

## ORIGINAL ARTICLE

## Screening for Migraine and Non-migraine headaches and their impact on daily functioning among undergraduate medical students.

Amna Ikhlaiq<sup>1</sup>, Talha Hammad Ahmad<sup>2</sup>, Zain ul Abdin Randhawa<sup>3</sup>, Amna Ahmad<sup>4</sup>, Khadija Anjum<sup>5</sup>, Humayun Suqrat Hasan Imam<sup>6</sup>

**ABSTRACT... Objective:** To assess frequency of migraines and measure their functional impact among undergraduate medical students. **Study Design:** Cross-sectional study. **Setting:** Aziz Fatimah Medical and Dental College, Faisalabad. **Period:** June 2024 to November 2024. **Methods:** 191 medical students (109 female, 82 male) were recruited through convenience sampling. Participants completed the 3-item Identify-Migraine (ID-Migraine) screening questionnaire and the 6-item Headache Impact Test (HIT-6) questionnaire through a virtual Google Form. The data was analyzed using SPSS version 27. **Results:** 79 (41 %) screened positive for migraine using the ID-Migraine questionnaire. Migraine prevalence was higher in females than males ( $p = 0.005$ ). Females also reported greater migraine-related disability than males, with higher proportions experiencing moderate (11% vs. 8.9%) and severe disability (20.4% vs. 6.8%) ( $p = 0.012$ ). Among migraine-positive students, 14% of females versus 3% of males experienced severe disability. Notably, 19.5% of students who screened negative still reported moderate-to-severe disability. **Conclusion:** This study provides valuable insight into the prevalence and functional impact of migraine among undergraduate medical students, highlighting a significantly higher burden experienced by female students. The findings underscore the importance of early screening among populations of interest to help mitigate the academic and functional consequences of migraine.

**Key words:** Migraine, Headache Disorders, Headache Impact, Epidemiology, Screening.

**Article Citation:** Ikhlaiq A, Ahmad TH, Randhawa Z, Ahmad A, Anjum K, Imran HSH. Screening for Migraine and Non-migraine headaches and their impact on daily functioning among undergraduate medical students. Professional Med J 2026; 33(10):2052-2057. <https://doi.org/10.29309/TPMJ/2026.33.10.10915>

### INTRODUCTION

Headache disorders are among the top ten causes of disability globally. A study conducted among undergraduate medical students in Malaysia found that 42% of participants reported having headache s, and over 60% of these were diagnosed as migraines using the International Headache Society (IHS) criteria.<sup>1</sup> Migraine is a prevalent and exhausting neurological medical condition that affects individuals worldwide, especially with high burden among young adults.<sup>2</sup> It is a debilitating neurovascular condition characterized by episodic, severe cephalalgia, more often accompanied by associated symptoms such as photophobia, phonophobia, and nausea.<sup>3</sup>

Among young adults, particularly undergraduate students, migraine can be especially distracting, impacting productivity, mental health, and social operations. Medical students represent a distinctive subset of this population, often subjected to high academic demands, unhealthy sleep, extended

study hours, and increased stress all factors that have been shown to stress or trigger migraine episodes.<sup>4</sup>

Epidemiological data suggests a preponderance of increased incidence of migraine among females as compared to males. The American Migraine Prevalence and Prevention (AMPP) study has reported lifetime prevalence rates of 43% in women and 18% in men.<sup>5</sup> A national pharmacy-based survey in Italy found a 43% prevalence of definite migraine, with a female-to-male ratio of 4.9:1. These evident sex-related differences in migraine prevalence can influence treatment patterns between men and women and influence care seeking behaviours.<sup>6</sup>

A study at Al Faisal University found a 36.8% prevalence of migraine among medical students based on ICHD-3 criteria, with 38.8% identified via the ID-Migraine tool and 18.5% meeting both criteria.

1. MBBS, MPH, CHPE, Demonstrator Community Medicine, Aziz Fatimah Medical and Dental College, Faisalabad.

2. MBBS, House Officer, Aziz Fatimah Hospital, Faisalabad.

3. MBBS, House Officer, Aziz Fatimah Hospital, Faisalabad.

4. MBBS, House Officer, Aziz Fatimah Hospital, Faisalabad.

5. MBBS, House Officer, Aziz Fatimah Hospital, Faisalabad.

6. MBBS, MPH, M.Phil, Professor & Head Community Medicine, Aziz Fatimah Medical and Dental College, Faisalabad.

#### Correspondence Address:

Dr. Amna Ikhlaiq

Department of Community Medicine, Aziz Fatimah Medical and Dental College, Faisalabad.

amnaai.twentynine@gmail.com

Article received on:

09/07/2026

Date of revision:

01/08/2026

Accepted for publication:

11/09/2026



Exams were a trigger for 66% of students, with 63% reporting worsened headaches during academic stress. Academically, 86% experienced at least one day of productivity loss due to migraine. Some students missed exams or reported GPA decline, particularly in later academic years.<sup>7</sup> A recent study among university students in Bangladesh reported a 21.4% prevalence of migraine. While the study identified several key risk factors, being female served as a significant predictor of migraine, with an adjusted odds ratio of 2.53. Other factors included low physical activity, family history of headaches, screen time >6 hours/day, and co-existing anxiety or depressive symptoms. Students with anxiety were also found to have a 2.35 times higher risk of experiencing migraines. Additionally, 37% of affected students had severe migraine-related impact on daily life (HIT6 score  $\geq 60$ ).<sup>8</sup>

The present cross-sectional study aimed to assess the frequency of migraines among undergraduate medical students in a local private medical institute by screening the student population using the ID-Migraine questionnaire and measuring functional impact with the Headache Impact Test (HIT-6). This approach helped estimate disease burden and the degree to which migraines and other headache types affected students' daily functioning. By identifying both the prevalence and effects of migraine on daily life through a gender-sensitive lens, the study aims to guide efforts to improve targeted support for all students in medical colleges.

## METHODS

This cross-sectional analytic study was conducted after getting ethical approval from the Institutional Ethical Committee (IEC) (Ref No: IEC/307-24). The sampling frame consisted of 430 medical students enrolled across five years of MBBS in Aziz Fatimah Medical and Dental College, Faisalabad during academic session 2023-2024. Convenience sampling was deployed and data collected from 191 students who gave consent to participate at the beginning of virtually administered questionnaires. This sampling technique was chosen for its feasibility given the project parameters and resource constraints. The sample size was calculated using Cochran formula<sup>9</sup> where 95% confidence level ( $\alpha$ ), estimated proportion, (proportion without attribute)

and margin of error. The minimum required sample size was 187 participants.

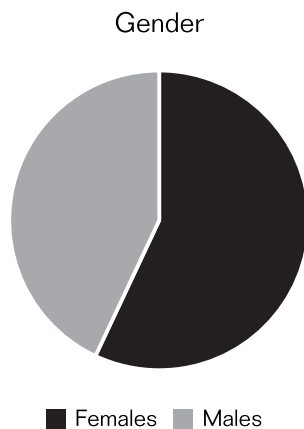
After confirming no previous diagnosis, students were screened using the 3-item ID-Migraine tool, which has a sensitivity of 81%, a specificity of 75% and a Cronbach alpha value of 0.70, established through research across multiple regional settings.<sup>10,11</sup> This was followed by administration of the 6-item Headache Impact Test (HIT-6) questionnaire to assess severity of impact of migraine headache on the participant's ability to function at school and in social situations. The internal consistency of the HIT-6 has been well-established in previous studies, with Cronbach's alpha values ranging from 0.78 to 0.90, indicating strong reliability.<sup>12</sup> Both tools were administered virtually as a Google Form and disseminated via a link in the official Whatsapp class groups. Study information was provided electronically at the start of the survey, outlining the purpose of the study, voluntary nature of participation, and intended use of data. Informed consent was obtained electronically, with participants required to indicate consent before proceeding; submission of the completed form was considered confirmation of consent for participation and publication of anonymized data. No personally identifiable information was collected, and responses were anonymous. Access to the Google Form responses was restricted to the research team via authorized email accounts, and all downloaded data and analysis files were stored on a single device accessible only to the lead investigator. These measures were taken to ensure confidentiality and privacy in accordance with institutional ethical guidelines. The data was downloaded to Microsoft Excel and cleaned manually before uploading to SPSS version 27.0 for analysis. Two categories, positive and not positive were derived for ID-Migraine responses, while the HIT-6 impact was scored as Disability (high), Moderate disability, Mild disability and No disability. Frequencies and percentages were derived for each category, and further dissected by gender categories, male and female. Chi-square test ( $X^2$ ) was further utilized to evaluate this relationship with level of significance taken as  $p < 0.05$ .

## RESULTS

Our total sample consisted of 191 students of which 109 were female and 82 were male. This was representative of class compositions throughout all years of MBBS, overcoming some risk of selection bias.

**FIGURE-1**

**Gender-wise distribution**



Of the total 191 students, 79 (41%) screened positive for migraine using ID-Migraine questionnaire with 29% females (n=109) and 13% males (n=82). This suggests migraine is more prevalent among females than males, with the difference being statistically significant ( $p = 0.005$ ) (Table-I).

**TABLE-I**

**ID-Migraine screening tool outcomes by gender**

|        | Migraine Prevalence (ID-Migraine outcome) |                | P-Value |
|--------|-------------------------------------------|----------------|---------|
|        | Positive n (%)                            | Negative n (%) |         |
| Male   | 24 (13)                                   | 58 (30)        | 0.005   |
| Female | 55 (29)                                   | 54 (28)        |         |

A statistically significant association was observed between gender and migraine-related disability ( $p = 0.012$ ), with females reporting higher levels of disability, including greater proportions with moderate (11% vs. 8.9%) and severe disability (20.4% vs. 6.8%) compared to males (Table-II).

Among students who screened positive for migraine, females reported higher levels of disability than males, with 14% experiencing severe disability compared to 3% of males (Table 3). Among

students who screened negative, 19.5% still reported moderate to severe disability, with a similar distribution across genders (Table-IV).

**TABLE-II**

**HIT-6 outcomes by gender**

|        | Impact score (HIT-6 outcome) |                       |                           |                  | P-Value |
|--------|------------------------------|-----------------------|---------------------------|------------------|---------|
|        | No Disability n (%)          | Mild Disability n (%) | Moderate Disability n (%) | Disability n (%) |         |
| Male   | 52 (27.2)                    | 0 (0)                 | 17 (8.9)                  | 13 (6.8)         | 0.012   |
| Female | 48 (25.1)                    | 1 (0.5)               | 21 (11)                   | 39 (20.4)        |         |

**TABLE-III**

**HIT-6 outcomes by gender among those who screened positive**

| Functional Impact (HIT-6 Outcome) | Migraine prevalence (Positive ID-Migraine Outcome) |         |
|-----------------------------------|----------------------------------------------------|---------|
|                                   | Male                                               | Female  |
| No disability                     | 12 (6)                                             | 14 (7)  |
| Mild disability                   | 0 (0)                                              | 0 (0)   |
| Moderate disability               | 6 (3)                                              | 14 (7)  |
| Disability                        | 6 (3)                                              | 27 (14) |

**TABLE-IV**

**HIT-6 outcomes by migraine status**

| Functional Impact (HIT-6 outcome) | Migraine Prevalence (ID-Migraine Outcome) |          |
|-----------------------------------|-------------------------------------------|----------|
|                                   | Positive                                  | Negative |
| No disability                     | 26 (13)                                   | 74 (39)  |
| Mild disability                   | 0 (0)                                     | 1 (0.5)  |
| Moderate disability               | 20 (10.5)                                 | 18 (9.5) |
| Disability                        | 33 (17)                                   | 19 (10)  |

## DISCUSSION

The current study represents one of the main efforts in Pakistan to ascertain not only the frequency of migraine among medical students but also its functional impact on their social and academic lives. 41% of our study population screened positive using the ID-Migraine tool. This prevalence is comparatively higher than that among the university students in neighboring Bangladesh, 21.4%, as reported by Rafi et.al.<sup>8</sup> A meta-analysis of 92 cross-sectional studies across the globe also reported the prevalence of migraine among medical students (n=40 studies) to be 18%.<sup>13</sup> Several factors may account for these differences. Variations in case definitions may contribute to higher prevalence estimates, and context-specific academic

stressors, including heavy curricular demands, long study hours, and frequent assessments, may be particularly pronounced in medical training settings in Pakistan leading to increase in migraine symptom reporting. Secondly, observed patterns of prevalence may also be influenced by sociocultural and environmental factors, such as sleep disruption, lifestyle patterns, and coping behaviors.

Distribution of migraine frequency by gender was reported as significantly higher among female participants in the current study (29%; 13%). The previously mentioned meta-analysis had similar findings with females having prevalence 23% in the pooled sample to their male counterparts (12%).<sup>13</sup> Interestingly, a recent study in Pakistan which used ICHD-3 criteria reported female medical students as having a prevalence of 41% —almost double the findings of this study.<sup>14</sup> This discrepancy may be explained by differences in diagnostic approaches, for example studies employing different screening tools may capture a broader or more specific spectrum of cases, depending on the sensitivity and validity of a tool in a specific context. Additionally, variations in study design and sample characteristics, including year of study and workload intensity may further contribute to differences across the literature.

The present study found a statistically significant association between gender and migraine prevalence among medical students ( $p = .005$ ) upon applying the Chi-square test, with a higher proportion of female students reporting migraine. This finding is consistent with global and regional studies; for instance, the AMPP study reported lifetime female-to-male prevalence ratios ranging from 1.48 to 3.25, likely reflecting biological, hormonal, and psychosocial factors that contribute to higher migraine prevalence among females.<sup>5</sup> In contrast, Athar et al. (2022) found no significant association between gender and migraine prevalence among medical students in Lahore ( $p = 0.32$ ), suggesting differences in population context or study methodology.<sup>15</sup>

The current assessment of disability due to migraine indicated that female students reported significantly higher migraine-related disability compared to males, with 21% reporting severe to moderate disability

in contrast to only 6% of males relating the same findings. These findings are consistent with those of Butt et al. (2025), who reported a higher prevalence of migraine among female MBBS students (23.3%) compared to males (17.3%,  $p = 0.042$ ).<sup>16</sup> A gender-based quality of life study conducted in Karachi cross-tabulating MIDAS scores with gender also found higher reported disability in females as opposed to males.<sup>17</sup> The higher migraine-related disability observed among female students may reflect a combination of hormonal influences on migraine severity, greater exposure to academic and psychosocial stressors, and differences in pain perception and coping, which together compound functional impairment.

The association between gender and migraine-related disability, as measured by HIT-6, was examined in the present study using the Chi-square test, which yielded a statistically significant result ( $p = 0.012$ ), with females reporting higher levels of disability. Gender-specific HIT6 data in the region is scarce but a South Asia-focused analysis of the Global Burden of Disease (GBD) study showed that migraine-related years lived with disability (YLDs) in females (584 per 100,000) significantly exceeded those of males (400 per 100,000), reflecting a notable regional sex disparity in migraine burden.<sup>18</sup> These patterns may reflect not only biological differences but also gender-specific psychosocial and academic stressors, such as perceived academic pressures, stress-related mood comorbidities, and additional domestic or caregiving responsibilities, that influence perceived functional impact.<sup>19</sup> The findings also corroborate with evidence by Oraby et al., who found that Egyptian medical students reported significantly higher moderate-to-severe migraine disability among females compared to males ( $p = 0.0013$ ), suggesting that gender differences in migraine-related disability may persist across cultural contexts.<sup>20</sup>

An interesting finding noted in the current study was that among those students who did not screen positive for migraine, 19.5% reported experiencing moderate to severe disability, suggesting the burdening impact of other types of headaches such as tension-type headaches (TTH). This finding is supported by a 2021 study among

medical students in Palestine which observed that 63% of students with TTH reported moderate disability levels, highlighting the functional burden of non-migraine types.<sup>21</sup> This finding highlights the importance of future studies adopting a broader headache classification framework, as non-migraine headache disorders may place a meaningful burden on daily functioning and remain under-recognized in student populations, warranting further examination across different demographic and contextual characteristics.

This strength of this study lies in contributing locally relevant data on the burden of headache disorders among medical students in Pakistan and examines both migraine and non-migraine headache types, allowing a broader understanding of headache-related disability. Additionally, the inclusion of gender-based analysis provides an insight into demographic variations in headache burden in young adult population. However, certain limitations should be acknowledged. The cross-sectional design limits causal inference, and the use of convenience sampling in a single institution with a relatively small sample size ( $n = 191$ ) may restrict generalizability. Self-reported impact measures may also be subject to perception bias. Despite these limitations, the findings offer valuable preliminary evidence to inform future multi-center and longitudinal research in an oft ignored subset of the population.

## CONCLUSION

This study provides valuable insight into the prevalence and functional impact of migraine among undergraduate medical students, highlighting a significantly higher burden experienced by female students. The findings underscore the importance of early screening among populations of interest to help mitigate the academic and functional consequences of migraine.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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#### AUTHORSHIP AND CONTRIBUTION DECLARATION

|   |                                                                                               |
|---|-----------------------------------------------------------------------------------------------|
| 1 | <b>Amna Ikhlaiq:</b> Conceptualization, methodology, investigation, formal analysis, writing. |
| 2 | <b>Talha Hammad Ahmad:</b> Data curation, data analysis.                                      |
| 3 | <b>Zain ul Abdin Randhawa:</b> Methodology, drafting.                                         |
| 4 | <b>Amna Ahmad:</b> Critical revisions.                                                        |
| 5 | <b>Khadija Anjum:</b> Data entry.                                                             |
| 6 | <b>Humayun Suqrat Hasan Imam:</b> Proof reading.                                              |