Tri-Annual

PMSRJ 2025 JANUARY-APRIL 2/1

Pakistan Medical Students Research Journal

Khyber Medical College Peshawar Pakistan

PAKISTAN MEDICAL STUDENTS RESEARCH JOURNAL

Printed at:
Khyber Prints
E-mail: khyberprints@gmail.com

CONTENTS

The Pakistan Medical Students Research Journal (PMSRJ), the official student-based journal published by Khyber Medical College, Peshawar, is peer-reviewed, open access. This multidisciplinary medical journal publishes scientific research articles related to public health and biomedical sciences. The target audience is medical students, graduates, post-graduates, post-doctoral, and health professionals. It publishes original papers, narrative and systematic review articles, case reports, short communication, special communication, viewpoint, research study protocols, editorials, and letters to the editors. All research articles are subject to the peer-review process. PMSRJ is a strong advocate of ethical medical journalism and promotes the integrity of science by practicing the highest standard of research and publication ethics. Any misconduct noticed during or after publication in PMSRJ will be dealt in line with the COPE guidelines.

Office of the Managing Editor,
Khyber Medical College, Peshawar

Principal Contact
Managing Editor, PMSRJ
Khyber Medical College Peshawar
Phone +92-91-9221387
managingeditor@pmsrj.com
Support Contact
Administrator PMSRJ
admin@pmsrj.com

The Pakistan Medical Students Research Journal (PMSRJ) is published on controlled circulation basis and distributed among the faculty of all national medical colleges, main libraries throughout the province, Pakistan Medical Research Council, PMDC, HEC and Tertiary Referral Centers.

The Pakistan Medical Students Research Journal (PMSRJ) is published triannually, composed and printed at Khyber Printers, Peshawar KP, Pakistan.

Annual Subscription
Pakistan: Rs. 5000/-
Overseas: US $ 500/-

Printed at:
Khyber Prints
E-mail: khyberprints@gmail.com

MESSAGE BY THE PATRON IN CHIEF

It is with immense pleasure and pride to announce the publication of the first issue of the Pakistan Medical Students Research Journal (PMSRJ). The idea was instilled in my mind when studies showed that medical students who indulged in research at college level later go on to becoming meaningful research oriented doctors in their respective fields. Success is all about harmonious team work for which I would especially like to thank Prof Bushra Iftihkar, associate Dean Research, our Director of Medical Education Professor Farooq Ahmad and the entire editorial board.

The prelude to this was a very successful "All Pakistan Medical Students Research Conference" held last year at Khyber Medical College. Its is a pleasure to present the 1st issue of the Pakistan Medical Students Research journal (PMSRJ) to our audience.

A lot of credit goes to our Editors, Reviewers, and Authors. The journal serves to provide a medium for communicating wealthy novel findings to all in the field of Medicine, Public health, and Social Science. In line with the aim of PMSRJ to interconnect all aspects of health sciences, this issue mostly covers topics related to public health.

This journal is intended to provide a platform for both undergraduate and postgraduate students in health sciences to present their research work on priority and in a cost-effective way. The editorial team has ensured a user-friendly, cost-effective, and facilitative platform for this purpose on the journal website, where the peer review process ensures transparency, and time-saving, in the meantime, ensures the editorial process is up to the mark. I hope the editorial team will try to maintain the highest research and medical writing standards in this journal.

The journal will consist of an editorial related to current topics of interest in medicine, dentistry, education, public health, and epidemiology. Guest editorials are also welcomed. It will have original articles and a case report on a mandatory basis.

The journal is also open to students' blogs, infographics, students' success stories, and other relevant material. We encourage students within our institution and outside to present their research work to this journal for speedy publication. We greatly value students' and others' inputs in the form of letters to the editor regarding critiques, feedback, and suggestions.

I thank and congratulate the authors, the editorial team, and the IT support staff for this invaluable new step towards excelling in research from the doors of Khyber Medical College.

Professor Dr. Mahmud Aurangzeb
Dean, Medical Teaching Institute, Khyber Medical College, Peshawar - Pakistan
Patron-in-Chief, Pakistan Medical Students Research Journal (PMSRJ)

MESSAGE BY THE CHIEF EDITOR

As the Editor in Chief of Pakistan Medical Students Research Journal (PMSRJ) I wholeheartedly congratulate the students & faculty of KMC on launching a health research journal dedicated exclusively to medical students. This initiative brings forth a remarkable opportunity to enrich the educational experience and intellectual growth of aspiring medical professionals. It is an endeavour that deserves our attention and support. Firstly, the creation of a health journal specifically tailored for medical students is an important step in encouraging their development as future healthcare providers. By providing a platform for students to publish their research findings, case reports, and clinical experiences, this journal will encourage their engagement in scholarly activities. It will enable them to contribute to the existing body of medical knowledge and enhance their understanding of scientific inquiry.

Moreover, the journal will serve as a valuable resource for medical students, offering a compilation of informative articles, reviews, and discussions related to various medical disciplines. This comprehensive coverage will help students broaden their understanding beyond their curriculum, exposing them to different perspectives and advancements in the field. It will encourage critical thinking, stimulate intellectual curiosity, and promote a culture of lifelong learning among future physicians. The availability of a dedicated health journal for medical students will also promote a sense of collaboration within the student and health community. It will provide a platform for them to connect, share their experiences, and learn from each other. The opportunity to engage in peer review processes and editorial roles will further enhance their skills in scientific writing, critical appraisal, and academic leadership.

Additionally, this journal can bridge the gap between students and faculty, facilitating mentorship and advancing meaningful interactions. Faculty members can contribute their expertise by serving as reviewers, editors, or advisors to the journal, guiding students in their scholarly pursuits. Such collaboration will not only enhance the quality of the journal but also strengthen the student-faculty relationship, creating a supportive academic environment. While the launch of this health journal is a promising development, it is important to ensure its sustainability and continued growth. Adequate resources, including dedicated editorial staff, peer reviewers, and technical support, will maintain the journal's standards and ensure timely publication.

Collaborations with other institutions and medical societies can help broaden its reach and increase its impact on the medical education community. In conclusion, the newly launched health journal for medical students is a significant milestone in the academic landscape. It provides a platform for students to publish their work, expand their knowledge, and strengthen collaboration. By supporting and actively engaging with this initiative, we can empower our future healthcare professionals, develop their research skills, and contribute to the advancement of medical education. Let us embrace this journal as a valuable tool in shaping the next generation of medical practitioners and promoting excellence in medical education.

Prof. Dr. Bushra Iftikhar

Associate Dean (Research) & Chairperson, Department of Community Medicine, Khyber Medical College, Peshawar

EDITORIAL

MIGRATION OF HEALTH PROFESSIONALS: BRAIN DRAIN OR GLOBAL SHARING?

Adeela Mustafa

Department of Community Medicine, Khyber Medical College, Peshawar - Pakistan

This editorial may be cited as: Mustafa A. Migration Of Health Professionals: Brain Drain Or Global Sharing?. PMSRJ 2025 Jan-April;2(1):123-124

Advocates for global health have long been concerned about the movement of health workers. Is it a way to improve personal prospects, a sign that systems are failing, or a means to promote global fairness? The truth lies somewhere between the ideas of brain drain and global sharing. We must reconsider this issue from the perspectives of fairness, sustainability, and moral duty.

On one hand, the movement of health professionals, especially from low- and middle-income countries (LMICs) to high-income countries (HICs), further weakens health systems that are already overstretched. Many trained healthcare workers are leaving countries like Pakistan, India, Nigeria, and the Philippines. Most of them attended public schools that the government heavily funded. [1] The World Health Organization (WHO) states that sub-Saharan Africa bears 25% of the world's disease burden but has only 3% of the world's health workers. This gap makes it very difficult to achieve Universal Health Coverage (UHC). [2]

The COVID-19 pandemic exposed the vulnerabilities in global health systems. High-income countries (HICs) quickly eased immigration policies to recruit healthcare workers from other nations to fill the shortages. This measure addressed the immediate issue of workforce shortages. However, it also worsened conditions in the countries of origin, where many healthcare workers were already experiencing shortages before the pandemic. For example, over the past ten years, more than 17,000 doctors have migrated from Pakistan to the UK and Gulf countries. The problem extends beyond financial factors; it highlights widespread dissatisfaction with working conditions, poor governance, limited career advancement, and safety concerns. [3, 4]

The COVID-19 pandemic exposed the vulnerabilities of global health systems. HICs quickly eased immigration restrictions to recruit foreign-trained healthcare workers and fill the gaps. While this move addressed the immediate shortage, it worsened the lack of healthcare personnel in the countries of origin, many of which were already facing shortages even before the pandemic. For example, Pakistan has seen over 17,000 doctors migrate to the UK and Gulf countries in the last ten years. [4] The issue goes beyond economics, reflecting dissatisfaction with working conditions, poor governance, limited career advancement, and security concerns.

Creating ethical hiring procedures would be a more fruitful approach than criticizing the mobility of health workers. The WHO Global Code of Practice on the International Recruitment of Health Personnel advocates for member states to balance the health system requirements of their nations with individuals' rights to migrate. [5] Additionally, bilateral agreements between the countries of origin and destination, such as the UK's Health and Care Visa program with Ghana and the Philippines, seek to compensate the countries of origin by investing in infrastructure and training. These agreements frequently lack strong enforcement and consistency. [6]

Instead of criticizing the mobility of health workers, a more effective approach would involve creating ethical recruitment practices. The WHO Global Code of Practice on the International Recruitment of Health Personnel encourages member states to balance their health system needs with individuals' rights to migrate. Additionally, bilateral agreements between origin and destination countries, such as the UK's Health and Care Visa program with Ghana and the Philippines, aim to compensate the countries of origin through training and infrastructure investments. These arrangements often lack consistency and strong enforcement. [6]

Migration can be viewed as a form of knowledge exchange and a means to build capacity rather than just as a loss. Through telemedicine, short-term services, or capacity-building initiatives, many diaspora professionals give back to their home countries. Between the extremes of brain drain and global sharing, the concept of "circular migration," in which professionals return with improved

skills or collaborate remotely, can help bridge the gap. Institutions also play a role. Return-of-service scholarships, partnership programs, and international collaborations can ensure that the development of the health workforce aligns with both national needs and global opportunities.

Instead of viewing migration solely as a loss, it can be seen as an exchange of knowledge and an opportunity for capacity building. Many professionals from the diaspora give back to their home countries through telemedicine, short-term services, or capacity-building programs. The concept of "circular migration," where professionals return with improved skills or participate in remote collaboration, can help bridge the gap between brain drain and global sharing. [7] Institutions also play a role. International collaborations, partnership programs, and return-of-service scholarships can ensure that health workforce development meets both national needs and global opportunities.

CONCLUSION

Health professional migration is a complex and challenging issue that requires clear policies, international cooperation, and an ethical perspective. It is neither inherently harmful nor entirely advantageous. Prioritizing the retention of healthcare workers and ensuring their job satisfaction is equally important for low- and middle-income countries as engaging in international discussions. For high-income nations, ethical recruitment should be complemented by a dedication to self-sufficiency. The movement of the health workforce must be strategically managed in our interconnected world, not just discussed. We need a framework grounded in ethics, equity, and shared benefits rather than unrestricted migration or physical barriers.

REFERENCES

1. Siyam A, Dal Poz MR, editors. Migration of health workers: WHO code of practice and the global economic crisis. Geneva: World Health Organization; 2014.
2. Bongaarts J. World Health Organization: Working Together for Health: The World Health Report 2006. Population and Development Review. 2006 Dec 1;32(4):790-2.
3. Ziemann M, Chen C, Forman R, Sagan A, Pittman P. Global Health Workforce responses to address the COVID-19 pandemic: what policies and practices to recruit, retain, reskill, and support health workers during the COVID-19 pandemic should inform future workforce development?.
4. Athar MW. The Impact of Brain Drain: Assessing Economic Shifts in Pakistan. Available at SSRN 5292332. 2025 May 10.
5. Tankwanchi AB, Vermund SH, Perkins DD. Has the WHO global code of practice on the international recruitment of health personnel been effective?. The Lancet Global Health. 2014 Jul 1;2(7):e390-1.
6. World Health Organization. Bilateral agreements on health worker migration and mobility: maximizing health system benefits and safeguarding health workforce rights and welfare through fair and ethical international recruitment. World Health Organization; 2024 Mar 14.
7. Diallo K. Data on the migration of health-care workers: sources, uses, and challenges. Bulletin of World Health Organ. 2004 Aug;82(8):601–607.

Dr. Adeela Mustafa
MBBS, M.Phil. FCPS
Associate Professor
Department of Community Medicine, Khyber Medical College, Peshawar - Pakistan
Cell: +92-345-2909019
Email: adeela.mustafa@kmc.edu.pk

ORIGINAL ARTICLE

STUDYING THE EFFECT OF SELF-ESTEEM AND SOCIAL SUPPORT ON ACADEMIC ACHIEVEMENT IN UNDERGRADUATE MEDICAL STUDENTS

Junaid Ahsan[1], Romana Ayub[2], Sidra Irfan[2], Natasha Junaid[2], Nasra Nawaz [3]

[1]Department of Community Medicine, Gajju Khan Medical College, Swabi - Pakistan

[2]Department of Community Medicine, Khyber Medical College, Peshawar - Pakistan

[3]MBBS Student, Khyber Medical College, Peshawar - Pakistan

ABSTRACT

Objective: To examine the impact of self-esteem, social support, and academic performance of male and female undergraduate medical students

Materials and methods: A correlational study was conducted among students at Khyber Girls Medical College, utilizing various instruments and scales to achieve the study's objectives.

Results: The frequency of males and females was equal in the study, while variables such as self-esteem and academic performance showed a weak correlation with academic performance. On the other hand, social support showed a strong positive correlation with academic performance.

Conclusion: Self-esteem and social support are highly individual phenomena, with social support playing a key role in enhancing academic performance.

Keywords: Self-Esteem, Social Support, Academic Achievement, Undergraduate Medical Students

This article may be cited as: Ahsan J, Ayub R, Irfan S, Junaid N, N Nawaz N. Studying The Effect Of Self-Esteem And Social Support On Academic Achievement In Undergraduate Medical Students. PMSRJ 2025 January-April;2(1):125-129

INTRODUCTION

Self-esteem has become a household term today. Teachers, parents, therapists, and others focus on boosting self-esteem, believing that high self-esteem leads to many positive results. Academic failure and dropout are widespread challenges in most education systems worldwide. Social support plays a crucial role in encouraging learning and perseverance. When students sense support from peers, family, institutions, and teachers, they typically exhibit greater motivation and achieve impressive academic success more easily.

Social support is considered a valuable resource for managing stress and meeting the demands of school or university. It directly increases motivation and engagement in learning activities. People have devoted considerable attention to the quality of life in their pursuit of overall well-being.

Additionally, improving the well-being of citizens is a key government goal. Therefore, the quality of life, which is an individual's overall assessment of their life, is of great interest to researchers, policymakers, and the public [1]. Although previous research has examined different socioeconomic groups, there has been a limited focus on the quality of life among university students, who are a crucial group in most societies [2]. This represents a critical research gap because, during their young adulthood, university students go through significant transitions marked by change, confusion, and exploration, and the choices they make during this time can have lasting effects [3]. Furthermore, due to their relatively limited social experience, university students generally have lower self-awareness and psychological resilience compared to employed individuals, making them more susceptible to psychological problems [4].

Previous studies have shown that the quality of life of university students predicts dropout or withdrawal [5] and significantly impacts their subjective well-being [6], as well as their physical and mental health [7]. Therefore, students' quality of life is a significant concern [8]. Academic failure and dropout are widespread challenges across all levels

Correspondence
Dr. Junaid Ahsan
Assistant Professor
Department of Community Medicine, Gajju Khan Medical College, Swabi – Pakistan
Email: dr.junaidahsan@gmail.com
Date Received: 24/12/2024
Date Revised: 30/09/2025
Date Accepted: 01/10/2025

of education in most countries. Research so far has highlighted various aspects of this widespread issue. On the one hand, some researchers suggest that social support is a key factor in promoting learning and persistence. In fact, they have found that when students perceive support from peers, family, institutions, and teachers, they tend to be more motivated and achieve academic success more easily [9].

Many teachers and some scholars have emphasized the role of student motivation and engagement in improving academic performance, supported by empirical findings [10]. This evidence highlights one aspect at a time. However, theoretical models that address this topic tend to be more comprehensive and suggest that social support enhances students' motivation and engagement, which then promotes better performance throughout the process. Self-esteem refers to an individual's overall self-evaluation of their abilities [11].

It is through self-evaluation and descriptive conceptualization that people form and maintain their self-perceptions. In this context, self-esteem refers to an individual's personal assessment of their own worth and value. Self-esteem reflects the degree to which a person "sees him [her] self as a competent, need-satisfying individual" [12]; therefore, a person with high self-esteem has a "sense of personal adequacy and a sense of having achieved need satisfaction in the past" 13. Besides representing a cognitive perception of oneself, self-esteem also includes an emotional component—people with high self-esteem tend to like who and what they are [14].

Therefore, people with high global self-esteem tend to agree with statements such as "I am a person of worth, on an equal plane with others" and "I am satisfied with myself" [1].

The self-esteem construct is typically viewed as a hierarchical concept. As such, it exists at various levels of specificity, often seen as global and task- or situation-specific self-esteem [15]. As a multifaceted view of the self, scholars generally agree that self-esteem can also develop in relation to several other dimensions (e.g., the social, physical, academic, and moral self) [12]. To date, most of our understanding of self-esteem in general and in the work and organizational context comes from research focused on global (chronic) self-esteem [16]. However, research concentrating on an organization-based view of the self has begun to appear.

Before the 1970s, interest in gender differences in academic performance centered on the idea that girls were outperforming boys in reading during the elementary school years [17]. Girls generally performed better than boys in reading and related subjects throughout elementary school and into adolescence [18]. By the 1970s, focus shifted to the possibility that boys were excelling over girls in Math and Science, especially during adolescence. However, boys have rarely been found to outperform girls in Math and Science grades, even during adolescence; in fact, girls often perform better than boys [18].

Regarding self-esteem, many researchers have found that males generally have higher levels of self-esteem compared to females [19], suggesting that males tend to have higher self-esteem. Gender differences across various personality aspects were identified, with a slight advantage for males (d=.10)[20], and this finding was compared to another analysis, which also found a subtle advantage for males (d=.12)[21]. Before the advent of meta-analysis, studies on gender differences in self-esteem suggested there was no consistent difference; however, their reasoning varied [22]. Nonetheless, some researchers found no gender differences in self-esteem [23].

Since academic performance and self-esteem development are crucial for an individual's future and personal growth, it is essential to examine the relationship between these variables. Generally, there are meaningful connections among the four variables: family functioning, social support, academic performance, and self-esteem. Previous research has shown that these variables are interconnected, with family functioning and social support being linked to both self-esteem and academic performance. Additionally, past studies have identified significant gender differences in educational performance and self-esteem. Typically, males tend to outperform females academically and also report higher levels of self-esteem compared to females.

Social support enhances students' self-esteem, which, in turn, promotes their academic achievement and relieves their emotional exhaustion. Self-esteem is an overall appraisal of oneself, reflecting the attitudes one holds toward oneself [24]. Social support can promote students' appraisals of self-worth and appreciation of their own capacity [25], which in turn helps them perform better in academic contexts [26]. Therefore, we expect that social support improves students' academic achievement by enhancing their self-esteem.

MATERIALS AND METHODS

This research is a correlational study conducted at Gajju Khan Medical College in Swabi, using simple random sampling with a sample size of 170. Both males and females were included in the study. All participants were

between the ages of twenty and thirty years; students who did not submit their questionnaires by the deadline were excluded. The Rosenberg Self-Esteem Scale and the Multidimensional Scale of Perceived Social Support were used to assess self-esteem and social support, respectively, and were correlated with academic performance. For data entry and analysis, the Statistical Package for the Social Sciences (SPSS) version 27 was utilized.

RESULTS

Table 1 presents the number, frequency, and percentage of the data sample, broken down by gender differences.

Table 2 presents the mean, Standard deviation, frequency, and Pearson correlation between the selected variables.

Self-esteem has a weak positive correlation with academic performance (r =.038).

Table 3 shows the mean, Standard deviation, frequency, and the Pearson Correlation between the selected variables.

Social support has a strong positive correlation with academic performance (r = .899).

Table 1: Gender distribution of participants in the study

Gender	Frequency	Percentage	Valid Percentage
Male	85	50.0	50.0
Female	85	50.0	50.0
Total	170	100.0	100.0

Table 2: Mean, Standard deviation, frequency, and Pearson correlation between self-esteem and academic performance

Variables	M	SD	f	P
Self-esteem	22.37	4.086	170	.038
Academic performance	70.17	11.92	170	.038

Table 3: Mean, Standard deviation, frequency, and Pearson correlation between social support and academic performance

Variables	M	SD	f	P
Social support	62.09	13.95	170	.899**
Academic performance	70.17	11.92	170	.899**

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

DISCUSSION

The objective of this study was to investigate the impact of self-esteem and social support on GKMC students and to examine their relationship with academic performance among both male and female students. This research is quantitative. A sample of 170 GKMC students was selected, consisting of 85 males and 85 females, with ages ranging from 20 to 30 years. The Multidimensional Scale of Perceived Social Support (MSPSS) was used to assess social support among participants. MSPSS is a 12-item tool designed to measure perceived social support from three sources: family, friends, and significant others. The scale evaluates the extent to which respondents perceive support from each source and includes three subscales: family (items 3, 4, 8, 11), friends (items 1, 2, 5, 6, 7, 9, 12), and significant others (items 1, 2, 5, 10).

Hypothesis No. 1 was that students with high self-esteem would have higher academic performance. The results in Table 2 indicate that a relationship exists between self-esteem and students' academic achievement; however, this relationship is very weak, suggesting that students' scores are not significantly affected by their self-esteem, whether it is high or low, but instead that it has a mild influence on their grades. These findings are inconsistent with studies that explain how negative feelings about oneself and experiences of failure affect self-esteem [30]. Hypothesis No. 2 was that students with more social support would have higher academic performance. The results in Table 3 suggest a significant positive correlation between social support and academic performance, indicating that students with greater social support, such as family, friends, and significant others, tend to perform better academically. These findings align with studies conducted by different researchers, which also state that social support has a significant effect [31], [32].

The findings of this study contribute to the limited body of research that has investigated the relationship between self-esteem and social support and its impact on students' academic achievement. As one of the early empirical studies in the area of student self-esteem, this study broadens and deepens our understanding of the practical role of social support in research. The findings support and expand existing knowledge in this field. Addressing the research hypotheses, the study identifies and recommends additional areas for future research. Past research has focused on self-esteem itself; however, most studies have been conducted in Western countries with individualistic cultures, rather than in collectivistic cultures. This was the gap in previous research. To the researcher's knowledge, no studies are available in the context of Pakistan. Many studies have been conducted on the general population in Pakistan, but not specifically on students in any medical college. Therefore, it was necessary to study this population. The current research included male and female students from GKMC, Swabi, to fill this gap.

Like any other academic research, this study has

some limitations. These limitations can be grouped into two main categories: those related to the research methodology and those affecting the generalization of the findings. Limitations also include the fact that participants are from a specific medical college, GKMC in Swabi. Additionally, participants may have responded in a biased manner.

CONCLUSION

Self-esteem and social support are both highly individual phenomena. The results of the present study show that both self-esteem and social support are related to students' academic scores. Compared to self-esteem, which showed a weak correlation with academic performance, social support has a robust correlation with the educational performance of GKMC students. Students with high social support tend to perform better and achieve higher marks in their academic careers. They are expressive, original, intuitive, introspective, and value certain qualities. Students with low self-esteem are not severely impacted in their grades but are mildly affected, whereas those with high self-esteem show a very weak positive correlation.

REFERENCES

1. Lenderking, William R. "The psychology of quality of life." (2005): 1439-1441.
2. Vaez M, Kristenson M, Laflamme L. Perceived quality of life and self-rated health among first-year university students. Social indicators research. 2004 Sep;68(2):221-34.
3. Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the early twenties. American Psychologist, 55(5), 469-480.
4. Bask M, Salmela-Aro K. Burned out to drop out: Exploring the relationship between school burnout and school dropout. European journal of psychology of education. 2013 Jun;28(2):511-28.
5. Timmons, F. R. (1978). Freshman withdrawal from college: A positive step toward
6. identity formation? A follow-up study. Journal of Youth and Adolescence, 7(2), 159-173. Sirgy, M. J., Grzeskowiak, S., &Rahtz, D. (2007). Quality of college life (QCL) of Students: Developing and validating a measure of well-being. Social Indicators Research, 80(2), 343-360.
7. Salmela-Aro K, Kiuru N, Leskinen E, Nurmi JE. School burnout inventory (SBI) reliability and validity. European journal of psychological assessment. 2009 Jan;25(1):48-57.
8. Benjamin M, Hollings AE. Toward a theory of student satisfaction: An exploratory study of the" quality of student life.". Journal of College Student Development. 1995 Nov.
9. Robbins, S., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do Psychosocial and study skill factors predict college outcomes? A meta-analysis. Psychological Bulletin, 130, 261-288.
10. Pintrich PR, Schrauben B. Students' motivational beliefs and their cognitive engagement in classroom academic tasks.Student perceptions in the classroom. 1992;7(1):149-83.
11. Rosenberg, M. Society and the adolescent self-image. Princeton, NJ: Princeton University Press; 1965 December 31.
12. Korman AK. Toward a hypothesis of work behavior. Journal of Applied Psychology. 1970 Feb;54(1p1):31.
13. Korman AK. Self-esteem variable in vocational choice. Journal of Applied Psychology. 1966 Dec;50(6):479
14. Pelham BW, Swann WB. From self-conceptions to self-worth: on the sources and structure of global self-esteem. Journal of personality and social psychology. 1989 Oct;57(4):672.
15. Simpson CK, Boyle D. Esteem construct generality and academic performance. Educational and Psychological Measurement. 1975 Dec;35(4):897-904.
16. Brockner J. Self-esteem at work: Research, theory, and practice. Lexington Books/DC Heath and Co., 1988.
17. Brophy J. Interactions of male and female students with male and female teachers. Gender influences in classroom interaction. 1985 Jan 1:115-42.
18. Dwyer CA, Johnson LM. Grades, accomplishments, and correlates. In: Gender and Fair Assessment (2013, Dec 16, pp. 127-156). Routledge.
19. Allgood-Merten B, Stockard J. Sex role identity and self-esteem: A comparison of children and adolescents. Sex roles. 1991 Aug;25(3):129-39.
20. Feingold A. Gender differences in personality: a meta-analysis. Psychological Bulletin. 1994 Nov;116(3):429.
21. Stier DS, Hall JA. Gender differences in touch: An empirical and theoretical review. Journal of personality and social psychology. 1984 Aug;47(2):440.
22. Major, B., Barr, L., Zubek, J., & Babey, S. H. (1999). Gender and self-esteem: A meta-analysis. In W. B. Swann, Jr., J. H. Langlois, & L. A. Gilbert (Eds.), Sexism and stereotypes in modern society: The gender science of Janet Taylor Spence (pp. 223–253).
23. Greene AL, Wheatley SM. "I've got a lot to do and I don't think I'll have the time": Gender differences in late adolescents' narratives of the future. Journal of youth and adolescence. 1992 Dec;21(6):667-86.
24. Leary, M. R., & MacDonald, G. (2003). Individual differences in self-esteem: A Review and theoretical integration. In M. R. Leary & J. P. Tangney (Eds.).
25. Cohen S, Wills TA. Stress, Social BSupport, and the buffering Hypothesis. Psychological Bulletin. 1985 Sep;98(2):310.

26. Fang L. Educational aspirations of Chinese migrant children: The role of self-esteem, contextual, and individual influences. Learning and Individual Differences. 2016 Aug 1;50:195-202.

27. Cotton NS. A developmental model of self-esteem regulation: Part 1. Hather Leigh Company, Long Island City, New York, NJ. 1985.

28. Ausubel DP. Negativism as a Phase of Ego Development. American Journal of Orthopsychiatry. 1950 Oct;20(4):796.

29. M. Karatepe O, Demir E. Linking core self-evaluations and work engagement to work-family facilitation: A study in the hotel industry. International Journal of Contemporary Hospitality Management. 2014 Feb 4;26(2):307-23.

30. Dutton KA, Brown JD. Global self-esteem and specific self-views as determinants of people's reactions to success and failure. Journal of personality and social psychology. 1997 Jul;73(1):139.

31. Dohnt H, Tiggemann M. The contribution of peer and media influences to the development of body satisfaction and self-esteem in young girls: a prospective study. Developmental psychology. 2006 Sep;42(5):929.

32. Shute R, Blasio TD, Williamson P. Social support satisfaction of Australian children. International journal of behavioural development. 2002 Jul 1;26(4):318-26.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Ahsan J	✓	×	✓	×	✓	×
Ayub R	✓	✓	×	✓	✓	×
Irfan S	×	✓	×	×	✓	×
Junaid N	✓	✓	✓	×	✓	✓
N Nawaz N	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ORIGINAL ARTICLE

EVALUATION OF COMPUTER VISION SYNDROME AMONG STUDENTS AT THE COLLEGE OF MEDICINE, UNIVERSITY OF KERBALA: RESULTS OF ONLINE LEARNING DURING COVID-19 ISOLATION

Mahdy AbuRagheiff

[1]Department of ???, Karbala University College of Medicine, Karbala - Iraq

ABSTRACT

Objective: A complex of vision problems related to stress can occur during the use of computers or other digital devices. Many of the visual problems that users report are transient and resolve after they stop using computers or other digital devices. Even after stopping their computer job, some people may still have diminished visual abilities, such as blurry distance vision. This study aimed to evaluate computer vision syndrome among students at the College of Medicine, University of Kerbala

Materials and Method: This is a cross-sectional study conducted at the University of Kerbala College of Medicine, which was completed between November 2021 and January 2022, involving students of the College of Medicine who were given student questionnaires about the effects of long-term use of computers, laptops, and mobile phones.

Result: The cross-sectional studies, which included questionnaires administered to 460 students at the College of Medicine, University of Karbala, were examined. We drew lines to identify computer vision syndrome based on these associated ocular and extraocular symptoms and recorded a high prevalence of computer vision syndrome, reaching 91.6%.

Conclusion: The criteria in this study can be used to diagnose computer vision syndrome, assess the severity of the condition, and determine its relationship to prolonged use of computers or other devices.

Keywords: Computer vision syndrome, ocular, extraocular

This article may be cited as: AbuRagheiff M. Evaluation Of Computer Vision Syndrome Among Students At The College Of Medicine, University Of Kerbala: Results Of Online Learning During Covid-19 Isolation. PMSRJ 2025 January-April;2(1):130-136

INTRODUCTION

The development of the 21st century has brought significant changes in how computers are used in the educational sector of universities. Additionally, computers are now utilized for watching movies, playing computer games, and engaging in online chatting. In early 2019, Iraq experienced a political crisis that prevented enrollment in colleges and schools, followed by the COVID-19 pandemic, which has lasted more than two years and is still ongoing. The mode of teaching shifted to online platforms in schools and universities through online teaching programs and social media. Due to prolonged use of mobile phones, iPads, and computers, students at the College of Medicine, University of Karbala, suffered harm beyond COVID-19 infection. [1-4] Over the past two years, dependence on mobile and computer devices has increased primarily due to the COVID-19 pandemic, prompting many universities and schools to utilize audiovisual equipment for online learning and research. This reliance led to complications in ocular and non-ocular signs and symptoms, similar to computer vision syndrome, which this research discusses in students. [1, 5, 9] Prolonged use of computers and other digital devices often results in a group of symptoms, with more patients complaining about ocular and non-ocular issues related to computer use. Symptoms such as eye strain, tired eyes, irritation, burning sensations, redness, dry eyes, blurred vision, and double vision reported by users of visual display units are collectively known as “Computer Vision Syndrome.” This study aimed to analyze the effects of mobile phones and computers on the quality of eyesight in students of the College of Medicine at the University of Karbala, who use gadgets for extended periods each day, and to examine the effects of these devices on the distribution of symptoms associated with computer vision syndrome. [6-8]

Correspondence
Dr. Mahdy AbuRagheiff
Department of ????????????, Karbala University College of Medicine, Karbala, Iraq
Email: mahdi.hameed@uokerbala.edu.iq
Date Received: 17/01/2025
Date Revised: 07/10/2025
Date Accepted: 07/10/2025

MATERIALS AND METHOD

This is a cross-sectional study conducted at the

University of Kerbala College of Medicine, completed between November 2021 and January 2022. The study involved students from the College of Medicine who completed questionnaires about the effects of long-term computer, laptop, and mobile phone use on the eyes and various parts of the body. The data collection period lasted three months. Data were gathered through both online and paper questionnaires. The questionnaire included questions about the type of electronic device used, daily duration of use, whether glasses were worn and their strength, symptoms related to electronic devices, and students' awareness of protection techniques.

MATERIALS AND METHODS

The study was conducted on 518 undergraduate students from the College of Medicine at the University of Karbala, with ages ranging from 19 to 24 years. Consent was obtained from them, excluding approximately 58 students who did not meet our search criteria, including the exclusion criteria, which are:

1. The person has an abnormality in vision and uses a high degree of eye class more than the power of eyeglasses

2. Disease related to the eye and causes severe headaches, such as Astigmatism, history of myopia & hyperopia

3. Consumption of drugs that cause affected vision and cause severe headaches

We developed a questionnaire for our subjects; a separate questionnaire was designed for data collection. The questionnaire has nine subsections covering participants' detailed medical history that has been collected for each subject, which includes:

1 Identity of the shared subject: name, gender (male or female), date of birth, and grade of the class.

2. What is used in studies, and how time is spent using the laptop and mobile

3. Distance more than 50 cm and using screen filters

4. Medical eyeglasses are used, and the Degrees of Medical eyeglasses are used

5. Any measures practiced to prevent eye problems

6. Headache

7. Burning sensation

8. Dry, tired, and sore eyes

9. Double vision and Blurred distance vision of the eyes

10. The subject has Neck pain, neck stiffness, shoulder pain, and Backache after a long time of use of this laptop and mobile

CRITERIA OF COMPUTER VISION SYNDROME

Three groups of criteria, each consisting of signs and symptoms, were established in this study to diagnose Computer Vision Syndrome. Three of these signs are consistently present and used for diagnosis, with two related to Ophthalmic disturbance that may require treatment. These groups are:

1. Group one// Ophthalmic symptoms

a. Visual symptoms

b. Internal Ocular Symptoms

2. External Ocular Symptoms

3. Group two// Musculoskeletal symptoms and headache

4. Groups three// Psychosocial symptoms

STATISTICAL ANALYSIS

was performed using Excel and Version 25 of the Statistical Package for the Social Sciences (SPSS). The differences between the groups were assessed using correlation and Crosstab to describe the relationship between the groups, and categorical data were presented as numbers and percentages. The study was conducted in accordance with the ethical standards established by the Medical Research Bioethics Committee of the University of Kerbala/College of Medicine. Before administering the questionnaires, informed consent was obtained from the student participants, and the study protocol was reviewed and approved by a local ethics committee (number 43) on 7/24/2020. The approval was renewed annually, with the final approval letter numbered 83, dated July 30, 2023.

RESULT

These cross-sectional studies were conducted using 33 questions (questionnaires) to 518 students of the College of Medicine/ University of Karbala; 460 were included in these studies, and 58 were excluded according to the criteria recorded in the method. A total of 460 medical students were included in the study with a mean age of (22 $\pm$ 1.27). The number of females in this study was 346 students equal to 75.2% and the number of males in this study114 students 24.8%), female with a male ratio of 3:1. Out of 460 students, 164 (35.7%) were using mobile, those were using IPad 158 (34.3%), were using laptops 138 (30%) explained in **figure 1.**

The majority of them used devices for more than 8 hours a day. Among students who used devices from a distance of more than 50cm, 228 (49.6%) used them at less than 50cm, while 232 (50.4%) used them at more than 50cm. Additionally, 148 (32.2%) students wore eyeglasses. The instruments students used to protect their eyes are detailed in Table **1.**

The majority of students used their laptops or mobile devices for more than 8 hours, which causes problems in vision. The prevalence of computer vision syndrome among student participants in this study was 89.6%, with 70% experiencing musculoskeletal symptoms. The most

common vision issue was ocular problems, as reported by students **in table 2 and figure 3.** Other issues related to muscle spasms and device usage are detailed in **table 3 and figure 4**.

To apply the criteria that were created we found 412 of 460 students (89.6% of students) have Computer Vision Syndrome of which 98 students (21.3%) present with the symptoms of all types of criteria recorded with different in severity, well the headache with ocular and visual symptoms in 128 students (27.83%) and backache with ocular and visual symptoms in 140 students (30.43%) and these percentage of the symptoms overlap with each other in some of the cases of students with computer vision syndrome and with other musculoskeletal symptoms. The cross-tabulation between the tool used by the students in

Table 1: The method used for the protective eye from the instrument.

Preventive measures		Frequency	Percent
Using screen filters	Yes	156	33.9 %
	No	304	66.1 %
Taking break	Yes	278	60.4 %
	No	182	39.6 %
Illumination of the room	Normal	344	74.8 %
	Abnormal	116	25.2 %
Brightness of screen	Normal	230	50.0 %
	Abnormal	230	50.0 %

Table 2: Explains the percentage of symptoms related to vision

Type of ocular Symptoms		Number of students with Symptoms related to eye							
		Mild		Moderate		Severe		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Blurred vision	460	105	22.83%	104	22.61%	29	6.3%	238	51.74%
burning sensation	460	150	32,61%	81	17.61%	39	8.48%	270	58.7%
Watery eyes and irritated eyes	460	178	38.7%	77	16.74%	23	5%	278	60.44%
Eye strain	460	104	22.61%	119	25.87%	47	10.22%	270	58.7%
Temporary Double vision	460	106	23.04%	37	8.04%	9	1. 96%	152	33.04%
Difficulty in accommodation	460	93	20.22%	62	13.48%	35	7.6%	190	41.3%

Table 3: explains the details of symptoms severity related to musculoskeletal and Extra-Ocular symptom

Type of Psychosocial Symptoms	Total	Number	Percent
Stress and Anxiety	460	122	26.52%
Fatigue,	460	101	21.96%
Dizziness and vertigo	460	71	15.43%
Reduced attention span	460	42	9.13%
Poor behavior	460	37	8.04%

Table 4: The Psychosocial symptoms distributed in students

Type of extraocular Symptoms		Number of students with Symptom							
		Mild		Moderate		Severe		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
backache	460	132	28.69%	72	15.65%	34	7.39%	238	51.74%
Shoulder pain	460	101	21.96%	40	8.7%	38	8.26%	179	38.9%
Headache	460	107	23.26%	134	29.13%	85	18.48%	326	70.87%
Neck pain	460	62	13.48%	75	16.3%	47	10.22%	184	40%
Neck stiffness	460	50	10.87%	43	9.35%	11	2.391%	104	22.61%

Table 5: explained the cross-tabulation between the tool used by the students in studies and ocular symptoms

symptoms	Degree of severity	The tool used by the students			Total
		Computer and laptop	I Pad	Mobile	
Blurred vision	Severe	11	8	10	29
	Moderate	30	43	31	104
	Mild	32	30	43	105
	No blurred v	65	77	80	222
	Total	138	158	164	460
Eye strain	Severe	15	16	16	47
	Moderate	33	49	37	119
	Mild	26	28	50	104
	No eye strain	64	65	61	190
	Total	138	158	164	460
burning sensation	Severe	9	16	14	39
	Moderate	23	30	28	81
	Mild	50	47	53	150
	No burning	56	65	69	190
	Total	138	158	164	460

Table 6: explained the cross-tabulation between the tool used by the students in studies and extra-ocular symptoms

symptoms	Degree of severity	The tool used by the students			Total
		Computer and laptop	I Pad	Mobile	
Headache	Severe	22	34	29	85
	Moderate	42	40	52	134
	Mild	33	37	37	107
	No headache	41	47	46	134
	Total	138	158	164	460
Backache	Severe	11	12	11	34
	Moderate	24	20	28	72
	Mild	39	45	48	132
	No backache	64	81	77	222
	Total	138	158	164	460
Shoulder pain	Severe	11	17	10	38
	Moderate	11	19	10	40
	Mild	25	36	40	101
	No pain	91	86	104	281
	Total	138	158	164	460
Neck stiffness	Severe	1	6	4	11
	Moderate	7	20	16	43
	Mild	25	14	11	50
	No stiffness	105	118	133	356
	Total	138	158	164	460
Neck pain	Severe	13	17	17	47
	Moderate	23	24	28	75
	Mild	12	28	22	62
	No pain	90	89	97	276
	Total	138	158	164	460

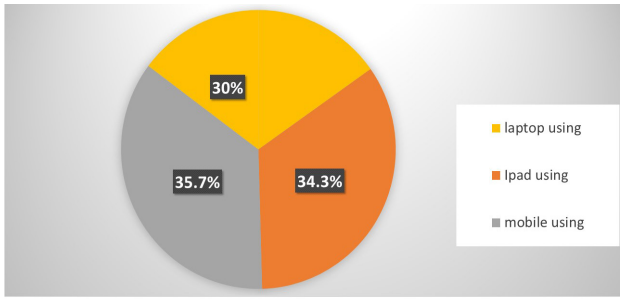

Fig 1: instrument used bv the student

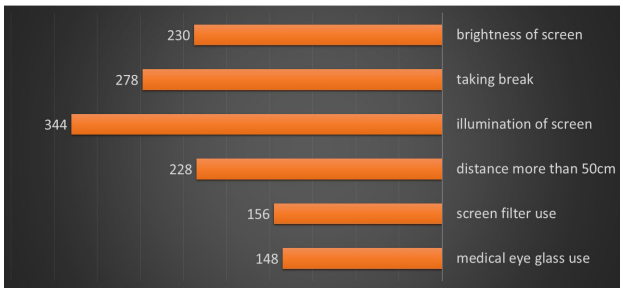

Fig 2: Protective eye methods sued by students

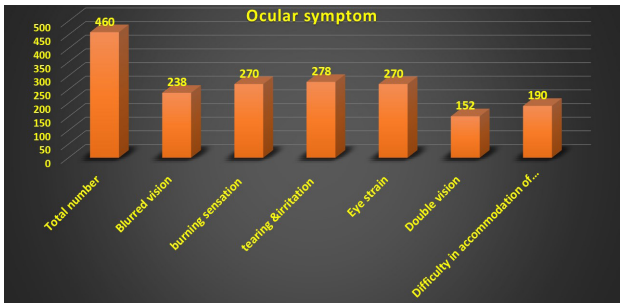

Fig 3: Explained the number of students with ocular and visual symptom

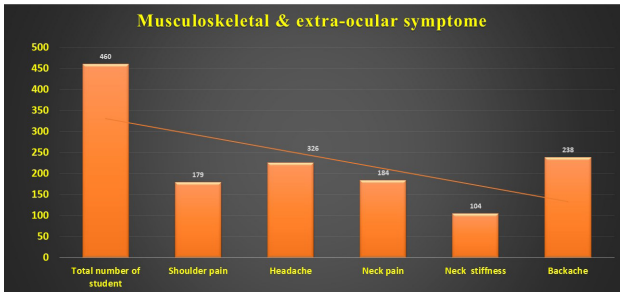

Fig 4: Explained the number of students with extraocular symptom

their studies and the symptoms of computer vision syndrome, as presented in **Tables 4 and 5,** indicates that there are no differences between using a mobile device or a computer in terms of the number of students with symptoms and the degree of severity of these symptoms.

DISCUSSION

In mid-October, Iraq faced a political crisis that led to restrictions on college and school enrollment. This was followed by over two years of COVID-19 isolation, during which online teaching through programs and social media became common, often involving extended use of mobile phones, iPads, and computers. This situation affected students at the College of Medicine, University of Kerbala, including those with health issues such as computer vision syndrome. The high prevalence of this syndrome among students explains the widespread impact, with a combined rate reaching 91.6%. This contrasts with studies from other countries conducted before COVID-19. [5, 22, 23, 24, 25, 26] During the isolation period, specific research also found similar percentages. [27, 28, 29]

Computer vision syndrome occurs from working long hours on a computer with poor sitting posture and not properly adjusting the screen brightness. Mild symptoms may last a few minutes to several hours during computer use. When severe eye issues develop, managing symptoms that persist while using the computer and improve after rest can become difficult, along with severe symptoms that may require medical treatment. Sometimes, severe eye lesions develop, leading to the need for corrective lenses, and extraocular vision problems might require medication.

In this study, we established criteria to identify computer vision syndrome based on associated ocular and extraocular symptoms. According to these criteria, students exhibit both ophthalmic symptoms and extraocular symptoms. Common ophthalmic symptoms related to CVS include visual and ocular issues such as eye strain, burning, blurred vision, and itchy eyes. The most typical visual problems noted in the study are eye strain, which affected almost 58.7% of students. A lower prevalence was reported among medical students in Chennai, at 32.3%, while university students in Ajman, United Arab Emirates (UAE), and Jordan reported rates of 54.8% and 48.3%, respectively [22, 28, 30]. Nearly 60.44% of our students complained of eye irritation. A lower prevalence was recorded among medical students in Chennai, with decreased rates of eye irritation (17.4% redness and 13.9%). In Ajman, over 48% of cases involved eye irritation (30). In our study, 33.04% of students reported temporary double vision, with lower rates reported in the UAE at 11.5% (30), and in Jordan at 18.3% [28]. About 51.71% of our students reported blurred distance vision, comparable to a study at Al-Aaliyah University in Jordan, which found a prevalence of 45.7% [28]. In contrast, a study among medical and engineering students in Chennai reported rates of 16.4% and 31.6%, respectively [22]. A study conducted in the UAE reported a prevalence of 24.8% (30), and the Indian study indicated a rate of 48% [32]. The percentage of difficulty in accommodation is 41.3%, which can be explained by the fact that accommodation is a dynamic process. Accommodation fatigue can result from maintaining the eyes in a stationary position. Changing the focal point can provide relief from constant eye strain and reduce glare [31, 42]. Visual fatigue occurs when the stress on the eye muscles caused by these movements exceeds the eye's ability to perform visually [10].

Extraocular symptoms may be related to or result from musculoskeletal spasms and are often accompanied by other ocular symptoms. The most common musculoskeletal symptom reported by students with computer vision syndrome in this study was backache, at 51.73%. While 38.9% of students reported shoulder pain, 40% reported neck pain, and 22.61% experienced neck stiffness. In contrast, a study among medical and engineering students in Chennai found a prevalence of 60% [22], and in Albania, a high rate of shoulder pain and neck stiffness was reported at 81% [33]. A study in Jamaica showed that 75.1% of undergraduate students suffered from neck pain and 65.5% from shoulder pain [35]. The variation is wide because musculoskeletal pain, such as backache, neck pain, and shoulder pain, is influenced by several factors, including poor posture and prolonged computer use. Nonetheless, it is important to note that this survey indicates the highest prevalence, underscoring the need to educate students on proper computer use and promote the development of good habits.

Headache was the most common symptom reported, at 70.87%. In contrast to a study conducted among medical and engineering students in Chennai, approximately 43.3% of medical students and 45% of engineering students were reported to experience headaches. Another study was conducted among university students in Ajman, UAE, where 53.3% reported headaches [28]. A similar percentage was also observed among university students in Jordan, at 53% [30]. A comparable study in India found that 82.1% of the population reported suffering from headaches [33]. Another study in Egypt found that 26% of medical students complained of headaches [34]. Common causes of headaches in CVS patients include the constant contraction of ocular and ciliary muscles to adjust the eyes and keep the lens in the accommodating phase. To view objects at various distances from the screen to the keyboard and to work on documents, the eyes must continually focus and refocus. This causes eye muscle fatigue or eyestrain, which can result in headaches, in addition to other vision-related issues such as cluster headaches and tension headaches—common symptoms associated with frequent computer use.

In our study, students with psychosocial symptoms related to computer vision syndrome showed high levels of stress and anxiety at 26.52% and fatigue at 21.96%, compared to those with low levels of reduced attention span at 9.13% and poor behavior at 8.04%. These symptoms have been reported by other authors in similar percentages [36-43]. The stress from studying and a political crisis, along with new online learning, contribute to fatigue, which leads to repetitive feelings of anxiety and stress, as well as ongoing fatigue. According to our study, students who used iPads and smartphones were more frequently affected by extraocular symptoms of computer vision syndrome than students who used desktops and laptops, and had more severe symptoms recorded in backache and headache.

CONCLUSION

The criteria in this study can be used to diagnose computer vision syndrome, assess the severity of the condition, and determine its relationship to prolonged use of computers or other devices.

REFERENCES

1. Koushik T, Vatinee Y, Robin K Kuriakose, Chandrasekaran P/ Computer Vision Syndrome (Digital Eye Strain), Eye Wiki, Augustine Hong, MD, on April 7, 2022. https://eyewiki.aao.org/Computer_Vision_Syndrome_(Digital_Eye_Strain)
2. Akinbinu T. R, and Mashalla Y. J; Impact of computer technology on health: Computer Vision Syndrome (CVS), Medical Practice and Review J, Vol. 5(3), pp. 20-30, November 2014 DOI 10.5897/MPR.2014.0121 Article Number: 0905F9948599; http://www.academicjournals.org/MPR
3. SEN A, STANLEY RICHARDSON / A study of computer-related upper limb discomfort and computer vision syndrome, Journal of Human Ergology, 2007; 36; 2; p.45-50, https://doi.org/10.11183/jhe1972.36.2_45
4. Cajochen C, Frey S, Anders D, Späti J, Bues M, Pross A, Mager R, Wirz-Justice A, Stefani O. Evening exposure to a light-emitting diode (LED)-backlit computer screen affects circadian physiology and cognitive performance. J Appl Physiol (1985). 2011 May;110(5):1432-8. doi: 10.1152/japplphysiol.00165.2011. Epub 2011 Mar 17. PMID: 21415172.
5. Higuchi S, Motohashi Y, Liu Y, Ahara M, Kaneko Y. Effects of VDT tasks with a bright display at night on melatonin, core temperature, heart rate, and sleepiness. J Appl Physiol (1985). 2003 May;94(5):1773-6. doi: 10.1152/japplphysiol.00616.2002. Epub 2003 Jan 17. PMID: 12533495.
6. Kanitkar K, Carlson AN, Richard Y. Ocular problems associated with computer use. The ever-increasing hours spent in front of video display terminals have led to a corresponding increase in visual and physical ills. Rev. Ophthalmol. 12:4.
7. Shima M, Nitta Y, Iwasaki A, Adachi M. Investigation of subjective symptoms among visual display terminal users and their affecting factor-analysis using log-linear models. Nippon Eisegaku Zasshi. 47:1032-1040.
8. Parihar JKS, Jain VK, Chaturved P. Computer and visual display terminals vision syndrome (CVDTS), Med J Armed Forces India. 2016; 72(3):270–276.
9. Logaraj M, Madhupriya V: Computer Vision Syndrome and Associated Factors Among Medical and Engineering Students in Chennai Ann Med Health Sci Res. 2014 Mar-Apr; 4(2): 179–185.
10. Agbonlahor O. / Prevalence and knowledge of Computer Vision Syndrome (CVS) among the Working Class Adults in FCT Nigeria. Journal of the Nigerian Optometric Association, 2019. 21(1): p. 49-60.
11. Boadi-Kusi SB, Abu SL, Acheampong GO, et al./ Association between poor ergophthalmologic practices and computer vision syndrome among university administrative staff in Ghana. Journal of environmental and public health, 2020. 2020.
12. Dessie A, Adane F, Nega A, et al. Computer vision syndrome and associated factors among computer users in Debre Tabor Town, Northwest Ethiopia. Journal of envi-

ronmental and public health, 2018. 2018.

13. Al Subaie M, Al-Dossari S, and Bougmiza MI. Computer vision syndrome among mobile phone users in Al-Ahsa, Kingdom of Saudi Arabia. Al-Basar International Journal of Ophthalmology, 2017. 4 (4): p. 99.
14. Abudawood GA, Ashi HM, and Almarzouki NK. Computer vision syndrome among undergraduate medical students in King Abdulaziz University, Jeddah, Saudi Arabia. Journal of Ophthalmology, 2020.
15. Gammoh Y. Digital eye strain and its risk factors among a university student population in Jordan: a cross-sectional study. Cureus, 2021. 13 (2).
16. Noreen K, Ali K, Aftab K, et al. Computer Vision Syndrome (CVS) and its Associated Risk Factors among Undergraduate Medical Students in Midst of COVID-19. Pakistan Journal of Ophthalmology, 2021. 37(1).
17. Shantakumari N, Eldeeb R, Sreedharan J, Gopal K: Computer use and vision-related problems among university students in Ajman, United Arab Emirate. Ann Med Health Sci Res. 2014 Mar-Apr; 4(2) :258-263. 10.4103/2141-9248.129058 / Ann Med Health Sci Res. 2014 Mar-Apr; 4(2): 258–263.
18. Ganong WF / Review of Medical Physiology. New York. 22nd ed. Lange Publication; [Google Scholar]
19. Bali, Jatinder MS; Navin, Neeraj MS; Thakur, Bali Renu MD; Computer vision syndrome A study of the knowledge, attitudes and practices in Indian Ophthalmologists Indian Journal of Ophthalmology 55(4):p 289-293, Jul–Aug 2007. | DOI: 10.4103/0301-4738.33042
20. Smith MJ, Cohen BCF, Stammerjohn LW / An investigation of health complaints and job stress in video display operations. Hum factors; 23:387-400
21. Iqbal M, El-Massry A, Elagouz M, et al. Computer vision syndrome survey among the medical students in Sohag University Hospital, Egypt. Ophthalmol Res 2018; 8(1): 1–8
22. Mowatt L, Gordon C, Santosh ABR, et al. Computer vision syndrome and ergonomic practices among undergraduate university students. Int J Clin Pract. Epub ahead of print 5 October 2017. DOI: 10.1111/ijcp.13035.
23. Kargarandehkordi A / Computer Vision Estimation of Stress and Anxiety Using a Gamified Mobile-based Ecological Momentary Assessment and Deep Learning: Research Protocol, medRxiv preprint doi: https://doi.org/10.1101/2023.04.28.23289168; this version posted April 29, 2023. The copyright holder for this preprint
24. Whitton A E., "Breaking open the black box: isolating the most potent features of a web and mobile phone-based intervention for depression, anxiety, and stress," JMIR mental health, vol. 2, no. 1, p. e3573, 2015.
25. De Belen R, Bednarz T, Sowmya A and Del Favero D / Computer vision in autism spectrum disorder research: a systematic review of published studies from 2009 to 2019; Translational Psychiatry (2020) 10:333, https://doi.org/10.1038/s41398-020-01015
26. Amar Das, Sangam Shah, Ballav T Adhikari, Paudel B, Kumar S, Rakesh Kumar, Shah C, Adhikar P, / Computer vision syndrome, musculoskeletal, and stress-related problems among visual display terminal users in Nepal; PLoS ONE, July 2022. PLoS ONE 17(7): e0268356. https://doi.org/10.1371/journal.pone.0268356
27. P. Washington P, Kalantarian H, Jack Kent, Husic A, Kline A, Emilie Leblanc E, et al / "Training affective computer vision models by crowdsourcing soft-targetlabels," Cognitive computation, vol. 13, pp. 1363-1373, 2021
28. Qian Y, Kargarandehkordi A, Mutlu O, Surabhi S, Honarmand M, Paul Wall D, Peter Washington., "Computer Vision Estimation of Emotion Reaction Intensity in the Wild," arXiv preprint arXiv:2303.10741, 2023.
29. Mansoori N, Qamar N, and Mubeen SM. Dry eye syndrome and associated risk factors among computer users in Karachi, Pakistan. Annals Abbasi Shaheed Hospital & Karachi Medical & Dental College 2017. 22(3): p. 165-170.
30. Washington P, et al/ Training Affective Computer Vision Models by Crowdsourcing Soft-Target Labels, Published in final edited form as: Cognit Comput. 2021 Sep; 13(5): 1363–1373. Published online 2021 Sep 27. doi: 10.1007/s12559-021-09936-4

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
AbuRagheiff M	✓	×	✓	×	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ORIGINAL ARTICLE

EMERGENCY MEDICINE RESEARCH IN PAKISTAN: A SCOPING REVIEW ABOUT THE PUBLICATION TRENDS AND QUALITY ANALYSIS OF EVIDENCE

Rida Jawed, Umaira Aftab, Salman Muhammad Soomar, Shahan Waheed

Department of Emergency Medicine, Aga Khan University Hospital, Karachi - Pakistan

ABSTRACT

Background: This study examines trends in emergency medicine research published in Pakistan from 2012 to 2021. We aimed to identify research gaps and areas needing further investigation.

Materials & Methods: We searched online databases (PubMed, CINAHL, Cochrane, EBSCO) for studies related to emergency medicine in Pakistan published between January 2012 and December 2021. Studies were included if they were published in English, peer-reviewed, and focused on emergency medicine in Pakistan. Two reviewers assessed eligibility and study quality.

Results: One hundred fifty articles were included in the review out of 871 that met the eligibility criteria. A significant portion of these articles was published in 2020, accounting for 22.7% of the total, followed by 2016 and 2017, which together contributed 12%. Conversely, 2021 had the fewest publications, with only 1.3% of studies released. During this period, the most common study design was the cross-sectional design, representing 40.7% of all studies, while mixed-methods and qualitative studies were the least common, each accounting for 1.3%. Regarding risk of bias, 48% of the studies were assessed as having a moderate level, and 50% were identified as having a high risk of confounding factors. Overall, approximately 80% of the articles were classified as having predominantly moderate quality. The primary focus of the cross-sectional and cohort studies, as well as case reports, was on Infectious Diseases. Notably, a mixed-methods study on Violence and Trauma was published in 2021, and a qualitative study from 2015 examined ethical considerations.

Conclusion: This scoping review emphasizes the prevalence of cross-sectional study designs and themes related to infectious diseases in Pakistani emergency medicine research, with most articles rated as moderate quality. Future research should focus on understudied areas, including social determinants of health, resource-limited settings, and cost-effectiveness analyses.

Keywords: Scoping, review, emergency medicine, Scoping Review

This article may be cited as: Jawed R, Aftab U, Soomar SM, Waheed S. Emergency Medicine Research In Pakistan: A Scoping Review About The Publication Trends And Quality Analysis Of Evidence. PMSRJ 2025 January-April;2(1):137-143

INTRODUCTION

The College of Physicians and Surgeons approved Emergency Medicine training in Pakistan in 2010, with residency programs commencing in 2011 at Aga Khan University Hospital, Karachi, and Shifa International Hospital, Islamabad. [1, 2]

Since then, approximately twenty-six institutions have been accredited for residency training in this field. As more institutions launch residency programs, there is a corresponding increase in the number of publications and research in emergency medicine. Given the significant research opportunities in this area, our goal is to evaluate the current literature in Pakistan, focusing on the characteristics, clinical factors, and quality that influence emergency care publications.

The main goal of this scoping review is to summarize existing literature on various emergency medicine topics studied by practitioners in Pakistan and to categorize the types of research conducted on each subject. A thorough review of recent studies is performed to compare them with earlier research, highlighting evolving trends and shifting focus areas over time.

This review emphasizes the overall significance of various medical and social factors within their temporal and social contexts. Categorizing Pakistani emergency medicine research will help identify potential areas for future investigation. This study aims to evaluate the trends and quality of emergency medicine publications in Paki-

Correspondence
Dr. Rida Jawed
MBBS Resident
Department of Emergency Medicine, Aga Khan University Hospital, Karachi - Pakistan
Email: rida.jawed@aku.edu
Date Received: 23/02/2025
Date Revised: 06/10/2025
Date Accepted: 06/10/2025

stan over the past decade.

MATERIALS & METHODS

A comprehensive literature review was conducted to identify research articles published in the field of Emergency Medicine (EM) in Pakistan. The goal was to evaluate the trends and quality of EM publications over a ten-year period, from January 2012 to December 2021. The online databases used for this research included PubMed, CINAHL, Cochrane, and EBSCO.

The search criteria included terms such as Emergency Medicine, Accident and Emergency, Trauma, Pakistan, Critical Care, Violence, Injury and Prevention, Emergency Medicine Systems, Disaster, Injury Surveillance, Emergency Department registries, Trauma Registries, Child Abuse, School Health, Deliberate Self-Harm, Resuscitation, Sepsis, and Emergency Airway Management, used both individually and in combination.

Eligibility criteria included all peer-reviewed articles published in English that were observational, experimental, qualitative, reviews, or commentaries/communications, provided they contained the term "Emergency/ Emergency Medicine" in their titles. These studies needed to be conducted within the Emergency Department of a healthcare facility in Pakistan or authored by a practicing Emergency Medicine physician based in Pakistan.

Two evaluators reviewed the articles against the established eligibility criteria. They thoroughly examined the title, abstract, and full text to assess the risk of bias and potential confounding factors, where applicable. The quality of each article was evaluated using a standardized criterion that employed quality indicators rated on a Likert scale, categorized as follows: 1. Weak, 2. Moderate, and 3. Strong. Relevant details, including author, year, study design or article type, study topic or theme, and study quality, were documented. Frequencies and percentages were calculated to determine the overall quality of the publications.

RESULTS

A total of 893 articles were initially identified, with 22 duplicates removed prior to the screening process. Ultimately, 150 articles were selected for inclusion in the review from the remaining 871, in accordance with the established eligibility criteria, as illustrated in Figure 1.

Out of the 871 articles, 531 did not meet the inclusion criteria during the initial review. Then, additional articles were excluded after reviewing the title, abstract, and full text, resulting in 40, 102, and 48 exclusions, respectively. This process led to the final selection of 150 articles.

Figure 2 displays the distribution of publication years, showing that most articles were published in 2020 (n = 34; 22.7%), followed by 2016 and 2017 (n = 18; 12% combined). Other notable years include 2013 (n = 15; 10%), 2015 (n = 14; 9.3%), and 2014 (n = 12; 8%). The fewest studies were published in 2021 (n = 2; 1.3%).

Figures 3, 4, 5, and 6 show that the most common study design was cross-sectional (n = 61; 40.7%), while the least common was mixed-methods/qualitative (n = 2; 1.3%). Concerning the risk of bias, nearly half of the studies were rated as moderate (n = 72; 48%), and half of the included articles showed a substantial risk of confounding (n = 75; 50%). Overall, the quality of the studies was mainly rated as moderate (n = 120; 80%).

Figure 7 shows the quality assessment of 19 case reports published in Pakistan's Emergency Department from 2012 to 2021. Between 2014 and 2017, all nine reports were rated as moderate. Most of the other reports were also classified as moderate, although three reports from 2021 (n = 5) were rated as strong. In 2020, only one of the five reports fell into this category, while one report was considered weak.

Our data analysis showed that case reports were spread across various specialties, with Neurology (n = 4) and Infectious Diseases (n = 5) leading in publication count. Meanwhile, other specialties had fewer reports.

Figure 8 shows a total of 61 cross-sectional studies conducted from 2012 to 2021. The period from 2012 to 2016 produced 29 studies of moderate quality. In 2017, out of eight studies, two were classified as strong, and a similar pattern appeared in 2020 (n = 13) and 2021 (n = 6), where one study in each year was rated as strong. Conversely, in 2018 (n = 2), 2019 (n = 3), and 2020, one study each was categorized as weak, while the rest were rated as moderate.

Regarding the thematic focus of the studies, nearly one-fourth (n = 27) of the cross-sectional studies focused on Infectious Diseases, followed by Psychiatry (n = 5), Pulmonology (n = 5), and Internal Medicine (n = 4). Cardiology and Emergency Medical Services each contributed a single article; however, the limited dataset introduces some uncertainty.

Table 1 presents data from 16 Cohort Studies published between 2012 and 2018, with no publications from 2019 to 2021. All the studies were rated as moderate in quality. In subsequent years, five case-control studies were conducted: two in 2013, one in 2015, one in 2019, and one in 2020. Quality assessments showed that one study was rated both as strong and weak, while the others were rated as moderate.

The themes of the Cohort studies spanned various specialties, including Internal Medicine, Toxicology, Cardiology, Oncology, Trauma, and Intensive Care. Infectious Diseases, particularly in the pediatric population (n = 7), were the most common focus. Conversely, all case-control studies examined environmental exposures and their impact on the population.

Figure 9 illustrates that there were a total of 8 randomized control trials (RCTs), with 2 published in 2013, 5 in 2020, and only 1 in 2021. The 2021 trial is classified as strong in terms of quality, while fore others are deemed moderate.

The majority of these RCTs focus on the effectiveness of various treatments for sepsis in pediatric populations, except for one trial that pertains to obstetrics.

Table 2 shows that one mixed-methods study was published in 2021 and one qualitative study in 2015, both rated as moderate in quality. The mixed-methods study covers issues related to violence and trauma, while the qualitative research focuses on ethical considerations.

The remaining data, as shown in Table 3, identify 33 unique categories of publications, including commentaries (n=12), prospective studies (n=3), retrospective studies (n=10), clinical audits (n=1), communications (n=2), reviews (n=3), and surveys (n=3), published between 2013 and 2021. Regarding quality, four publications are classified as strong, 7 as weak, and the rest as moderate. The covered themes include a subtle influence of research (n=3), infectious diseases (n=3), and several topics that are both directly and indirectly related to emergency medicine (n=6).

DISCUSSION

In general, Cross-sectional research designs were predominantly employed in the studies reviewed, with infectious diseases and psychiatry emerging as the most frequently addressed subjects. The overall quality of the studies was found to be average, although there were notable exceptions on both ends of the quality spectrum.

A significant finding from the scoping study is the limited number of investigations conducted in Pakistan's rural and underdeveloped areas. Most of the identified studies were centered in urban tertiary care facilities, highlighting the urgent need to enhance research initiatives in marginalized and rural regions, where access to emergency medical services may be inadequate or entirely lacking.

Another important observation is the lack of established protocols and standards for emergency medical practices in Pakistan. This underscores an urgent need to develop and implement evidence-based guidelines that

Table 1: Quality of Cohort and case control studies in ER

Area of study/Theme	Study design	Quality of Publication	Year of publication
Infectious Disease/pediatric	Prospective Cohort	Moderate	2017
Cardiology	Prospective Cohort	Moderate	2016
Pediatric Oncology	Prospective Cohort	Moderate	2016
Trauma	Prospective Cohort	Moderate	2016
Pediatrics Medicine	Prospective Cohort	Moderate	2015
Intensive Care / Pediatrics.	Prospective Cohort	Moderate	2015
Emergency/internal medicine	Prospective Cohort	Moderate	2015
Pediatrics / infectious diseases	Prospective Cohort	Moderate	2013
Pediatrics / infectious diseases	Prospective Cohort	Moderate	2012
Pediatrics / infectious diseases	Prospective Cohort	Moderate	2012
Pediatrics / infectious diseases	Prospective Cohort	Moderate	2018
Pediatrics / infectious diseases	Prospective Cohort	Moderate	2018
Pediatrics / infectious diseases	Prospective Cohort	Moderate	2020
Trauma checklist In Emergency Department.	Prospective Cohort	Moderate	2020
Internal Medicine	Prospective Cohort	Moderate	2016
Environment/neurology	Prospective Cohort	Moderate	2018
Environment/oncology	Case control	Moderate	2015
Environment/oncology	Case control	Moderate	2013
Environment/pulmonology/ pediatric	Case control	Moderate	2013
Environment/oncology	Case control	Strong	2020
Environment/oncology	Case control	Weak	2019

Table 2: Mixed-method & Qualitative studies in ER

Area of study/Theme	Study design	Quality of Publication	Year of publication
Violence and Trauma	Mixed Method	Moderate	2021
Ethics	Qualitative	Moderate	2015

Table 3: Other studies published in emergency literature

Area of study/Theme	Study design	Quality of Publication	Year of publication
Internal Medicine	Commentary	Moderate	2017
Triaging	Commentary	Strong	2017
Internal Medicine /Obstetrics	Commentary	Moderate	2016
Pediatrics/ Emergency	Commentary	Moderate	2016
Pediatrics/ Emergency	Commentary	Moderate	2016
Emergency Medicine	Commentary	Moderate	2016
Research	Commentary	Moderate	2014
Research	Commentary	Strong	2014
Ethics and Practices	Commentary	Moderate	2016
Internal Medicine	Commentary	Moderate	2016
Pediatrics	Commentary	Moderate	2021
Infectious Diseases	Commentary	Moderate	2020
Internal Medicine	Prospective Study	Weak	2021
Urology	Prospective	Weak	2020
Pulmonology	Prospective test validation study	Moderate	2018
Delay admission from Emergency Department	Retrospective study	Moderate	2016
Trauma/ Pediatrics	Retrospective study	Moderate	2017
Traumatic Brain Injury	Retrospective observational	Moderate	2015
Emergency/internal medicine	Retrospective study	Moderate	2014
Toxicology	Retrospective, case series	Moderate	2013
Emergency medicine	Retrospective Study	Moderate	2013
Emergency/internal medicine	Retrospective study	Strong	2020
Endocrinology / Internal Medicine	Retrospective study	Moderate	2019
Traumatic Brain Injury	Retrospective study	Weak	2019
Patient flow and crowding in Emergency Department	Retrospective study	Weak	2019
Cardiology	Clinical Audit	Moderate	2015
Psychology	Communication	Weak	2017
Leadership/Emergency Medicine	Communication	Weak	2017
Infectious diseases	Review	Moderate	2016
Research in ED	Review	Moderate	2015
Internal medicine	Review	Strong	2020
Infectious diseases	Survey	Moderate	2019
Cardiology	Survey	Weak	2020

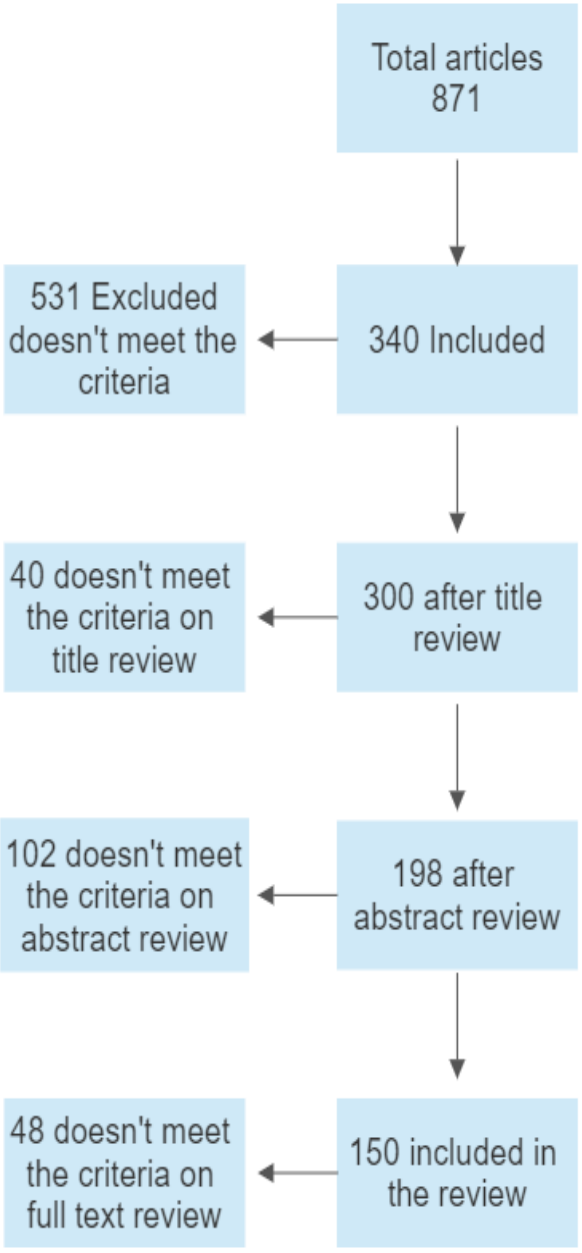

Fig 1: Flow chart of the studies included in the review

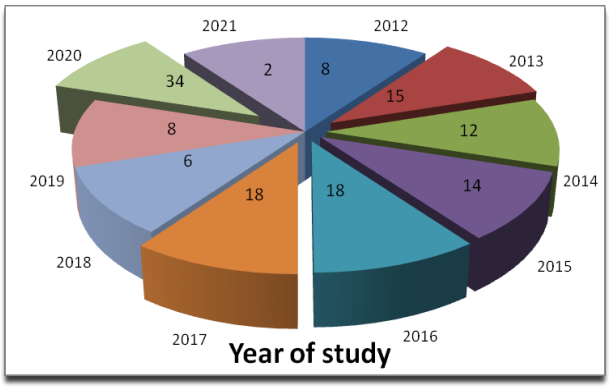

Fig 2: Year of study of publications

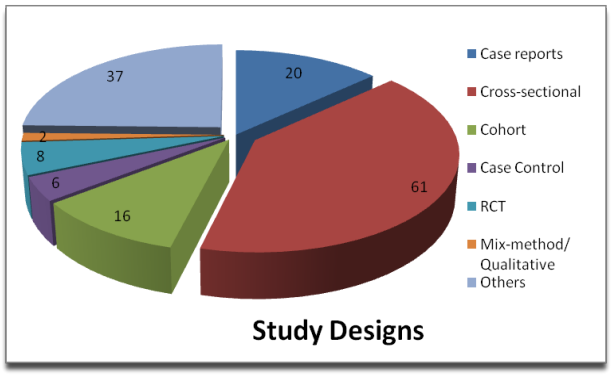

Fig 3: Study designs

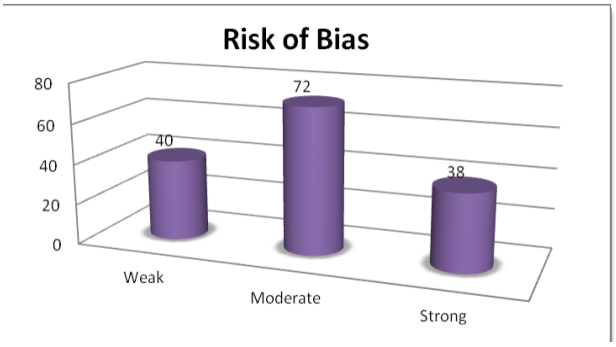

Fig 4: Risk of bias in the studies

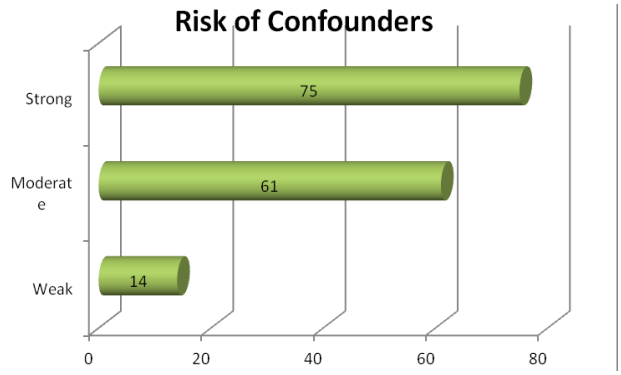

Fig 5: Risk of confounders in studies

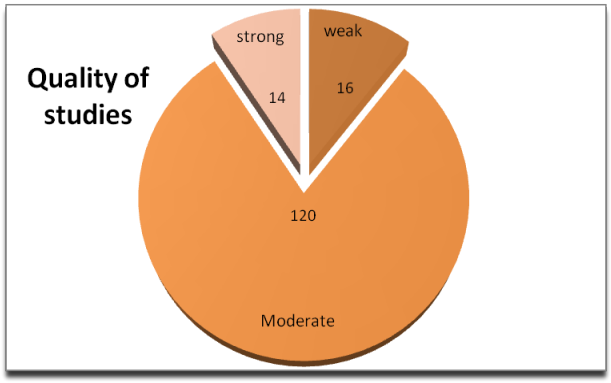

Fig 6: Overall Quality of Studies

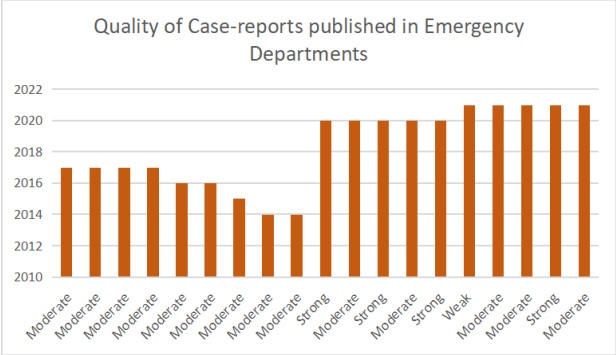

Fig 7: Quality of case reports published in ER

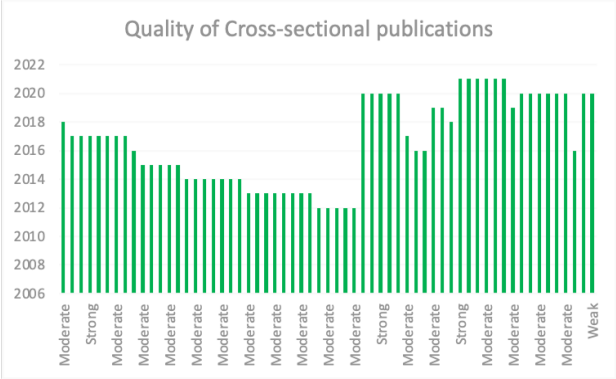

Fig 8: Quality of Cross-sectional studies published in ER

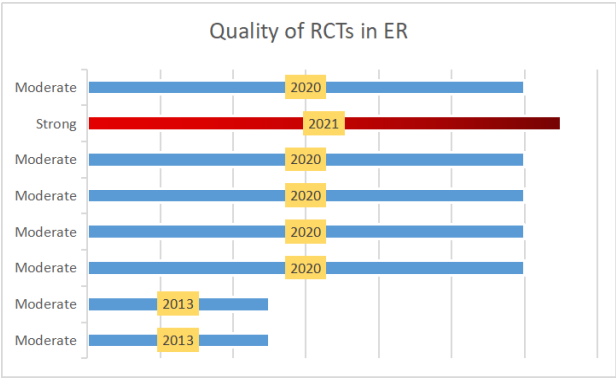

Fig 9: Quality of RCTs published

can improve the quality of care and patient outcomes in emergency medicine.

Furthermore, our findings differ from the scoping review conducted by Kivlehan SM et al. in 2021[4], which showed that emergency care in resource-limited settings (ECRLS) made up the largest part of published literature, followed by topics related to emergency medicine development and disaster response.

In contrast, the review highlights a lack of research on the financial aspects of emergency care in Pakistan. Only a few studies have looked into the costs of emergency care and the effectiveness of related interventions. Future research should focus on examining the economic impact of emergency medicine in Pakistan, including treatment costs, the financial burden on patients, and strategies for better resource allocation.

A review of the social emergency medicine literature conducted by Shah et al.[5] shows that out of 1,571 publications, 590 (38%) were relevant to the field of social emergency medicine. Most of these studies focused on human trafficking, followed by firearm violence and pediatric issues. In contrast, our analysis found only two studies addressing social aspects, with one specifically related to violence. Given the growing importance of these issues in modern society, there is an urgent need for more research on the social aspects of emergency medicine.

This study highlights the features and trends of research published in emergency departments across Pakistan over the past decade. The results emphasize the need for more high-quality research in this field and suggest that stronger evidence might be necessary for certain types of studies.

LIMITATIONS

The scoping review of emergency medicine studies in Pakistan has several limitations. First, focusing only on research from the past ten years may not fully cover the entire field. Also, the review's language bias, as it only includes studies published in English, might exclude important research published in other languages, affecting how well the results apply broadly. Additionally, the quality assessment used a broad scale that did not focus on specific quality aspects, which could lead to an incomplete review of the studies. Finally, the large scope of the review has resulted in limited information on certain research areas, making it difficult to draw clear conclusions about the current state of emergency medicine research in Pakistan.

Numerous potential research strategies can be proposed to overcome the limitations and improve the emergency medicine sector in Pakistan. First, it is essential to focus research efforts on marginalized populations, especially in rural areas. This will help identify specific challenges these communities face and guide targeted interventions. Furthermore, collaboration among healthcare organizations, policymakers, and researchers is vital for creating standardized protocols and guidelines for emergency medical practices. Additionally, there is a significant need for more research into the economic aspects of emergency care to better allocate resources and improve the overall efficiency of emergency medical services across the country. Finally, it is crucial to conduct more high-quality studies with an emphasis on reducing biases and confounding factors.

CONCLUSION

In summary, the scoping review of the literature on emergency medicine in Pakistan has shed light on the current landscape of the field and highlighted avenues for future advancement. By collaborating with policymakers and healthcare practitioners to address existing challenges and explore proposed research areas, it is possible to enhance Pakistan's emergency medical care system and improve patient outcomes.

REFERENCES

1. Emergency Medicine and CPSP. Emergency Medicine in Pakistan - All about Emergency Medicine. Published August 25, 2019. Accessed May 28, 2024. http://www.abdussalamkhan.work/emergency-medicine-and-cpsp/
2. Edu.pk. Accessed May 28, 2024. https://listing.cpsp.edu.pk/weblink_new/accreditation/accredited-institutes-fcps.php
3. McGuinness LA, Higgins JPT. Risk-of-bias VISualization (robvis): An R package and Shiny web app for visualizing risk-of-bias assessments. Res Synth Methods. 2021;12(1):55-61. doi:10.1002/jrsm.1411
4. Kivlehan SM, Hexom BJ, Bonney J, et al. Global emergency medicine: A scoping review of the literature from 2021. Acad Emerg Med. 2022;29(10):1264-1274. doi:10.1111/acem.14575
5. Shah R, Della Porta A, Leung S, et al. A scoping review of current social emergency medicine research. West J Emerg Med. 2021;22(6):1360-1368. doi:10.5811/westjem.2021.4.51518

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Jawed R	✓	×	✓	×	✓	×
Aftab U	✓	✓	×	✓	✓	×
Soomar SM	×	✓	×	×	✓	×
Waheed S	✓	✓	✓	×	✓	✓

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ORIGINAL ARTICLE

PREVALENCE OF ANEMIA AMONG PREGNANT WOMEN VISITING LIAQAT MEMORIAL WOMEN AND CHILDREN HOSPITAL, KOHAT, KHYBER PAKHTUNKHWA, PAKISTAN

Zunaira Shafique[1], Samar Minallah[1], Aisha Niqab Ahmad[1], Laleen Shehzadi[1], Aiman Khaliq[1], Anisa Shah[1], Salafa Khan[1], Muhammad Ishtiaq[2]

[1]4th year MBBS students of Kohat Institute of Medical Sciences, Kohat - Pakistan

[2]Department of Community Medicine, Kohat Institute of Medical Sciences, Kohat - Pakistan

ABSTRACT

Objective: The primary goals of our research were to determine the prevalence of anemia among pregnant women and to identify the underlying causes of anemia in this population.

Materials & Methods: A cross-sectional study was conducted from March to September 2024. The sample consisted of 298 women visiting Liaqat Memorial Hospital in Kohat, Khyber Pakhtunkhwa, Pakistan. A relevant literature review was conducted using Google Scholar and PubMed platforms, and a questionnaire was developed based on the findings of the literature survey. Microsoft Office 2010 and SPSS version 22 were used for data collection, analysis, and interpretation.

Results: Our study showed that the prevalence of anemia was 27.5% among pregnant women, likely due to inadequate iron intake and poor dietary habits. Additionally, other factors such as illiteracy (55.7%) and multi-parity were also involved.

Conclusions: It was determined that most women were diagnosed with anemia and related factors, which contributed to low hemoglobin levels. A common factor was their low socioeconomic status, which adversely affected their lifestyle. Furthermore, it was observed that the diets of anemic patients often lacked fruits and meat.

Keywords: Anemia, Pregnant Women, Iron Intake, Diet, and Illiteracy

This article may be cited as: Shafique Z, Minallah S, Ahmad AN, Shehzadi L, Khaliq A, et al. Prevalence Of Anemia Among Pregnant Women Visiting Liaqat Memorial Women And Children Hospital, Kohat, Khyber Pakhtunkhwa, Pakistan. PMSRJ 2025 January-April;2(1):144-147

INTRODUCTION

Anemia is a significant public health issue worldwide, impacting a vast population. The WHO defines anemia as a condition where hemoglobin levels in red blood cells (RBCs) fall below 11 g/dL. Despite ongoing efforts, anemia continues to be a persistent global health problem, with a prevalence of 24.3%, totaling approximately 1.92 billion cases in 2021. The condition is prevalent among preschool children and women of reproductive age (WRA), defined as 15–49 years, in developing countries. About 32 million women globally are affected by anemia. The rates are notably higher in South Asian countries, where about 47% of non-pregnant women and 52% of pregnant women are affected. [1] Evidence indicates that pregnant women are most at risk due to increased micronutrient needs and physiological changes during pregnancy. [2]

Correspondence
Zunaira Shafique
4th year MBBS students
Kohat Institute of Medical Sciences, Kohat - Pakistan
Email: zunairashafiq11@gmail.com
Date Received: 19/03/2025
Date Revised: 07/10/2025
Date Accepted: 07/10/2025

Anemia is disproportionately common among low socioeconomic groups and is closely related to nutrition, infectious diseases, and other factors. Malaria, schistosomiasis, HIV infection, cancer, and chronic conditions such as heart failure and inflammatory bowel disease have shown a strong and significant connection with anemia during pregnancy and its related complications for mothers and newborns. [3] Many factors can cause anemia, with 95% of cases resulting from iron deficiency. Iron deficiency anemia is the most prevalent type of anemia during pregnancy and a major health concern worldwide.

According to data from the World Health Organization, prevalence rates range from an average of 14% in industrialized countries to an average of 56% (range 35-75%) in developing countries. [4] When a pregnant woman is anemic, the inadequate supply of oxygen to the fetus can lead to various complications, including miscarriage, premature birth, low birth weight, and fetal development problems. [5] The impact of iron deficiency anemia in pregnant women includes 12%-28% fetal mortality, 30% perina-

tal mortality, and 7%-10% neonatal mortality. [6] In Pakistan, infant, child, and maternal morbidity and mortality rates are high. More than half of the population is anemic, causing serious health issues among mothers, children, and newborns. In Pakistan, the prevalence of anemia among married women aged 15 to 44 is reported to be 26% in urban areas and 47% in rural areas. [7]

MATERIALS AND METHODS

A cross-sectional descriptive study was conducted at Liaquat Memorial Hospital, Kohat, from February to September 2024. The study lasted one month after the synopsis was approved by the ethical review committee of Khyber Medical University Institute of Medical Sciences, Kohat. The study area was the Gynecology OPD of Liaquat Memorial Hospital, Kohat. A total of 298 pregnant women were selected as the sample size. Using a simple random sampling technique, 298 women were chosen for data collection. Data were gathered with a semi-structured questionnaire covering various dependent and independent variables. Initially, a literature review was performed using Google Scholar, PubMed, journals, and books on the selected topic, and this information was thoroughly studied. The review helped shape the study's aims and objectives. The questionnaire was then developed based on the literature review, aligned with the study's objectives and relevant knowledge of the subject. Pregnant women visiting Liaquat Memorial Hospital in Kohat were interviewed using the structured questionnaire for data collection. Data analysis and interpretation were carried out using Microsoft Office 2010 and SPSS version 22.

RESULTS

Among a total of 298 women, 196 were found to be anemic with a hemoglobin level of less than 11 g/dL (mean 10.1). See Table 1 for details. Most of the patients were taking iron supplements. Table 2 presents various etiologies and risk factors associated with iron deficiency anemia.

Table 1: Showing Frequency of Anemia Among Women Visiting LMH Kohat

Frequency Of Anemia		Frequency	Percent	Valid Percent	Cumulative Percent
	Non-Anemic Women	102	34.2	34.2	34.2
	Anemic Women	196	65.8	65.8	100.0
	Total	298	100.0	100.0	

Table 2: Showing Frequency of Various Determinants Affecting Anemia Among Women Visiting LMH Kohat

S.NO	Variables	Yes	No
1	Iron Supplement Intake	216	82
2	History Of Acute or Chronic Infection	76	222
3	History Of Worm Infestation	25	273
4	History Of Miscarriage	107	191
5	History Of Hemorrhagic Disease	22	276
6	Suffering From Stress	122	176

DISCUSSION

In our study, the prevalence of anemia was found to be 65.8%, which was higher than the prevalence reported in previous international studies: 41.74% 57.2%, and 50.6% respectively. [8, 9] On the other hand, previous studies conducted in Pakistan have revealed a prevalence of 67.6% (10) and 77.10%. [10, 11] A cross-sectional study conducted at the Muara community health center, in December 2017, estimated that 63.5 % women were anemic, having low literacy level or illiterate, and 37.5% were non-anemic and healthy, having higher education status. [12]

According to a study conducted in Pakistan, among anemic pregnant women, 62.7% were found to be illiterate. There was a strong association observed between illiteracy and the occurrence of anemia, as well as with the severity of anemia. [13] In a cross-sectional study conducted in 2017, in Hossana Town, the prevalence of mild to moderate anemia was 56.6% and 40.8% respectively. Moreover, in another study conducted at Batunadua Health Center, in 2021; found that those women who have good and healthy eating had 18.2% prevalence of anemia

and among those with poor diet had 86.5% (7) anemia among pregnant individual. [2, 7]

In our study, 91.6% of women had no history of worm infestation; among them, 66.3% were anemic. While 8.4% of the women had experienced worm infestation, 60% of these women were anemic, indicating a significant relationship between anemia and worm infestation. This finding aligns with another study conducted in Ethiopia, where the prevalence of anemia among pregnant women infected with intestinal parasites (55.6%) was significantly higher than among women who were not infected (16.4%). [14] In another study in Pakistan, 38.46% of anemic women had a history of worm infestations. [3]

Iron supplementation is crucial during pregnancy to prevent or overcome iron deficiency anemia. In our study, 65.8% women were anemic who were not taking any iron supplementation. In an international study, over 80% of pregnant women reported using iron supplementation, but in the same study, the prevalence of anemia at 68.6% and among overweight 70.5% were anemic. While another study stated that increasing BMI and obesity were associated with a lower risk for anemia in pregnancy, where 35.4 % anemic women had normal BMI, 1.1 %were underweight, and 43.9% were overweight. [15] In an international study, over 80% of pregnant women reported using iron supplementation; however, the exact study reported a prevalence of anemia of 53.7%. [16] In our study, 62.3 of % with normal BMI were anemic, among underweight, 68.6% and among overweight, 70.5% were anemic. While another study stated that increasing BMI and obesity were associated with a lower risk for anemia in pregnancy, where 35.4 % anemic women had normal BMI, 1.1 % were underweight, and 43.9% were overweight. [15] In a study conducted in Faisalabad, two-thirds of respondents reported following a balanced diet during their pregnancy. At the same time, 22.5% did not. [17] In our study, 95% of the women consumed 1-3 meals per day, and among them, 66.4% were anemic. About half of the women included fruits in their diets 1-2 times per week, and 60.2% of them were anemic. Additionally, 46.3% did not include any meat in their diet, and 70.2% of the women were anemic.

CONCLUSIONS

Our study found that most women visiting LMH were anemic and exhibited multiple factors contributing to their low hemoglobin levels. Of the 16 factors we examined, the most notable were their monthly income and literacy status, which led to a low socioeconomic lifestyle, poor diet, and an inability to afford iron and folic acid supplements. Additionally, it was observed that anemia was more common in women who lacked dietary essentials such as fruits and meat, while it was less prevalent among those with a balanced diet. Further studies at the district level are recommended to gain more insight into the prevalence of anemia among pregnant women.

REFERENCES

1. Das M, Verma M, Barman P, Behera DK. Prevalence of anaemia among married women with recent birth history and high-risk fertility behaviour: secondary data analysis of the National Family Health Survey-India (2019–21). BMJ Open. 2024;14(1).
2. Romedan D, Delil R, Tamiru D, Zinab B. Dietary Diversity and Its Association with Anemia among Pregnant Women Attending Public Health Facilities in South Ethiopia.
3. Gul M, Ishtiaq M, Hussain A, Ijaz B, Ali W. frequency & causes of anemia among pregnant women visiting health care facility. 2020;13(1):21–5.
4. Igbinosa I, Berube C, Lyell DJ. Iron deficiency anemia in pregnancy. Curr Opin Obstet Gynecol. 2022;34(2):69–76.
5. Zulfiqar H, Shah IU, Sheas MN, Ahmed Z, Ejaz U, Ullah I, et al. Dietary association of iron deficiency anemia and related pregnancy outcomes. Food Sci Nutr. 2021;9(8):4127–33.
6. Amalina LN. Incidence of Anemia in Pregnant Women with Closer Spacing of Pregnancies and Multiparity: A Case Report. Biosci Med J Biomed Transl Res. 2023;7(9):3561–5.
7. Dewi SSS, Hasibuan DA, Aswan Y, Harahap M, Anggraini W. Relationship Between Diet and Physical Activity with the Event of Anemia in Pregnant Women. Int J Public Heal Excell. 2022;1(2):87–92.
8. L. L. Tirore, A. S. Areba, A. Habte, M. Desalegn, and A. S. Kebede, 'Prevalence and associated factors of severity levels of anemia among women of reproductive age in sub-Saharan Africa: multilevel ordinal logistic regression analysis', Front Public Health, vol. 11, Jan. 2024, doi: 10.3389/fpubh.2023.1349174.
9. E. J. Lema and S. A. Seif, 'Prevalence of anemia and its associated factors among pregnant women in Ilala Municipality - Tanzania: Analytical cross-sectional study', Medicine, vol. 102, no. 23, p. e33944, Jun. 2023, doi: 10.1097/MD.0000000000033944. 38 9
10. Biosci IJ, Ullah I, Zahid M, Khan MI, Shah M, Biosci IJ. Prevalence of anemia in pregnant women in district Karak, Khyber Pakhtunkhwa, Pakistan. Int J Biosci. 2013;3(11):77–83.
11. Anjum Z, Ali S, Rahat A, Chishti R, Yousaf F. Prevalence of Iron Deficiency Anemia and Dietary Profile of Pregnant Women of University Campus, District Peshawar, Pakistan. NeuroQuantology [Internet]. 2023;21(6):891–7.

12. Helliyana H, Aritonang EY, Sanusi SR. The Associations between Maternal Education, Chronic Energy Deficit, and Anemia in Pregnant Women: An Evidence from Lhokseumawe, Indonesia. J Matern Child Heal. 2019;4(5):302–6.

13. Siddiqui R, Mangi MM, Shah AA, Bhutto SA. Relationship of Anemia during pregnancy with education and trimester of pregnancy. Med Forum Mon. 2014;25(10):31–4.

14. Bolka A, Gebremedhin S. Prevalence of intestinal parasitic infection and its association with anemia among pregnant women in Wondo Genet district, Southern Ethiopia: A cross-sectional study. BMC Infect Dis. 2019;19(1):1–8.

15. S. S. S. Dewi, D. A. Hasibuan, Y. Aswan, M. Harahap, and W. Anggraini, 'Relationship Between Diet and Physical Activity with the Event of Anemia in Pregnant Women', International Journal of Public Health Excellence (IJPHE), vol. 1, no. 2, pp. 87–92, May 2022, doi: 10.55299/ijphe.v1i2.36.

16. R. Delil, D. Tamiru, and B. Zinab, 'Dietary Diversity and Its Association with Anemia among Pregnant Women Attending Public Health Facilities in South Ethiopia', Ethiop J Health Sci, vol. 28, no. 5, pp. 625–634, Sep. 2018, doi: 10.4314/ejhs.v28i5.14.

17. R. Siddiqui, M. Muqeem Mangi, A. Ali Shah, and S. Ahmed Bhutto, 'Relationship of Anemia During Pregnancy with Education and Trimester of Pregnancy', 2014.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Shafique Z	✓	×	✓	×	✓	×
Minallah S	✓	✓	×	✓	✓	×
Ahmad AN	×	✓	×	×	✓	×
Shehzadi L	✓	✓	✓	×	✓	✓
Khaliq A	✓	✓	×	✓	✓	×
Shah A	✓	✓	×	✓	✓	×
Khan S	×	✓	×	×	✓	×
Ishtiaq M	✓	✓	✓	×	✓	✓

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ORIGINAL ARTICLE

DIETARY PATTERNS AND THEIR DETERMINANTS AMONG MEDICAL STUDENTS OF KHYBER MEDICAL UNIVERSITY– INSTITUTE OF MEDICAL SCIENCES, KOHAT, PAKISTAN

Anosha Nadeem[1], Eman[1], Yusra Khalid[1], Nazia Kanwal[1], Mahnoor Safeer[1], Hasfsa Habib[1], Malaika Falak[1], Hina Zaman[1], Eman Naveed[1], Tooba Asad[1], Bushra Najeeb[1], Muhammad Ishtiaq[2]

[1]MBBS student at Kohat Institute of Medical Sciences, Kohat - Pakistan

[1]Department of Community Medicine, Kohat Institute of Medical Sciences, Kohat - Pakistan

ABSTRACT

Background and Introduction: The concept of a balanced diet was introduced to promote optimal health and well-being. Dietary patterns are crucial for analyzing consumption habits and the frequency of food and nutrient intake within a population, ultimately aiding in the prevention of chronic diseases. According to the World Health Organization, 80% of people develop chronic diseases due to unhealthy lifestyles and dietary factors. The determinants include age, gender, year of study, residency, financial status, whether a student lives in a hostel or is a day scholar, level of physical activity, weight (kg), height (m), for calculating BMI (kg/m ^ 2), smoking habits, daily intake of breakfast, lunch, and dinner, any acute or chronic diseases, and the frequency of food consumption.

Objective: The main goal of this study was to identify dietary patterns among medical students and examine how these patterns are related to modifiable, non-modifiable, socioeconomic, personal, and environmental factors that influence nutrition.

Materials and Methods: After obtaining ethical approval, a descriptive cross-sectional study

The study was conducted at Kohat Institute of Medical Sciences, Kohat, Pakistan, involving 405 medical students. A semi-structured questionnaire, including a validated food frequency questionnaire along with lifestyle and sociodemographic questions, was used to assess dietary patterns and their determinants. The research took place from February to September 2024. All medical students aged 19 to 25 were eligible to participate. Data analysis and interpretation were performed using Microsoft Office 2010 and SPSS version 22. The results were presented in tables.

Results: The study showed that among 182 females, 115 (63.1%) followed a healthy pattern, while among 223 males, 135 (60.5%) maintained a healthy pattern. Respondents with a normal BMI (18.5-24.9 kg/m^2) also displayed healthy habits. Middle-aged students, around 22 years old, exhibited healthier behaviors. Following a healthy pattern helps prevent all medical illnesses, with 219 (60.8%) reporting no health issues. Unhealthy dietary habits were linked to lower daily food intake, smoking, fast food consumption, and decreased physical activity. Respondents with higher family incomes (<$100,000) and more disposable income for food, especially hostel residents, showed a healthier dietary pattern.

Conclusions: It was observed that dietary patterns vary among medical students, with key factors influencing these differences including age, physical activity, daily food intake, family income, BMI, monthly pocket money, and smoking habits. Many students reported following a healthy dietary pattern. University policies aimed at improving students' lifestyle behaviors by offering nutritious foods and encouraging regular physical activity are essential for supporting healthy development.

Keywords: Dietary Pattern, Medical Students, Age, Body Mass Index, Food Frequency Questionnaire

This article may be cited as: Nadeem A, Eman[1], Khalid Y, Kanwal N, Safeer M, et al. Dietary Patterns And Their Determinants Among Medical Students Of Khyber Medical University– Institute Of Medical Sciences, Kohat, Pakistan. PMSRJ 2025 January-April;2(1):148-152

Correspondence
Dr. Muhammad Ishtiaq
Professor
Department of Community Medicine, Kohat Institute of Medical Sciences, Kohat - Pakistan
Cell: +92-334-9121822
Email: drishtiaq71@yahoo.com
Date Received: 19/03/2025
Date Revised: 19/05/2025
Date Accepted: 10/09/2025

INTRODUCTION

The concept of a Balanced Diet was introduced to promote optimal health and development, including a nutritious diet that supports longer life expectancy and helps prevent serious diseases. [1, 2] A dietary pattern (DP) helps analyze the overall profile of food and nutrient intake and frequency within a population. Patterns established in childhood often carry into adulthood, and an unhealthy or

sedentary dietary pattern can lead to the development of chronic diseases. [3] Analyzing dietary patterns with dietary data can also uncover the link between diet and chronic illnesses related to specific eating behaviors. [4]

Understanding nutrition and diet is crucial for choosing a healthy, balanced lifestyle. According to the World Health Organization, 80% of people suffer from chronic diseases caused by lifestyle and dietary factors; therefore, making informed choices is advised to lessen this burden. [5]

Several studies have shown that various factors, including socioeconomic status (SES), living environment, education, occupation, family background, and income, influence dietary habits and food intake. Research on Caucasian children examined the relationship between these factors and nutritional habits, reporting that a healthy diet characterized by high consumption of carbohydrates, proteins, and fats is positively associated with higher SES and educational levels, and negatively associated with unhealthy behaviors such as smoking and low physical activity. [6] A study in Kelantan state found that different ethnic groups display distinct, significant dietary patterns. Studies conducted in Australia, Brazil, Scotland, and China briefly explored the link between nutrients and food consumption. In the United States (US), about 31.8% of male and 33.5% of female adolescents have poor dietary habits. In Alberta, Canada, approximately 42.0% of adolescents exhibit poor eating habits, primarily due to a shift from consuming vegetables, fruits, nuts, and dairy products to junk food and snacks. [7]

The rapid social changes, socioeconomic progress, globalization, and health disparities that have occurred in recent years have led to shifts in food consumption patterns, causing more people to focus on processed and refined foods. [8, 9] Globally, studies conducted between 2000 and 2020 consistently show that university students are at the peak of transitioning from a healthy to an unhealthy lifestyle. [10, 11] Similarly, medical students play a significant role in promoting a healthy lifestyle, which is why it is highly emphasized. They should adopt effective and healthy eating habits during their studies and pass this knowledge on to their patients as well. [12] Therefore, this study aims to identify dietary patterns among medical students and explore how these patterns relate to age, gender, year of study, residency, financial status, whether they are hostel residents or day scholars, level of physical activity, weight (kg), height (m) for calculating BMI (kg/m^2), smoking habits, daily intake of breakfast, lunch, and dinner, presence of any acute or chronic diseases, and the frequency of food consumption via FFQ.

MATERIALS AND METHODS

A cross-sectional descriptive study was carried out at the Department of Community Medicine, KMU-IMS Kohat, Khyber Pakhtunkhwa, Pakistan, from February 2024 to September 2024. After receiving ethical approval, 405 students from first to final year, aged 19 to 25, were eligible to participate. A semi-structured questionnaire, including a validated food frequency questionnaire along with lifestyle and socio-demographic questions, was used to assess dietary patterns and their determinants. The semi-structured FFQ, comprising 25 items, aimed to determine food consumption frequency, categorized as daily, 2-3 times a week, once a week, once a month, or once every two months. The study identified two distinct dietary patterns: one healthy and one unhealthy. Respondents who consumed carbohydrates, proteins, fruits, vegetables, and other items daily or 2-3 times a week, and other items once a month or twice a month, were classified as following the healthy pattern. An unhealthy pattern was observed among respondents who consumed fast food and snacks daily or 2-3 times a week, as well as other items once a month.Data were analyzed using SPSS 22 and Microsoft Office 2010, with results presented in charts and tables.

RESULTS

A study involving 405 medical students from KMU-IMS Kohat, Khyber Pakhtunkhwa, Pakistan, including MBBS students from all years, found that 3rd and 4th-year MBBS students comprised 24.0% of the sample. The students ranged in age from 18 to 26 years, with the highest percentage (21.2%) being 22 years old. The percentages of males and females were 51.4% and 48.6%, respectively.

The study results indicated that students with a normal weight had the highest percentage at 64.7%, while students who were overweight or obese comprised 16.1%. The examination of family illness history revealed that 58.5% of participants reported no family illness. Among those with a family history of illness, 9.7% had acute diseases, 17.3% had chronic illnesses, and 7.8% had both. Additionally, 55.6% ate three meals a day, 39.5% had two meals, and 5.7% ate only one meal daily. A healthier diet was more common among those who ate more frequently—62.6% of three-meal eaters followed a nutritious diet, compared to 63.1% of two-meal eaters and 43.5% of one-meal eaters. See Table 1 for details.

Generally, unhealthy patterns were most common among those with fewer meals, with 56.5% of one-meal eaters showing poor dietary habits. Among the students, 49.2% were moderately active, 24.4% were regularly active, 15.8% were less active, and 8.6% were very active.

Physical activity levels were connected to dietary patterns, as more active individuals tended to follow healthier diets. Among moderately active students, 59.4% had a healthy diet, while 40.6% followed an unhealthy pattern. Similarly, 67.7% of regularly active students and 82.9% of very active students maintained a healthy diet. Conversely, less active students had roughly an even split, with 56.3% following a healthy diet and 43.7% having an unhealthy one. Additionally, 51.6% of students with a family income above 100,000 PKR followed a healthy dietary pattern. Higher income groups showed a stronger tendency toward healthier diets, with 61.2% in the >100k category eating healthily, compared to 58% in the 20-50k range and 50% in the 50-100k range. In contrast, students from lower-income families (<20k) had an almost equal split between healthy and unhealthy diets.

DISCUSSIONS

This study was conducted to assess the frequency of dietary patterns and their determinants among students at a medical college in Pakistan. Ahmed Jaeydi et al. concluded in a study that most people who consume a healthy diet (fruits, vegetables, carbohydrates, protein, and legumes) are less likely to have acute and chronic diseases compared to those with an unhealthy pattern, which aligns with our findings, where 60.8% of medical students reported following a healthy dietary pattern and had no medical issues. [13] The survey conducted in Broda, India, noted that nearly one-third of adolescents skipped meals regularly, a behavior mirrored in our study, where 36.9% of students reported eating only two meals a day and 5.3% ate just one, highlighting the impact of demanding academic schedules on students' meal patterns, where convenience often takes precedence over nutrition. [14] Our study revealed that 47.7% of students were moderately active. In comparison, only 8.1% were very active, reflecting a trend toward physical inactivity that aligns with a study conducted in KSA, where 75.3% of individuals did not exercise regularly. [15]

Additionally, a study conducted in South Africa found that 59.3% of the low-income population relied on reduced food intake, which included not just vegetables and fruits, aligning with our findings that privileged students exhibited healthier dietary patterns compared to those from low-income households. [16] A study from India revealed that 40% of the population was underweight,

Table 1: Demographic variables, physical activity, BMI, food intake habits, illnesses, and income

Variables	% age
Year of Study	
1st year	14.5
2nd year	15.4
3rd year	24
4th year	24
Final year	15.4
Age	
18	1.6
19	4.4
20	15.9
21	15.7
22	21.2
23	18.7
24	12.2
25	3.5
Gender	
Male	51.4
Female	41.9
Physical Activity of Medical Students	
Less active	14.7
Moderately Active	47.7
Regularly active	22.8
Very Active	8.1
BMI of Medical Students	
Underweight <18.5	18.4
Normal 18.5-24.9	64.7
Overweight & obese	
25-29.9	16.1
Daily Food Intake of Medical Students	
Only one meal a day	5.3
Two meals a day	36.9
Three meals a day	51.2
History of Family Illness of Medical Students	
No illness	58.5
Acute	9.7
Chronic	17.3
Acute & Chronic both	7.8
Medical Issues of Medical Students	
No Medical Issue	82.9
Acute Medical Issue	6
Chronic Medical Issue	3
Both Acute and Chronic	
issues	1.4
Family Monthly Income	
< 20000	11.3
> 100000	47.9
20-50000	11.1
50-100000	23

while 6% were overweight, likely due to poor dietary choices and a lack of nutritious foods. [17] In contrast, our study found the prevalence of obesity among hostel residents to be 11.5%. A similar pattern was observed in the article, noting that poor dietary habits and stress contribute to both underweight and overweight conditions among medical students. The study also found that lower physical activity levels were directly associated with higher BMI among medical students. [18]

Additionally, the study emphasizes that insufficient physical activity combined with a high-calorie diet contributes to rising obesity rates among medical students. A survey showed that 64% of participants had a normal weight, and 18% were overweight, which aligns with our study, indicating that 64.7% of students had a normal BMI and 16.1% were classified as overweight or obese, engaging in low to moderate physical activity. In a study conducted at an Egyptian university, nearly one-quarter of the students met the recommended daily intake of fruit. [20] However, our data reveal interesting trends, with 60.4% of students consuming fruits 2-3 times per week and maintaining healthy dietary patterns. [21]

CONCLUSIONS

This study found that most students follow a healthy diet, regularly eating carbohydrates, proteins, fruits, and vegetables. However, a notable number of students have unhealthy eating habits, often consuming fast food, snacks, and processed foods. Furthermore, there is a clear link between unhealthy eating patterns and lower physical activity levels among obese and overweight students. In addition, students' pocket money, parents' monthly income, tobacco use, and fast-food consumption are closely associated with their dietary habits.

REFERENCES

1. Sanne I, Bjørke-Monsen AL. Dietary behaviors and attitudes among Norwegian medical students. BMC Med Educ. 2023;23(1):1–8.
2. Walnik L, Kück M, Tegtbur U, Fischer V, Kerling A. Physical Fitness, Nutrition and Quality of Life in German Medical Students. Nutrients. 2022;14(24):1–9.
3. Omage K, Omuemu VO. Assessment of dietary pattern and nutritional status of undergraduate students in a private university in southern Nigeria. Food Sci Nutr. 2018;6(7):1890–7.
4. Yuan YQ, Li F, Meng P, You J, Wu M, Li SG, et al. Gender difference on the association between dietary patterns and obesity in Chinese middle-aged and elderly populations. Nutrients. 2016;8(8).
5. ul Haq I, Mariyam Z, Li M, Huang X, Jiang P, Zeb F, et al. A comparative study of nutritional status, knowledge attitude and practices (KAP) and dietary intake between international and Chinese students in Nanjing, China. Int J Environ Res Public Health. 2018;15(9):1–11.
6. Chen L, Zhu H, Gutin B, Dong Y. Race, Gender, Family Structure, Socioeconomic Status, Dietary Patterns, and Cardiovascular Health in Adolescents. Curr Dev Nutr. 2019;3(11):1–11.
7. Abdullah NF, Teo PS, Foo LH. Ethnic differences in the food intake patterns and its associated factors of adolescents in Kelantan, Malaysia. Nutrients. 2016;8(9):1–14.
8. Man CS, Salleh R, Ahmad MH, Baharudin A, Koon PB, Aris T. Dietary patterns and associated factors among adolescents in malaysia: Findings from adolescent nutrition survey 2017. Int J Environ Res Public Health. 2020;17(10):1–12.
9. Rezali FW, Chin YS, Shariff ZM, Mohd Yusof BN, Sanker K, Woon FC. Evaluation of diet quality and its associated factors among adolescents in Kuala Lumpur, Malaysia. Nutr Res Pract. 2015;9(5):511–6.
10. Malczyk E, Muc-Wierzgo M, Fatyga E, Dzi-gielewska-Gsiak S. Salt Intake of Children and Adolescents: Influence of Socio-Environmental Factors and School Education. Nutrients. 2024;16(4):1–13.
11. Cheema S, Maisonneuve P, Abraham A, Chaabna K, Yousuf W, Mushannen T, et al. Dietary patterns and associated lifestyle factors among university students in Qatar. J Am Coll Heal [Internet]. 2023;71(9):2795–803. Available from: https://doi.org/10.1080/07448481.2021.1996374
12. Snetselaar L, Malville-Shipan K, Ahrens L, Smith K, Chenard C, Stumbo P, et al. Raising Medical Students' Awareness of Nutrition and Fitness in Disease Prevention: Nutrition and Fitness Program at the University of Iowa. Med Educ Online. 2004;9(1):4358.
13. Jayedi A, Soltani S, Abdolshahi A, Shab-Bidar S. Healthy and unhealthy dietary patterns and the risk of chronic disease: An umbrella review of meta-analyses of prospective cohort studies. Br J Nutr. 2020;124(11):1133–44.
14. Kotecha P V., Patel S V., Baxi RK, Mazumdar VS, Shobha M, Mehta KG, et al. Dietary pattern of schoolgoing adolescents in Urban Baroda, India. J Heal Popul Nutr. 2013;31(4):490–6.
15. Majeed F. Association of BMI with diet and physical activity of female medical students at the University of Dammam, Kingdom of Saudi Arabia. J Taibah Univ Med Sci [Internet]. 2015;10(2):188–96. Available from: http://dx.doi.org/10.1016/j.jtumed.2014.11.004
16. Odunitan-Wayas FA, Faber M, Mendham AE, Goedecke JH, Micklesfield LK, Brooks NE, et al. Food security, dietary intake and foodways of urban low-income older south african women: An exploratory study. Int J Environ Res Public Health. 2021;18(8):1–14.

17. Essaw E, Moses MO, Afrifa D, Acheampong IK, Mensah W, Owusu L. Physical activity patterns and dietary habits of undergraduate students. Balt J Heal Phys Act. 2019;11(1):115–23.

18. Alhashemi M, Mayo W, Alshaghel MM, Brimo Alsaman MZ, Haj Kassem L. Prevalence of obesity and its association with fast-food consumption and physical activity: A cross-sectional study and review of medical students' obesity rate. Ann Med Surg [Internet]. 2022;79(June):104007. Available from: https://doi.org/10.1016/j.amsu.2022.104007

19. Seconda L, Egnell M, Julia C, Touvier M, Hercberg S, Pointereau P, et al. Association between sustainable dietary patterns and body weight, overweight, and obesity risk in the NutriNet-Santé prospective cohort. Am J Clin Nutr [Internet]. 2020;112(1):138–49. Available from: https://doi.org/10.1093/ajcn/nqz259

20. Al-Qahtani MH. Dietary Habits of Saudi Medical Students at University of Dammam. Int J Health Sci (Qassim). 2016;10(3):335–44.

21. Sabbour SM, Hussein WM, Amin GE. Fruit and vegetable consumption among medical students in an Egyptian University: knowledge, practice, and attitude towards accessible healthy food. Egyptian Journal of Community Medicine. 2018 Jan;36(1).

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Nadeem A	✓	×	✓	×	✓	×
Eman[1]	✓	✓	×	✓	✓	×
Khalid Y	×	✓	×	×	✓	×
Kanwal N	✓	✓	✓	×	✓	✓
Safeer M	✓	✓	×	✓	✓	×
Habib H	✓	✓	×	✓	✓	×
Falak M	×	✓	×	×	✓	×
Zaman H	✓	✓	✓	×	✓	✓
Naveed E	✓	✓	×	✓	✓	×
Asad T	×	✓	×	×	✓	×
Najeeb B	✓	✓	✓	×	✓	✓
Ishtiaq M	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ORIGINAL ARTICLE

INGUINAL HERNIA AND ITS ASSOCIATED RISK FACTOR AMONG ADULTS: A CASE-CONTROL STUDY

Aftab Alam[1], Saad Mujtaba[1], Ahmar Ali Shehzad[1], Zamir Khan[1], Muhammad Abbas[1], Muhammad Atiq[1], Muhammad Sohaib Aziz[1], Muhammad Ishfaq[2]

[1]4th year MBBS Students of Kohat Institute of Medical Sciences, Kohat - Pakistan

[2]Department of Community Medicine, Kohat Institute of Medical Sciences, Kohat - Pakistan

ABSTRACT

Objective: This study aimed to determine the frequency and risk factors of inguinal hernia and their association with BMI, and ways to reduce this problem.

Methods: A case-control study was conducted among 315 adults living in Khyber Pakhtunkhwa (KP), Pakistan, in 2024. Data were collected and analyzed by SPSS version 22 using descriptive statistics and odds ratios

Results: The inguinal hernia was more common in males (73.83%) than in females (26.16%). Among these, males and females aged 40 and older made up 56.07% and 43.92%, respectively, of those under 40. Hernia was significantly influenced by positive family history (41.12%), physical activity (44.85%), constipation (56.07%), COPD (33.64%), and multiparity (85.71%).

Conclusion: Inguinal hernias are a common issue in KP, Pakistan. They occur more often in men, and there is a strong connection between constipation, family history, and multiparity. Public health initiatives should prioritize early diagnosis and prompt treatment to minimize patient morbidity and mortality.

Key Words: Inguinal Hernia, Risk Factors, Body Mass Index, Constipation, Chest Problems, Multi-Parity

This article may be cited as: Alam A, Mujtaba S, Shehzad AA, Khan Z, Abbas M, et al. Inguinal Hernia And Its Associated Risk Factor Among Adults: A Case-Control Study. PMSRJ 2025 January-April;2(1):153-156

INTRODUCTION

A hernia is defined as the abnormal protrusion of a part or structure through the tissues that typically contain it. The parts of a hernia include the sac, the neck, and the contents. Most commonly, it contains fat and is situated near the intestine. Abdominal hernias are a prevalent surgical condition affecting all ages and both sexes. About 7.5% of all surgeries are hernia operations [1]. Inguinal hernia is one of the most common surgical pathologies. It is the most prevalent form of abdominal wall hernia and occurs more frequently in adult men. Over a quarter of adult men in the United States are expected to have a medically diagnosed inguinal hernia. The lifetime risk of inguinal hernia repair is estimated at 27% for men and 3% for women [4]. Inguinal hernia repair is among the most common surgeries performed by general surgeons, with over one million repairs in the U.S. each year [5]. It is the most common hernia, accounting for 73% of cases [7]. Inguinal hernia repair is the most frequently performed operation in general surgery.

In 2003, approximately 770,000 inguinal hernia repairs occurred in the U.S. The lifetime risk of undergoing inguinal hernia repair is as high as 42.5% for men and 5.8% for women [8]. The prevalence of abdominal wall hernia is approximately 1.7% across all age groups and about 4% for those over 45 years old [12]. Inguinal hernia is very common in sub-Saharan Africa, with many cases remaining untreated, resulting in a high disease burden [11]. The earliest recorded case of an inguinal hernia was found in the Ebers Papyrus from Egypt, dated to 1552 BC. More than 3,000 years later, the diagnosis appeared in the writings of Caspe Stromayer (1559), as documented in a French monograph by Lorenz Heister in 1724 ([14]). Inguinal hernia repair is a standard surgical procedure performed on both adults and children, accounting for over 95% of all groin hernia repairs [15].

The causes of hernia development include muscle weakness and strain. Chronic coughing, as well as damage from surgery or trauma, are common contributing factors. Major risk factors include heavy lifting, obesity, pregnancy, and constipation. Smoking is particularly significant, especially in inguinal hernias. Collagen vascular disease, increased intra-abdominal pressure, and a history of open appendectomy are also considered relative

Correspondence
Aftab Alam
4th year MBBS Students
Kohat Institute of Medical Sciences, Kohat - Pakistan
Email: 2002aftabalamkhan@gmail.com
Date Received: 19/03/2025
Date Revised: 07/10/2025
Date Accepted: 07/10/2025

risk factors [18]. Interestingly, studies have reported a lower incidence of inguinal hernia among overweight and obese men compared to those of normal weight. The risk among overweight men is about 80% of that in normal-weight men, and among obese men, it's approximately 50% [17]. Similar findings were observed in a community survey in Israel and a hospital-based case-control study in the Netherlands.

Additionally, advanced age, male gender, smoking, chronic cough, which increases intra-abdominal pressure, and chronic constipation are identified risk factors. The prevalence of chronic constipation is reported at 14% [19]. Despite its commonality, high prevalence, and associated complications, few studies have been conducted in Pakistan to revisit or reassess its risk factors. To our knowledge, no research has been carried out in Khyber Pakhtunkhwa to explore these factors further. While several studies link hernia to obesity, clear evidence directly associating inguinal hernia with increased body weight and BMI is lacking. We are eager to investigate whether increased body weight and BMI are directly or inversely linked to the incidence of inguinal hernia.

MATERIALS AND METHODS

A case-control study was conducted on patients from KPK province, Pakistan, between February and September 2024. Adult men and women presenting with primary inguinal hernia at (mention all hospitals) were enrolled as cases. Patients aged 18 to 95 years who visited District Headquarters Hospital with inguinal hernia were included, while those under 18, with multiple comorbidities, pregnancy, congenital disorders, recurrent inguinal hernia, or requiring emergency care were excluded.

Control subjects were selected randomly from the hospital, excluding those with other illnesses during the same period. Cases and controls were matched with cases of our study according to sex and age. Controls were taken for the case. Consent was obtained from the patient to participate in the study after a thorough explanation was provided. Controls also needed to give informed consent.

Clinical data were divided into socio-demographic details and lifestyle factors. Socio-demographic details included age, gender, marital status, address, occupation or job type, and educational level. Risk factors encompassed smoking, constipation, physical activity, and COPD.

DATA PROTOCOL

The study examined various factors that contribute to the development of inguinal hernia. Data were collected on participant characteristics, including age, body mass, height, and body mass index (BMI). Additional health information was gathered, such as smoking status, presence of chronic respiratory issues, and bowel movement habits. Family medical history was also considered, specifically whether a first-degree relative had been diagnosed with an inguinal hernia. The level of physical activity and occupation type were categorized as either strenuous or non-strenuous. The type of hernia (indirect or direct) was also documented. Subjects with BMI >30 were considered obese. Participants were grouped into different weight status categories based on their BMI. These categories included: underweight (BMI below 20), normal weight (BMI 20-24.9), overweight (BMI 25-29.9), and obese (BMI 30 or higher). SPSS version 22 was used for statistical analysis. Relative risk factors for cases were compared with controls by calculating ODDS RATIO with a 95% confidence interval.

RESULTS

A total of 315 male and female patients were interviewed. Among them, 107 had inguinal hernia, while the remaining 208 served as controls. The age range for both cases and controls was defined as 18-60 years, with a mean age between 45 and 60 years. The most common age group was 45-60 years. It is important to note that we assumed the age and gender of cases and their respective controls were the same in our study. The distribution of risk factors for inguinal hernia among the cases and controls is shown in Table 2. Male patients comprised 73.83%, and female patients made up 26.17%.

DISCUSSIONS

Inguinal hernia is a condition that primarily affects males and tends to become more common with age. In this study, individuals aged 40 years or older make up about 60 percent of cases in the KPK population. As people age, muscle weakness increases, raising the risk of hernia [21]. A positive family history of inguinal hernia is a significant risk factor, with 44% of patients having a first-degree relative with the condition. Our results also show that unilateral hernia is less often associated with a positive family history, while nearly 70 percent of cases with a family history have bilateral hernias. Men with a family history are eight times more likely to develop a primary inguinal hernia. Genetic factors also contribute to hernia development [21]. Strenuous physical activity is a significant risk factor; individuals in more active jobs are more prone to hernias [5]. Chronic constipation causes prolonged straining, increasing abdominal pressure and predispos-

Table 1: Age Distribution of Patients with Inguinal Hernia

Age in years	Number	Percentage
18-24	5	4.67
25-34	19	17.757
35-44	23	21.50
45-60	40	37.38
> 60	20	18.70
Total	107	100

Table 2: Distribution of Risk Factors For Inguinal Hernia Among Subjects And Controls

Variables	Controls N=208 No (%)	Cases N=107 No (%)	Odds Ratio OR (CI=95%)
Age			
>40	118 (56.73)	60 (56.07)	1.03 (CI=0.64-1.64)
<40	90 (43.26)	47 (43.92)	
Gender			
Male	155 (74.51)	79 (73.83)	0.96 (CI=0.57-1.64)
Female	53 (25.48)	28 (26.16)	
Parity***			
Primigravida	2 (3.77)***	4 (14.28)***	3.5 (CI=0.6-20.55)
Multipara	42 (79.25)***	24 (85.71)***	
BMI			
>25	108 (51.92)	70 (65.42)	0.57 (CI=0.35-0.92)
<25	100 (48.07%)	37 (34.57)	
Family history			
Present	26 (12.5)	44 (41.12)	4.89 (2.78-8.59)
Absent	182 (87.5)	63 (58.87)	
Smoking history			
Present	49 (23.55)	33 (30.84)	1.45 (0.86-2.44)
Absent	159 (76.44)	74 (69.65)	
Physical exercise			
Present	74 (35.57)	48 (44.85)	1.47 (0.92-2.37)
Absent	134 (64.42)	59 (55.14)	
Constipation			
Present	92 (44.23)	60 (56.07)	1.61 (1.01-2.57)
Absent	116 (55.76)	47 (43.92)	
Chronic respiratory problems			
Present	53 (25.48)	36 (33.64)	1.48 (0.89-2.46)
Absent	155 (74.51)	71 (66.35)	

ing to inguinal hernia formation. About 60 percent of our cases reported a history of chronic constipation. During defecation, especially in the squatting position, pushing the abdominal organs can increase pressure, leading to hernia [11]. Obesity and overweight were not found to be significant risk factors; in fact, excess adipose tissue may strengthen abdominal muscles, providing a stronger barrier against hernia formation [22]. Smoking is also a relevant risk factor, with 33 percent of cases having a history of long-term smoking. OBERG and colleagues suggest that smoking leads to increased collagen degeneration and abnormal synthesis in fibroblasts, which may elevate hernia risk [14]. Chronic respiratory problems, such as COPD, were present in nearly 36 percent of cases, and frequent coughing can repeatedly increase intra-abdominal pressure, potentially causing hernias [16]. Inguinal hernias are most common among multiparous women; about 85.71% of cases in our study involved multiparity, while no nulliparous women were included. A small portion, 14.28%, were primiparous. To reduce this problem, lifestyle modifications are recommended, including regular exercise focusing on core strength, avoiding heavy lifting and strenuous work, and managing constipation through dietary changes, use of fiber laxatives, and medical check-ups. Additionally, quitting smoking and seeking timely surgical treatment are advised. Our findings also reveal an inverse relationship between BMI and hernia occurrence, meaning that higher BMI is associated with fewer hernias. However, promoting higher BMI is not advisable, as it increases the risk for other serious conditions such as Type 2 diabetes and hypertension.

CONCLUSIONS

Inguinal hernia remains a common condition among adult men. Strenuous activity, age, and family history are significant risk factors for inguinal hernia in adults of KP. Other factors such as constipation, multi-parity, and COPD also contribute significantly to the development of inguinal hernia. Public health officials should take appropriate steps to ensure early diagnosis and prompt treatment, thereby reducing patient morbidity and mortality.

REFERENCES

1. Chowdhury S, Chakraborty P Pratim. Universal health coverage: There is more to it than meets the eye. J Fam Med Prim Care [Internet]. 2017;6(2):169–70. Available from:http://www.jfmpc.com/article.asp?issn=2249-4863;year=2017;volume=6;issue=1;spage=169;epage=170;aulast=Faizi
2. Dietz UA, Kudsi OY, Gokcal F, Bou-Ayash N, Pfefferkorn U, Rudofsky G, et al. Excess Body Weight and Abdominal Hernia. Visc Med. 2021;37(4):246–53.
3. Zelicha H, Bell DS, Chen D, Chen Y, Livingston EH. Obesity and abdominal hernia in ambulatory patients, 2018–2023. Hernia. 2024;(0123456789):2018–23.
4. Ashindoitiang JA, Ibrahim NA, Akinlolu OO. Risk factors for inguinal hernia in adult male Nigerians: A case control study. Int J Surg [Internet]. 2012;10(7):364–7. Available from: http://dx.doi.org/10.1016/j.ijsu.2012.05.016
5. Cowan B, Kvale M, Yin J, Patel S, Jorgenson E, Mostaedi R, et al. Risk factor for inguinal hernia repair among US adults. Hernia. 2023;27(6):1507–14.
6. Öberg S, Andresen K, Rosenberg J. Etiology of Inguinal Hernias: A Comprehensive Review. Front Surg. 2017;4(September):1–8.
7. Ahmed Alenazi A, Alsharif MM, Hussain MA, Gharbi Alenezi N, Alenazi AA, Almadani SA, et al. Prevalence, risk factors, and character of abdominal hernia in Arar City, Northern Saudi Arabia in 2017. Electron Physician. 2017;9(7):4806–11.
8. Goede B De, Timmermans L, Kazemier G, Lange JF, Hofman A, Jeekel J. Chapter 2. 2015;157(3):1–13.
9. M.S.L. L, Y. VDG, R.C. Z, I. G, T.J.M.V. VV. Risk factors for inguinal hernia in women: A case-control study. Am J

Epidemiol. 1997;146(9):721–6.

10. O'Rourke MGE, O'Rourke TR. Inguinal hernia: Aetiology, diagnosis, post-repair pain and compensation. ANZ J Surg. 2012;82(4):201–6.
11. Article O. Study of Risk Factors in Patients of Primary Inguinal Hernia in Bundelkhand Region of India. 2018;(4):22–5.
12. Balamaddaiah G, Reddy SVRM. Prevalence and risk factors of inguinal hernia : a study in a semi-urban area in Rayalaseema, Andhra Pradesh, India. 2016;3(3):1310–3.
13. Article O. Clinical Presentation of Inguinal Hernia among Adults in Uyo, Nigeria. 2021;1082–5.
14. Ashindoitiang JA, Ibrahim NA, Akinlolu OO. Risk Factors of Inguinal Hernia in Urban South Africa. 2023;5(August 2019):169–72.
15. Patel N, Surgery G, Surgery G. Assessment of risk factors of inguinal hernia. 2022;13(6):651–4.
16. Lau H, Fang C, Yuen WK, Patil NG. Risk factors for inguinal hernia in adult males: A case-control study. Surgery. 2007;141(2):262–6.
17. Ghawas AH, Saeed A, Alayed M, Mohammed F, Al O. EC MICROBIOLOGY Systemic Review Prevalence of Inguinal Hernia in Relation to Various Risk Factors. 2017;5:182–92.
18. Alkalash SH, Odah MM, Alkudaysi FM, Alnashri I, Alsayed MY, Almuntashiri AH, et al. Knowledge and Attitude towards Hernia among Adults in Al-Qunfudhah, Saudi Arabia; A Cross-Sectional Community-Based Study. Ann Case Reports. 2022;7(6).
19. Idiz C, Cakir C. Nutritional status and constipation scoring of inguinal hernia patients: a case–control study. Hernia. 2020;24(5):1107–12.
20. Al-maliki OHS. Risk Factors of Umbilical Hernia in Patients CAJMNS. 2023;(c):582–7.
21. Article O, Öberg S, Andresen K, Rosenberg J, Zelicha H, Bell DS, et al. Risk factors for inguinal hernia in women: A case-control study. Electron Physician [Internet]. 2017;10(4):364-7. Available from: https://doi.org/10.1007/s10029-019-02075-8
22. Ashindoitiang JA, Ibrahim NA, Akinlolu OO. Risk factors for inguinal hernia in adult male Nigerians : A case control study. Int J Surg [Internet]. 2012;10(7):364–7. Available from: http://dx.doi.org/10.1016/j.ijsu.2012.05.016

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Shah SM	✓	×	✓	×	✓	×
Ahsan MH	✓	✓	×	✓	✓	×
Saqib M	×	✓	×	×	✓	×
Mahsud A	✓	✓	✓	×	✓	✓
Nazir S	✓	✓	×	✓	✓	×
Himanshi	✓	✓	×	✓	✓	×
Yousaf S	×	✓	×	×	✓	×
Marwat MI	✓	✓	✓	×	✓	✓

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.

PRIMARY AMOEBIC MENINGOENCEPHALITIS IN A YOUNG MALE FROM DERA ISMAIL KHAN: A RARE BUT FATAL THREAT IN A HOT CLIMATE

Adeela Mustafa[1], Maryam Amir[2]

[1]Department of Community Medicine, Khyber Medical College, Peshawar - Pakistan

[2]MBBS student, Northwest School of Medicine - Pakistan

ABSTRACT

Objectives: The thermophilic, free-living amoeba Naegleria fowleri causes Primary Amoebic Meningoencephalitis (PAM), a rare but rapidly fatal infection of the central nervous system.

Presentation of the Case: After swimming in a nearby freshwater canal, a 21-year-old man from Dera Ismail Khan, Pakistan, developed a high-grade fever, severe headache, and altered consciousness. Purulent CSF with neutrophilic pleocytosis was observed after lumbar puncture, but Gram stain revealed no bacteria. Motile Naegleria fowleri trophozoites were confirmed by wet mount microscopy. The patient died within five days despite receiving supportive care and aggressive amphotericin B treatment.

In conclusion, this case emphasises the critical need for enhanced diagnostic and reporting systems in PAM-endemic areas, early clinical suspicion, and public education regarding water safety.

Keywords: Naegleria fowleri, Primary Amoebic Meningoencephalitis, Fatal meningitis, Karachi, Waterborne infection

This article may be cited as: Mustafa A, Amir M. Primary Amoebic Meningoencephalitis In A Young Male From Dera Ismail Khan: A Rare But Fatal Threat In A Hot Climate. PMSRJ 2025 January-April;2(1):157-158

INTRODUCTION

Primary Amoebic Meningoencephalitis (PAM), a serious and almost always deadly disease, is caused by the rare but highly virulent pathogen Naegleria fowleri. It infects people through the nasal cavity when they swim or use the bathroom, and it thrives in warm freshwater.

PAM is often underreported and underrecognized in many developing countries, including Pakistan, despite occasional cases. The risk of PAM is rising due to inadequate chlorination and increasing temperatures, especially in urban areas like Karachi. [1, 2]

CASE PRESENTATION

After two days of high fever reaching up to 39.5°C, along with severe frontal headache, photophobia, nausea, and confusion, a 21-year-old male from DI Khan who was previously healthy arrived at the emergency room. He had no recent travel history or known sick contacts. According to his family, he went swimming in a nearby canal with friends three days before the symptoms began. On examination: GCS 11/15. Neck rigidity was present, with positive Brudzinski and Kernig signs. Vitals showed a temperature of 39.3°C, heart rate of 98 bpm, and blood pressure of 110/70 mmHg. Laboratory tests revealed leukocytosis with neutrophils at 85%, and a WBC count of 17,000/μL. CSF examination showed a turbid appearance, WBC: 900 cells/μL, mostly neutrophils, serum: 95 mg/dL; glucose: 35 mg/dL, protein: 120 mg/dL. Gram stain was negative. Ziehl-Neelsen stain was negative. Wet mount microscopy revealed motile trophozoites compatible with Naegleria fowleri.

Identification and treatment: Naegleria fowleri-caused primary amoebic meningoencephalitisCeftriaxone, vancomycin, and acyclovir were the first broad-spectrum antibiotics and antiviral drugs the patient was empirically started on.

According to established protocols, intravenous amphotericin B, fluconazole, and rifampicin were initiated as soon as PAM was suspected, and the wet mount results were verified 3 days later. The patient's neurological condition quickly worsened, leading to coma and brainstem dysfunction in spite of the most supportive intensive care unit treatment. On the fifth day of his hospital stay, he was pronounced dead.

Correspondence
Dr. Adeela Mustafa
Associate Professor
Department of Community Medicine, Khyber Medical College, Peshawar - Pakistan
Email: adeela.mustafa@kmc.edu.pk
Date Received: 22/07/2025
Date Revised: 07/10/2025
Date Accepted: 07/10/2025

DISCUSSION

PAM is notoriously difficult to identify and manage. Early on, it can be mistaken for bacterial meningitis, which delays diagnosis. Rapid, necrotizing hemorrhagic meningoencephalitis. [4] It is caused by Naegleria fowleri, which enters the central nervous system through the cribriform plate. Since 2008, there have been multiple fatal PAM cases reported each year in Pakistan, especially in Karachi. [5] One significant risk factor is using water that isn't well-chlorinated for swimming or rinsing the nose during ablution. Although the death rate exceeds 95%, some survivors have been documented worldwide with prompt and intensive treatment. This case highlights the importance of early diagnostic suspicion, public education, and policy-level interventions such as water source surveillance and chlorination monitoring.

CONCLUSION

In Pakistan, amoebic meningoencephalitis remains a deadly, underreported, and overlooked disease. When patients in endemic regions exhibit meningitis after freshwater exposure, healthcare providers must be highly vigilant. Strengthening water safety regulations and promoting preventive education should be the primary focus of public health efforts.

REFERENCES

1. Visvesvara GS. Pathogenic and opportunistic free-living amebae. Manual of Clinical Microbiology. 2015 May 15:2387-98.
2. Rehman SU, Farooq S, Tariq MB, Nasir N, Wasay M, Masood S, Karim M. Clinical manifestations and outcome of patients with primary amoebic meningoencephalitis in Pakistan. A single-center experience. Plos one. 2023 Nov 8;18(11):e0290394.
3. Cope JR, Ali IK. Primary amebic meningoencephalitis: what have we learned in the last 5 years?. Current infectious disease reports. 2016 Oct;18(10):31.
4. Seidel JS, Harmatz P, Visvesvara GS, Cohen A, Edwards J, Turner J. Successful treatment of primary amebic meningoencephalitis. New England Journal of Medicine. 1982 Feb 11;306(6):346-8.
5. Nadeem A, Malik IA, Afridi EK, Shariq F. Naegleria fowleri outbreak in Pakistan: unveiling the crisis and path to recovery. Frontiers in Public Health. 2023 Oct 19;11:1266400.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Mustafa A	✓	×	✓	×	✓	×
Amir M	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

INSTRUCTION TO AUTHORS

INSTRUCTIONS FOR AUTHORS

The **"PAKISTAN MEDICAL STUDENTS RESEARCH JOURNAL (PMSRJ),** is the official student-based journal of Khyber Medical College, Peshawar. The PMSRJ started its publications in 2023. The PMSRJ is a triannually, peer-reviewed medical journal. It follows the uniform requirements for Manuscripts (URM) submitted to Biomedical journals as approved by the International Committee of Medical Journal Editors (ICMJE) as revised in 1997 and published in N Eng J Med 1997; 336:309-15. Detailed information about updated URM can be downloaded from www.icmje.org. The PMSRJ follows the Committee on Publication Ethics (COPE) guidelines regarding publication ethics.

1- SUBMISSION OF ARTICLE

The PMSRJ is one of the Pakistani medical journals that provides you with easy and user-friendly ONLINE SUBMISSION OF ARTICLES on its website. Visit www.pmsrj.com and REGISTER yourself as an AUTHOR by filling out a form. Log in with your "username" and "password". A web portal will be on the screen with a block of NEW SUBMISSION and follow the following 5 steps of manuscript submission as per online instructions.

- Start
- Upload Submission
- Enter Metadata
- Confirmation
- Next steps

Log in > User Home > Author > Submissions > New Submission > step 1 Starting the submission> step 2 Enter metadata> step 3 Upload submission >step 4 Upload supplementary files > step 5 Confirmation.

2- FORMAT/ REQUIREMENTS

While submitting manuscripts, please carefully follow the instructions given below:-

Summary of Technical Requirements

The journal will accept (a) Original research articles (b) Review articles (c) Case reports (d) Editorials (f) Special communication (g Short communications (h) a Letter to the Editor.

It should be typed in single or double space with clear margins on both sides. Begin each section or component on a new page.

Review the sequence: title page, abstract and keywords, text (Introduction to conclusion), acknowledgments, references, tables (each on a separate page), and legends. Illustrations, unmounted prints, should not be larger than 203 × 254 mm (8 × 10 inches).

The manuscript should not exceed 20 pages excluding tables and references. There should be no more than 40 references in the original article, <10 references in the case report, and no more than 100 references in a review article.

Include permission to reproduce previously published material or to use illustrations that may identify human subjects. Keep copies of everything submitted.

Approval certificate from Institutional review board for bioethics (IRBB)/ research ethical committees. From July 2015 onward no article will be processed without IRBB approval certificate.

3- ARTICLE PROCESSING/PUBLICATION FEE

The PMSRJ has no article processing fee while it will charge Rs: 4000/- for publication of article. The PMSRJ also follow different waiver policies adopted internationally.

4- MATERIAL FOR PUBLICATION

All manuscripts of original research should contain following sections:-

5- Title Page

- The title of the article should be concise, specific, and informative. Authors should include all information in the title that will make electronic retrieval of the article sensitive and specific.
- Full name of each author, with his or her highest academic degree(s) and institutional affiliation.
- The name of the department(s) and institution(s) to which the work should be attributed.
- Disclaimers, if any.
- The name, email, and postal address of the author responsible for correspondence about the manuscript.
- The name and address of the author to whom requests for reprints should be addressed, source(s) of support in the form of grants, equipment, drugs, or all of these.

6- Abstract

The second page should carry structured abstract of not more than 250 words.

Objectives: The abstract should state the Objective: the purpose of the study or investigation;

Materials and Methods: Study design, place and duration of the study, basic procedures such as selection of study subjects or laboratory animals, observational and analytical methods;

Results: Main findings giving specific data and their statistical significance, if possible and

Conclusion: It should emphasize new and important aspects of the study or observations. Below the abstract authors should provide, and identify as such, 3 to 10 keywords or short phrases that will assist indexers in cross-indexing the article and may be published with the abstract. Terms from the Medical Subject Headings (MeSH) list of Index Medicus should be used. If suitable MeSH terms are not yet available for recently introduced terms, present terms may be used.

Keywords: About 3-5 keywords are mandatory to mention

References: References should be in Vancouver style. The introduction section should not contain more than 10% of the references of the whole document.

The rest of the article should follow the same rules of abstract but in greater detail. The article must contain between 2000-3500 words.

Executive Editor,

PMSRJ, KMC

FOR DETAILS, SEE OUR EDITORIAL POLICY IN THE NEXT SECTIONS

AUTHOR'S AGREEMENT

Pakistan Medical Students Research Journal (KMC Peshawar pISSN - Under-process)

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 PMSRJ 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: 250 words, Article: 2000-3500 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) Ethical approval certificate
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) Bank draft for Rs. 4000/- (Rs. Four Thousand) in the name of Pakistan Medical Students Research Journal, 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 & RELEVANT POLICIES

OVERVIEW

This text highlights the mission, objectives, and editorial policy of PMSRJ regardingthe publication process by adhering to the guidelines by 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 THE MISSION OF THE PMSRJ

To provide a platform for medical students (both undergraduate and postgraduate) to publish scientific material to help them in their practice, teaching and learning, and career development

B OBJECTIVES OF PMSRJ

a. To publish clinical, epidemiological, public health, educational, translational, and allied sciences research to enable the 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 formedical studentsin promoting their career development through publishing quality research

C EDITORIAL POLICY

1- OPEN ACCESS

PMSRJ 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 PMRJS 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 office of the chief editor. The document is either accepted for further review, sent for revision back to the authors, or rejected at that time. Further review of PMSRJ is following a blinded approach, where the article is sent to 2 reviewers, local and international. During this process, all the relevant information about the authors and reviewers is kept confidential. However, we encourage to share 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 by 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 researchprocess. All those designated as authors should meet all these 4 criteria. The co-authors should declare their roles and contributions in 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 from 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.

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

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

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

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

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 regardingfinancial aspects, academic competitions, and relationships during writing, reviewing, and publishing 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 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 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 editorshould 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 more recent version should be cited by the authors or others.

8.4: If the error is judged to be unintentional, and 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 PMSRJ 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

The editorial board has fixed a fee of 4000/- Rs (Pakistani), for local authors and 100 $ (US) for international authors. The fee should be submitted as bank draft/ online payment through the account (for more information visit/contact Office of Managing Editor, PMSRJ) For international authors, the amount of 100 US dollars will be accepted after both internal and external review. Authorsare advised to submit the fee after the whole process of review is completed and the article is accepted for publication.

11- ROLES OF THE EDITORIAL BOARD, EDITORS, AND MEMBERS

The editorial board of PMSRJ is following the Higher Education Commission (HEC) policy for research journals. The roles of the editorial board for PMSRJ 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 Board 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/ASSOCIATE/ASSISTANT EDITORS:

11.3.1: The criteria for selection of Chief/Associate/ Assistant Editors are:

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

ii. Publication record of 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 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 ensure that any feedback to authors is constructive.

ii. An editor should also familiarize him/herself 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:

The roles of managing editor are:

i. To help the chief editors to achieve the above-mentioned goals

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

iii. To regularly evaluate the research work

iv. To 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. To 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 senior editorial team

vi. Training of future reviewers, young members, and 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 policyfor 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 /associate and assistant 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 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 PMSRJ.

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. 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 PMSRJ if allegedly suspected of scientific misconduct, an official complaint for the same must be received by the office of the managing editor via email, managingeditor@pmsrj.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 PMSRJ 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 PMSRJ managingeditor@pmsrj.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- COPYRIGHT POLICY

17- DATA REPOSITORY

The real-time data backup of the whole server for the PMSRJ is created on the remote VPS (Virtual Private Server) of Khyber Medical College(KMC). Parallel mirror Imaging (PMI) is also created on the PMSRJ server.

18- JOURNAL FUNDING

We receive funding from our institute on a need basis. Another source of funding is through a research paper processing fee amounting to Rs: 4,000/-. We also receive funding through annual subscriptions by different national libraries amounting to 5000/- annual (500 US$ for overseas libraries).

19- CONTACT INFORMATION

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

Email: managingeditor@pmsrj.com

REFERENCES:

ICMJE recommendations

COPE guidelines

SCOPUS

This document is prepared in September 2022 to be used by the editorial board, reviewers, researchers, and faculty as a guide to making them aware of policies and procedures of publishing, conducting, writing, reviewing, and evaluating the research published in PMSRJ. This document is developed by including the recommendations of ICMJE (2019) and COPE guidelines and in case of any conflict, lack of clarity, and ambiguity, the recommendations of the latest ICMJE recommendation and COPE will prevail.

Khyber Medical College Peshawar Pakistan