice bulletin no.10 Washington D.C: American College of Obstetrician and Gynecologists, Novermber 1999.
4. Varras M. Akrivis Ch. Misoprostol for second trimester abortion in women with prior uterine incisions. Clin Expo Obstet Gynecol. 2010; 37(1):10-12
5. Costescu D, Guilbert E. No. 360- induced abortion: surgical abortion and second trimester medical methods. Journal of Obstetrics and Gynaecology Canada 2018 Jun 1;40(6):750-83
6. Manning-geist B. Rimawi BH, Severe infections in obstetrics and gynaecology: how early surgical intervention saves lives. Journal of Clinical Gynaecology and Obstetrics. 2016 Mar 31;5(1):1-6.
7. Ashraf S, Sahar A, Safdar S. Inducing abortion in 2nd trimester; eficacy of misoprostol with previous one cesarean section. Professional Med J 2017; 24(6): 839-84
8. Kucukgoz Gulec UY, Ununsak IF. Eser F, Guzel AB, Ozgunen FT, Evruke IC, Buyukkuri S.Misoprostol for midtrimester termination of pregnancy in women with 1 or more prior cesarean deliveries. Int J Gynaecol Obstet

2013; 120 (1):85-7

9. Iktihar B. Khanum R. Akram NA. Nasreen S. Ibrar F. Fatah A. A COMPARISON OF COMPLICATIONS IN PREVIOUS CAESAREAN WITH NON CAESAREAN CASES UNDERGOING MISOPROSTOL INDUCED MID TRIMESTER ABORTIONS. Pakistan Armed Forces Medical Journal. 2019 Jun 25;69(3):528-33
10. Wu HL, Marwah S, Wang P, Wang QM, Chen XW. Misoprostol for medical treatment of missed abortion: a systematic review and network meta-analysis. Sci Rep. 2017 May 10;7(1):1664. doi: 10.1038/s41598-017-01892-0. PMID: 28490770; PMCID: PMC5431938.
11. Berghella V. Airoldi J.O Neil AM. Einham K. Hoffman M. Misoprostol for second trimester pregnancy termination in women with prior caesarean: a systematic review. BJOG 2009; 116(9)1151-7
12. Shah D. Rijal P. Thakur A. Raj R. Mifepristone and Misoprostol vs Misoprostol Alone in Second Trimester Termination of Pregnancy. Journal of the Nepal Medical Association. 2018 Sep 1:56(213)
13. Flagwany A, Fawzy A. Silent uterine rupture associated with the use of misoprostol during second trimester pregnancy termination in primigravida Archives of Perinatal Medicine 2015;2(1):57-59
14. Mazouni C, Provensal M, Porcu G, Guidicelli B, Heckenroth H, Gamerre M, Bretelle F. Termination of pregnancy in patients with previous cesarean section. Contraception. 2006 Mar;73(3):244-8. doi: 10.1016/j.contraception.2005.09.007. Epub 2005 Nov 2. PMID: 16472563.
15. Shah N.Azam S.I. Khan N.H.Sublingual versus vaginal misoprostol in the management of missed miscarriage.J Pak Med Assoc.60.113-116(2010)
16. Andrikopoulou M. Lavery J A Cervical ripening agents in the second trimester of pregnancy in women with a scarred uterus.a systemic review and metaanalysis of observational studies
17. El Sharkwy IA, Elsayed MI. Ahmed MA. Ainemet AA. Low dose vaginal misopostol with or without Foleys catheter for late second trimester pregnancy termination in women with previous multiple cesarean sections. The Journal of Maternal-Fetal & Neonatal Medicine.2019 Nov17:32(22):3703-7

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Sabir SA: Concept, Critical appraisal, and Discussion Writing

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

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.

ORIGINAL ARTICLE

ASSESSING SLEEP QUALITY AND ITS IMPACT ON ACADEMIC PERFORMANCE AMONG UNDERGRADUATE STUDENTS OF PESHAWAR

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ABSTRACT

Objectives: To assess students' sleep quality and to find the association of students' academic performance with sleep quality.

Materials and Methods: It is a cross-sectional study conducted in three public sector institutes: Khyber Medical College Peshawar (KMC), Khyber College of Dentistry (KCD) Peshawar, and the University of Peshawar (UOP). A convenience sampling technique was used, and a sample size of 139 was calculated using the Cochran formula. Data collection was done from September 10, 2022, to October 1, 2022. A self-administered well-validated questionnaire was used to inquire about students' personal and lifestyle characteristics and academic performance and also included the Pittsburgh Sleep Quality Index (PSQI). A score equal to or greater than 5 on the PSQI scale signifies poor sleep quality. The chi-square test and Pearson correlation were applied to determine statistical significance. The data analyses were conducted using IBM's SPSS Statistical Software for Windows (IBM SPSS Version 21, Chicago, IL, USA).

Results: Out of 139 participants, 29 (20.9%) had good-quality sleep, while 110 (79.1%) were poor sleepers. However, we could find no significant association between sleep quality and academic performance ($p = 0.194$; $r = - 0.049$)

Conclusion: A very high percentage of students had poor sleep quality. However, we could establish no association with academic performance.

Keywords: Sleep Quality; Academic Performance; Medical Students; Dental Students.

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INTRODUCTION

For years it is known that sleep is central to human health, and its deprivation or disruption in any manner poses severe health risks ranging from cognitive decline, lack of concentration, and poor academic performance to psychiatric disorders including anxiety and depression, traffic accidents, occupational injuries, increased risk of obesity and even some types of cancers such as breast cancer. [1]

Medical students are especially prone to insufficient quantity and quality of sleep due to the extensive workload and competitive exams that they must excel in. [2] Insufficient sleep duration, a delay in the onset of sleep, and the occurrence of napping episodes during the day typify their sleep pattern.[3] Abundant evidence has substantiated the elevated occurrence of substandard sleep quality among medical students, with a reported prevalence of 52.7% in one study.[4] Studies regarding the association of sleep quality with academic performance have shown conflicting results, with some claiming that poor sleep quality has a significant association with academic performance, while others have not found so.[5, 6]

The same holds for dental students, as shown by a study in a Brazilian University that dental students also suffer from poor sleep quality, with some studies reporting that poor sleep quality was associated with lower academic performance. [7] In contrast, another study in Iran showed no association. [8] Poor sleep quality was also seen in students of other disciplines unrelated to the medical field, as shown by different studies.[9]

Since previous studies have shown a geographic variation in sleep quality and its association with academic

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performance, only a few studies addressed this problem in dental and other specialty students. To our knowledge, this study is the first of its kind to be conducted in the Khyber Pakhtunkhwa Province of Pakistan. We aim to enunciate the prevalence of poor sleep quality among medical, dental, and students of other disciplines and also to assess its association with academic performance. This research may highlight the need for more comprehensive sleep education for students and professionals in these fields. It will also help educational institutions to develop strategies to support their students' sleep health and optimize their academic performance.

MATERIALS AND METHODS

It is a cross-sectional study conducted in three public sector institutes: Khyber Medical College (KMC) Peshawar, Khyber College of Dentistry (KCD) Peshawar, and the University of Peshawar (UOP). Convenience sampling was used, and based on a previous study, a sample size of 139 was calculated using Cochran's formula. [10] Undergraduate students, Students of 2nd-year to 5th-year MBBS and 2nd-year to 4th-year BDS, and students of 2nd to 8th semester of the University of Peshawar, both males and females were included in our study while those who did not appear in their last exam, students of UOP studying in the first semester, first-year MBBS and BDS students, students with insomnia secondary to some chronic illness, and those students who do a part-time job were excluded. Data collection was started after approval from IREB Khyber Medical College Peshawar (564/DME/KMC, 29th Aug 2022). After informed consent, the data for the sample were collected from September 10, 2022, to October 1, 2022, during active academic sessions. The following operational definitions are used: Academic performance is the percentage of marks obtained in the last professional examination for MBBS and BDS students; while for students of other specialties, it is the percentage equivalent of Grade Point Average (GPA); The classification of good and bad sleepers is according to the Pittsburgh Sleep Quality Index (PSQI) scale, a pre-made validated tool for assessing sleep quality.

Each participant received a self-administered questionnaire that had been validated for accuracy. The questionnaire was face and content validated by subject experts and pilot testing on students, who were then excluded from the study to minimize bias. It included sections on students' personal and lifestyle characteristics, the Pittsburgh Sleep Quality Index (PSQI), and academic performance. Academic performance was assessed by asking participants about their percent marks obtained or grade point average (GPA) for the last exam before the study period. The Pittsburgh Sleep Quality Index (PSQI) is a self-report instrument used to assess sleep quality and detect disturbances experienced during the month preceding the survey. It assigns scores ranging from 0 to 21. A score equal to or greater than 5 signifies poor sleep quality. The application of the chi-square and Pearson correlation tests allowed for the evaluation of statistical significance and correlation between the variables. The data analyses were conducted using IBM's SPSS Statistical Software for Windows (IBM SPSS Version 21, Chicago, IL, USA).

RESULTS

A total of 139 students from various universities filled out the questionnaire, out of which 42 students belonged to KMC, 38 students to KCD, and 59 students from the UOP. Out of the 139 students who completed the questionnaires, 79 (56.8%) were males, and 60 (43.2%) were females.

Overall, 29 (20.9%) participants had good-quality sleep, while 110 (79.1%) were poor sleepers (Figure 1). The maximum number of students (74) fell in the "Good (Percentage 70 to 79% or GPA 3.2 to 3.6)" category. The sleep quality of this group was such that 11 (7.9%) were good sleepers, while 63 (45.3%) were poor sleepers. A total of 36 students fell in the "Outstanding (Percentage > 80% or GPA >3.7) category. Among these, 11 (7.9%) were good sleepers, and 25 (18%) were poor sleepers. The third largest group according to academic performance was "Average (Percentage 50 to 69% or GPA 2.0 to 3.1)". A total of 27 students had an average score, of which 6 (4.3%) participants had good sleep quality, while 21(15.1%) had poor sleep quality. Only two students had poor academic performance (Percentage < 50% or GPA < 2.0), out of which one was a good and one bad sleeper (Table 1, Figure 2).

Additionally, 136 i.e., 97.8% of students used mobile phones in the 2 hours before going to sleep. 27(19.4%)

Table 1: Demographics of included participants

No of participants	Gender		Age (Mean ± SD)	No of participants, according to discipline			No of participants according to academic performance
	Male	Female		MBBS	BDS	Other disciplines	
139	79	60	1.39 ± 21.27	42	38	59	Outstanding: 36
							Good: 74
							Average: 27
							Poor: 2

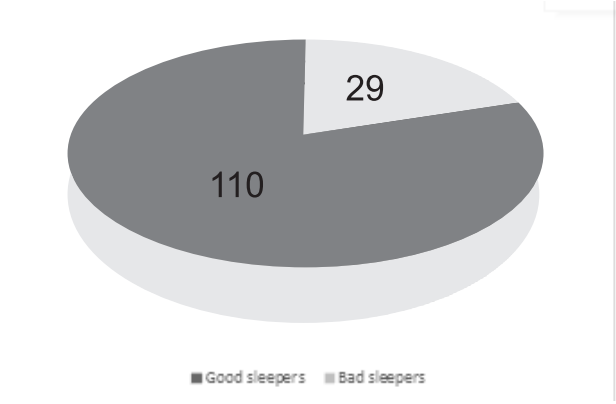

Fig 1: Study participants having good and bad sleep patterns

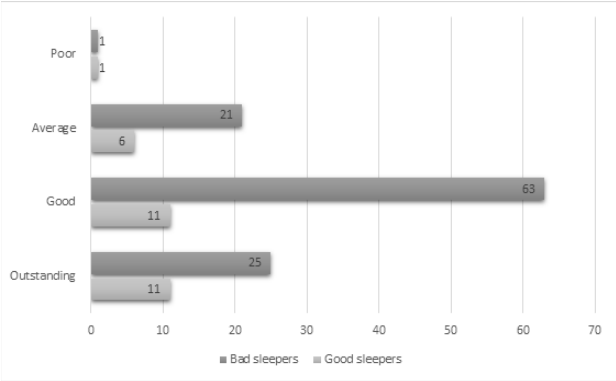

Fig 2: Relationship between sleep quality and academic performance

students' sleep was disturbed up to the level that they were taking sleep-inducing medication. Thirty-three out of the total 38 (86.8%) students from KCD were poor sleepers, which is the highest figure among the three institutes included in the study.

Chi-Square test was applied to determine the effect of sleep quality on academic performance. However, as reported by other studies, we could find no significant association between sleep quality and academic performance ($p = 0.194$). A bivariate Pearson correlation was also run, and it showed a statistically non-significant correlation ($p > 0.05$; $r = - 0.049$)

DISCUSSION

In the modern era where multiple psychosocial factors, a sedentary lifestyle, and excessive use of smartphones signify our daily routine, the importance of sleep becomes of much relevance. Apart from cognitive impairment, and a decrease in productivity and safety in the workplace, Sleep cycle disturbances have been linked to multiple serious health conditions including Parkinson's disease, Multiple system atrophy, depression, and bipolar disorder among others.[11] A striking 79.1% of students had poor while 20.9% had good sleep quality, regardless of their academic performance. However, we could not establish an association between sleep quality and academic performance.

Ojeda-Paredes et al. conducted a study akin to ours, encompassing 65 male and 53 female medical students, and found that 98.11% of women and 90.76% of men experienced a subjective perception of poor sleep quality; No association was found between sleep quality and academic performance.[6] A research conducted in Saudi Arabia by Malak A. Al Shammari et al. involved a sample population consisting of 36.7% males and 63.30% females. The results revealed that 80.60% of the participants reported poor sleep quality, with 37.80% of the students indicating excessive daytime sleepiness. The odds of having poor academic performance were significantly higher in individuals who reported excessive sleepiness.[12]

In an Iranian study in which 177 medical students were enrolled, 36.6% of participants had poor sleep quality; similar to our findings, a higher ratio of females had poor sleep quality, but in contrast to our results, abnormal PSQI scores were significantly associated with lower academic achievement.[13] Abdullah D Alotaibi et al. demonstrated that medical students in their pre-clinical years exhibited poor sleep quality and elevated levels of stress, with a significant association observed between these two variables.[14]

According to a study by K. Ahrberg et al., there is a connection between academic performance and sleep quality as well as stress specifically before exams. The findings reveal that poor academic performance is associated with low sleep quality and high levels of stress during this particular period. However, this relationship was not observed during other time points; but they contend that among medical students, it is not the overall poor sleepers who demonstrate inferior performance in medical board exams. Rather, it is those students who experience higher levels of stress and exhibit poor sleep quality who tend to fare worse on their exams. Nonetheless, it should be acknowledged that inadequate sleep quality can negatively affect test performance, thereby contributing to a cycle of underperformance.[15]

Dental students are no exception to being the victims of poor sleep quality, with one study reporting poor sleep quality in 65% while another in 35%; however, contradicting our findings, sleep quality was associated with academic performance.[7,16]

Contrary to the paradigm that sleep is central to achieving good academic results, we did not observe any significant relationship between sleep quality and academic performance., specifically during the examination period. This difference is surprising, as it suggests that temporary disturbance in sleep during examination times

may not affect academic performance, or it may even improve performance if that time is allocated for studying; in fact, some studies report that poor sleepers had better academic performance than good sleepers. [17] In our study also, the majority of the participants in the outstanding and good category performers were poor sleepers. A possible reason might be that the good performers give less time to sleep yet give more time to study and thus perform better than good sleepers.

To summarize, this study investigated exam performance and sleep quality interrelationships. A staggering majority of the participants were poor sleepers and only a small proportion were good sleepers. We could not show any significant association between sleep quality and exam performance.

Using a cross-sectional study design and convenient sampling limits the power of our study. We also did not consider the students' anxiety, stress, smoking status and marital status. Still, our findings are similar to studies conducted across many other countries, and our results are accurate and generalizable to the study population.

CONCLUSION

A very high percentage of students had poor sleep quality. However, we could establish no association with academic performance. Further research is needed on how much disruption in sleep is tolerable and does not affect academic performance. Large-scale cohort studies with a larger sample size should be conducted to determine the long-term effects of poor sleep quality on academic performance.

Further studies can also identify potential confounders such as stress level, study habits, marital status, smoking, and physical activity. Although a short-term academic performance was not affected, the deleterious effects of poor sleep quality have been well entrenched in the literature and this issue needs to be addressed appropriately. Special educational sessions on the importance of sleep can be arranged for students. The competent authorities should take steps to reduce the workload on students especially those related to health care, so that they can optimize their sleep and be more productive and efficient in the workplace.

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REFERENCES

1. Owens JA, Weiss MR. Insufficient sleep in adolescents: causes and consequences. Minerva Pediatr. 2017;69(4):326-36.
2. Sun Y, Wang H, Jin T, Qiu F, Wang X. Prevalence of Sleep Problems Among Chinese Medical Students: A Systematic Review and Meta-Analysis. Front Psychiatry. 2022;13:753419.
3. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AM, Alhaqwi AI. Sleep disorder among medical students: relationship to their academic performance. Med Teach. 2012;34 Suppl 1:S37-41.
4. Rao WW, Li W, Qi H, Hong L, Chen C, Li CY, et al. Sleep quality in medical students: a comprehensive meta-analysis of observational studies. Sleep Breath. 2020;24(3):1151-65.
5. Ayala EE, Berry R, Winseman JS, Mason HR. A Cross-Sectional Snapshot of Sleep Quality and Quantity Among US Medical Students. Acad Psychiatry. 2017;41(5):664-8.
6. Ojeda-Paredes P, Estrella-Castillo DF, Rubio-Zapata HA. Sleep quality, insomnia symptoms and academic performance on medicine students. Investigación en educación médica. 2019;8(29):36-44.
7. Muñoz MDS, Dantas PPA, Pola NM, Casarin M, de Almeida RZ, Muniz F. Poor Quality of Sleep is Associated with Lower Academic Performance in Undergraduate Dental Students: A Cross-Sectional Study. Sleep Vigil. 2023:1-10.
8. Jowkar Z, Fattah Z, Khorshidi Asl Z, Hamidi SA. Stress, Sleep Quality, and Academic Performance among Dental Students in Shiraz, Iran. Int J Dent. 2022;2022:3781324.
9. Ghrouz AK, Noohu MM, Dilshad Manzar M, Warren Spence D, BaHammam AS, Pandi-Perumal SR. Physical activity and sleep quality in relation to mental health among college students. Sleep Breath. 2019;23(2):627-34.
10. Halari MM, Halari CD, Olaleye AO, Williams IE. Identifying Learning Pattern Among Medical Students and Their Preferred Mode of Study. American Scientific Research Journal for Engineering, Technology, and Sciences. 2016;18(1):142-52.
11. Meyer N, Harvey AG, Lockley SW, Dijk D-J. Circadian rhythms and disorders of the timing of sleep. The Lancet. 2022;400(10357):1061-78.
12. Al Shammari MA, Al Amer NA, Al Mulhim SN, Al Mohammedsaleh HN, AlOmar RS. The quality of sleep and daytime sleepiness and their association with academic achievement of medical students in the eastern province of Saudi Arabia. J Family Community Med. 2020;27(2):97-102.
13. Rasekhi S, Ashouri F, Pirouzan A. Effects of Sleep Quality on the Academic Performance of Undergraduate Medical Students. Health Scope. 2016;In press.
14. Alotaibi AD, Alosaimi FM, Alajlan AA, Bin Abdulrahman KA. The relationship between sleep quality, stress, and academic performance among medical students. J Family Community Med. 2020;27(1):23-8.
15. Ahrberg K, Dresler M, Niedermaier S, Steiger A, Genzel L. The interaction between sleep quality and academic performance. J Psychiatr Res. 2012;46(12):1618-22.

16. Elagra MI, Rayyan MR, Alnemer OA, Alshehri MS, Alsaffar NS, Al-Habib RS, et al. Sleep quality among dental students and its association with academic performance. J Int Soc Prev Community Dent. 2016;6(4):296-301.

17. Al-Khani AM, Sarhandi MI, Zaghloul MS, Ewid M, Saquib N. A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. BMC Res Notes. 2019;12(1):665.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

AM and **IH** conceived and designed the study and are responsible for the integrity of the study.

All authors contributed to the acquisition, analysis, or interpretation of data.

All authors critically revised the manuscript and approved it for publication.

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.

ORIGINAL ARTICLE

VACCINATION STATUS AGAINST HEPATITIS B VIRUS AMONG YOUNG DOCTORS WORKING AT A PUBLIC SECTOR TEACHING HOSPITAL IN PESHAWAR

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ABSTRACT

Objectives: To determine the vaccination status and to find out reasons why young doctors working in KTH do not opt for vaccination against HBV.

Material and Methods: This cross-sectional study was undertaken at Khyber teaching hospital, Peshawar, for four months. A self-administered questionnaire validated by Lynn Criteria and pilot testing for construct, face, and content validity was distributed among young doctors to obtain the vaccination rate and demographic data.

Results: Of the total 150 doctors, who participated in the study, 68.5% were vaccinated. Among them, 38.9% were fully vaccinated with three doses, while the rest were partially vaccinated. The barrier to completing Vaccination in our study population was work overload, negligence, and non-availability of the vaccine.

Conclusion: We observed a low rate of HBV vaccination among young doctors working at Khyber teaching hospital compared to our target vaccination rate. The major frame factors to complete Vaccination in our study population were work overload, negligence, and non-availability of vaccines. Different steps should be taken to ensure the Vaccination of all healthcare workers, including young doctors.

Keywords: Hepatitis B Virus, Vaccination, Healthcare professionals.

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INTRODUCTION

Hepatitis B virus (HBV) infection is a worldwide health threat, affecting more than 2 billion people around the globe, including 350 million people as chronic carriers. It is the 10th major cause of death globally.[1] Approximately 5 million people are suspected of HBV infection in Pakistan.[2] HBV infection is still one of the significant threats to all healthcare personnel. This high incidence of hepatitis B virus infection is due to its mode of transmission. [3]

If we compare healthcare professionals (HCPs) to the general population, healthcare professionals have a higher incidence, approximately ten times greater than the general population.[4] The W.H.O. report showed that about 6% of HCPs are exposed yearly to blood-borne HBV infections corresponding to about 66,000 HBV infections among healthcare workers worldwide. [5]

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The presentation of hepatitis B infection ranges from mild flu-like illness and jaundice to cirrhosis and hepatocellular carcinoma. Such deadly consequences can be prevented by getting vaccinated against the virus. Various studies worldwide have been done regarding vaccination status among healthcare workers. Among such studies, one of the studies was done in India. A prospective study conducted over six months recruited 500 healthcare workers. The study showed that most healthcare workers were unvaccinated, and even those vaccinated had low titers of anti-HBs, so it was made compulsory among healthcare professionals to get vaccinated to check HBsAg and Anti-HBs regularly. [6] A cross-sectional study from Ethiopia among healthcare professionals concluded that vaccination status significantly varies based on the level of education and type of profession. Unavailability and cost of the vaccine were the significant barriers to un-vaccination. [7] Another study in India was done to identify the prevalence of hepatitis B infection among healthcare professionals and their vaccination status. The study results showed that many healthcare professionals are still unvaccinated, so policies should be made to screen, vaccinate, and check serological responses. Those with low titers of antibodies should get a booster dose. [8] A study in Nigeria among health care professionals was conducted to identify vaccination status. This study identified a low

uptake of hepatitis B vaccination among doctors; this was significantly influenced by knowledge of injection safety. [9]

Our research work aims to determine the Hepatitis B vaccination status among young doctors working in Khyber Teaching Hospital (KTH) and the possible barriers that cause hindrances in the complete vaccination process. The literature shows that Vaccination plays an integral part in preventing hepatitis B infection among healthcare professionals and the general population, and studies worldwide showed a low incidence of vaccination among healthcare professionals. So for this reason, hospitals should make policies to screen, vaccinate and check titers of antibodies regularly who are already vaccinated. Our study will focus on identifying the vaccination status of young doctors working in both surgical and medical wards of Khyber teaching hospital and the significant barriers faced by the doctors who are not vaccinated.

MATERIAL AND METHODS

This cross-sectional study was conducted in the Department of Medicine, Medical Teaching Institute, Khyber Teaching Hospital (MTI-KTH), Peshawar Pakistan after getting approval from Institutional Ethical Board (IREB Ref# 796/DME/KMC Dated 3-11-2022). The study population was young doctors, including house officers (HOs) and trainee medical officers (TMOs) working in the medical and surgical wards of KTH Peshawar.

A convenient consecutive sampling technique was used and the duration of the study was four months starting from November 15, 2022. The inclusion criteria were: 1. Young doctors, including both house officers (HOs) and trainee medical officers (TMOs) working in the Clinical departments of MTI-KTH; 2. Both male and female gender fulfilling the criteria; and 3. Working doctors only. Trainee Registrars/ Experiential Registrars/ Faculty of Clinical Departments starting from Experiential Registrar and above/ Doctors with a past and current history of HBV infections and on-leave/hospitalized doctors were excluded from this study. Our study sample comprised of 149 doctors including both HOs and TMOs (20 each from the surgical and medical wards of KTH).

The term “Young Doctors” in this study implies HOs and TMOs of either gender working in the medical and surgical wards of KTH. The term “Vaccination Status” applies to the vaccination status of the doctors, whether they are vaccinated or not against HBV, and if they are vaccinated so, whether are they fully vaccinated or partially vaccinated.

A questionnaire was developed for data collection. This questionnaire was validated for construct, face, and content validity. Lynn criteria were utilized for construct and content validity with 6 faculty members from the Department of Medicine MTI KTH Peshawar having a threshold value of 0.8 for each construct. Pilot testing involving non-participating final year MBBS students of KMC Peshawar (Total of 20) determine the face validity of this questionnaire.[10] This questionnaire was distributed among young doctors and filled by them. Content and face validity of the questionnaire was performed by pilot testing on ten TMOs who were not part of this research work. Data analysis was then conducted in SPSS version 22. Frequencies and percentages were obtained for qualitative (categorical) variables, while means and SD were obtained for quantitative (numerical) variables. The chi-square test was utilized to compare the relative frequencies of categorical data with a p-value of ≤ 0.05 as significant.

RESULTS

Our study sample size was 150 doctors of which 55 % were male and 45% were female participants. The percentage of HOs was 39.6%, while TMOs were 60.4%. All the relevant demographics are presented in Table no 1.

Among the study subjects, 102 doctors were vaccinated (68.5%), while the number and percentage of un-vaccinated doctors were 47 and 31.5% respectively. Among those who were vaccinated, some of them were partially vaccinated, and the rest were fully vaccinated. Among those, the percentage of those study members who had received only one dose was 12.1%, while for those receiving two doses, the percentage was 16.8% among the study members who had received all three doses. Only 18.4% of the sample had received the booster dose. The typical schedule followed was the conventional one, which accounts for 94.11%, while the accelerated schedule was followed in 4.9% of the cases. The most common reason for being vaccinated was to protect from the infection, which counts for 49%. The second most common reason was exposure to occupational hazards, i.e., needle stick injuries and other hazards, which count for 21.5%.

Only 8.26% of the population sample has checked their antibodies status after Vaccination. When asked how serious needle stick injuries can be after exposure, they all answered that the condition could be hazardous.

About 16.8% of the study population had previous exposure to needle stick injuries, and then different strategies were applied after the exposure to minimize the extent and consequences of the insult. When asked about the suggestion that would lead to a decrease in the burden of Hepatitis B infections in the health care workers community, many different possible suggestions were mentioned by the subjects, which include Vaccination (42.2 %), proper SOP protocol which needs to be followed before having exposure to patients (32.6%), proper use of PPE (11.89%), and proper disposal of the needles and sharp objects after usage (3.96%) (Table no 2).

The total percentage of the vaccinated population was 68.5%, of which 76.1 % were vaccinated. Among the

married doctors, only 64.1 % were vaccinated. The percentage of those subjects who had doctors in their families and were vaccinated was 77.6%, while those who did not have any family doctors and were vaccinated were 61.0%. One thing which was observed and was also expected was the 100% vaccination of those doctors who had family members or friends who were infected.

One worrisome thing was the non-vaccination status of that 16.0% of the doctors who were exposed to occupational hazards but were not vaccinated (Table# 3). The major reasons elaborated by these non-vaccinated HCPs were workload, negligence, procrastination, and non-availability of HBV vaccines at the institutional level.

DISCUSSION

Healthcare workers, including young doctors, are prone to infection with HBV. Thus they play an essential role in controlling the epidemic of HBV-related infections. The best approach to prevent HBV infection is through the complete vaccination course and observing protective measures when dealing with patients. A safe and effective vaccine is available throughout the globe. Complete three vaccination doses can prevent approximately 85-95 % of HBV-related deaths. [11, 12]

Despite the availability of an effective vaccine, many doctors still need to be vaccinated. Many different reasons creating hurdles in the drive for adequate vaccination coverage among health workers have been found. Among those, the most common reason includes the cost, availability of vaccines, demanding routine schedule, and being too lazy to get vaccinated.[13]

The vaccination rate in our study population was 68.5%, which is low compared to different studies conducted across the globe and in Pakistan.[14] Different studies have been conducted across different hospitals in Pakistan, where the percentage of vaccinated HCPs varied.[15)] The vaccination percentage in Allama Iqbal, medi-

Table 1: Demographic profile of study participants

Variable		Frequency	%
	Mean age	**2.069 ± 26.40**	
Gender	Male	82	55.0
	Female	67	45.0
Designation	HO	59	39.6
	TMO	90	60.4
Type of residency	Rural	60	40.3
	Urban	89	59.7
Marital status	Single	110	73.8
	Married	39	26.2
Any doctor in the family	No	82	55.0
	Yes	67	45.0
Family member infected	No	147	98.7
	Yes	2	1.3
Friends infected	No	146	98.0
	Yes	3	2.0

Table 2: Vaccination status, reasons, personal experience, attitude, and suggestion of study participants

Variables		F	%
Variables F %	**Yes**	**102**	**68.5**
	No	47	31.5
Number of doses	1	18	12.1
	2	25	16.8
	3	58	38.9
	4	1	0.7
Schedule	Accelerated	5	4.9
	Conventional	96	94.11
	Unknown	1	0.98
Reason for getting Hep-B Vaccination	Occupational Exposure	32	21.5
	Offered free of cost	2	1.3
	Part of the Workplace Requirement	3	2.0
	Self-protection	73	49.0
	Unvaccinated	21	14.1
	Others	18	12.1
Booster dose	No	102	81.6
	Yes	23	18.4
Antibody status	No	111	91.73
	Yes	10	8.26
Attitude Towards Vaccination	Institution Bound	11	6.7
	Vaccinated because of institution	3	1.8
	Personal Protection	43	26.38
	Vaccinated because of personal choice	95	58.28
	Occupational Exposure	11	6.7
How Dangerous Needle Stick Injury Is?	Can be serious	1	0.7
	Dangerous	1	0.7
	Very dangerous	148	98.6
Personal Experience with Needle Stick	No	124	83.2
	Yes	25	16.8
Measures Taken	Saline wash	17	47.2
	Vaccination	12	33.3
	Pyodine	4	11.11
	Serology	3	8.33
Suggestions	Vaccination	96	42.29
	Proper use of PPE	27	11.89
	Follow SOPs	74	32.60
	Safety precautions	12	5.28
	Mass Vaccination	9	3.96
	Proper disposal	9	3.96

cal college Lahore, was 49%, 86% in Aga Khan University Hospital Karachi, 50% in National Institute of Child Health Karachi, 64.6% in Liaquat University Hospital Jamshoro, 71.8% in Sir Ganga Ram Hospital/ Fatima Jinnah Medical College Lahore, 76.05% in King Edward Medical University Lahore and 52% in Dow Medical College and Civil Hospital, Karachi.[11] Another study conducted at LRH Peshawar showed that only 65.6% of the total sample population was vaccinated, and among these, only 66% had completed the whole three doses course of Vaccination.[12] A significant difference was observed in the percentage of vaccination in HCPs before and after they started a professional life at a hospital. A study showed 605 (73.42%) HCPs who had completed their HBV vaccination, of which 83(13.7%) had completed their vaccination before starting a professional life at a hospital. In comparison, 522 (86.3%) received their vaccination after it. [16, 17]

Hepatitis B infection is still a significant risk for healthcare workers, who are exposed to it in many ways. Our study showed the vaccination status of young doctors, which is below the expected target. The current study tried to determine the different hurdles, which is making it a challenge to achieve our target vaccination rate. By eliminating these hurdles and facilitating our healthcare workers, we can achieve our 100% vaccination target of healthcare workers. We hope our study can be used for future research purposes and as a source of awareness for young doctors who need to be vaccinated so that we can halt the spread of this infection.

Following are the recommendations to improve HBV vaccination in Pakistan: enhance awareness campaigns both in public and among healthcare professionals, improve the accessibility of HBV vaccines to all people, make it a mandatory prerequisite for all school/college admissions, appear in high stake examinations and job recruitment, encourage the families to utilize EPI vaccination programs, identify and target high-risk groups, training healthcare professionals, engage all stakeholders, monitoring, and surveillance and minimize the stigma pertinent to vaccines. All these measures are impossible without effective government support.

A single-centered, cross-sectional study with convenient sampling is the main limitation of this study. A multi-centered trial with both quantitative and qualitative perspectives of research should be conducted to avail deep insight into this problem.

CONCLUSION

A significant portion of young doctors is still unvaccinated, even though young doctors have good knowledge and understanding of the role of vaccination against HBV infection. The major frame factors are workload, negligence, procrastination, and non-availability of HBV vaccines at the institutional level.

More awareness about the effectiveness and an increase in access to vaccination needs to be done to achieve our target of 100% vaccination. The Hospital vaccination board needs to prioritize the vaccination of those unvaccinated doctors by providing them with free-of-cost vaccine availability. Vaccination including booster dose should be adopted as a mandatory step for exit examination at both undergraduate and postgraduate high stake medical education.

REFERENCES

1. Singhal V, Bora D, Singh S: Hepatitis B in health care workers: Indian scenario. Journal of Laboratory Physicians 2009,1(2):41–48. 10.4103/0974-2727.59697.
2. Jaffri W. Around 5 million suspected hepatitis B virus carriers in Pakistan. Daily Times. May 20, 2010.
3. WHO, Guidelines for The Prevention, Care, and Treatment of Persons with Chronic Hepatitis B Infection. Geneva, 2015, http:// www.who.int/hiv/pub/hepatitis/hepatitis-b-guidelines/en
4. Centers for Disease Control and Prevention, CDC guidance for evaluating healthcare personnel for hepatitis b virus protection and for administering post-exposure management, Morbidity and Mortality Weekly Report (MMWR) 2013; 62 (10).
5. A. Pruss-Ustun, E. Rapiti, and Y. Hutin. Estimation of the global burden of disease attributable to contaminated sharps injuries among healthcare workers. The Am J of Indust Med. 2005; 48 (6): 482–90.
6. Batra V, Goswami A, Dadhich S, Kothari D, Bhargava N. Hepatitis B immunization in healthcare workers. Annals of Gastroenterology: Quarterly Publication of the Hellenic Society of Gastroenterology. 2015; 28(2): 276.
7. Biset Ayalew M, Adugna Horsa B. Hepatitis B Vaccination Status among Health Care Workers in a Tertiary Hospital in Ethiopia. Hepato Res Treat 2017; 65: 6470658. doi: 10.1155/2017/6470658.
8. Singhal V, Bora D, Singh S. Prevalence of hepatitis B virus infection in healthcare workers of a tertiary care center in India and their vaccination status. J Vaccines Vaccin 2011; 2(2): 1-4.
9. Obi A, Ofili A. Hepatitis B Vaccination Uptake among Doctors in Benin City, Edo State, Nigeria. Journal of Community Medicine & Health Education 2013;3(7): 246-9.
10. Yusoff MSB. ABC of Content Validation and Content Validity Index Calculation. Education in Medicine Journal 2019; 11(2):49-54. DOI:10.21315/eimj2019.11.2.6
11. Jadoon NA, Shahzad A, Yaqoob R, Raza Ali, Hussain. Hepatitis B Vaccination status of Health care workers at a tertiary care hospital in Multan. Int J Infect Dis 2010; 14: 180-4. 10.1016/S1201-9712(10)60180-4.
12. Mast EE, Alter MJ, Margolis HS. Strategies to prevent and control hepatitis B and C Virus Infections: A global perspective. Vaccine 1999; 17: 1730–3. doi: 10.1016/S0264-410X(98)00415-0.
13. Haider I, Badshah A, Yousaf A. Knowledge, Attitudes and

Practices (KAP) Study Among Medical And Dental Students Regarding Hepatitis B Vaccination. J of Med Sci 2018: 26(4), 287–91.

14. Khan MI, Rahman S, Ur, Khan S. Knowledge And Practices About Viral Hepatitis in Blood Bank Staff at A Tertiary Care Transfusion. J of Med Sci 2017; 25(4): 409–13.
15. Haider I, Humayun M. The Global Burden Of Hepatitis And Efforts For Its Eradication. J Of Med Sci 2017; 25(3): 281-2.
16. Ahmed H, Rauf MA, Farooqi JI, Khan NS, Ali N, Jan KZ, et al. Status and attitude towards Hepatitis B virus vaccination in the staff of Lady Reading Hospital Peshawar. J Postgrad Med Inst 2011; 23 (3): 182- 9.
17. Attaullah S, Khan S, Naseemullah K, Ayaz S, Khan SN, Ali I, et al. Prevalence of HBV and HBV vaccination coverage in tertiary healthcare workers of tertiary hospitals Peshawar, Pakistan. Virol J 2011; 8: 275- 8. doi: 10.1186/1743-422X-8-275.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Ullah I: Concept, Design,

Haider I: Acquisition and critical review

Khan HH: Analysis and interpretation of data

Ishaq M: Data collection

Arshad S: Data collection

Fayyaz M: Bibliography and proofreading

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.

ORIGINAL ARTICLE

CREATING A LEVEL PLAYING FIELD: ADDRESSING GENDER BIAS IN UNDERGRADUATE MEDICAL STUDENT ASSESSMENTS

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ABSTRACT

Objectives: To identify the mechanisms to reduce gender bias during assessments in undergraduate medical education.

Material and Methods: A qualitative study with a phenomenological study design was conducted at a Public and Private Medical College in Peshawar, Pakistan, from July 2020 to October 2020. In this qualitative study, four gender-specific focal group interviews with undergraduate medical students and 10 individual interviews with senior faculty members were conducted by using a pre-tested & validated semi-structured interview guide. The interviews were recorded and transcribed verbatim. The thematic analysis of the data was done where codes were developed and organized into distinct categories giving rise to discrete themes. Data triangulation was done to increase the credibility and authenticity of the study.

Results: Out of 24 students and 10 faculty members, half of the participants were females who shared their perceptions about mechanisms to counteract gender bias in medical education. The analysis revealed 24 codes that were labeled and organized into 10 categories. The 4 themes deducted from these categories were Anti-Bias Training, Surveillance of Examination, Psychological Evaluation of Students & Faculty, and Transparency & Accountability.

Conclusion: Gender bias can substantially affect medical students' capacity to learn and succeed in their careers, is a well-established fact. Thus, to reduce gender bias in medical education, medical schools must take more excellent initiatives and promote anti-bias awareness sessions & workshops, post-examination feedback & reporting systems, and strict surveillance & accountability. Similarly, psychological evaluation of teachers & students, structured examination patterns, and promoting a panel of assessors for high stake exams are other strategies to counteract this issue in undergraduate medical education.

Keywords: Assessment, Gender bias, Reduce, Undergraduate Medical Education

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INTRODUCTION

Education plays a significant role in the transformation and progress of any society, thus providing a necessary pathway to grow, enrich and restructure the standards of any community. It is perceived that gender bias has affected this platform too.[1]

It has been a growing international phenomenon that girls' academic performance is superior to boys' at secondary school and college levels of education. It is essential to consider the possibility of gender influences on student performances at this critical gate-keeping point.[2] Many studies in developed and developing countries have revealed that girls have made significant achievements and excelled in all realms of education than boys.[3]

Professionals in education, psychology, sociology, history, and culture have identified and justified many reasons for girls' academic success. Literature asserted the importance of parental education, feminization of the teaching profession, personal freedom and higher status of boys in the family, rebellious behavior of boys, and involvement of boys in socio-economic activities as reasons attributed to the low educational performance of boys.[4,5] However, people exhibit the typical stereotypical explanation for female students' success and attribute their success to their physical attractiveness and grooming in different parts of the world.[6]

We live in a sociocultural context, so prevailing social and gender stereotypes influence our perceptions and opinions in our environment. It is not easy to isolate yourself from the influence of society.[1, 7] Educational setups represent society and follow the same socialization process of unconscious biases, gender stereotyping, and gender roles. Egalitarian views and opinions are not suffi-

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cient to bring a positive change until they are followed by appropriate actions directed to address gender bias.[8]

Gender stereotyping and gender bias usually start at a very early stage of children's learning. Gender equity is not a spontaneous activity. Great efforts are needed to structure gender issues in society, particularly in education. The literature has proven few practices applied at the home & school level can help to strengthen the bias-free environment.[9] Therefore, awareness and training of both parents & teachers to ensure that they are gender receptive are crucial for creating a bias-free environment. Both parents & teachers need to be aware of a gender-friendly atmosphere and learning methodologies. It will help grow our society's social infrastructure and make people receptive to the different needs of both genders, thus providing an equitable environment for both girls and boys. [8] Practices like delegating group leadership roles equally to both boys and girls, intermittent use of "he" and "she" in learning activity references, and advocating children regarding gender equality are a few very elementary techniques to bring the desired change at the grass-root level.[9] Literature provides few specific methods for the educational environment to counteract gender bias in education. Evidence-based interventions are required to create awareness and reduce implicit & psychosocial bias among students & faculty regarding gender.[8,10] Similarly, incorporating gender issues in medical curricula, innovative & structured assessment tools, supporting women in senior & leadership roles, transparency, and strict accountability of cases can help counteract gender issues in educational assessment.[11, 12,13]

There is a substantial gap in the literature on medical education regarding gender inequality especially, in Asian countries.[14] Due to our sociocultural context, gender bias in medical education has long been suspected.[15] For understanding the gender-specific issues of medical students and teachers in these regions, there is an utmost need to conduct more research. The present study will help to identify the mechanisms to reduce gender issues during assessment in undergraduate medical education.

MATERIAL AND METHODS

This study was conducted at a Public and Private Medical College in Peshawar, Pakistan, from July 2020 to October 2020. A qualitative research design with a phenomenological approach was employed. Final-year MBBS students and senior faculty teaching them with more than two years of teaching experience were selected for this study. Participants were purposively selected through the maximum variation sampling technique. Twelve faculty members had to be interviewed but due to the non-availability of Assistant professors in Private Medical College, only 10 faculty members were interviewed. A semi-structured interview guide was developed and validated by subject experts and a pilot study was carried out. Consent from the participants was obtained and anonymity and confidentiality were ensured. The interviews were recorded and transcribed verbatim. The thematic analysis of the data was done by Braun & Clarke method. [16]

RESULT

In this study, half of the participants were females who shared their perceptions regarding addressing gender bias in medical education. The analysis revealed 24 codes that were organized and collated into 10 categories. The themes deducted from these categories were

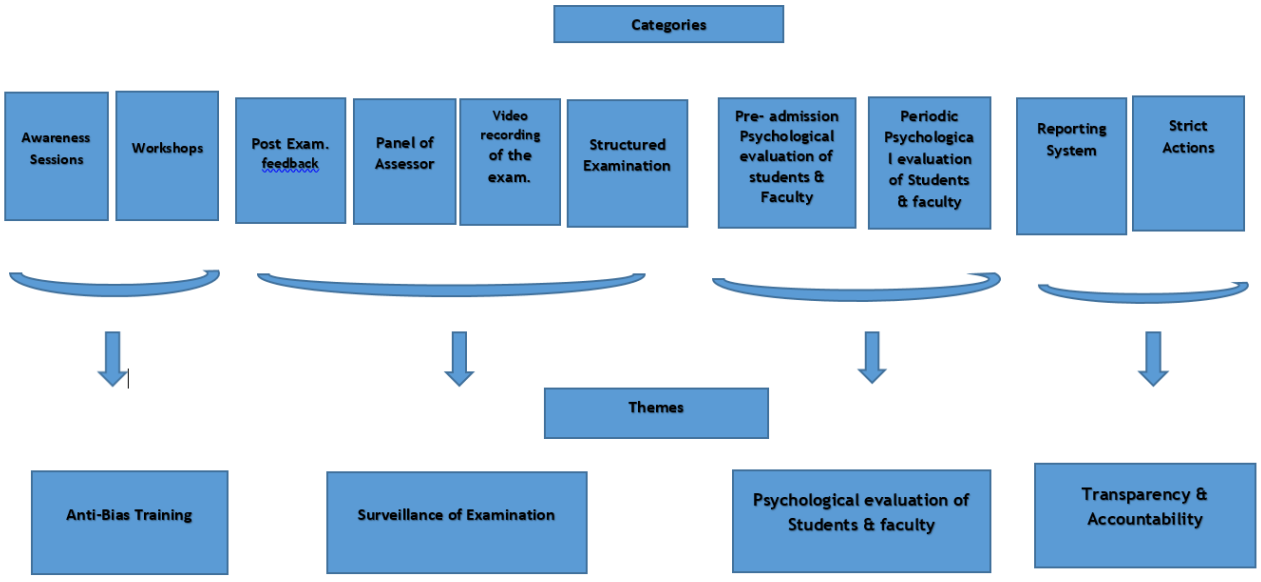

Fig 1: Thematic Analysis of the Data

Anti-Bias Training, Surveillance of Examination, Psychological evaluation of Students & Faculty, and Transparency & Strict Accountability as shown in Fig 1. The participants believed that Anti-bias training sessions/workshops, Surveillance of examinations, psychological evaluation of Students & Faculty, and Transparency & Strict accountability could play a strategic role as a unified solution in medical academia to address this issue.

DISCUSSION

This project revealed the importance of creating awareness regarding gender roles, stereotypes, and prejudices in our educational system. This study emphasizes conducting awareness sessions both for students and faculty in medical institutions to create an atmosphere for accepting gender equality and equity in academics. These awareness sessions both for students and faculty would represent the first step towards creating gender equality in medical institutions.

"Honestly, encourage discussion on this subject. It is a sensitive issue people avoid talking about it as it branches out into many other problems. Awareness sessions should be arranged both for students and teachers."

Most of the participants believed that a collaborative effort from the families, society, and educational system could help to change these existing stereotypes in our learning environment.

"We cannot eliminate gender bias, but we can control this issue …….. I think the most important thing is to create awareness and education regarding this issue. So that both students and teacher know their roles. I think we should more focus on the upbringing of the family. The family is the basic unit of the culture. If the family norms are such that this concept of bias is discouraged, the socio-cultural norms will automatically change."

These gender awareness campaigns could help highlight how gender bias would be unfair & immoral and could affect students' professional careers. These sessions could also help as norm-setting strategies in institutions and organizations because individuals who discriminate may be unconscious of their prejudices while assessing others.[17,18] "You are dependent on your stereotypes – but stereotypes can be changed." [18]

Ozlem Midik et al. observed that boys were less conscious of gender concepts than girls in their study. This attitude indicated male insensitivity towards gender issues and reflected the philosophy of socializing agents in their lives to shape their beliefs and opinions. Teaching institutions would further strengthen and shape this process of gender in-sensitization. So, creating awareness and fostering change was regarded as the crucial means of carrying out hidden preconceptions that may be filled with biases or stereotypes in the educational environment.[19]

Anne Boring also recommended that institutions regularly adopt gender bias awareness programs for students to reduce prejudice in the evaluations of teachers.[20]

Kollmayer M et.al recommends the importance of training and workshops for faculty and students on this issue. The study emphasizes pre-service training and in-service training of teaching faculty to ensure that they are gender-sensitive and bias-free during the teaching and examination process. There should be personal development programs for faculty to create a gender-neutral environment for the student in the learning environment to help students reach their maximum potential. He emphasized that teachers can play a significant role in fostering gender equality and equity at academic institutions. Their own gender-stereotyped beliefs and educational practices have been demonstrated to encourage gender bias in students.[21]

However, translating research findings into the societal structure is challenging. These training and workshops can help people not develop associations between their apparent beliefs and implicit activated stereotypes.[22]

"I now realize that the major differences between boys and girls are found in my perception of them – not in their cognitive skills."[22]

Morgan et al. also suggested incorporating explicit training for students and junior & senior faculty to create an atmosphere of gender equality and equity within academic medicine. Such activities would not only help to remove prevailing biases but also help to transfer the skills needed to counteract sociocultural norms that promote prejudices.[11]

The majority of the study participants mentioned the concepts of Transparency and Accountability as a fundamental tool for creating gender equality in medical education. The participants felt it challenging to report such discriminatory behavior or atmosphere during an examination in a teaching institution. There was no specific process and policy for reporting such discrimination issues in medical institutions to deal with such a situation. The participants concluded that now it's time to avoid discussing this subject and start addressing it. One participant commented:

"There should be supervision/surveillance of the oral assessment process. Similarly, the administration should take serious action on it. They usually avoid such issues by saying that it happens & ignore it."

One of the participants commented:

"The institutional management should have the power to strictly supervise such issues. Similarly, students should be given that confidence that his/her complaints regarding faculty/specific department should be entertained and their complaints should be taken seriously by

management."

Samuriwo et al. suggested that medical colleges need to struggle for more significant actions to reduce gender bias in this noble profession. The study emphasized the promotion of a top-down fashion to involve regular analysis of gender-specific challenges within medical institutions and an active & centralized mechanism for reporting & strict accountability of such cases in medical schools. The students should also be given the confidence to report any evidence of bias during medical education as students' reporting rates were usually low due to the perceptions of ineffectiveness. [23,24]

The study participants emphasized the pre-employment and periodic psychological evaluation of faculty and students to have an insight into their personality traits. Pre-employment and periodic psychological screening have also been in common practice to determine the mental & emotional vulnerability of employees in almost every service and institution. A personality component of psychological assessment can help to learn about the inbuilt and social elements of one's personality so that problems can be figured out in the early stage & the best approach.[24]

The study conducted in Turkey supported that psychological assessment and evaluation of teachers must be a continuous process in any educational system which should start from with pre-service teacher training and proceed until every stage of in-service programs.[25]

This study has established helpful information on the solution to reduce gender bias in our educational environment but due to the subjectivity of the phenomenon, this study should be replicated in other medical institutes of the province in a different context to have a broader vision that would help to counteract this issue and devise the counter- mechanism for addressing this issue in our educational system. This research opens a window for further research on this subject that could help to establish the precise relationship between the role of gender and education.

CONCLUSION

Gender bias is a debatable and controversial psychological phenomenon in our educational system. Concerted action that aims to recognize and address gender bias in teaching & assessments may be a starting point in reducing such inequities. Thus, to reduce gender bias in medical education, medical schools must take more remarkable initiatives and promote evidence-based interventions to counteract such issues in the educational environment. The medical schools should endorse and encourage anti-bias awareness sessions & workshops for both students & Faculty, Feedback & Surveillance mechanisms for examination, Pre-recruitment & Periodic psychological evaluation of both teachers & students and Transparency & Accountability of reported cases to counteract gender issues in undergraduate medical education.

REFERENCES

1. Sharma M, Parika M. Gender Bias in Education. European J Molecular & Clinical Med. 2020;7(7):6145-51
2. Axelson RD, Solow CM, Ferguson KJ, Cohen MB. Assessing implicit gender bias in medical student performance evaluations. Eval Health Prof. 2010;33(3):365–85
3. Ullah R. Boys versus girls' educational performance: Empirical evidence from the global north and global south. African Educ Res J. 2019; 7(4):163–7
4. Hassan N, Hassan T. Female students get more marks as compared to male students: a statistical study. J Business Finance Affairs. 2016; 5:4-10.
5. Franceschini VLC, Miranda-Ribeiro P, Gomes MMF. The color of school failure: Factors associated with academic failure of high-school students. Educ e Pesqui. 2016; 42(3):773–86
6. Krawczyk M. Do gender and physical attractiveness affect college grades? Assess Eval High Educ.2018;43(1):151–61. Available from: http://dx.doi.org/10.1080/02602938.2017.1307320
7. Babaria P, Abedin S, Berg D, Nunez-Smith M. "I'm too used to it": A longitudinal qualitative study of third-year female medical students' experiences of gendered encounters in medical education. Soc Sci Med. 2012; 74 (7):1013–20. Available from: http://dx.doi.org/10.1016/j.socscimed.2011.11.043).
8. Moss-Racusin CA, van der Toorn J, Dovidio JF, Brescoll VL, Graham MJ, Handelsman J. A "scientific diversity" intervention to reduce gender bias in a sample of life scientists. CBE Life Sci Educ. 2016; 15(3):1–11
9. Marshall CS, Reinhartz J. Gender issues in the classroom. Clear house A. J Educ Strateg Issues Ideas. 1997; 70(6):333–7
10. Risberg G, Johansson EE, Hamberg K. A theoretical model for analysing gender bias in medicine. Int J Equity Health. 2009;8:1–8.
11. Morgan AU, Chaiyachati KH, Weissman GE, Liao JM. Eliminating Gender-Based Bias in Academic Medicine: More Than Naming the "Elephant in the Room." J Gen 59 Intern Med. 2018;33(6):966–8.
12. Robert B, Brown EB. Encyclopedia of Educational Theory and Philosophy. 2014th ed. Phillipes D., editor. SAGE; 2004. 1–14.
13. Van den Brink M, Benschop Y, Jansen W. Transparency in academic recruitment: A problematic tool for gender quality? Organization Studies. 2010; 31(11):1459–83
14. Haq I, Higham J, Morris R, Dacre J. Effect of ethnicity and gender on performance in undergraduate medical examinations. Med Educ. 2005;39(11):1126–8.
15. Tabassum N, Nayak BS. Gender Stereotypes and Their Impact on Women's Career Progressions from a Managerial Perspective. IIM Kozhikode Soc Manag Rev. 2021;10(2):192–208
16. Kiger ME, Varpio L. Medical Teacher Thematic analysis of qualitative data: AMEE Guide No. 131 Thematic anal-

ysis of qualitative data: AMEE Guide No. 131. Available from: https://doi.org/10.1080/0142159X.2020.1755030

17. Parajuli M, Thapa A. Gender differences in the academic performance of 65 Students. J Dev Soc Eng. 2017;3(1):39–47
18. Midik O, AytuĞ KoŞan AM, Coskun O, Baykan Z, SÜrel Karabilgin ÖztÜrkÇÜ Ö, Şenol Y. Gender in medical education in Turkey: The Intern Perspective. J Adv Med Educ Prof. 2020;8(4):149–57
19. Boring A. Gender biases in student evaluations of teaching. J Public Econ. 2017;145:27–41. Available from: http://dx.doi.org/10.1016/j.jpubeco.2016.11.006
20. Kollmayer M, Schultes MT, Lüftenegger M, Finsterwald M, Spiel C, Schober B. REFLECT – A Teacher Training Program to promote gender equality in schools. Front Educ. 2020;5 (July):1–8.
21. Kimotho J. Not Fighting teaching practices that reinforce gender bias in school titles. FAWE Blog.
22. Samuriwo R, Patel Y, Bullock A. Response to: 'Gender bias in medical education: Stop treating it as an inevitability.' Med Educ. 2020;54(9):864
23. Mann S, Ariyanayagam D. Gender bias in medical education: Stop treating it as an inevitability. Med Educ. Sep 2020;54(9):863
24. Marshall RE, Milligan-Saville JS, Steel Z, Bryant RA, Mitchell PB, Harvey SB. A prospective study of pre-employment psychological testing amongst police recruits. Occup Med (Chic Ill). 2020;70(3):162–8
25. Atmaca Ç. Using Psychological tests for choosing teacher candidates. Int J Turkish Lit Cult Educ. 2017;6(6/3):1759–77.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Aliya B: Conceptualization, methodology design, data, and writing of the original draft.

Ahmed F: Analysis, and critical review of the manuscript.

Kashif L: Data collection and literature review

Jamil B: Supervision, bibliography, and proofreading

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.

ORIGINAL ARTICLE

THE PRESENTATION OF MEDICAL COMPLICATIONS IN THE ACUTE IN-HOSPITAL MANAGEMENT OF STROKE PATIENTS AND THEIR DETERMINANTS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objectives: To find the frequency of Acute Medical complications and their determinants in stroke patients admitted to a hospital in Peshawar.

Materials and Methods: In this cross-sectional descriptive study in the Department of Medicine and Neurology at Hayat Abad Medical Complex, Peshawar, Pakistan from 1/10/2022 till 31/12/2022, a total of 180 patients who presented with Cerebrovascular events based on CT/MRI were included. Patients' data were collected through questionnaires, NIHSS and GCS scores were calculated at the presentation and patients were followed in the hospital to detect complications. Comparisons with p-values were then determined using SPSS.

Results: The overall rate of stroke complications in 180 patients documented was 90%, the common being Aspiration Pneumonia (48.89%), Urinary Tract infections (30%), Bedsores (28.33%), Pyrexia illness (22.22%) and Seizures (12.78%). NIHSS scores had a direct relationship, with patients scoring >12 having a complications rate of 93% in contrast to 76.5% in patients with scores of ≤3 (p-value 0.032). GCS at presentation had similar predictive value with scores of 15/15 having 73% and ≤8 having a 91% complication rate. Duration of hospitalization (p-value 0.014) had a key impact as patients admitted for a month had higher percentages of complications primarily UTI (52.4%), Bedsores (71%), and Constipation (33.3%). Treatments like Dexamethasone (p-value 0.003) and antiplatelets (p-value 0.010) were found to increase the rate of complications.

Conclusion: In-hospital post-stroke complications are common having a direct link with stroke severity, hospitalization duration, and treatment given. An active approach is needed to identify and treat any complications early, thereby, improving outcomes and decreasing morbidity.

Keywords: Stroke, Complications, in-hospital management

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INTRODUCTION

Stroke or Cerebrovascular Accident (CVA) has been one of the leading causes of mortality and morbidity in evolving medical times. It has the largest share of neurological disease-related deaths primarily because of the numerous complications associated with it.[1]

Its incidence worldwide is 157.99 (Crude rate per 100,000 per year) according to the stroke factsheet 2022. [2] And in Pakistan, it was reported as 1.2% (1200 per 100,000 population) according to a study in KP in 2016 and 250 per 100000 population according to another study done in 2018.[3, 4] The various risk factors for stroke include but are not limited to hypertension, diabetes, old age, clotting disorders, arrhythmias, smoking, valvular heart disease, and hyperlipidemia. Acute in-hospital complications of stroke are common as well lead to poor recovery.

These complications must be recognized and reported to optimize the treatment and rehabilitation of patients. [5, 6] Our study aims at finding the frequency of acute stroke complications and correlating them with key factors like NIHSS severity scale, hospitalization duration, and treatments provided in hospital settings in Peshawar to shed light on patient care and highlight potential areas where the extra focus can reduce the overall morbidity and mortality associated with this disease.

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MATERIALS AND METHODS

Our team carried out this cross-sectional study in Hayat Abad Medical Complex in Peshawar after approval from the ethical review committee board of the institution. Patients were selected through a convenient non-probability sampling technique by visiting neurology, medicine, and neurosurgery wards for a duration of 4 months from October 2022 to December 2022. The sample size was calculated while keeping the margin of error at 7.3% and the Confidence interval at 95% was 180. All patients gave informed consent for inclusion.

Inclusion Criteria were aged 18 years or more, patients with acute/new-onset stroke diagnosed via radiology, and clinical evidence as outlined in the operational definition given below.

Exclusion criteria included patients with subarachnoid hemorrhage as it required a separate grading criterion, patients with stroke-mimicking disorders or are in a diagnostic dilemma and patients with cerebral venous infarcts as advanced imaging techniques are required for diagnosis.

The data was recorded after taking permission from the patients by reviewing the patient's history and examining the patient that included GCS (Glasgow Coma Scale), NIHSS (National Institute of Health Stroke Scale), pre-existing conditions, and biodata as well. [7, 8]

Stroke was defined as an acute event of neurological dysfunction causing local or global deficit due to a result of ischemia or intracerebral hemorrhage, lasting for more than 24 hours or death. Stroke was divided into two major categories of ischemic and hemorrhagic types based on initial neurological imaging and ischemic stroke was further classified according to TOAST classification.[9]

Acute in-hospital medical complications were defined as non-neurologic medical consequences occurring during the hospital stay and included the occurrence of aspiration pneumonia, bedsores, urinary tract infection, chest infection, pyrexial illness, deep vein thrombosis, and others with reference taken from previous literature. [6]

Data were analyzed using IBM SPSS version 26 (statistical package for social sciences) and frequencies of different complications were calculated and associations with NIHSS and duration of hospitalization were tested using the Chi-squared test. Where the expected count was less than 5 in >20% of the cells, Fischer Exact test was used for 2x2 contingency tables and the Likelihood ratio for tables larger than 2x2. No missing data was encountered. Data were considered significant where the p-value <0.05.

RESULTS

Figure1 highlights percentages of individual complications in stroke patients, with the highest being Aspiration pneumonia (48.89%) followed by UTI (30%), Bedsores (28.33%), and pyrexial illness (22.22%) among the 19 acute complications documented.

Table 1 shows the summarized profile of study subjects where characteristics were stratified according to the development of acute complications. Age strata showed statistical significance (P-Value 0.047) with patients of age group >70y showing a greater percentage of having developed complications that is 26 (100.0%). Other statistically significant strata included 'Stroke severity' (P-Value 0.032) where 42 patients (93%) with NIHSS score >12 developed complications compared to 26(76.5%) with scores 0-3. 42(97.7%) patients having an atherosclerotic cause of stroke (P-Value 0.028) developed complications as opposed to lesser percentages in other causes. Among the co-morbidities, smoking had a statistical impact (P-Value 0.015) where 54 (98.2%) patients suffered complications. Twenty-one (100%) patients having stayed for > a month in the hospital had complications as opposed to 56 (82.4%) patients having stayed <7 days (P-Value 0.014). Patients with lower GCS at presentation showed a higher complication percentage (P-Value 0.001). Treatment also had a statistical impact where 112 (94.1%) patients on antiplatelets (P-Value 0.010) and 56 (100.0%) patients on dexamethasone (P-Value 0.003) developed complications. Other determinants mentioned had no statistically significant impact.

Table 2 compares complications with stroke severity determined according to NIHSS Score. A statistically significant impact of severity was mainly on Aspiration pneumonia, where 30 (66.7%) patients having a score of >12 developed the aforementioned complication (P-Value <0.001), and on Pyrexial illness, contracted by 16 (35.6%) of patients belonging to the same score category (P-Value 0.016). Percentages of these aforementioned complications were lower in patients having a lower NIHSS score.

Table 3 highlights the frequency and percentages of individual complications and their relation with the duration of hospitalization. Pyrexial illness had higher percentages in patients hospitalized for < 7days (30.9%) and in those hospitalized for >a month (33.3%) as compared to the rest (P-Value 0.032). Among the patients that were hospitalized for >a month, 11 (52.4%) developed UTI (P-Value 0.025), 15 (71.4%) developed Bedsores (P-Value <0.001), 7 (33.3%) developed seizures (P-Value 0.046) and 7 (33.3%) developed constipation (P-Value 0.011), higher than in those that stayed for shorter durations.

DISCUSSION

The purpose of our investigation was to determine the overall occurrence of post-stroke complications in a tertiary care setup in Peshawar, Pakistan, and to see what risk factors or determinants are most predictive of these

Table 1: Baseline profile of the patients related to acute complications

		Acute Complications		P-Value
		No (n=18)	Yes (n=162)	
	30-40	5(20.0%)	20(80.0%)	0.047
	41-50	5(17.2%)	24(82.8%)	
	51-60	5(8.3%)	55(91.7%)	
	61-70	3(7.5%)	37(92.5%)	
	>70	0(0.0%)	26(100.0%)	
Gender (Male)		8(8.2%)	89(91.8%)	0.397
Stroke Severity (NIHSS Score)				
	0-3	8(23.5%)	26(76.5%)	0.032
	4-5	5(10.4%)	43(89.6%)	
	6-12	2(3.8%)	51(96.2%)	
	>12	3(6.7%)	42(93.3%)	
Stroke Type				0.089
	Hemorrhagic	9(15.5%)	49(84.5%)	
	Ischemic	9(7.4%)	113(92.6%)	
Ischemic Stroke Subtype (TOAST Classification)				0.028
	Thromboembolism	4(28.6%)	10(71.4%)	
	Atherosclerosis of major vessels	1(2.3%)	42(97.7%)	
	Small vessel occlusion	2(14.3%)	12(85.7%)	
	Others	4(22.2%)	14(77.8%)	
	undetermined cause	7(7.7%)	84(92.3%)	
Hypertension		13(8.8%)	135(91.2%)	0.325
Diabetes Mellitus		7(7.7%)	84(92.3%)	0.297
Hyperlipidemia		4(16.0%)	21(84.0%)	0.475
Arrhythmias		1(9.1%)	9(90.9%)	1.000
Previous MI		4(28.6%)	10(71.4%)	0.037
Smoking		1(1.8%)	54(98.2%)	0.015
Previous Stroke		7(11.3%)	55(88.7%)	0.676
Duration of hospitalization				0.014
	<7 days	12(17.6%)	56(82.4%)	
	7-14 days	5(8.6%)	53(91.4%)	
	15-30 days	1(3.0%)	32(97.0%)	
	>a month	0(0.0%)	21(100.0%)	
GCS at presentation				0.001
	15	10(27.0%)	27(73.0%)	
	13-14	4(7.8%)	47(92.2%)	
	9-12	1(1.7%)	57(98.3%)	
	≤8	3(8.8%)	31(91.2%)	
On Antiplatelets		7(5.9%)	112(94.1%)	0.010
Anticoagulants		8(12.1%)	58(87.9%)	0.470
Treatment with steroids (Dexa-methasone)		0(0.0%)	56(100.0%)	0.003

Table 2: Acute complications concerning stroke severity

Complications	Stroke severity (NIHSS Score)				P-Value
	0-3	4-5	6-12	>12	
Aspiration Pneumonia (n=88)	6(17.6%)	21(43.8%)	31(58.5%)	30(66.7%)	<0.001
Pyrexial illness (n=40)	3(8.8%)	7(14.6%)	14(26.4%)	16(35.6%)	0.016
UTI (n=54)	8(23.5%)	11(22.9%)	21(39.6%)	14(31.1%)	0.242
Bedsores (n=51)	6(17.6%)	11(22.9%)	15(28.3%)	19(42.2%)	0.076
DVT (n=12)	1(2.9%)	3(6.3%)	4(7.5%)	4(8.9%)	0.717
Seizures (n=23)	0(0.0%)	8(16.7%)	7(13.2%)	8(17.8%)	0.084
Musculoskeletal pain (n=38)	12(35.3%)	12(25.0%)	8(15.1%)	6(13.3%)	0.062
Gastritis (n=34)	5(14.7%)	8(16.7%)	16(30.2%)	5(11.1%)	0.081
Constipation (n=22)	3 (8.8%)	5(10.4%)	6(11.3%)	8(17.8%)	0.605

Table 3: Acute complications to the duration of hospitalization

Complications	Stroke severity (NIHSS Score)				P-Value
	0-3	4-5	6-12	>12	
Pyrexial illness (n=40)	21(30.9%)	8(13.8%)	4(12.1%)	7(33.3%)	0.032
Aspiration Pneumonia(n=88)	27(39.7%)	30(51.7%)	18(54.5%)	13(61.9%)	0.228
UTI (n=54)	15(22.1%)	21(36.2%)	7(21.2%)	11(52.4%)	0.025
Bedsores (n=51)	9(13.2%)	15(25.9%)	12(36.4%)	15(71.4%)	<0.001
DVT (n=12)	2(2.9%)	3(5.2%)	3(9.1%)	4(19.0%)	0.114
Seizures (n=23)	5(7.4%)	7(12.1%)	4(12.1%)	7(33.3%)	0.046
Musculoskeletal pain (n=38)	19(27.9%)	10(17.2%)	7(21.2%)	2(9.5%)	0.249
Gastritis (n=34)	16(23.5%)	8(13.8%)	6(18.2%)	4(19.0%)	0.583
Constipation (n=22)	4(5.9%)	5(8.6%)	6(18.2%)	7(33.3%)	0.011

complications. Stroke and stroke-related complications are a heavy burden on healthcare systems and having a more complete picture of the outcomes, especially in developing and low to middle-income areas such as Pakistan, adds significantly to the global picture of stroke management.

Our most significant finding was the overall rate of stroke complications which came out to be 90% (163 of 180). This compares very similarly to the results of many other previous studies.[5,10] Although the overall rate of complications varies widely amongst setups and regions ranging from 20% to 95%. Our study lands in the higher ranges of possibilities, although it is not possible to make a proper association based on this one result, it may reflect greatly on our stroke inpatient management as western setups range in the lower numbers.[5, 10, 11, 12]

The overall trend of stroke being a complication was another significant finding and tends to mirror the results of other studies and meta-analyses. In our investigation, the most frequently occurring complications were aspiration pneumonia (48.89%), followed by urinary tract infections (30%), bedsores (28.33%), and pyrexia illness of undetermined cause at 22.22% (figure-1). Kumar et.al observed similar findings with urinary tract infections outpacing aspiration pneumonia (15% vs 11%).[10]Jhonston CK et.al present results more similar to our study, with pneumonia being the most common (5%), followed by Gastrointestinal bleeding and heart failure at 3% each.[5]

A very interesting comparison can be made between our findings and those of Kim BR,[11] Roth EJ,[12]Davenport RJ [13] and longhorn P.[6] In almost all the studies the most frequent complications were urinary tract infections or lower respiratory tract infections (ranging from 4% for pneumonia and 3% UTI for Kim BR all the way to 30% for UTI and 4% for Roth EJ). However, more alarming than the wide range of prevalence is the runner-up complications of bladder dysfunction, bowel incontinence, falls, and depression which would range in prevalence from 8% to 4.8% for bladder dysfunction[11,12] and from 5% to 15% for depression. [6, 13] Our study did take these complications into account and found a prevalence of 3.88% for bladder dysfunction and 10.56% for depression. The takeaway point is that in our study, infections were far outpacing milder complications whereas in other setups, in more developed regions, minor complications such as dysphasia, bladder/bowel dysfunction, and depression were as prevalent if not more common. Further insight is needed into what factors are causing this variability and why these infections are more common in our setup.

When it comes to bed sores and skin ulcers, our

study is very much reflective of others with a prevalence of 28.33%, comparable to the values of 21% and 9% respectively. [6, 10]

Trying to form a more relatable picture requires us to focus more on how our study compares to others done primarily in Lower middle-income regions. Ali M Et.al has done a prospective study on in-patient stroke complications in Lady Reading Hospital, a tertiary care setup similar to ours, and his findings closely matched ours. [14] Aspiration pneumonia was 31% and bedsores were 7%, in contrast to our 48.89% and 28.33%, respectively (figure 1). However, they did not report UTIs or other minor complications. Their most significant finding was constipation, with a prevalence of 28% compared to our 12.22%, and their reported seizure rates post-stroke of 5% to our 12.78%.

The variation in complications presentation is quite stark and perhaps we can elaborate when looking at the risk factors and determinants that we assessed. The most important determinant we must acknowledge is the NIHSS scoring (table-1). We reported a direct relationship between NIHSS scores at presentation with patients scoring above 12 having a complication rate of 93%, and those with a score of 3 or less having a complication rate of 76.5%. The p-value attained was 0.032 and this shows the value in using the NIHSS. This compares well with Muir KW who reported an accuracy of the NIHSS as 0.83.[15]The value of the NIHSS is well documented.[16]It is useful for determining the long-term outcomes after a stroke, this is more significant when taking into account the inconsistency in initial patient assessment and stratification in our setup.

The GCS at presentation had a similar predictive value with a p-value of 0.001 (score of 15/15 having 73% and less than 8 having 91% complication rates) (table-1). Similar studies attest to the value of the GCS by using regression analysis to determine how it relates to outcomes. [17, 18] These studies show an inverse association with the GCS at presentation and the 1–3-month outcome. We took our study even further by analyzing which complications have the strongest association with the scoring system (table-2). The strongest is association with aspiration pneumonia, with a p-value less than 0.001. No other complication presented a significant association warranting documentation, but overall, the NIHSS score has a direct correlation with complication rates and the need for care. No comparative literature could be found analyzing the relationship between the NIHSS score and complications.

Other determinants of complications were age, with a 100% complication rate amongst >70-year-olds and an 80% rate in 30–40-year-olds. This is mirrored in the findings of Kim BR. [11] Duration of hospital admission with 82% having complications below 7 days of admission and 100% having complications after a month of admission. This compares well to other studies where hospital duration is directly related to complication rates.[11,12] We extrapolated our findings to determine a relationship between duration of stay and complications and found that the strongest association was with bedsores, constipation, UTIs, and seizures in that order (table-3).It is important here to highlight the fact that these complications had no statistically significant relationship with the NIHSS score. The association between bedsores and constipation is well documented with these two complications being common in all admitted patients, not just the stroke ones. [19, 20]

Other than these determinants we looked at many other factors such as type of stroke, secondary risk factors (MI, DM, IHD) arrhythmias, and gender. All these had a visible positive association with complications but were statistically not significant. These factors are well documented as risk factors for strokes to occur, but may also have a knock-on effect when it comes to post-stroke outcomes.[5,10,11]

One very unusual association that came to light in our study was with treatment and complication rates. In our setup, guideline-based therapy is not strictly followed and we observed a paradoxical negative association between treatment and complications, most apparent being with anti-platelets (aspirin or aspirin plus clopidogrel) and steroids (IV dexamethasone). Complications are more common in groups treated with these medications that make up part of guideline-directed stroke treatment and have a proven outcome benefit.[21] The cause of this association needs further study.

Some of the limitations of our study are low sample size and single-center study. Further multicenter, large-scale studies are needed to elaborate the findings more.

CONCLUSION

Our study further complimented previous literature on stroke and hospitalized patients. Complications were commonly prevalent in stroke patients with the incidence increasing when hospitalization duration, severity, and age of the patient were increased. Patients on dexamethasone and anti-platelet drugs had a higher rate of complications. Several pathologies like UTI, Bedsores, and Constipation were linked more to the duration of hospitalization than the severity of the stroke. We noticed that the overlap between complications and common risk factors was sufficient to embrace prophylactic measures and be ready for all possible contingencies that healthcare professionals can come across while dealing with stroke patients.

REFERENCES

1. Global Health Estimates 2016:Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. Geneva, World Health Organization. 2018.

2. Feigin VL, Brainin M, Norrving B,Martins S,Sacco RL, Hacke W et al. World Stroke Organization (WSO): Global Stroke Fact Sheet 2022. International Journal of Stroke. 2022;17(1):18-29. doi:10.1177/17474930211065917

3. Sherin A, Ul-Haq Z, Fazid S,Shah Bh, Khattak MI, Nabi F . Prevalence of stroke in Pakistan: Findings from Khyber Pakhtunkhwa integrated population health survey (KP-IPHS) 2016-17. Pak J Med Sci. 2020;36(7):1435-1440. doi:10.12669/pjms.36.7.2824

4. Khan MI, Khan JI, Ahmed SI, Haq UU. The Epidemiology of Stroke in a Developing Country (Pakistan). J Neurol Stroke. 2018;8(1): 00275. DOI: 10.15406/jnsk.2018.08.00275

5. Johnston KC, Li JY, Lyden PD, Hanson SK, Feasby TE, Adams RJ. et al. Medical and neurological complications of ischemic stroke: experience from the RANTTAS trial. RANTTAS Investigators. Stroke. 1998;29(2):447-453. doi:10.1161/01.str.29.2.447.

6. Langhorne P, Stott DJ, Robertson L,Macdonald J, Mcalpne C, Dick F. et al. Medical complications after stroke: a multicenter study. Stroke. 2000;31(6):1223-1229. doi:10.1161/01.str.31.6.1223

7. Weingarten S, Bolus R, Riedinger MS, Maldonado L, Stein S, Ellrot AG. et al. The principle of parsimony: Glasgow Coma Scale score predicts mortality as well as the APACHE II score for stroke patients. Stroke. 1990;21(9):1280-1282. doi:10.1161/01.str.21.9.1280

8. Kazi SA, Siddiqui M, Majid S. Stroke Outcome Prediction Using Admission NihssIn Anterior And Posterior Circulation Stroke. J Ayub Med Coll Abbottabad. 2021;33(2):274-278.

9. Adams HP Jr, Bendixen BH, Kappelle LJ,Biller J, love BB, Gordon DL. et al. Classification of subtype of acute ischemic stroke. Definitions for use in a multicenter clinical trial. TOAST. Trial of Org 10172 in Acute Stroke Treatment. Stroke. 1993;24(1):35-41. doi:10.1161/01.str.24.1.35

10. Kumar S, Selim MH, Caplan LR. Medical complications after stroke. Lancet Neurol. 2010;9(1):105-118. doi:10.1016/S1474-4422(09)70266-2

11. Kim BR, Lee J, Sohn MK, kim DY, Lee SG, Shin YI. et al. Risk Factors and Functional Impact of Medical Complications in Stroke. Ann Rehabil Med. 2017;41(5):753-760. doi:10.5535/arm.2017.41.5.753

12. Roth EJ, Lovell L, Harvey RL,Heinemann AW, Semik P, Diaz S . Incidence of and risk factors for medical complications during stroke rehabilitation. Stroke. 2001;32(2):523-529. doi:10.1161/01.str.32.2.523

13. Davenport RJ, Dennis MS, Wellwood I, warlow CP. Complications after acute stroke. Stroke. 1996;27(3):415-420. doi:10.1161/01.str.27.3.415

14. Ali M, Khan Y, Khan H. Complications of Cerebrovascular Accident in Two Tertiary Care Hospitals of Peshawar, Pakistan. IRCMJ. 2008; 10(4):261-266

15. Muir KW, Weir CJ, Murray GD, Povey C, Less KR. Comparison of neurological scales and scoring systems for acute stroke prognosis. Stroke. 1996;27(10):1817-1820. doi:10.1161/01.str.27.10.1817

16. Adams HP Jr, Davis PH, Leira EC, Chang KC, Bendixen BH, Clarke WR et al. Baseline NIH Stroke Scale score strongly predicts outcome after stroke: A report of the Trial of Org 10172 in Acute Stroke Treatment (TOAST). Neurology. 1999;53(1):126-131. doi:10.1212/wnl.53.1.126

17. Weir CJ, Bradford AP, Lees KR. The prognostic value of the components of the Glasgow Coma Scale following acute stroke. QJM. 2003;96(1):67-74. doi:10.1093/qjmed/hcg008

18. Harms H, Grittner U, Dröge H, Meisel A. Predicting post-stroke pneumonia: the PANTHERIS score. Acta Neurol Scand. 2013;128(3):178-184. doi:10.1111/ane.12095

19. Kaur S, Singh A, Dhillon MS. Incidence of Bedsore among the admitted Patients in a Tertiary Care Hospital. J Postgrad Med Edu Res. 2015; 49 (1):26-31

20. Nassar AP Jr, da Silva FM, de Cleva R. Constipation in intensive care unit: incidence and risk factors. J Crit Care. 2009;24(4):630.e9-630.e6.3E12. doi:10.1016/j.jcrc.2009.03.007

21. Phipps MS, Cronin CA. Management of acute ischemic stroke. BMJ. 2020;368:l69m83. Published 2020 Feb 13. doi:10.1136/bmj.l6983

22. Agha R, Abdall-Razak A, Crossley E, Dowlut N, Iosifidis C and Mathew G, for the STROCSS Group. The STROCSS 2019 Guideline: Strengthening the Reporting of Cohort Studies in Surgery. International Journal of Surgery 2019;72:156-165

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Ikram MT:	Concept, Critical appraisal, and Discussion Writing
Azam HU:	Data collection, compilation of results, formatting of the article
Azam KU:	Data Collection, Manuscript writing
Arif A:	Manuscript Writing, Bibliography
Rahman A:	Overall compilation of the article
Khan BD:	Supervision, Critical appraisal
Rahim AK:	Data Collection, Manuscript 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.

LEIOMYOSARCOMA OF THE KIDNEY IN A 56-YEAR OLD MALE- A CASE REPORT

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ABSTRACT

Objective: Leiomyosarcoma (LMS) of the kidney is a rare condition, and little is known about this subtype of renal sarcoma. The main complaint of a 56-year-old man was left flank pain that had been present for one month. His CT renal angiogram including arterial, venous, and delayed phases showed a large left renal mass and an interpolar region containing a solid mass with a central cystic/necrotic component suggesting renal cell carcinoma projecting into the renal sinus fat. The patient was identified as having high-grade LMS based on immunochemical analysis and gross specimen examination. Although there is a poor prognosis, radical nephrectomy is still the preferred course of action. It is important to review adjuvant therapy's possible advantages with certain patients.

Keywords: Leiomyosarcoma, Flank pain, Renal cell carcinoma

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INTRODUCTION

Only 0.12% of renal malignancies are LMS, making them extremely rare tumors. Additionally, it is known that women in their 60s are particularly affected. Even though LMS is not frequently seen in clinical settings, its aggressive nature, similarities to renal cell carcinoma, and the potential role of adjuvant therapy all require our understanding of this pathology. [1]

CASE PRESENTATION

A 56-year-old man doing an office job was presented to our facility hypertension positive, non-smoker, no retention of urine, burning micturition, and fever visited our institution to get a second opinion on how to handle his kidney tumor. A few episodes of gross haematuria were observed last week as round and long threads of clots. No fresh bleeding or clots were seen in the urine. The patient had a weight loss of 12 kg in 6 months due to appetite loss in the last 6 months, cough positive, no hemoptysis, constipation, GI bleeding, and abdominal trauma or surgery was noted. His reconstructed non-contrast and post-contrast CT renal angiogram including arterial, venous, and delayed phases was done that showed a large left renal mass and interpolar region containing a solid mass with central cystic/necrotic component measuring 13.4 x 13.4 cm, suggesting renal cell carcinoma projecting into the renal sinus fat without tumor thrombus extension into the left renal vein. It was abutting the Gerota fascia but had not extended beyond it. It has stretched the renal calyces. No definite evidence of tumor thrombus extension into the left renal vein was found. The left adrenal gland contained a 10 x 10 mm nodule with an absolute washout of 65% suggesting an adenoma. The lower pole of the left kidney showed a 10 x 25 mm calculus having a density of 1482 HU. Mildly enlarged left para-aortic lymph nodes were also seen. The clinical diagnosis of renal cell carcinoma was made based on the location and features of the kidney tumor. The patient gave his consent for the surgical removal of his kidney tumor and underwent a left-open radical nephrectomy. Hemisection of the kidney by pathology showed histopathological findings as shown in Table 1 and Figure 1.

To further lower the chance of micrometastatic illness, adjuvant chemotherapy was a possibility that was discussed with the patient. For a formal consultation, the Patient was referred to a medical oncology facility. The patient remained stable after the procedure, and a follow-up appointment in three months with a CT scan of the chest, abdomen, and pelvis was planned.

DISCUSSION

Despite being the most common histological subtype and accounting for 50–60% of all renal sarcomas, LMS is a very rare tumor. [1] The signs of LMS are like those of other types of kidney cancer. Clinical manifestations are

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Table 1: Histopathological findings

Microscopic Findings	
Tumor size	17 cm
Histologic type	LMS
Histologic grade	3
Mitotic rate	Approx. 20 mitoses per 10 high power field
Necrosis (Extent)	Present (50%)
Treatment effect	No known presurgical therapy
Margins	
Prinephric fat margin	Uninvolved by sarcoma (UBS)
Renal sinus soft tissue margin	UBS
Renal vein margin	UBS
Ureteral margin	UBS
pT Category	pT1 (Tumor confined to organ)
pN Category	pN0
Immunohistochemistry	
SMA	Diffusely +ve in tumor cells (TC)
Caldesmon	Diffusely +ve in TC
Desmin	Diffusely +ve in TC
CK	Focal +ve in TC
EMA	Focal +ve in TC
PAX8	-ve in TC
CD34	-ve in TC
S100	-ve in TC

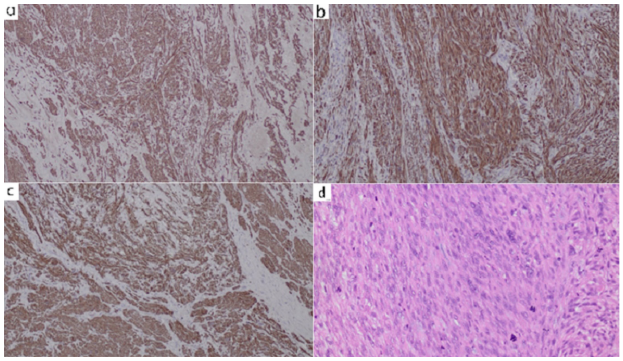

Fig 1: Microscopic Immunohistochemistry images (a) SMA positive in malignant neoplasm 100x (b) Desmin positive in malignant neoplasm 100x (c) Caldesmon positive in neoplasm 100x (d) Spindle cell neoplasm composed of atypical cells with multiple atypical mitoses 400x

commonly non-specific because patients typically have flank discomfort or abdominal pain associated with hematuria. Due to limitations of imaging, it can be difficult to accurately differentiate LMS from RCC due to certain tumor features. [2] Therefore, it is not surprising that renal LMS and RCC are frequently misdiagnosed before surgery and tissue examination that follows. [3]

Under a microscope, the pathologic sample from our patient showed areas of necrosis and spindle cells, which was consistent with earlier studies. Immunohistochemical analysis frequently reveals smooth muscle actin, calponin, desmin, and h-caldesmon positive expressions in renal LMS; this suggests a shift in the cytoskeleton's bundled structure and gives information on the neoplastic transformation process. Despite our case's diffusely positive desmin result, this is typical and demonstrates the altered cytoskeleton bundle. When it can be challenging to distinguish between LMS and sarcomatoid RCC based solely on histology comparisons, immunohistochemical analysis is helpful via the French Federation of Cancer Centre`s guidelines. [4] Due to his high-grade malignancy, our patient is predicted to have a poor prognosis with a 5-year survival rate of less than 40%. Radical nephrectomy is the gold standard for renal LMS. A preoperative diagnosis may be helpful even though it is technically difficult since neoadjuvant chemotherapy can be utilized to treat potential micro-metastases in LMS. [5] For patients with renal LMS, radiation and adjuvant chemotherapy are further alternatives. A high index of suspicion should be maintained because the presenting symptoms and findings from imaging tests do not offer a solid basis for a precise and rapid diagnosis. Adjuvant and neoadjuvant therapy should be considered in addition to surgical excision, which is the chosen treatment of choice for renal LMS. Patients with renal LMS should be sent to an established sarcoma center for complete management.

REFERENCES

1. Niceta P, et al. LMS of kidney. Review of the literature. Urology. 1974;3(3):270–277.
2. Sharma D, et al. LMS of kidney: a case report with long term result after radiotherapy and chemotherapy. Int Urol Nephrol. 2007;39(2):397–400.
3. Demir A, et al. Case report: good prognosis in LMS of the kidney. Int Urol Nephrol. 2007;39(1):7–10.
4. Venkatesh K, et al. Primary LMS of the kidney. Patholog Res Int. 2010; 2010:652398.
5. Deyrup AT, Montgomery E, Fisher C. LMS of the kidney: a clinicopathologic study. Am J Surg Pathol. 2004;28(2):178–182.

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 ρ 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

AUTHOR'S AGREEMENT

Journal of Medical Sciences (KMC Peshawar pISSN 1997-3438)

Journal_____

ArticleTitle_____

I certify that

A) None of the material in the manuscript has been published previously/currently under consideration for publication elsewhere.

B) The article has not been accepted for publication elsewhere

C) I have not signed any right or interest in the article to any third party

D) I am able/willing to produce the data on which this article is based, should the Editorial Board of the Journal of Medical Sciences request such data.

E) Animal Care Committee/Institutional Review Board approval was granted for this study.

I (including spouse and children), disclose financial interest at the level

a) Nothing to disclose b) Financial interest to the amount of _____

F) I/We confirm to comply fully with the suggestions/critical views of the reviewers/editor, failing which my/our article may be rejected at the sole discretion of the editor. I/we further confirm that if our article is rejected (whihc is the sole discretion of the editor) I/we will have no right to complain against the journal/editor/representative of the journal/printer in any forum including the court of law.

G) I/we suggest the following two overseas reviewers to review our article.

1) _____	_____	_____
2) _____	_____	_____
Name of reviewer	Postal address	Email address & Telephone No.

_____	_____	_____
Author name	Author signature	Author e-mail address

Note: Author agreement form must be signed by each author (one page for each) and submitted with the article.

Author's Checklist:

i) Eliminate nonstandard abbreviation in the titles
ii) Supply full author names (including institutional affiliation and contact informations)
iii) Contribution of individual authors
iv) Nomination of first 3 co-authors by the principal author
v) Abstract: 200 words, Article: 2000 words (excluding references).
vi) Supply references in Vancouver style, accurately cited in the text in numerical order
vii) Cite tables in the text in numerical order
viii) Send 03 Hard copies and on a R/W CD (in MS Word), in a protective envelop, do not use clips
ix) Cite figures in the text in numerical order
x) Author agreement is signed by all authors.
xi) Departmental Permission Letter for the study.
xii) Letter of ethical review of concerned hospital/study place.
xiii) Bank draft for Rs. 5000/- (Rs. Five Thousand) in the name of Journal of Medical Sciences, Peshawar, Pakistan/or deposit in cash with Managing Editor Account No. 4048685170 (3548-9) Can be transferred ONLINE to the Account No. 4048685170 (3548-9) Branch Code 0388 at National Bank of Pakistan, University Campus Branch, Peshawar.

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 teleconference, Skype, or other web platforms.

11.2: The Patron:

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

11.3: The Chief Editor:

11.3.1: The criteria for selection of Chief Editor are:

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

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

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

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

v. Enthusiasm to undertake the Editor role

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

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

11.3.2: The roles of the Chief Editor are:

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

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

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

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

11.3.3: Managing editor:

i. The roles of managing editor are:

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

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

iv. To regularly evaluate the research work

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

11.3.4: Executive editor:

The roles of the executive editor are:

i. To evaluate the research articles presented for publication

ii. To help the editorial board in policymaking

iii. They help the editorial board in smooth publishing

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

11.3.5: Section editors:

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

i. Bibliography

ii. Proof-reading

iii. Academic writing reviewing, grammar, and spell checking

iv. Dissemination of articles for review

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

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

vii. others

11.3.5: Editorial advisory board:

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

12 Policy regarding recruitment and continuation of the editorial board

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

13 Plagiarism policy

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

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

14 Allegations of research Misconduct

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

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

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

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

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

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

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

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

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

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

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

15 Appeal and complaint process

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

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

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

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

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

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

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

16 Contact information

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

17 Archiving and Data Repository

- In accordance with our open-access policy, we permit the self-archiving of published papers after their publication in JMS. Without requesting permission from the journal or publisher, authors are free to archive their academic works in PDF format at any time and retain ownership of the intellectual property. However, a yearly subscription is required to access the print edition of the entire magazine issue, which can be stored in libraries in the country and overseas for 500 US dollars or 5000 Pakistani rupees respectively.
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References

ICMJE recommendations

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