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Prevalence and impact of migraine among university students in Bangladesh: findings from a cross-sectional survey

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Abstract

Background: Migraine is one of the main causes of long-term morbidity, and it is one of the major contributors of all types of headaches in worldwide. Despite its disruptive effect, it is frequently underdiagnosed and undertreated in Bangladesh. The aim of the present study was to determine the prevalence of migraines and its impact on daily life of university students in Bangladesh.

Methods: This cross-sectional study was conducted among 2,352 students of Rajshahi University and Jahangirnagar University during March 2020 through a self-administered online survey. ID Migraine™ scale and HIT-6 scale were used to screen migraine and its impact respectively. Frequency distribution, Chi-square test and t-test along with multiple logistic regressions model were used to determine the prevalence and associated factors of migraine respectively.

Results: The overall prevalence of migraine among the participants was 21.4%. The prevalence was higher among females (29%) than males (12%). A multivariable logistic regression model provided the following eight risk factors of migraine: (i) gender ($p < 0.01$), (ii) family income ($p < 0.01$), (iii) marital status ($p < 0.01$), (iv) infrequent exercise ($p < 0.01$), (v) family history of headache ($p < 0.01$), (vi) high screen time ($p < 0.05$), (vii) depressive symptoms ($p < 0.05$) and (viii) anxiety disorder ($p < 0.01$). More than two-thirds of the people with migraines reported more than five attacks during the past month with moderate to severe intense headache. Stress was the most reported trigger of migraine among university students (71%) followed by irregular sleep (47%), academic pressure (33%), and external noise (28%). Almost 37% of the participants who had migraines reported that headache caused severe impact in their day to day life.

Conclusions: The prevalence of migraine among university students of Bangladesh is alarmingly high. Frequent migraine attacks and severe intensity of headache cause a substantial level of impact among the sufferers. Cautious avoidance of the triggering factors through appropriate interventions and prophylactic medication can mitigate the negative impact of migraine as well as improve the quality of life.

Keywords: Migraine, ID Migraine™, HIT-6, University students, Bangladesh

Background

Headache disorder is one of the main causes of long-term morbidity worldwide. It is listed as the second leading cause of years lived with disability for the last three

decades according to the Global Burden of Disease Study [1]. Migraine is one of the major contributors of all types of headaches with a lifetime prevalence of 14% to 16% around the world [2]. It is often associated with impaired social and professional life and reduced productivity, making it responsible for roughly 3% of disability making it the eighth most burdensome disease [2, 3].

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A wide range of factors including stress, noise and sound, fatigue, fasting, sleep disorder, alcohol drinking, etc. are associated with the precipitation of migraine [4]. These triggering factors notably educational stress and irregular sleep are more prevalent among young adults compared to other age groups, especially university students, which have made them vulnerable to migraines. It is reported that almost 10–18% of university students suffer from migraine worldwide [5]. This high prevalence of migraine impairs the academic performance of the students and also decrease the quality of life of the sufferers [6, 7].

Regardless of its disruptive effect, migraine is frequently underdiagnosed and undertreated in Bangladesh. There is scarcity of evidence reporting the prevalence and effect of migraine among university students of Bangladesh. A study including a small sample reported that the prevalence of migraines as 17.4% among medical students suffering from irritable bowel syndrome [8]. However, the study did not evaluate the risk factors and the effect of migraine on their life events. University students are asset of a particular country, special attention is paid to university students considering their potential contribution to the nation. Due to their unique role in the country, it is important to understand the prevalence and identify the risk factors of migraine as well as its effect on their daily life for taking further preventive measures.

Therefore, the present study aims to determine the prevalence and risk factors of migraines among the university students of Bangladesh as well as the effect of this disease on their daily life.

Methods

Study design and setting

This was a cross-sectional study conducted among the two selected universities students (i.e., University of Rajshahi and Jahangirnagar University) during March 2020 through an online survey. The University of Rajshahi and Jahangirnagar University is the second and fourth largest universities in Bangladesh respectively, with students coming from the different parts of the country. A total number of 55,276 students are studying in these two universities (38,495 in University of Rajshahi, and 16,781 in Jahangirnagar University).

Sample size calculation and sampling method

The sample size was calculated from the prevalence estimate using the formula: $n = \frac{z^2 pq}{d^2}$, where, n = number of the samples; $z = 1.96$ for 95% confidence interval (CI), p = “best guess” for prevalence and d = precision of the prevalence estimate. We did not find any existing data on the prevalence of migraine among the university students of Bangladesh. However, a previous study from the

neighboring country India reported the prevalence as 14.12% [9], which was considered as p (best guess) value ($p = 0.1412$) for calculating sample size for the present study, and the formula provided that 2337 sample would be the required size. Assuming a 10% non-response rate, a total of 2600 university students were approached. The convenient sampling method was used to include the participants in this study as those who had the social media id and personal relation with the recruited volunteers had the chances of enrollment in the study.

Data collection procedure

A self-administered online survey form created in Google forms were used to collect data from the participants. The survey link was posted in a regular interval of one week in the internal social media groups of the university students and an open request was placed by the team of investigators to fill-up the form. Also, 20 volunteers from different departments of these universities were employed to circulate the survey link among their student networks, in addition to regular posting in the above-mentioned social media groups. They were instructed to be inclusive, open, and circulate it periodically for maximum reach. Login with email and providing student ID number was mandatory for limiting single response. Email addresses of the participants were collected upon proper clarification and informed consent for the reliability of the data. The study was conducted following the Checklist for Reporting Results of Internet ESurveys (CHERRIES) guidelines [10].

Data collection instruments

A self-developed questionnaire was used to collect information from patients. The survey questionnaire comprised of four parts: (i) socio-demographics, lifestyle and behavioral factors related data, (ii) headache-related data, (iii) impact of headache, if migraine was present using the Headache Impact Test (HIT-6), and (iv) presence of anxiety and depressive symptoms using two psychometric scales (the GAD-7 for assessing anxiety disorder and the PHQ-9 for assessing depressive symptoms). As the ID Migraine™ and HIT-6 scales were not used before among Bangladeshi population, these were not validated in Bangla. We have used back translation method for translating the tools after proper consent from the developers under supervision of a team of three consultant neurologists of the Department of Neuromedicine of RMCH (Rajshahi Medical College & Hospital). A pretest of the questionnaire was done in the Department of Neuro-medicine, RMCH among 30 diagnosed migraine patients by a consultant neurologist.

Part 1: Socio-demographics, lifestyle and behavioral factors

Socio-demographic information was collected during the survey by asking questions concerning age, gender, study year, monthly family income, marital status, height, and weight. Lifestyle and behavioral factors included fast food intake (frequency per week), amount of physical exercising (days per week for at least 30 min a day), smoking habits (yes/no), alcohol intake (yes/no), substance abuse (yes/no), and sleep quality measured by the Pittsburgh sleep quality index (PSQI) which is an appropriate screening tool for measuring sleep dysfunction in both clinical and non-clinical samples. The PSQI score was categorized as poor (PSQI score > 5) and good (PSQI score ≤ 5) [11].

Part 2: Headache related data

Participants were initially evaluated by the question “*Did you have two or more headaches in the last 3 months?*” Those who responded ‘yes’ were considered as the subjects with potentially troublesome headaches and further screened using the ID Migraine™ test. The screening question was adopted from previous evidence [6, 12]. The ID-Migraine™ test is a three-item self-administered screening tool, developed by Lipton et al. (2003) [13]. It consists of three questions regarding problems related to migraines over the last three months: 1. *Did you feel nauseated or sick in your stomach with your headaches?* 2. *Did light bother you when you had a headache (a lot more than when you do not have headaches)?* and 3. *Did your headache limit your ability to work, study or do what you needed to do for at least 1 day?* A test-diagnosis of migraine headache is made by at least two positive responses. ID Migraine™ has been validated using the International Classification of Headache Disorders (ICHD) criteria in different studies with a pooled sensitivity of 0.84 and a specificity of 0.76 [14].

Headache related data were collected from the participants who were screened as positive for migraine. These included intensity of headache (measured on a four-point scale where 0 = no headache; 1 = mild headache; 2 = moderate headache; 3 = severe headache recommended for use in migraine research by the International Headache Society) [15], frequency of headache during the past month, associated symptoms of headache, characteristic of headache (unilateral, bilateral, pulsating, and throbbing), frequency of analgesic use during the past month, frequency of healthcare facility visit during past 12 months, migraine triggers, and family history of migraine.

Part 3: Impact of headache

Headache Impact Test (HIT-6) was used to measure the impact of migraine headaches among the ID Migraine™ positive participants. The HIT-6 is a brief and easy to use instrument, developed by Kosinski et al. (2003) [16] to measure the adverse headache impact and to use in screening and monitoring patients with headaches in both clinical practice and clinical research. It consists of six items regarding problems related to headache (i.e., *When you have headaches, how often is the pain severe?*) with a five-point Likert scale ranging from 6 (Never) to 13 (Always). The total score was obtained by the summing raw score from each contract ranging from 36 to 78, with greater scores indicating a severe impact. In present study, the headache impact severity was categorized into four classes based on total scores of HIT-6: little or no disability (≤ 49), mild disability (50–55), moderate disability (56–59), and disability (≥ 60). This scale is suggested as a reliable and valid tool for measuring headache impact in migraine [17].

Part 4: Anxiety and depressive symptoms

Patient Health Questionnaire (PHQ-9): The PHQ-9 is one of the most psychometrically sound and robust screening tools, developed by Spitzer et al. (1999) [18] which is one the most widely used instruments for assessing depressive disorder globally including Bangladesh [19, 20]. This scale consists of nine items regarding problems related to depression symptomatology over the past two weeks (e.g., *Thoughts that you would be better off dead, or of hurting yourself in some way?*) with a four-point Likert scale ranging from 0 (*Not at all*) to 3 (*Nearly every day*). The total score was obtained by the summing raw score from each contract ranging from 0 to 27. In the present study, those scoring moderate to severe (≥ 10) were classed as having depressive symptoms [21].

Generalized Anxiety Disorder (GAD-7): The GAD-7 is one of the most psychometrically sound and robust screening tools, developed by Spitzer et al. (2006) [22] and used in different countries including Bangladesh for assessing anxiety disorder [23, 24]. The scale comprises seven items regarding problems related to anxiety symptomatology over the past two weeks (e.g., *Feeling afraid as if something awful might happen?*) with a four-point Likert scale ranging from 0 (*Not at all*) to 3 (*Nearly every day*). The total score was obtained by the summing raw score from each contract ranging from 0 to 21. In the present study, those scoring moderate to extremely severe (≥ 10) were classified as having anxiety disorder positive [22].

Statistical analysis

Statistical analysis was conducted using SPSS version 24.0. Descriptive statistics was performed for categorical variables (i.e., frequency and percentage), and for continuous variables (i.e., mean and standard deviation). Chi-square test and t-test were used in case of categorical variables and continuous variables, respectively to investigate the relationship between dependent and independent variables. Binary multiple logistic regressions were performed with a 95% confidence interval to determine the significant associations between categorical dependent and independent variables. Multicollinearity problems among independent variables in multiple logistic model was checked by standard error (SE) suggested by Chan [25]. The association of variables was considered statistically significant if the two-sided *p*-value was less than 0.05.

Results

Characteristics of the participants

A total of 2,352 university students participated in the study (response rate 90.5%). Their mean age was 21.9 (SD=2.3) years. More than half of them (56%) were female. Almost 47% of the participants were from middle income families. BMI of 63% participants was within a normal range (18.5–24.9 kg/m²). Among the participants, 25%, 19% and 11% were smokers, alcoholic and substance abusers, respectively. More than 69% of the participants reported poor sleep quality. The prevalence of anxiety and depressive symptoms were 29% and 42%, respectively (Table 1).

Prevalence of migraine

The overall prevalence of migraine among the participants was 21.4%. The prevalence was higher among females vs. males (29% vs. 12%), participants from 1st year vs. 2nd year (32% vs. 15%), married vs. unmarried (32% vs. 20%), and participants from high-income families (27.6% vs. 18.5% in middle and 17.5% in low-income families). Moreover, the prevalence of migraine was higher among the participants who reported higher vs. lower daily screen time (27.5% for >6 h vs. 16.7% for <6 h), having family history of headache vs. those who hadn't (30.5% vs. 14.7%), poor vs. good sleep quality (24% vs. 16%), having with vs. without considerable anxiety (34% vs. 16%) and having with vs. without considerable depressive symptoms (29% vs. 16%) (Table 1).

Only the significant factors provided by Chi-square were used as independent variables in multiple logistic regression models, and the magnitude value of SE of each variable was less than 0.50, no evidence of multicollinearity problems among our selected independent

variables and the model demonstrated a good fit, Nagelkerke $R^2=0.39$. After controlling the effect of other variables, the model demonstrated that predictors of suffering from migraine included female sex (aOR 2.53, 95% CI: 1.97–3.24; $p<0.01$), high family income (aOR 0.70, 95% CI: 0.51–0.96; $p<0.05$ for low income and aOR 0.74, 95% CI: 0.58–0.95; $p<0.05$ for middle income), being married (aOR 1.54, 95% CI: 1.12–2.11; $p<0.01$), infrequent exercise (aOR 1.51, 95% CI: 1.14–1.98; $p<0.01$), high screen time (aOR 1.47, 95% CI: 1.02–2.12; $p<0.05$) and family history of headache (aOR 2.29, 95% CI: 1.83–2.85; $p<0.01$). Moreover, those who reported anxiety had 2.35 times higher risk of suffering from migraine (aOR 2.35, 95% CI: 1.77–3.12; $p<0.01$), while those who reported depressive symptoms had 1.35 times higher risk (aOR 1.35, 95% CI: 1.02–1.79; $p<0.05$) (Table 2).

Characteristics of migraine

Almost 68% of the participants who had migraines reported the intensity of their headache as moderate to severe, and almost 88% of them had more than five attacks during the past month. Nausea was the most common symptoms associated with migraine (81%) followed by photophobia (67%) and vomiting (52.5%). More than 77% of the migraineurs had unilateral headache and pulsating in nature (85%). Almost 57.5% of the people with migraine had used analgesic more than five times during the past month and almost 42% had visited healthcare facilities due to their headache at least once during the last 12 months. Stress was the most commonly reported trigger of migraine among the participants (71%) followed by irregular sleep (47%), much reading (33%), noise (28%) and overuse of electronic device (25%) (Table 3).

Impact of migraine

Almost 37% of the participants who had migraines reported that headache caused severe impact in their day to day activities (HIT-6 score ≥ 60), while mild and moderate levels of impact due to migraines were reported as 13% and 16% respectively. Only 34% of the people with migraine reported little or no impact due to migraine (HIT-6 score ≤ 49) (Fig. 1).

Discussion

The present study was one of the primary attempts to determine the prevalence of migraine among the university students of Bangladesh. According to our findings, overall 21.4% of the university students were suffering from migraines, as screened by the self-reported ID Migraine™ tool. This prevalence was comparatively higher than the prevalence among the university students of neighboring India (14.12%) [9].

Table 1 Socio-demographic and lifestyle related characteristics of the participants ($n = 2352$)

Characteristics	Total N (%)	Migraine N (%)	No migraine N (%)	p-value
Age (Mean, SD)	21.9 (2.3)	21.7 (2.2)	21.9 (2.3)	0.051
Sex				
Female	1313 (55.8)	378 (28.8)	935 (71.2)	< 0.001
Male	1039 (44.2)	125 (12.0)	914 (88.0)	
Year of study				
1 st	621 (26.4)	196 (31.6)	425 (68.4)	< 0.001
2 nd	534 (22.7)	78 (14.6)	456 (85.4)	
3 rd	511 (21.7)	90 (17.6)	421 (82.4)	
4 th	403 (17.1)	77 (19.1)	326 (80.9)	
5 th / Masters	283 (12.0)	62 (21.9)	221 (78.1)	
Family income				
Low (<BDT 15,000)	458 (19.5)	80 (17.5)	378 (82.5)	< 0.001
Middle (BDT 15,000–30,000)	1098 (46.7)	203 (18.5)	895 (81.5)	
High (BDT > 30,000)	796 (33.8)	220 (27.6)	576 (72.4)	
Marital status				
Married	261 (11.1)	83 (31.8)	178 (68.2)	< 0.001
Unmarried	2091 (88.9)	420 (20.1)	1671 (79.9)	
BMI				
Overweight (≥ 25 kg/m ²)	434 (18.5)	85 (19.6)	349 (80.4)	0.560
Normal (18.5–24.9 kg/m ²)	1481 (62.9)	320 (21.6)	1161 (78.4)	
Underweight (< 18.5 kg/m ²)	437 (18.6)	98 (22.4)	339 (77.6)	
Frequency of fast-food intake per week				
More than 3 times	217 (9.2)	45 (20.7)	172 (79.3)	0.840
1–2 times	778 (33.1)	162 (20.8)	616 (79.2)	
Less than once	1357 (57.7)	296 (21.8)	1061 (78.2)	
Frequency of exercise per week (at least 30 min daily)				
More than 3 times	423 (18.0)	83 (19.6)	340 (80.4)	0.014
1–2 times	446 (19.0)	118 (26.5)	328 (73.5)	
Less than once	1483 (63.1)	302 (20.4)	1181 (79.6)	
Screen time (daily)				
> 12 h	201 (8.5)	51 (25.4)	150 (74.6)	< 0.001
6–12 h	811 (34.5)	223 (27.5)	588 (72.5)	
2–6 h	1052 (44.7)	176 (16.7)	876 (83.3)	
< 2 h	288 (12.2)	53 (18.4)	235 (81.6)	
Smoking				
Yes	591 (25.1)	115 (19.5)	476 (80.5)	0.187
No	1761 (74.9)	388 (22.0)	1373 (78.0)	
Alcohol intake				
Yes	441 (18.8)	103 (23.4)	338 (76.6)	0.263
No	1911 (81.3)	400 (20.9)	1511 (79.1)	
Substance abuse (e.g. cannabis, heroine, marijuana, amphetamines etc.)				
Yes	262 (11.1)	68 (26.0)	194 (74.0)	0.056
No	2090 (88.9)	435 (20.8)	1655 (79.2)	
Family history of chronic headache				
Yes	993 (42.2)	303 (30.5)	690 (69.5)	< 0.001
No	1359 (57.8)	200 (14.7)	1159 (85.3)	
Sleep quality				
Poor (PSQI score > 5)	1627 (69.2)	388 (23.8)	1239 (76.2)	< 0.001
Good (PSQI score \leq 5)	728 (31.0)	115 (15.8)	613 (84.2)	

Table 1 (continued)

Characteristics	Total N (%)	Migraine N (%)	No migraine N (%)	p-value
Anxiety				
Yes (GAD-7 score \geq 10)	686 (29.2)	235 (34.3)	451 (65.7)	< 0.001
No (GAD-7 score < 10)	1666 (70.8)	268 (16.1)	1398 (83.9)	
Depression				
Yes (PHQ-9 score \geq 10)	984 (41.8)	282 (28.7)	702 (71.3)	< 0.001
No (PHQ-9 score < 10)	1368 (58.2)	221 (16.2)	1147 (83.8)	

Table 2 Predictors of migraine among the participants in logistic regression model ($n = 2352$)

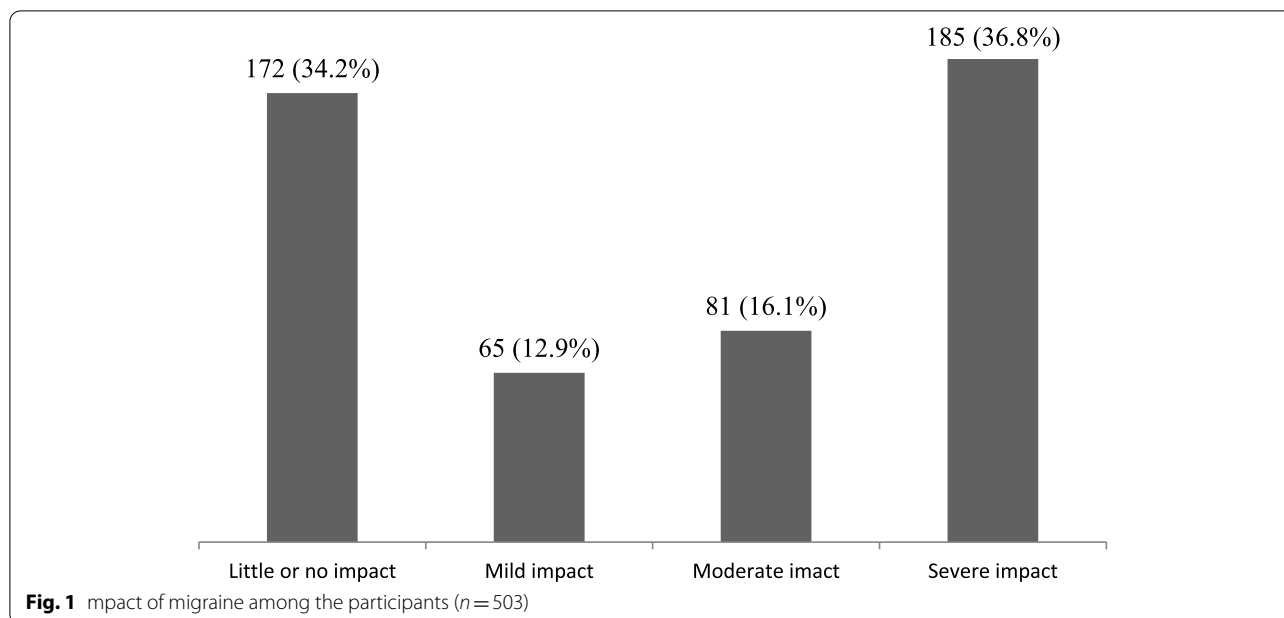
Characteristics	cOR (95% CI)	p-value	aOR (95% CI)	p-value
Sex				
Female	2.95 (2.36–3.69)	< 0.001	2.53 (1.97–3.24)	< 0.001
Male	Ref		Ref	
Year of study				
1 st	1.64 (1.18–2.28)	0.003	1.46 (0.99–2.12)	0.051
2 nd	0.61 (0.42–0.88)	0.009	0.63 (0.42–1.05)	0.058
3 rd	0.76 (0.53–1.09)	0.141	0.84 (0.56–1.25)	0.396
4 th	0.84 (0.58–1.22)	0.369	0.98 (0.65–1.48)	0.946
5 th /Masters	Ref		Ref	
Family income				
Low (< BDT 15,000)	0.55 (0.41–0.73)	< 0.001	0.70 (0.51–0.96)	0.031
Middle (BDT 15,000–30,000)	0.59 (0.48–0.73)	< 0.001	0.74 (0.58–0.95)	0.018
High (BDT > 30,000)	Ref		Ref	
Marital status				
Married	1.85 (1.40–2.46)	< 0.001	1.54 (1.12–2.11)	0.007
Unmarried	Ref		Ref	
Frequency of exercise per week (at least 30 min daily)				
More than 3 times	0.95 (0.73–1.25)	0.737	1.19 (0.88–1.61)	0.251
1–2 times	1.41 (1.10–1.79)	0.006	1.51 (1.14–1.98)	0.003
Less than once	Ref		Ref	
Screen time (daily)				
> 12 h	1.50 (0.97–2.33)	0.065	1.33 (0.82–2.15)	0.244
6–12 h	1.68 (1.20–2.35)	0.002	1.47 (1.02–2.12)	0.041
2–6 h	0.89 (0.63–1.25)	0.504	0.88 (0.61–1.28)	0.525
< 2 h	Ref		Ref	
Family history of headache				
Yes	2.54 (2.08–3.11)	< 0.001	2.29 (1.83–2.85)	< 0.001
No	Ref		Ref	
Sleep quality				
Poor (PSQI score > 5)	1.67 (1.32–2.10)	< 0.001	1.24 (0.95–1.62)	0.100
Good (PSQI score < 5)	Ref		Ref	
Anxiety				
Yes (GAD-7 score > 10)	2.87 (1.37–3.92)	< 0.001	2.35 (1.77–3.12)	< 0.001
No (GAD-7 score < 10)	Ref		Ref	
Depression				
Yes (PHQ-9 score > 10)	1.45 (1.01–1.99)	0.015	1.35 (1.02–1.79)	0.035
No (PHQ-9 score < 10)	Ref		Ref	

Table 3 Headache related characteristics among the participants with migraine ($n = 503$)

Characteristics	N	%
Intensity of headache		
Mild	163	32.4
Moderate	185	36.8
Severe	155	30.8
Frequency of headache during past month		
0–5	111	22.1
6–10	184	36.6
11–15	137	27.2
> 15	71	14.1
Associated symptoms		
Nausea	407	80.9
Vomiting	264	52.5
Photophobia	337	67.0
Characteristic of headache		
Unilateral	389	77.3
Bilateral	114	22.7
Pulsating	428	85.1
Throbbing	75	14.9
Frequency of analgesic use during the past month		
0–5	214	42.5
6–10	155	30.8
11–15	99	19.7
> 15	35	7.0
Frequency of healthcare facility visit during the past 12 months		
Never	293	58.3
Once	110	21.9
Twice	72	14.3
3 times	17	3.4
> 3 times	11	2.2
Migraine triggers (as reported by the participants in open ended question)		
Stress	356	70.8
Irregular sleep	237	47.1
Academic pressure	167	33.2
External noise (e.g. loudspeaker, crowd etc.)	142	28.2
Electronic device use (e.g. laptop, mobile phones?)	124	24.7
Physical activity	89	17.7
Exposure to sun	74	14.7
Menstruation in female	63	12.5
Smoking	46	9.1
Specific food or drink (e.g. coffee, tea, chocolates etc.)	38	7.6
Others	56	11.1

A meta-analysis of 56 studies including 34,904 university students reported that the prevalence of migraine ranges between 2.4% and 48.5% in different countries of the world. The pooled prevalence of migraine in university students was 16.1% (95% CI 13.6%–18.9%) [5].

The prevalence of migraine varies a lot according to the applied diagnostic criteria. For example, according to ICHD-1 criteria, the prevalence of migraine was 12.7%, according to ICHD-2 criteria it was 17.5%, while according to ICHD-3 criteria it was 29.2% [5]. Similarly,



our used screening tool, ID Migraine™, reported the prevalence of migraine ranging from 12.2 to 28.1% with a combined prevalence of 18.9% [5]. The prevalence in our study population is consistent with the previous study findings using the same tool in different settings. The findings of the study should be interpreted considering the fact that the first wave of COVID-19 pandemic and country-wide lockdown was started during the data collection period, though the study design did not include the effect of the pandemic. The more recent studies evidenced that disease progression of migraine has been worsen during the lockdown and pandemic due to negative behavioral factors like pandemic related psychological distress, poor sleep quality and home confinement [26–28].

The prevalence of migraine was significantly higher among female participants of our study (29% in female and 12% in male). Migraine was reported as more prevalent among females in many of the previous studies [29–31]. However, some studies reported no significant difference between males and females [32, 33]. This gender difference in a conservative setting like Bangladesh needs further exploration. According to our findings, participants from the higher socioeconomic conditions were more likely to suffer from migraines (27%). This finding is contradictory with the social causation hypothesis of migraine as most of the previous studies reported lower socioeconomic conditions as a risk factor of migraine [34–37]. Further investigations using a well-established clinician-administered diagnostic tool may resolve the ambiguity.

Among the lifestyle-related factors, infrequent exercise (moderate exercise for at least 30 min for less than three days a week) and higher screen time (>6 h) were associated with migraine. However, regular exercise (3 or more days a week) was not associated with migraine in logistic regression in our study. Though irregular exercise can trigger migraine attacks, there are pieces of evidence that regular exercise may have a prophylactic effect on migraine frequency which is most probably due to an altered migraine triggering threshold in persons who exercise regularly [38–40]. Similar to our findings, higher screen time showed a positive association with migraine prevalence in some previous studies [41, 42]. However, during the lockdown period due to COVID-19 pandemic, work from home strategy made people use screen for abnormally long period of time. It has deteriorate the daily lifestyle of people, caused poor sleep, and psychological distress which is evidenced to increase headache attacks in people with migraine [27, 28]. Other lifestyle-related factors such as tobacco smoking and substance abuse which have been reported as risk factors of migraines in previous studies [43–45] were not found to be associated with migraines in our study.

Symptoms of anxiety and depression were significantly associated with migraine among our study population. The risk of having migraines was more among the participants with anxiety compared to those with depressive symptoms, which is consistent with a previous finding [46]. There are a number of existing evidence supporting the association between migraine and psychological distress [47–49]. However, due to the cross-sectional nature

of the study, the relation between migraine and psychological distress remained ambiguous. Moreover, anxiety and depressive symptoms might be over-estimated as there are some recent studies reporting that during the pandemic a huge number of university students faced these problems [50–52].

Elevated stress level, regular sleep disturbance, academic pressure and external noise were the most frequently reported triggers of migraine among our participants, which is consistent with the finding of a review article including 25 studies where these particular factors were enlisted among the top ten triggering factors of migraine [4]. One-third of the participants with migraines reported more than ten attacks of migraines during the past month and almost similar percentages of them reported severe headaches during the attacks. This high rate of frequency and intensity of headache during the migraine attacks caused severe migraine-related disability of more than 37% of the people with migraine as measured by the HIT-6 scale. This finding is consistent with the findings of some previous studies conducted using the same scale or the MIDAS scale [53, 54], though some other studies reported a higher rate of severe disability compared to our findings (55, 56).

Strengths and limitations

The present study provides baseline information about the prevalence, associated factors, and day-to-day impact of migraine among the university students of Bangladesh. We anticipate that the findings will be somehow helpful for understanding the epidemiology of migraines among students in this country and guide further research on the people with migraine. However, some limitations of the study would be worth mentioning. Firstly, the study was conducted in a specific cohort of the population (university students), so the findings cannot be inferential for the overall population. Moreover, an online survey based on convenient sampling had a potential risk of sampling bias, which could influence the accuracy of the findings. Secondly, convenient sampling might create response bias where people of interest might be more responsive to the survey and it might result in over-estimation of the prevalence. Being a self-administered survey under-reporting or over-reporting behavior of the participants as well as recall bias could not be rolled out. Thirdly, being a cross-sectional study, it had failed to establish any causal relationship between migraine and the dependent variables. And most importantly, we used ID Migraine™, a self-administered screening tool for migraine, which was not clinically diagnostic. Finally, the data for the study was collected during initial lockdown period of COVID-19 pandemic which might limit the findings from generalizability. Further studies using clinical diagnostic criteria

under the supervision of the clinicians is suggested to get a more comprehensive insight into the epidemiology of migraines in Bangladesh.

Conclusions

Our study shows that the prevalence of migraine among university students of Bangladesh is alarmingly high, especially female students suffer more. Several modifiable factors including lack of exercise, high screen time and symptoms of anxiety and depression are associated with migraines. Frequent migraine attacks and severe intensity of headache cause a substantial level of disability among these young sufferers. Cautious avoidance of the triggering factors through appropriate interventions and prophylactic medication can mitigate the negative impact of migraine as well as improve the quality of life. We suggest further large-scale longitudinal studies using standard clinical diagnostic tools to report nationwide prevalence & factors associated to understand the epidemiology of migraine among students in Bangladesh.

Abbreviations

AOR: Adjusted Odds Ratio; CHERRIES: Checklist for Reporting Results of Internet ESurveys; CI: Confidence interval; GAD: Generalized Anxiety Disorder; HIT: Headache Impact Test; IBM: International Business Machines; ICHD: International Classification of Headache Disorders; MIDAS: Migraine Disability Assessment; PHQ: Patient Health Questionnaire; PSQI: Pittsburgh sleep quality index; RMCH: Rajshahi Medical College & Hospital; SE: Standard error; SPSS: Statistical Package for the Social Sciences.

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Authors' contributions

Conceptualization: MAR and MSI. Formal analysis: MAR and MGH. Investigation: MAR and MSI. Methodology: MAR, MSI and MGH. Resources: MSI. Supervision: MGH. Writing – original draft: MAR and MSI. Writing – review and editing: MAR, MSI, MTH and MGH. The author(s) read and approved the final manuscript.

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Availability of data and materials

Data will be available on request to the corresponding author.

Declarations

Ethics approval and consent to participate

The present study was carried out in accordance with the ethical standard of the World Medical Association (i.e., declaration of Helsinki) as well as the guidelines of Institutional research ethics. The formal ethical approval was

endorsed by the Ethical Review Committee of Rajshahi Medical College (RMC/ERC/2020–2022/198/178). Participants were well informed about the procedure and purpose of the study, and confidentiality of their information. Electronic informed consent was ensured by each of participants.

Consent for publication

Not applicable.

Competing interest

The authors declare that they have no competing interest.

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