Migraine Prevalence, Characteristics, Triggers, and Coping Strategies Among Medical Students in Saudi Arabia

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ABSTRACT

Objective: To determine the prevalence, characteristics, and triggers of migraine and coping strategies used among medical students in Saudi Arabia.

Methods: This cross-sectional descriptive study was conducted among undergraduate students in the College of Medicine of Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. Included students were in their second to sixth year of the Bachelor of Medicine or Bachelor of Surgery programs during the 2019–2020 academic year. The diagnosis of migraine was made according to the *International Classification of Headache Disorders*, Third Edition criteria.

Results: A total of 396 students participated in the study; 238 (60.1%) were female and 158 (39.9%) were male. Their age ranged between 18 and 26 years old, with a mean age of 21.32 ± 1.659 years. Only 16 of 396 students fulfilled the criteria for migraine, with a prevalence of 4.04%. Migraine prevalence was higher in females (n = 11, 4.6%) compared to males (n = 5, 3.1%), with a female:male ratio of 1.5:1. The most common triggers associated with migraine were study-related stress (88%) and emotional-related stress (81%).

Conclusions: This project was undertaken to evaluate prevalence, triggers, and coping strategies of migraine among medical students. The prevalence of migraine headache in this study was lower compared to other national and international universities, with a higher female to male ratio. Stress was a major trigger among our study population. The findings of this study will add to the growing body of literature on migraine.

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Headache is a highly prevalent neurologic disorder, especially migraine. Primary headache disorders including migraine greatly impact social, economic, and psychological aspects of life.[1] The *International Classification of Headache Disorders*, Third Edition (*ICHD-3*) describes migraine as "recurring attacks of unilateral, throbbing headache that last from 4 to 72 hours, moderate to severe intensity, aggravated by regular physical activities and associated with nausea, vomiting, photophobia, or phonophobia."[2(18)]

Migraine headaches affect 12% of the global population[3] and 25% of the Saudi population.[4] Migraine is considered the third most common disorder after dental caries and tension-type headache, respectively, and is ranked as the seventh disabling illness worldwide according to the Global Burden of Disease Study 2015.[5]

Migraine is predominant in women during their 20s and 30s.[6] According to the World Health Organization, the male:female ratio for migraine is approximately 1:2.[6] The higher prevalence in females has been related to estrogen levels.[7]

Prevalence of migraine in medical students has been found to vary between 7.14% and 54%.[8–20] Migraine is considered a significant health problem among university students due to its negative influence on their academic performance, daily activities, and quality of life.[13,21]

The student lifestyle including long hours of working and studying and sleep deprivation has been linked to fatigue, stress, and anxiety, which are common triggers for migraine attacks.[22] Medical students are considered part of a special group of students due to the heavy study load and prolonged years of education.[13,15]

Previous studies[10,13,15,19,22] of migraine among medical students showed that paracetamol and non–steroidal anti-inflammatory drugs (NSAIDs) are 2 of the most commonly used analgesia. Sleep, rest, hot showers, water or food intake, self-medication, acupuncture/massage, and prescribed medication are used as coping mechanisms.[13,16]

This is the first study, to the best of our knowledge, to estimate the prevalence of migraine in medical students in Dammam, Saudi Arabia. The objective was to determine the prevalence, characteristics, triggers, and coping strategies associated with migraine among medical students attending Imam Abdulrahman Bin Faisal University (IAU) located in Dammam, Saudi Arabia.

METHOD

Subjects and Study Design

This cross-sectional descriptive study was conducted among undergraduate students in the College of Medicine at IAU and included students in their second to sixth academic year of the Bachelor of Medicine or Bachelor of Surgery programs during the 2019–2020 academic year. The sample size was calculated according to a pre-established formula.[23]

Clinical Points

- Primary headache disorders including migraine have a great impact on social, economic, and psychological aspects of life.
- Coping strategies for migraine headache are important and include good sleep hygiene, rest, and avoidance of well-known migraine attack triggers.

The estimated sample size needed to achieve a precision of ± 0.05% with a 95% confidence interval (CI) was 257 participants. Students who did not complete the questionnaire were excluded.

The study included 515 medical students with a 77% response rate; 119 students were excluded due to incomplete questionnaires. A total of 396 students completed and returned the questionnaires.

Participation in the study was completely voluntary. Confidentiality was strictly assured, and no names were required from the participants. The study was approved by the Institutional Ethics Review Board of IAU (reference no. 2019–01-277).

Validity of the Questionnaire

The validity of the questionnaire was confirmed by a pilot study (unpublished data; Danah Aljaafari, MD; 2019) in 30 participants and was reviewed by 3 neurologists. The reliability coefficient was found to be > 0.6, which confirmed that the questionnaire was suitable for use in this study.

Table 1. Socioeconomic and Clinical Characteristics of Migraine Among Students (N = 396)[a]

	Migraine			
Variable	Yes (n = 16)	No (n = 380)	χ^2 (df)	P Value
Age, mean ± SD, y[b]	20.75 ± 2.082	21.34 ± 1.638		.164
Sex				
Male	5 (31.3)	153 (40.3)	0.520 (1)	.471
Female	11 (68.8)	227 (59.7)		
Marital status				
Single	16 (100)	339 (89.2)	1.926 (1)	.391
Married	0 (0)	21 (10.8)		
Academic year				
2nd year	6 (37.5)	69 (18.2)	6.823 (4)	.146
3rd year	4 (25.0)	72 (18.9)		
4th year	4 (25.0)	78 (20.5)		
5th year	1 (6.3)	66 (17.4)		
6th year	1 (6.3)	95 (25.0)		
Grade point average				
≥4.5	6 (37.5)	153 (40.3)	0.049 (1)	.825
≤4.4	10 (62.5)	227 (59.7)		
No. of hours spent studying/day				
≤2	3 (18.8)	81 (21.3)	0.226 (2)	.893
3–5	8 (50.0)	200 (52.6)		
≥6	5 (31.3)	99 (28.1)		
Frequency of migraine headache/month				
≤14	14 (87.5)	361 (95.0)	1.720 (1)	.205
≥15	2 (12.5)	19 (5.0)		
Side of headache				
Bilateral	12 (75.0)	249 (65.5)	0.762 (2)	.683
More to the right side	3 (18.8)	84 (22.1)		
More to the left side	1 (6.3)	47 (12.4)		
First-degree family history of migraine				
Yes	7 (43.8)	72 (18.9)	5.914 (1)	.024*
No	9 (56.3)	308 (81.1)		
Analgesic use				
Yes	14 (87.5)	221 (58.2)	5.479 (1)	.019*
No	2 (12.5)	159 (41.8)		

[a]Values are shown as n (%) unless otherwise specified.
[b]Range, 18–26 years.
*Statistically significant difference, P < .05.

Data Collection

Data were collected via a structured self-administered questionnaire designed to fulfill the study objectives. The first part contained questions related to the demographics including age, sex, marital status, academic year, grade point average, height, and weight in addition to the number of hours spent studying per day, smoking status, and first-degree family history of migraine.

The second part consisted of questions related to the *ICHD-3* diagnostic criteria for migraine. The third part was composed of headache triggers, frequency, and coping strategies and type of analgesia used. Questions were dichotomous yes/no items and single/multiple choice.

Diagnostic Criteria

The diagnosis of migraine was made according to *ICHD-3* criteria[2] wherein at least 5 headache attacks fulfill the following: (1) the attack lasts 4–72 hours; (2) the attack is associated with at least 2 of the following features: unilateral headache, pulsatile in nature, moderate or severe intensity, and aggravated by or leading to avoiding routine physical activities; and (3) during the attack at least 1 of the following complaints is present: nausea and/or vomiting, photophobia, or phonophobia. The headache characteristics should not better fulfill the criteria of another *ICHD-3* headache diagnosis.[2] Headaches that fulfilled *ICHD-3* criteria were considered migraine headaches, whereas headaches that did not fulfill the criteria were considered nonmigrainous headaches.

Statistical Analysis

All data were analyzed with SPSS 21.0. Continuous data were represented as mean ± SD and categorical and nominal data as frequencies and percentages. χ^2 test was used to test the relationship between the qualitative variables, and independent *t* test was used for the quantitative variables. A P value < .05 was regarded as statistically significant.

RESULTS

A total of 396 students participated in the study; 238 (60.1%) were female and 158 (39.9%) were male. They ranged in age from 18 to 26 years with a mean ± SD age of 21.32 ± 1.659 years. The mean ± SD age of the students with migraine was lower (20.75 ± 2.082 years) than those without migraine (21.34 ± 1.638 years).

Figure 1. Relationship Between Family History and Migraine
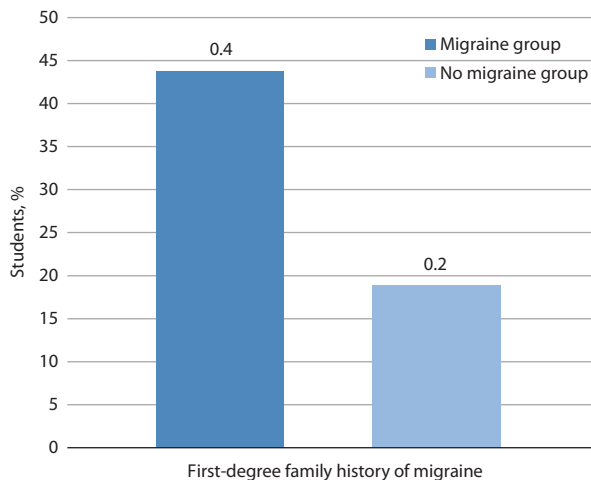
was higher in females (n = 11, 4.6%) compared to males (n = 5, 3.1%), with a female-to-male ratio of 1.5:1.

Family History of Migraine

As shown in Table 1, migraine was significantly higher among students with a first-degree family history of migraine compared to students without migraine (*P* < .05) (Figure 1).

Frequency and Side of Migraine Headache

The majority of participants with migraine experienced bilateral headaches (75.0%), followed by right-sided (18.8%) and left-sided (6.3%) headaches. A preponderance of students with migraine experienced ≤ 14 headache days/month (87.5%), while only 12.5% had ≥ 15 headache days/month.

Table 1 shows that the differences between migraine and nonmigrainous headache were statistically significant for family history and analgesic use (*P* < .05). However, differences between the 2 groups for age, sex, marital status, academic year, grade point average, hours spent studying, and frequency and side of headache were nonsignificant (*P* > .05).

There was no significant difference between males and females regarding age, academic year, grade point average, hours spent studying, frequency and side of headache, family history of migraine, or use of analgesics (Table 2).

Triggers of Migraine

Study-related stress (88%) and emotional-related stress (81%) were the most common triggers associated with migraine followed by sleep disturbance (75%), bright lights (44%), noise (44%), fasting or missing a meal (38%), physical activity (25%), menstrual periods (25%), and caffeine (19%) (Figure 2).

Coping Strategies

The main coping strategy in migraine participants was sleep (81%), followed by rest (75%), stay in dark room (44%), self-medication with analgesia (38%), drink coffee/tea (31%), food (25%), meditation (25%), seek medical care (19%), cold compressors (13%), and self-medication with prophylactic therapy (13%) (Figure 3).

Analgesia Use

The majority of students with migraine (87.5%) used analgesia to relieve their

Table 2. Characteristics of Migraine in Students According to Sex[a]

Variable	Male (n = 5)	Female (n = 11)	χ^2 (df)	P Value
Age, mean ± SD, y[b]	21.80 ± 2.168	20.27 ± 1.954	...	.182
Academic year			8.630 (4)	.071
2nd year	1 (20.0)	5 (45.5)		
3rd year	0 (0)	4 (36.4)		
4th year	3 (60.0)	1 (9.1)		
5th year	1 (20.0)	0 (0)		
6th year	0 (0)	1 (9.1)		
Grade point average			0.019 (1)	1
≥ 4.5	2 (40.0)	4 (36.4)		
≤ 4.4	3 (60.0)	7 (63.6)		
No. of hours studying/day			3.588 (2)	.166
≤ 2	1 (20.0)	2 (18.2)		
3–5	4 (80.0)	4 (36.4)		
≥ 6	0 (0)	5 (45.5)		
Frequency of migraine headache days/month			1.039 (1)	1
≤ 14	5 (100)	9 (56.2)		
≥ 15	0 (0)	2 (18.2)		
Side of headache			0.485 (2)	.785
Bilateral	4 (80.0)	8 (50.0)		
More to the right side	1 (20.0)	2 (18.2)		
First-degree family history of migraine			0.780 (1)	.596
Yes	3 (60.0)	4 (36.4)		
No	2 (40.0)	7 (63.6)		
Analgesic use			5.029 (1)	.083
Yes	3 (60.0)	11 (100)		
No	2 (40.0)	0 (0)		

[a]Values are shown as n (%) unless otherwise specified.
[b]Range, 18–26 years.

Academic Year

There were more females than males in all academic years. Most of the students participating in the study were in their sixth year (n = 96, 24.2%), followed by fourth (n = 82, 20.7%), third (n = 76, 19.2%), second (n = 75, 18.9%), and fifth (n = 67, 16.9%), respectively. Migraine headaches were higher in students in their second year, followed by students in their third and fourth year, which represents 37.5% and 25.0% of students with migraine, respectively.

ICHD-3 Criteria

According to the *ICHD-3*, we found that only 16 of 396 students fulfilled the criteria for migraine, with a prevalence of 4.04%. Migraine prevalence

Figure 2. Trigger Factors for Migraine Among the Students

Trigger	Students, %
Caffeine	0.19
Menstrual periods	0.25
Physical activity	0.25
Fasting or missing a meal	0.38
Bright lights	0.44
Noise	0.44
Smoking	0.00
Sleep disturbance	0.75
Emotional-related stress	0.81
Study-related stress	0.88
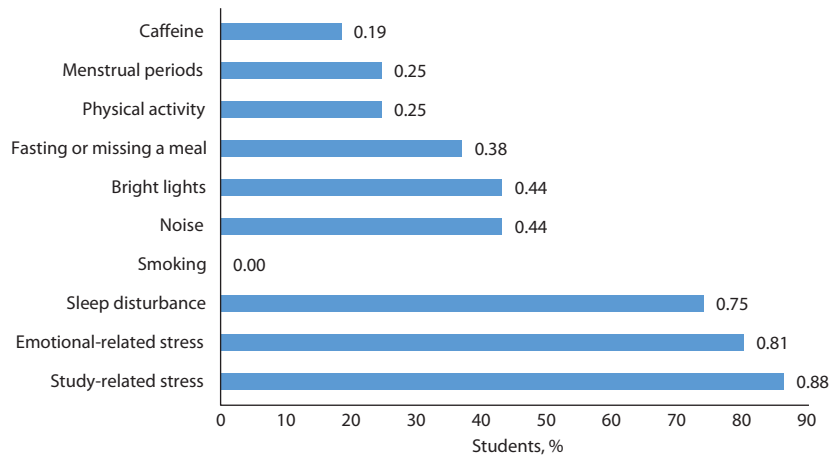
Figure 3. Common Coping Strategies in Students With Migraine

Strategy	Students, %
Self-medication with analgesia	0.38
Self-medication with prophylactic therapy	0.13
Seeking medical care	0.19
Meditation	0.25
Cold compressors	0.13
Food	0.25
Drink coffee/tea	0.31
Stay in dark room	0.44
Rest	0.75
Sleep	0.81
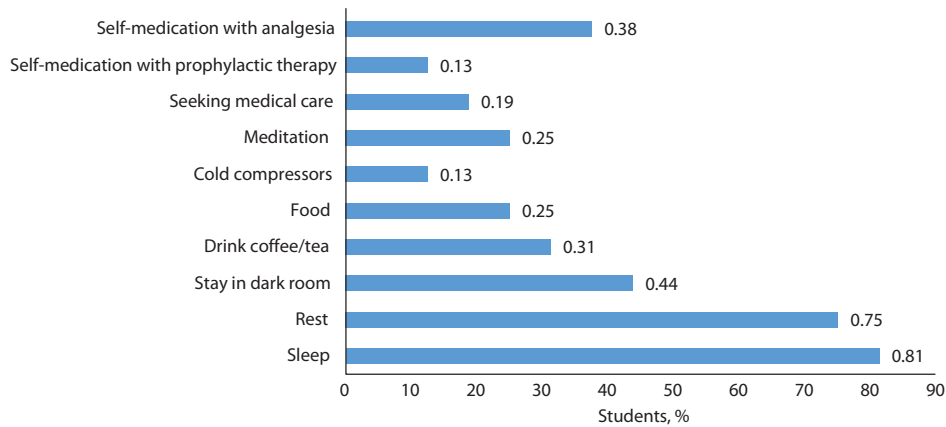
Figure 4. Analgesic Use in Students With and Without Migraine

	Migraine group	No migraine group
Used analgesics	0.9	0.5
Did not use analgesics	0.1	0.4
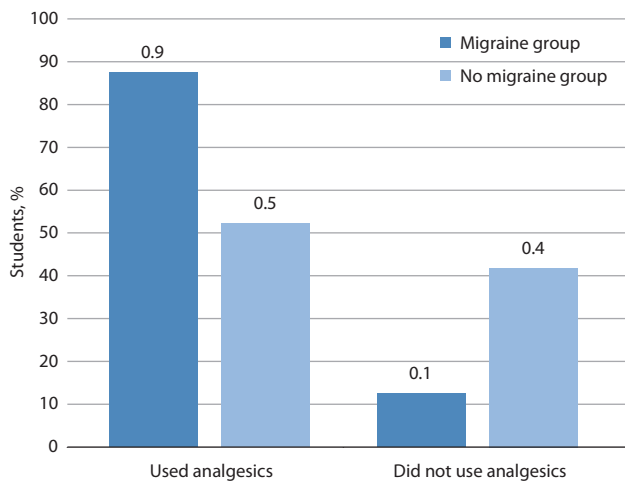
headache (Figure 4). Acetaminophen (85.7%) was the most common analgesic used for migraine followed by NSAIDs (21.4%) and opioids (7.1%). Surprisingly, none of the students with migraine used 5-HT$_1$ agonists (triptans), as shown in Table 3.

DISCUSSION

This study was conducted among undergraduate medical students at IAU in the academic year 2019–2020. Until now, this study is the first university survey evaluating the prevalence of migraine based on self-report in the College of Medicine at IAU.

The IAU medical program requires constant concentration, continuous effort, and hard work. Absence from lectures and laboratories can affect the student's college performance and success even if it was only 1 day. Therefore, diagnosis and treatment of migraine headache are important for both students and the treating doctors.

Table 3. Type of Analgesics Used by Students With Migraine

Type of Analgesic	Students, n[a]
Acetaminophen	12 (85.71)
Nonsteroidal anti-inflammatory drugs	3 (21.43)
Opioids	1 (7.14)
5-HT$_1$ agonists (triptans)	0 (0)

[a]Some students had multiple responses.

Table 4. Prevalence of Migraine Among Medical Students in Previous Studies

Study Location	Prevalence, %
Saudi Arabia	
Hail University[9]	12.7
King Abdulaziz University[14]	48.7
King Saud Bin Abdulaziz University[20]	23.7
International	
Kuwait[8]	27.9
Nairobi[10]	33.8
Turkey[11]	12.6
Oman[12]	12.2
China[13]	7.9
United States[15]	54.0
Pakistan[16]	38.3
South India[17]	28.0
Nigeria[18]	14.1
Southeast of Iran[19]	7.1

The prevalence of migraine among medical students is variable worldwide.[8] This study found the prevalence of migraine among IAU medical students to be 4.04%. This prevalence was lower compared to other national and international studies of prevalence of migraine among medical students (Table 4). These differences in migraine prevalence could be explained by the methods used, the period of time when the study was conducted (eg, during midterms or final examinations), and presence of well-established counseling services at IAU.

The female preponderance of migraine in virtually all studies is reflected in our study, with a female:male ratio of 2.2:1, and this could be explained by estrogen hormone levels.[7] Twenty-five percent of female students reported that their menstrual period is a trigger factor for migraine similar to other studies,[7,24] which is due to the sudden decrease of the estradiol hormone in plasma.

Family history of migraine is important. In this study, we found that 43.8% ($P < .05$) of medical students had a positive family history of migraine. Al-Hashel et al[8] found that family history was an important factor in the prevalence of migraine. They[8] reported that 53.3% of migraine-diagnosed students had a positive family history of migraine with highly significant association ($P < .0001$).[8] Another study[18] found that only 28.6% of participants had a family history of migraine.

This study showed migraine prevalence to be higher among second-year students. Another study showed higher migraine prevalence among first- and second-year junior students.[13] This finding could be explained by adaptation and learning overload in a new environment.

Regarding the trigger factors for migraine, in reviewing the literature, stress and sleep disturbance were the most common triggers, which was confirmed in this study. We found that study-related stress (88%) and emotional-related stress (81%) were the most common triggers associated with migraine, followed by sleep disturbance (75%). Other triggers included bright light, noise, fasting, menstrual period, and caffeine intake. Another study[10] on migraine among medical students found that stress (24.9%) was the most common trigger factor, followed by irregular sleep (20.8%). An additional study[21] reported that exam stress (82.6%), sleep disturbance (79.9%), and emotional stress (73.2%) were common trigger factors.

Analgesic medications are often used to relieve migraines, as show in our study (87.5%). Acetaminophen (85.7%) was used most often, followed by NSAIDs (21.4%) and opioids (7.1%); however, none of the students use 5-HT$_1$ agonists. Previous studies found that paracetamol[9] was the most commonly used analgesia among students, followed by NSAIDs.[12,14,18,22] The best explanation for these findings is that these medications are available over the counter.

The most common coping strategies found in our study were sleep (81%) and rest (75%). One study[9] reported that comfort, exercise, and analgesic use were the most common coping strategies used in their population (38.1%). Another study[8] found the most important relieving factors to be rest and sleep (63.5%) and medication (33.2%), followed by darkening of the room (30.3%), massage therapy (20.1%), and drinking coffee (18.0%).

CONCLUSIONS

In this study, the aim was to assess migraine prevalence among medical students at IAU, which was found to be lower compared to similar studies from other universities, however, comparable to prevalence of migraine in the Saudi population. This prevalence may reflect the coping strategies used among the IAU medical students. Limitations include use of a self-administered survey in which some questions could have been misunderstood and risk of subjectivity in the answers.

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