



Migraine among Students from the Faculty of Applied Medical Sciences, King Abdulaziz University, Jeddah, Saudi Arabia

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Authors' contributions

This work was carried out in collaboration between all authors. Author NKI selected the study topic, designed the study, performed the statistical analysis, and wrote the first draft of the manuscript. Authors AKA, RMB, FMA and AMB helped in writing the protocol, conducted data collection, helped in the analyses of the data, helped in writing the manuscript. Author MHW helped in construction of scheme of work, designed the study, and managed the work. All authors read and approved the final manuscript.

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ABSTRACT

Aim: To determine the prevalence, grades, clinical features, triggers and predictors of migraine headache among students from Faculty of Applied Medical Sciences, King Abdulaziz University (KAU), Jeddah, Saudi Arabia.

Methods: A cross-sectional study was done among during 2016/2017. A multi-stage stratified random sample was used, and 304 students were selected. A validated, self-administered data collection sheet was used. It included ID migraine™, and the Migraine Disability Assessment Score

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(MIDAS). Migraineurs were also asked about the triggers, clinical features and factors associated with migraine. Descriptive, inferential statistics and logistic regression analyses were done.

Results: It was found that 66.4% of the participants had ≥ 1 headache attack(s) during the 3 months preceded the study. The prevalence of migraine headache was 36.5%, and 29.7% of the migraineurs suffered from severe disability based on MIDAS. In bivariate analysis, migraine was associated with gender (female), family history, and chronic diseases namely Irritable Bowel Syndrome (IBS), asthma and anxiety. The most frequently reported triggers of migraine were sleep disturbance (78.4%) and stress (64.9%). Photophobia and difficulty in concentration were the commonest associated symptoms.

Conclusion: Migraine represents an important public health problem among students enrolled in Faculty of Applied Medical Sciences. About 30% of migraineurs suffered from severe headache disability. Family history of migraine and the presence of chronic diseases were migraine predictors. Sleep disturbance was the most frequent migraine triggers while practicing exercise was the commonest alleviating factor. Screening and providing medical care students who have migraine is recommended. Conduction of awareness campaigns and stress management courses are required.

Keywords: Migraine; ID migraine™; MIDAS; prevalence; disability; triggers; alleviating factors.

1. INTRODUCTION

Headache is the most common disorder affecting the nervous system [1,2]. Migraine is a common neurological disorder characterized by episodic headaches with specific features [3]. Migraine is a type of primary headache which is a benign, recurrent headache that not caused by underlying disease or structural problems. The location may be in one part of the face or skull or may be generalised involving the whole head [4]. Migraine is typically characterised by moderate to severe attacks of unilateral pulsating headache, aggravated by routine activity and associated with nausea and/or photophobia and phonophobia [5].

A migraine is currently known to be caused by dysfunction of the nerves of the brain [4], and it is one of the neurovascular disorders with multiple processes and complex patho-physiologies. Nowadays, there is a better understanding of the role of the trigeminal vascular system in causing migraine pain. Furthermore, it is clear that other brain areas and trigemino-thalamic projections all have a role in migraine [5].

As one of the neurologic disorders, migraine represents a significant public health problem due to its high frequency, associated disability symptoms, and the loss of performance. Migraine can also reduce the capacity of socializing, working and studying at the time where people are more productive [6]. Migraine was estimated to be the seventh global cause of living with a disability [7], and the third cause of disability between individuals aged < 50 years. A recent study, 2018, conducted among the general population from Al-Taif, Saudi Arabia,

revealed about 90% prevalence of migraine among urban population [8]. Such high prevalence makes migraine one of the major health burden in the Kingdom.

Migraine may occur due to numerous psychological and physical stressors. However, this type of a headache is still not well recognized or treated [9]. Students in particular, undoubtedly, need constant focusing and good performance which can be interrupted by headache [4]. Migraine may have a negative impact on both academic and non-academic productivity of the students. This can lead to a big load on their families and on the society, and can precipitate further decreasing in their effective performance in life [2]. Students may be exposed to headache triggers such as the psychological and physical stressors. Wang, et al. [10] conducted a meta-analysis of 56 studies done between university students, and their results revealed a 16.1% prevalence of migraine.

A student enrolled in faculties from medical fields are usually working hard, and need continuous concentration and study, which may expose them to more stresses and sleep disturbances and become more liable to highly stressful conditions which make them more prone to migraine [11]. Although migraine represents an important health problem, there is a lack of adequate epidemiological studies done among students from Faculty of Applied Medical Sciences for assessing magnitude and characteristics of it. So, there is an urgent demand for such study.

The current study was done to determine the prevalence, grades, clinical features, triggers and

predictors of migraine among students from Faculty of Applied Medical Sciences, King Abdulaziz University (KAU), Jeddah, Saudi Arabia.

2. MATERIALS AND METHODS

A cross-sectional study was performed among students from Faculty of Applied Medical Sciences, King Abdulaziz University, during the academic year 2016/2017. A multi-stage stratified random sample was used; based on gender and academic year. The sample size was determined using the formula for estimation of sample from the cross-sectional design [12]. The prevalence (p) was assumed to be 26.3% based on a recent study done on the medical college of KAU, Jeddah [11]. The minimal estimated sample size to accomplish a precision of 0.05% at 95% Confidence Interval (CI) was 297 students.

A validated, self-administered data collection sheet was used. Validation was done by a panel of two experts. The internal consistency reliability was assessed by Cronbach's alpha test and it was found to be 0.85. The sheet included questions asked about personal and socio-demographic factors. Habits as smoking and practicing physical activities were inquired. Any chronic diseases (disease lasting ≥ 3 months) diagnosed by physicians was determined. The types of these diseases such as Irritable Bowel Syndrome (IBS), asthma, anxiety and depression were determined.

Females were inquired about the presence of menstrual problems as dysmenorrhea and amenorrhea or menorrhagia were determined.

The sheet asked about the history of headache (in general) during 3 months preceded the study. The sheet also included the ID migraine™. It was used as a screening tool for detection of migraine. It consists of 3 items, and diagnosis of migraine depends on giving positives responses on at least two items, by the participants. ID migraine™ has a good validity as a detecting migraine tool [13]. If the participant was diagnosed as having migraine, he/ she will complete the sheet which inquired about the used medication (if any), and its source either prescribed or Over the Counter (OTC) drugs. Migraine Disability Assessment Scale (MIDAS) was also included to assess the impact of migraine on students' daily activity and productivity during the last 3 months [14]. MIDAS

consists of 5 questions covering three dimensions. It contains 2 additional questions which measure frequency of headache. MIDAS is a valid and reliable tool to be used for grading of migraine [15].

2.1 Statistical Analysis

SPSS version 21 was used for data analysis. For MIDAS, the scale is graded in four grades in relation to total numbers of days for each 5 questions. It provides scale for the average intensity of pain and ranged from 0-10 [15]. It is then graded into little or no disability defined by grade I (0 - 5 days); mild disability or grade II (6 - 10 days); moderate disability or grade III (11 - 20 days); and severe disability or grade IV (≥ 21 days) [14].

Descriptive, inferential statistics were done. Chi-squared test, Odds Ratios (ORs) and 95% Confidence interval (CI) were calculated. A multivariate logistic regression analysis was done to determine migraine predictors after controlling of confounding factors. Adjusted OR (aOR) was calculated. P -values less than 0.05 were accounted as statistically significant.

2.2 Ethical Statement

The protocol of the study was approved from the administrators of the Faculty of Applied Medical Sciences & then it was approved by the Institutional Review Board (IRB) of King Abdulaziz University Hospital (KAUH), with a Reference No of 320-17. An informed consent was taken from each student who accepted to participate, before participation.

3. RESULTS

A total of 304 students completed the study; with a slight increase more than the minimal calculated sample size for the stratification purpose. About two-thirds (66.4%) of the participants had ≥ 1 attacks during 3 months preceding the study. Results found that 45.9% of our participants reported that their headache was worsening throughout the day.

The prevalence of migraine among the participants was 36.5%. According to MDAS, 57.7%, 12.6% and 29.7% of the students suffered from mild, moderate and severe disability due to migraine pain, respectively. (Fig. 1).

Concerning the used medications for the condition, 55.8% the migraineurs used drugs; 14.4 % of them utilized prescribed medications, and 41.4% used OTC drugs. On the other hand, 44.2% of migraineurs did not use any drug.

Among all migraineurs who used drugs, paracetamol was the commonest (69.4%) used medication. Non-Steroidal Anti-inflammatory Drugs (NSAIDs) alone were used by 3.2 % of the migraineurs. Both types of analgesics were used by 17.6 %. Other types of drugs were utilized by 9.8% of the students.

Table (1) illustrates that prevalence of migraine among females (40.1%) was higher than that of males (25.0%), with a statistically significant difference ($\chi^2 = 5.39, P < .05$). The lowest prevalence of migraine was among students enrolled in the second year, and there is some increase in the prevalence to reach the highest percentage during the fifth year and the internship ($P > .05$). Students who had a family history of migraine were approximately 3 times more liable to have migraine compared to others (OR=2.94; 95% CI: 1.69- 5.14). Moreover, students who studied more than 3 hours daily had a higher migraine prevalence, but without

statistical difference ($P > .05$). Students who lived in dormitory had a higher prevalence (41.7%) of migraine compared to other (36.1%). However, there is no statistical significant association. There is no statistical association also between migraine and each of the age, educational year or the nationality.

Table (2) depicts that migraine was associated with the presence of chronic diseases (OR= 2.23, 95% C.I.:1.38-3.60). Migraine was significantly associated ($P < .05$) with anxiety, asthma and irritable bowel syndrome (previously diagnosed by physicians). Those who had IBS were 2.33 times more prone to have migraine compared to others (OR= 2.33, 95% C.I.: 1.08-5.05).

Results of logistic regression analysis (Table 3) shows that the first predictor of migraine, after controlling confounding, was the presence of family history of the condition. Those who had family history of migraine were about two and half times more prone to it than others (aOR=2.55; 95% CI: 1.44 - 4.52). The second predictor of migraine was having a chronic disease (aOR=1.86; 95% CI: 1.13 - 3.06).

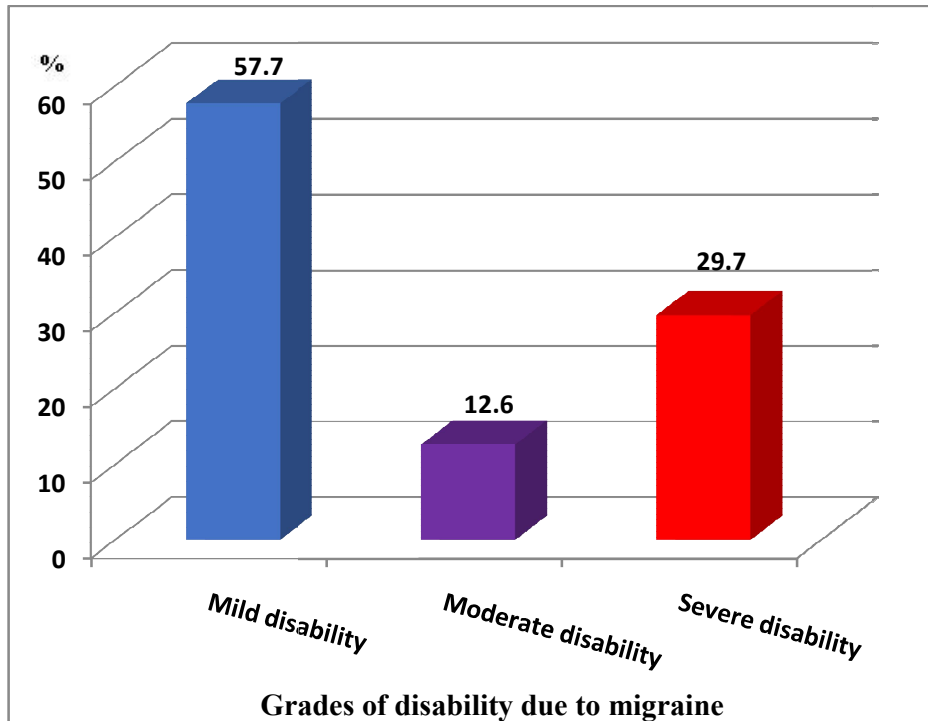


Fig. 1. Grades of disability caused by migraine among students enrolled in Faculty of Applied Medical Sciences, King Abdulaziz University, Jeddah

It is apparent from Table (4) that the commonest symptoms associated with migraine were photophobia (43.2%), and difficulty in concentration (42.3%). On the other hand, runny nose (3.6%) and loss of consciousness (3.6%) were the least associated symptoms with

migraine. Regarding migraine triggers, the same table shows that lack of sleep (78.4%) and stress (64.9%) were the most frequently reported triggers. On the other hand, the commonest reported alleviating factors of migraine were practicing physical exercise (97.3%).

Table 1. Relationship between migraine with personal, socio-demographic and habits of students enrolled in Faculty of Applied Medical Sciences, King Abdulaziz University

Variables	Migraine (n = 111)		No-Migraine (n=193)		Total (n=304)	X ²	P	OR	C.I.
	No.	%	No.	%					
Gender									
Female	93	40.1	139	59.9	232	5.39	0.020	2.01	1.11- 3.64
Male	18	25	54	75	72				
Age									
21 and younger	67	35.8	120	64.2	187	0.10	0.754	0.93	0.57-1.5
22 and above	44	37.6	73	62.4	117				
Nationality									
Saudi	102	35.4	186	64.6	288	2.83*	0.092	0.43	0.15-1.18
Non-Saudi	9	56.3	7	43.8	16				
Marital status									
single	107	37.8	176	62.2	283	2.97*	0.085	2.58	0.85-7.88
Ever married	4	19	17	81	21				
Academic year									
2 nd year	34	34.0	66	66	100	1.32	0.725	1 ^{RC}	
3 rd year	32	37.2	54	62.8	86				
4 th year	29	35.4	53	64.6	82				
5 th year or intern	16	44.4	20	55.6	36				
Residence									
With family	101	36.1	179	63.9	280	0.30	0.585	0.79	0.34-1.84
Dormitory	10	41.7	14	58.3	24				
Income									
Not enough	28	44.4	35	55.6	63	4.88	0.087	1 ^{RC}	
Enough	69	32.5	143	67.5	212				
Enough & exceed	14	48.3	15	51.7	29				
Family history of migraine									
Family history	38	56.7	29	43.3	67	15.13	0.000	2.94	1.69- 5.14
No Family history	73	30.8	164	69.2	237				
Smoking									
Yes	6	40	9	60	15	0.09	0.774	1.17	0.41- 3.37
No	105	36.3	184	63.7	289				
Practice exercise									
Yes	46	40.4	68	59.6	114	1.16	0.282	1.3	0.81-2.10
No	65	34.2	125	65.8	190				
Number of studying hours/Day									
> 3 hours	66	41.5	93	58.5	159	3.59	0.058	1.58	0.98-2.53
≤ 3 hours	45	31.0	100	69	145				

^{RC} : Referent Category, * : Fisher's exact test

Table 2. Relationship between migraine and medical conditions of students enrolled in Faculty of Applied Medical Sciences, King Abdulaziz University

Variables	Migraine		No migraine		X ²	p	OR	95 C.I.
	No.	%	No.	%				
Chronic diseases								
Yes	57	47.9	62	52.1	10.94	0.001	2.23	1.38-3.60
No	54	29.2	131	70.8				
Irritable Bowel Syndrome								
Yes	16	55.2	13	44.8	4.81	0.028	2.33	1.08-5.05
No	95	34.5	180	65.5				
Asthma								
Yes	16	57.1	12	42.9	5.66	0.017	2.54	1.15- 5.59
No	95	34.4	181	65.6				
Depression								
Yes	5	38.5	8	61.5	0.02	0.881	1.09	0.35-3.42
No	106	36.4	185	63.6				
Anxiety								
Yes	11	61.1	7	38.9	4.99	0.025	2.9	1.10-7.77
no	100	35	186	65				
Menstrual problem among females (No=232)								
Yes	8	8.6	15	10.8	0.3	0.585	0.78	0.32- 1.92
No	85	91.4	124	89.2				

Table 3. Logistic regression analysis of the predictors of migraine among students enrolled in Faculty of Applied Medical Sciences, King Abdulaziz University

Variable	Beta	P	aOR	95% CI
Family history of migraine	0.937	0.001	2.55	1.44-4.52
Having chronic disease(s)	0.62	0.01	1.86	1.13-3.06
Constant	- 1.061			

aOR: Adjusted Odds Ratio

4. DISCUSSION

The current study revealed that 66.4% of the participants experienced ≥ 1 headache attack(s) during the 3 months preceded the study. This finding agrees with results from a study done among medical students from India [16]. Falavigna et al. [17] reported also that majority of their sample of undergraduate Brazilian students had headache attacks during the same period of time.

The prevalence of migraine among the contributors from Faculty of Applied Medical Sciences in the present study was 36.5%. Similar rates were reported among medical students from Riyadh [18], and adolescents from Jordan [19]. However, a lower rates were reported among medical students from India (28.0%) [16] and Jeddah (26.3%) [11]. These discrepancy may be due to differences between the target populations, or due larger sample of females from the present study. On the other hand, a much lower rate (13.06%) was reported among

Ethiopian medical and health sciences' students [20]. The cause of this discrepancy may be also attributed to the differences between the target populations.

Based on MIDAS, 29.7% of the migraineurs in the current study suffered from severe disability due to migraine pain. Another study done among Turkish medical students found that 22.5 % of their migraineurs had severe disability [21]. Furthermore, the study of Falavigna et al. reported that 46.7% of the Brazilian participants had a moderate or severe disability [17], which agrees with our finding (42.6% suffered from both degrees). Johnson et al. [22] found that the majority of their medical students reported a decrease in their productivity during headache attacks. Another study reported that overall productivity was affected by 45% as reported by students studied medicine and psychology [6].

Our results, from bivariate analysis, revealed that girls were more affected by migraine than boys.

Table 4. Associated symptoms, triggers and alleviating factors of migraine among students enrolled in Faculty of Applied Medical Sciences, King Abdulaziz University

Associated symptoms:	Frequency No. = 111	Percent
Photophobia	48	43.2
Difficulty concentration	47	42.3
Phonophobia (fear from loud sound)	44	39.6
Nausea	42	37.8
Neck pain	30	27
Abdominal pain	18	16.2
Vomiting	10	9
Diarrhea	7	6.3
Runny nose	4	3.6
Loss of consciousness	4	3.6
Triggering factors:		
Sleep disturbance	87	78.4
Stress	72	64.9
Noise	69	62.2
Exposure to bright light	66	59.5
Anxiety	47	42.3
Long reading hours	47	42.3
Hunger	44	39.6
Caffeine withdrawal	25	22.5
Depression	23	20.7
Menstrual period (females) (no= 93)	21	22.6
Physical activity	10	9
Smoking	8	7.2
Certain food (chocolate, cheese, etc.)	3	2.7
Odours	1	0.9
Alleviating factor:		
Exercise	108	97.3
Rest	39	35.1
Quite and darkness	28	25.2
Massage	14	12.6
Warm shower	10	9.0

This finding agrees with results from a meta-analysis of studies among university students, 2016 [10]. It coincides also with the results among medical students from Jeddah [11], and India [16], and with the results from Al Taif city [8]. The cause of such higher prevalence of migraine among females compared to males may be because hormonal variations are influenced by oestrogen among females [8,23], or due to central cortical excitability [8].

It was previously reported that about two-thirds of migraine cases run in families [4]. Similarly, the current study revealed that migraine was significantly associated with family history of the condition, and this history was the first predictor of migraine. This finding points out to the genetic predisposition of migraine [23]. This result agrees with many other previous studies [2,3,10,11].

The current study revealed that rate of migraine increased slightly by increasing the number of studying hours per day. This finding is in line with a recent study, 2018, from Korea [3].

The results of the current study showed that presence of chronic diseases was associated with migraine, and it is one of its predictors. Bivariate analysis also found that bronchial asthma was associated with migraine. Our result is supported by a study published on 2017, and showed that headache and migraine is common among asthmatic patients compared to the overall population [24]. The cause of these findings may be because in the pathogenesis of both asthma and headache there are several common biological factors (genetic predisposition, mast cell activation, platelet activating factor, impaired arachidonic acid metabolism) have been suggested to play a role [24].

Our bivariate analysis revealed that IBS was associated with migraine, which agrees with the results among medical students from Jeddah [11]. The cause of such findings may be due to possible physiological pathways of migraine that can be associated with the brain-gut axis, neuro-immunity, and neuro-endocrine interactions [11]. The results of the current study also reveal an association between migraine and diagnosis of anxiety which agrees with other studies [11,16].

Concerning migraine associated symptoms, the present study found that photophobia was the most frequently associated symptoms. This finding is in line with results of many other studies [11,16,25]. In addition, 42.3% of the participants suffered from difficulty in concentration. Similarly, another cross-sectional study, 2017, revealed that migraineurs had significantly lower scores on the memory recall than others [26]. Furthermore, our results depicts that phonophobia was one of the common reported symptoms accompanying migraine, which concurs with the results from the Indian study [16].

Sleep disturbances and stress were the most frequently reported triggers of migraine in the current study. This result is in line with many other studies from Italy, [7] Turkey, [9] India, [16] Alabama (USA), [27] and Jeddah [11]. As sleep deprivation and stress are the modifiable triggers for migraines, so proper attention to stress, psychiatric disorders, sleep hygiene, and life habits is important to cope with migraine triggers [28].

Regarding alleviating factors of migraine, the most common factor in the current study was practising physical exercise, which is in line with a recent randomised clinical trial [29].

Most of the migraineurs in the present study used paracetamol drug to relive their migraine attacks, which is in line with the results from Jeddah [11]. The majority of migraineurs used OTC drugs which also agrees with the other Jeddah's study [11].

5. STUDY STRENGTHS AND LIMITATIONS

5.1 Study Strength

The study may be the first study about migraine that was done among students from the Faculty of Applied Medical Sciences, Jeddah, Saudi Arabia.

5.2 Study Limitation

The number of females in the sample is more than males, because the females have a larger presentation in this faculty.

6. CONCLUSION

Migraine represents a prevalent problem among students from the Faculty of Applied Medical Sciences (36.5%) at KAU, Jeddah. About 30% of migraineurs suffered from severe headache disability based on the MIDAS. In bivariate analysis, statistically significant associations were found between migraine and each of gender (female), family history of migraine, chronic diseases including IBS, asthma and anxiety. After controlling confounding, family history and the presence of chronic diseases were the two migraine predictors.

The most frequently reported migraine triggers were sleep disturbance, followed by stress. Photophobia and difficulty in concentration were the commonest associated migraine symptoms. The exercise was found to be an important alleviating factor of migraine. Screening of migraine need to be done among students from Faculty of health Sciences, and among university students in general, with management of detected cases. There is a need to provide medical care and advice to those students to maintain their performance and university activity. Furthermore, educational program is highly required to raise the level of awareness of students about a headache and migraine. Establishing stress management courses to advise students on how to deal with their daily stresses is also needed. Enhancing physical activities is recommended, especially among students suffering from migraine. Further studies are needed to be done among all university students. Lowering the frequency and the severity of a headache can be achieved by proper surveillance and detecting of the trigger factors.

7. THE IMPLICATIONS FOR PRACTICE AND RESEARCH

Migraine represents an important health problem among students from the Faculty of Applied Medical Sciences. There is a need for screening and management of cases. Further researches are required among students from other faculties.

CONSENT

An informed consent was taken from each student who accepted to participate, before participation.

ETHICAL APPROVAL

The protocol of the study was approved from the administrators of the Faculty of Applied Medical Sciences & then it was approved by the Institutional Review Board (IRB) of King Abdulaziz University Hospital (KAUH), with a Reference No of 320-17.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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