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Original

Triggering and relieving factors of migraine among university students: A cross-sectional study in Lebanon

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Abstract

Introduction

Migraine is common among university students and can directly affect their daily activities and learning since students with migraine have difficulties attending classes and missed more school days than other students.

Objectives

This study aimed to identify triggering factors of migraine along with factors that relieve headaches associated with migraine episodes among university students.

Methods

An observational cross-sectional study targeted students from different faculties of the public university campus in Lebanon using a survey for data collection.

Results

Feeling hungry (65.9%), fasting (50.7%), and coffee deprivation (22.7%) were the most commonly reported dietary factors inducing headaches among university students. In comparison, climate changes (77.1%), noise and high volumes (73.9%), and hot weather (60.2%) were the most common environmental triggers. Among the psychological factors, anxiety (53.4%) and crying (47.3%) were highly reported and were significantly higher among women. Fatigue (63.2%), studying for exams (59.5%), and neck pain (46.8%) were the most common physical activity-reported factors. Lack of sleep (72%) and changes in sleeping hours (42.7%) were the primarily reported sleeping habits that can trigger headaches, with no statistically significant differences between men and women. Sleeping (66.3%), relaxing (53.4%), avoiding migraine's trigger factors (42.9%), and having a warm bath (38.5%) were the most reported relieving factors of headache among students. No statistically significant association was noted between any of the factors and the sex of the participants.

Conclusion

The triggering and relieving factors of migraine were comparable between men and women. Some triggering factors such as crying, anxiety, and fatigue were found significant among women, while driving was a higher migraine trigger among men. Lifestyle interventions may provide clues on effective relieving strategies and yield the establishment of different medical services and university programs.

Introduction

Up to 75% of adults experience headaches, and many are underdiagnosed or undertreated.[1] Migraine, tension-type headaches, and headaches related to medication overuse are the most common headache disorders worldwide.[2] These disorders can cause substantial disability and impose considerable burdens of financial cost on patients and governments.[3]

Migraine is the leading cause of disability in the world namely in individuals aged 50 years and younger, with a higher prevalence in women.[4] The one-year prevalence of migraine is 15% with a higher prevalence in Europe and Southeast Asia.[4,5] Many internal and external stimuli can precipitate migraine with inter-individual differences and can also vary between the different attacks in the same person.[6] A recent study published in 2021 showed a significant association between self-reported trigger factors of migraine, namely light, sound, foods and skipping meals and early premonitory symptoms.[7] As a result, psychobiological manifestations can occur such as difficulty thinking, irritability, trouble concentrating, higher or lower energy, confusion and depression.[8] Photophobia, phonophobia, nausea, vomiting, neck pain and vertigo are the most reported accompanying symptoms of migraine.[9] Accurate identification of individual factor-attack profiles is crucial in order to recognize true triggers and for improved migraine management.[10]

The management of migraine differs between countries and includes acute, preventive, and non-pharmacological therapies.[11] Individualized treatments are recommended taking into consideration the family history of the patient, available comorbidities, and possible interactions while avoiding triggers and maintaining a long-term follow-up.[12] Lifestyle modifications are effective interventions to reduce migraine symptoms and the corresponding headache disabilities.[13] Among others, dietary interventions[14], ice packing application[15], heat massage[16], sleeping, and exercise[17] can help in relieving headaches associated with migraine episodes.

Migraine is common among university students and can directly affect their daily activities and learning18 since students with migraine have difficulties attending classes and missed more school days than other students.[19] In 2022, a cross-sectional study performed among medical students in Lebanon reported that 12.1% had migraine with anxiety, depression, insomnia, and online education as main triggers.[20] Most recently, a study revealed that 35.8% of university students had migraine with a higher prevalence among women.[21] In order to maximize students' awareness of migraine attacks, migraine management must be improved by identifying and avoiding common trigger factors.[22] Moreover, assessing the factors that relieve headaches can improve their quality of life and productivity by reducing the magnitude of disabilities related to migraine.[23] Therefore, this study aims to identify trigger factors of migraine among university students and factors that relieved headaches associated with migraine episodes.

Methods

Study design
An observational cross-sectional study was carried out over a period of six months between January and June 2018 targeting students from different faculties of the public university campus in Lebanon. Data were collected using a uniform questionnaire through face-to-face interviews performed by trained pharmacists.

Sample size calculation
Epi-info was used to calculate the required sample size, using the following equation:

$$N = (Z_{1-a/2})^2 \, p(1-p)/d^2$$

where Z is a standard normal variate (Z1-a/2= 1.96 at 95% confidence interval), d is the absolute accuracy or precision (5% marginal error), P is the expected proportion of the population with a specific outcome and was set at 0.279 taking into consideration data from a study carried out in Kuwait University that used the same tool for migraine assessment.[24] This resulted in a necessary sample size of 1,236 participants to be able to detect the prevalence of migraine among university students. Each faculty was sampled as an independent sub-population from which students were randomly selected.

Data collection
Data were collected using a uniform survey through face-to-face interviews performed during teaching hours. Data completion took on average 13 minutes per participant. The survey was available in both Arabic and English according to the student's preferences and consisted of three parts. The first part included questions covering the general characteristics of the participants (age, sex, governorate of residence, faculty attended, academic year, medical coverage and occupation). Afterward, the three-item ID test[25] was performed and those diagnosed with suggested migraine headaches were included

in the study and therefore, continued the interview. Participants were then asked about different factors that can be considered as trigger factors for headaches such as dietary (10 questions), environmental (12 questions), and hormonal factors (4 questions, only women) (See Table 2, multiple answers were possible). Moreover, 5 psychological factors were analyzed, 11 different physical activity changes and 5 changes in sleeping habits (See Table 3, multiple answers were possible). The third part of the questionnaire reported information encompassing the relieving factors of pain or headache during migraine episodes such as avoiding triggers, sleeping, avoiding light, vomiting, relaxing, head massage, applying ice, a warm bath and applying pressure on the head.

Ethical considerations

This study used a questionnaire for data collection without any type of invasive procedures or intervention. The study protocol and tool were reviewed and approved by the institutional review board of the faculty of pharmacy of the Lebanese University on November 14th, 2017. Data were completely anonymous and non-identifiable; storage of data follow-up university general data protection regulation guidelines and written informed consent was obtained from each student together with official approval from the rectorate and the deans/principals of the different faculties after reviewing the study protocol and tool. Students were acknowledged that they could withdraw their participation at any point during the interview.

Statistical analysis

Statistical analyses were performed using Statistical Package for Social Sciences (SPSS Inc, Chicago, Illinois) Version 27. Age is presented using means and standard deviations, whilst categorical variables are presented using frequencies and percentages. Bivariate analyses were conducted testing the association between the triggers of headaches among students, relieving factors and sex (dichotomous). The chi-square/Fisher exact tests were used to compare percentages between associate categorical variables. The unpaired t-test/Mann-Whitney test was used for the comparison of data between two different groups. A p-value <0.05 was considered statistically significant.

Results

General characteristics of the sample

In total 1,284 students were approached out of which 1,144 were included based on the previously defined criteria (89.1%). Based on the ID-migraine test, 410

students (35.8%) had a high probability of having migraine headaches. Table 1 displays the general characteristics of students with migraine headaches. The sample included more women (n=321, 78.3%) than men (n=89, 21.7%) with a mean age of 20.3 ± 2.6 years. The majority of the sample had Beirut (n=238, 58.6%) and Mount Lebanon (n=96, 23.6%) as the governorate of residence. The faculty of sciences accounted for the highest proportion of students diagnosed with migraine (n=174, 42.4%) followed by the faculty of business (n=89, 21.7%) and faculty of law (n=47, 11.5%). The majority of the students were in their first or second year of study (n=251, 61.8%) followed by those in their third or fourth year (n=115, 28.3%) and only 40 (9.9%) were in their fifth year or more. Almost 56% of migraine students had public coverage, 26.4% had private insurance and 17.3% had no medical coverage or rely on out-of-pocket money to cover medical expenses.

Table 1. Distribution of the general characteristics of students diagnosed with migraine headache

		Frequency (%)
Sex (n=410)	Men	89 (21.7%)
	Women	321 (78.3%)
Age (years) (n=404)	Mean ± SD	20.3 ± 2.6
Governorate of residence (n=406)	Beirut	238 (58.6%)
	Mount Lebanon	96 (23.6%)
	South	37 (9.1%)
	Bekaa	21 (5.2%)
	North	8 (2.0%)
	Nabatiyeh	6 (1.5%)
Faculty (n=410)	Sciences	174 (42.4%)
	Business	89 (21.7%)
	Law	47 (11.5%)
	Arts	29 (7.1%)
	Public health	22 (5.4%)
	Other	49 (11.9%)
Academic year (n=406)	1-2	251 (61.8%)
	3-4	115 (28.3%)
	>4	40 (9.9%)
Number of household members (n=399)	1-3	92 (34.3%)
	4-6	49 (18.3%)
	>6	49 (18.3%)
Medical coverage (n=387)	Public coverage	218 (56.3%)
	Private Insurance	102 (26.4%)
	None	67 (17.3%)
Working status (n=378)	Non-working student	316 (83.6%)
	Working student	62 (16.4%)

Results are given in terms of frequency (percentage) or mean ± standard deviation.

Trigger factors of headaches among students with migraine

Table 2 displays the reported triggers of headaches in terms of dietary, environmental and hormonal factors and their association with the sex of the students. Feeling hungry (n=270, 65.9%), fasting (n=208, 50.7%) and coffee deprivation (n=93, 22.7%) were the most commonly reported dietary factors inducing headaches among the students. Climate changes (n=316, 77.1%), noise and high volumes (n=303, 73.9%) and hot weather (n=247, 60.2%) were the most common reported environmental triggers of headache followed by exposure to light (n=208, 50.7%) and perfumes or detergents' smell (n=169, 41.2%). Women were also asked about the inducing effect of hormonal factors. A higher proportion indicated that headache is greater before (n=161, 50.2%) and during menstruation (n=102, 31.8%). There was no significant difference between men and women with regard to dietary and environmental factors (p>0.05) except for fasting reported to be a greater trigger among women (p<0.001) and smoking or smoke inhalation with a significantly higher percentage of women reporting it to be headache inducer (p=0.014).

Among the psychological factors, students with migraine headaches reported anxiety (n=219, 53.4%), crying (n=194, 47.3%) and intense emotions (n=175, 42.7%) to be the most common triggers of headaches. Anxiety and crying were significantly higher among women in comparison with men in terms of inducing headaches (p=0.040 and <0.001 respectively). Furthermore, fatigue (n=259, 63.2%), studying for exams (n=244, 59.5%), and neck pain (n=192, 46.8%) were the most common physical activity reported factors followed by being ill (having cough or flu) (n=102, 24.9%). Fatigue was significantly more prevalent among women (p=0.005) while driving or sitting in a car was reported more in men as a headache trigger (p<0.001). Lack of sleep (n=295, 72%), changes in sleeping hours (n=175, 42.7%), and having difficulties in sleeping (n=167, 40.7%) were the most common reported sleeping habits that can trigger headaches with no statistically significant differences between men and women (Table 3).

Table 2. Distribution of the general and clinical characteristics of migraine

Variables	Total	Men	Women	p-value
Dietary factors				
Feeling Hungry	270 (65.9%)	57 (64%)	213 (66.4%)	0.684
Fasting	208 (50.7%)	30 (33.7%)	178 (55.5%)	<0.001
Drinking coffee	22 (5.4%)	5 (5.6%)	17 (5.3%)	0.905
Coffee deprivation	93 (22.7%)	18 (20.2%)	75 (23.3%)	0.531
Fruits/vegetable consumption	6 (1.5%)	-	-	-
Dairy products consumption	12 (2.9%)	-	-	-
Eating ice cream or cold food	69 (16.8%)	13 (14.6%)	56 (17.4%)	0.526
Spicy food consumption	21 (5.1%)	7 (7.9%)	14 (4.4%)	0.185
Energy drinks and beverages	19 (4.6%)	6 (6.7%)	13 (4%)	0.285
Alcohol consumption	6 (1.5%)	-	-	-
Environmental factors				
Climate changes	316 (77.1%)	70 (78.7%)	246 (76.6%)	0.689
Hot weather	247 (60.2%)	57 (64%)	190 (59.2%)	0.408
Cold weather	58 (14.1%)	11 (12.4%)	47 (14.6%)	0.585
Rain	17 (4.1%)	3 (3.4%)	14 (4.4%)	0.678
Light	208 (50.7%)	47 (52.8%)	161 (50.2%)	0.658
Noise and high volumes	303 (73.9%)	63 (70.8%)	240 (74.8%)	0.449
Perfumes or detergents smell	169 (41.2%)	33 (37.1%)	136 (42.4%)	0.370
Air conditioning	121 (29.5%)	26 (29.2%)	95 (29.6%)	0.944
Pollution	119 (29%)	22 (24.7%)	97 (30.2%)	0.312
High altitudes	64 (15.6%)	13 (14.6%)	51 (15.9%)	0.768
Smoking or smoke inhalation	166 (40.5%)	26 (29.2%)	140 (43.6%)	0.014
Gas or gasoline smell	95 (23.2%)	16 (18%)	79 (24.6%)	0.189
Hormonal factors (in women)				
Before menstruation	161 (50.2%)	-	-	-
During menstruation	102 (31.8%)	-	-	-
After menstruation	35 (10.9%)	-	-	-
After taking contraceptives	5 (1.6%)	-	-	-

Results are given in terms of frequency (percentage)

Table 3. Distribution of the general and clinical characteristics of migraine

Variables	Total	Men	Women	p-value
Psychological factors				
Anxiety	219 (53.4%)	39 (43.8%)	180 (56.1%)	0.040
Crying	194 (47.3%)	18 (20.2%)	176 (54.8%)	<0.001
Intense emotions	175 (42.7%)	36 (40.4%)	139 (43.3%)	0.630
Work/life stress	136 (33.2%)	32 (36%)	104 (32.3%)	0.528
Period after stress	34 (8.3%)	6 (6.7%)	28 (8.7%)	0.549
Physical activity				
Fatigue	259 (63.2%)	45 (50.6%)	214 (66.7%)	0.005
Studying for the exams	244 (59.5%)	47 (52.8%)	197 (61.4%)	0.145
Neck pain	192 (46.8%)	35 (39.3%)	157 (48.9%)	0.109
Cough/flu	102 (24.9%)	23 (25.8%)	79 (24.6%)	0.812
Much reading or writing	72 (17.6%)	20 (22.5%)	52 (16.2%)	0.169
Traveling	56 (13.7%)	12 (13.5%)	44 (13.7%)	0.957
Physical activity/ exercise	40 (9.8%)	13 (14.6%)	27 (8.4%)	0.081
Driving/sitting in a car	35 (8.5%)	16 (18%)	19 (5.9%)	<0.001
Constipation	33 (8%)	7 (7.9%)	26 (8.1%)	0.943
Weight lifting	10 (2.4%)	-	-	-
Sexual activity	4 (1%)	-	-	-
Sleeping habits				
Lack of sleep	295 (72%)	58 (65.2%)	237 (73.8%)	0.107
Changes in sleeping hours	175 (42.7%)	37 (41.6%)	138 (43%)	0.811
Having difficulties sleeping	167 (40.7%)	37 (41.6%)	130 (40.5%)	0.855
Excess of sleep	91 (22.2%)	23 (25.8%)	68 (21.3%)	0.357
Using low pillows	83 (20.2%)	20 (22.5%)	63 (19.6%)	0.554

Results are given in terms of frequency (percentage)

Table 4. Distribution of the relieving factors of migraine among university students

Variables	Total	Men	Women	p-value
Sleeping	272 (66.3%)	52 (58.4%)	220 (68.5%)	0.074
Relaxing	219 (53.4%)	43 (48.3%)	176 (54.8%)	0.276
Avoiding trigger factors	176 (42.9%)	43 (48.3%)	133 (41.4%)	0.246
Warm bath	158 (38.5%)	38 (42.7%)	120 (37.4%)	0.362
Avoid light	156 (38.0%)	32 (36%)	124 (38.6%)	0.646
Head Massage	143 (34.9%)	37 (41.6%)	106 (33%)	0.134
Apply pressure on the head	63 (15.4%)	10 (11.2%)	53 (16.5%)	0.222
Vomiting	42 (10.2%)	8 (9%)	34 (10.6%)	0.659
Applying ice	21 (5.1%)	7 (7.9%)	14 (4.4%)	0.185

Results are given in terms of frequency (percentage)

Discussion

The present study aimed to identify triggering factors of migraine along with factors that relieve headaches associated with migraine episodes among university students. Findings showed that students diagnosed with migraine were mostly from the faculty of science followed by the faculty of business and low. The majority were women, residing mainly in Beirut and Mount Lebanon. More than half of the students diagnosed with migraine were from the first or second academic year, non-working, with public medical coverage. In terms of triggering factors for headaches, there were no statistically significant differences between men and women, except for fasting and smoking or smoke inhalation, which were more reported by women than by men. Moreover, among psychological and physical factors anxiety, fatigue and crying were statistically significantly high in women than men, while driving a car was a greater headache inducer in men. Whilst looking at the reliving factors, sleeping, relaxing, avoiding triggering factors, and taking warm baths were the most reported factors by both sexes with no statistical differences between them.

A study carried out in Bangladesh reported similar results, such as more female students in their early 20s and first year of academia having migraine, as well as anxiety and depression being triggering factors for migraine headaches.[26] Another study conducted in Ethiopia showed that noise, sunlight, fatigue, as well as smell, and menstruation were triggering factors for women. Unlike our results, they found that late sleep at night was a trigger for migraine in women more than men.[27]

Relieving factors of headache among migraine students

Table 4 presents the relieving factors of headaches reported by migraine students and their association with sex. Sleeping (n=272, 66.3%), relaxing (n=219, 53.4%), avoiding migraine's trigger factors (n=176, 42.9%), and having a warm bath (n=158, 38.5%) were the most commonly reported relieving factors of headache among the students followed by avoiding light (n=156, 38%) and head massage (n=143, 34.9%). Nevertheless, vomiting (n=42, 10.2%) and applying ice on the head (n=21, 5.1%) were the least commonly reported factors to relieve migraine's associated pain. No statistically significant association was noted between any of the factors and the sex of the participants. However, a borderline p-value was observed (p=0.074) for sleeping as a relieving factor for migraine headaches reported by more women (n=220, 68.5%).

A study from Saudi Arabia carried out among medical students reported similar triggering and relieving factors. Though they included just the faculty of medicine in their study, this similarity may be explained by cultural and geographical factors.[28] Furthermore, several studies demonstrated that during fasting, for example, during Ramadan period, headaches are worsened. This is in line with our results, suggesting that special precautions and prophylactic measures should be taken into account among this population, especially among women, being more vulnerable to the trigger.[29] Another study conducted among Iraqi Kurdish patients demonstrated that taking medications, vomiting, and pregnancy in women were the most commonly reported relieving factors among the patients. However, this can be probably related to the age of participants as they include a wider population aged from 10 to 69 years old.[30]

A recent review that evaluated the triggering factors among multi-ethnic Southeast Asian adult patients and assessed the influence of geographical location, ethnicity, and gender on the various trigger factors of migraines has found that the most common factors were sleep deprivation, stress, change of weather, and sunlight. Nevertheless, there were conflicting reports on the existence of differences between genders in the other triggers such as weather change and odor. In some studies, change of odor and weather were more common triggers among women while in some other studies there were no differences unfolded among the genders.[31] Our results demonstrated that fatigue, studying for exams, and neck pain were reported as major physical factors inducing migraine headaches. As most of the students with migraine headaches were from the faculty of science and business, they may be the ones with more busy schedules and study load.

Many non-pharmacological measures are being practiced by people to get rid of their headaches. Sometimes it is not even clear if the behavior during the attack is a general response to a headache or if it is headache type specifically. There are some instinctive maneuvers used by patients to alleviate their pain such as massage, sleep, rest, and posture, being the most reported by clinicians who work in the field.[32] Our results also demonstrated that sleeping, relaxing, head massage along with avoiding triggering factors, and warm baths are the most useful techniques practiced by students to alleviate their headaches.

This study has limitations. Students were not interviewed by a neurologist to confirm the diagnosis of migraine. Moreover, recall bias due to the use of a self-administered questionnaire might induce differences in understanding some asked questions. However, stratification increased the external validity of the study and can allow the generalizability of the findings to other university students in similar settings worldwide.

Conclusion

Overall, the triggering and relieving factors are common and similar in men and women suffering from migraine headaches. Even though some of the triggering factors such as crying, anxiety, and fatigue are indicated significantly among women, there is just one factor associated significantly with men (driving or sitting in the car). This difference disappears when looking at relieving factors for migraine between sexes. The careful monitoring of vulnerable groups is essential in the prevention and treatment of migraine among university students. Furthermore, they may provide clues on effective relieving strategies and yield to the establishment of different medical services and programs in universities. Based on that, future research should be focused on examining the effectiveness of implemented measures that can be extrapolated in more diverse populations.

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