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Review

Prevalence of migraine and associated factors among medical students in Ouagadougou (Burkina Faso)

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Introduction
Migraine is highly prevalent among university students and it is associated with impaired academic performance and limited daily activities.
Objective
To determine the prevalence, clinical characteristics and impact of migraine among medical students in the city of Ouagadougou.
Methods
This across-sectional study was carried out during a period of 6 months from August 2021 to January 2022. Participants were selected by stratified random sampling according to academic level. Hetero-administered questionnaire was administred to each student. The ICHD 3rd edition criteria and the MIDAS were used to assess the diagnosis and the impact of migraine on quality of life.
Results
Two hundred and twenty seven students were selected for this study. The prevalence of migraineurs was 31.8%. Their mean age was 22.20±2.67 years. There was female predominance among the migraineurs (73.9%). More than half of the migraineurs had a family history of headache disorders (53.6%). Migraine without aura was the most frequent subtype (59.4%). Visual aura was predominant (78.2%). Migraine was of moderate intensity in 60.8% of cases. Insomnia and/or lack of sleep was the most common trigger (73.7%) followed by stress and fatigue in 71% of cases. Migraine caused severe disability in 15.9% of migraineurs.
Conclusion
There was a high prevalence of migraine among medical students in Burkina Faso. Stress and irregular sleep were the most common triggers factors.

Keywords:
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Introduction

Migraine is neurological disorder and major public health problem witch affected one in seven people in the world.[1] Due to the high impact on quality of life, the WHO in 2016 ranked the disease as the second leading cause of years of life with disability.[2] This significant limitation thus leads to high direct and indirect costs.[3] Migraine is highly prevalent among university students and it is associated with impaired academic performance and limited daily activities.[4] It has negative effects among university students, who indeed require constant concentration and high level of performance.[5] As medical students are subjected to stress regarding their exams, high level performance, many years of education and the implicit responsibility to the courses. Medical students are considered a special group of university students and, naturally, prolonged medical training and heavy study load are the typical sources of stress that can lead to migraine attacks.[6-8] Thus, studies have been conducted in many Western and Asian countries to estimate the situation of migraine attacks among medical students.[9, 10] The prevalence of migraine among medical students ranges from 11 to 40% worldwide.[11-13] In West Africa, there are few studies from Benin et al.,14 and Mali et al., 15 which reported migraine prevalence among university students. A study carried out in Southeastern Nigeria, the prevalence of migraine among medical and nursing students was 13.1%.[16] In Burkina Faso, primary headaches were most prevalent, dominant by tension-type headache and migraine type. Although students are the second social group most affected by headaches, no studies have been carried out on migraine in students, let alone medical students.[17] The aims of the study were to determine the prevalence, clinical characteristics, impact of migraine and its associated factors among medical students in Burkina Faso, in order to contribute to its management and thus improve the academic performance of these future doctors.

Methods

Study location

Burkina Faso is a french speaking country located in the heart of West Africa. It covers an area of 274,222 km^2.[17] It's population is estimated in 2019 at 20, 870,060 inhabitants with predominance of rural population (80%), people under 35 years (77.9%) and female population (51.7%).[18] Ouagadougou the country's capital had an estimated population of 2.5 million. There is a two-university medical school in the capital; Joseph KI zerbo University and Saint Thomas d'Acquin University in Saaba on the outskirts of Ouagadougou. This establishment now has more than 2,500 students. The Department of Medicine had 1077 students (1st to 7th year) enrolled for the year 2020-2021.

Type and duration of study

This study cross-sectional was performed during the 2022 academic year, from 1st August 2021 to 31th January 2022.

Study design

The study was carried out on medical students of University Saint Thomas d'Acquin in Ouagadougou, registered for the year 2020-2021, having given their free consent. Students absent at the time of the study were not included in the study.

Sampling

To estimate the sample size, we took into account the risk of alpha error of 5%. The formula we used is this: $n = [Z\alpha^2 p (1-p)]/e^2$. n: size of the sample, Zα: reduced deviation for the alpha risk at 5% (it is read on the normal distribution table) and is equal to 1.96. e: desired precision of 5%. p: prevalence. Based on an estimated prevalence of 15% [17], our minimum sample size is 196 students. We assumed a nonresponse rate of 10%, which gave us a final sample size of 217. Random sampling stratified by education level was adopted as the sampling procedure. The number of students to be surveyed per cohort was calculated using the formula np = Ep×217/Et. Where np = workforce selected for the promotion survey, Ep = class size and Et = total class size of all classes.

Collection tools

Hetero-administered questionnaire was designed to collect the data. The questionnaire was divided into 3 parts. The first part concerned the socio-demographic information of the students.

The second part of the questionnaire focused on the diagnosis and clinical characteristics of migraine, family history of migraine and associated cardiovascular risk factors and comorbidities. The third part of the questionnaire based on the MIDAS[18] focused on the impact of migraine on the quality of life of students and the care seeking practices of migraine sufferers.

Variables

The study variables were as follows: socio-demographic characteristics (age, sex, level of study, marital status, place of residence during the academic year); characteristics of headaches (associated signs, severity, duration, frequency of attacks, triggering factors, calming factors); types of migraine (without aura, with aura), family history of migraine, vascular risk factors and associated comorbidities, type of treatment (self-medication, traditional treatment, medical prescription); consultation with a healthcare professional (yes or no), the MIDAS score, etc.

Course of the investigation

Before the survey, a meeting with the promotion delegates was made to determine the hoavailable hours and meeting places for administering the questionnaire. The list of students was provided by the administration of the establishment. Students were interviewed in their classrooms during break time, during group work or at the end of class. The students who participated in the study were chosen by random drawing of the order numbers on the promotion lists. When a selected student did not consent to participate in the study or left the study out of disinterest or obligation, another student was chosen to replace him. The questions of incomprehension had been answered before and during the investigation. The students had given their free consent before answering the questions. The estimated time to answer the questions was 15 minutes.

Data analysis

The data collected was recorded on a microcomputer and then analyzed using Epi info software in its French version 7.2.2.16. Quantitative variables were expressed by their mean ± standard deviation and qualitative variables by number and percentage. The chi-square test was used to compare qualitative variables for counts ≥ 5. For counts < 5, we used Fisher's exact test. Student's t test was used to compare quantitative variables. The test was significant if $p < 0.05$.

Assessements

Migraine was diagnosed according to the ICHD 3rd edition[19] and the MIDAS[18] was used to assess the impact of migraine on students' quality of life. The frequency of migraine attacks was considered rare (less than 4 attacks per month); frequent (4 and 6 attacks) and very frequent (7 and 9 attacks) and very frequent (greater than or equal to 10 attacks).

Results

Population History

Two hundred and seventeen medical students from 1st to 7th year were included in this study. Among them, 69 (31.8%) students were diagnosed with migraine.

Socio-demographic characteristics of migraineurs

The mean age of migraineurs was 22.20 ±2.67 years, ranging from 18 to 31 years. The majority of migraineurs (72.4%) was in the age group of 20 and 24 years. Eigtheen migraineurs (26.1%) were male and 51 (73.9%) female. Undergraduate students were 41 (59.5%) of migraine sufferers. The majorty of students were single (94.2%). Fifty four (53.6%) of migraine students had a family history of chronic headache disorders. Fourteen of the students (20.3%) had reported anxity and/or depression. Chronic sinusitis was found in 7.2 % of migraineurs. Table 1 shows the distribution of migraine sufferers according to their socio-demographic characteristics.

Table 1. Headache characteristics of study group

Variables	Study Population (N=69)	Percentage (%)
Age (years)		
<20	8	11.6
20 – 24	50	72.4
25 – 29	10	14.5
≥30	1	1.5
Sex		
Male	18	26.1
Female	51	73.9
Education level		
Licence	41	59.5
Master	18	26
Doctorat	10	14.5
Residence		
Saaba	42	60.9
Hors de Saaba	27	39.1
Familly history of migraine	37	53.6
Personal medical history		
Anxiety and depression	14	20.3
Sédentarity	3	4.7
Obesity	2	2.8
Sinusitis	5	7.2
Alcool	3	4.4
Diabete mellitus	1	1.4

Clinical characterics of migraine headaches

The mean migraine attacks per month was 4.21± 4.4 attacks. The majority of migraineurs (65.2 %) had less than 4 migraine attacks per month. The duration of each episode was estimated at 4 to 72 hours in 78.3% of migraineurs. The location of headache was unilateral in 31 (44, 9%) participants. The table 2 summerise the distribution of participants according to ICDH criterias. At least, 41 students (59.4%) had migraine without aura and 28 (40.6%) migraine with aura. The most common auras were visual signs (78.2%), paresthesias (4.9%) and language disorders (n=1; 1.4%). The mean duration of migraine was 3.08±2.25 years. The duration of migraine was under a year in 16 (23.2%), between 1-5 years in 30 (43.5%) and more than 5 years in 23 (33.3%) participants. Headache can occurred at any time in 59.4% of participants, at the afternoon in 33.3 % and at evening in 10% of participants. The most common triggering factors were sleep disorders (92.7%) followed by stress (71%) and fatigue (71%). Menstruations were found in 25.5% of female students with migraine.

Migraine treatment and impact of life

Thirty two (46.4%) students with migraine had already consulted a healthcare professional for their headaches. Among them, 75% had already consulted a general practitioner, 16% a neurologist and 9% a nurse. Thirteen participants (18.8%) had benefited from brain imaging. According to treatment, self-medication was the main treatment (50.7%), medical prescription (43.4%) and traditional treatment (14.3%). Fifty-five students (79.7%) affirmed that they noted an absence of improvement or even a worsening. The Table 2 gives the clinical characterics of migraine type headache in students. Migraine caused severe disability (MIDAS>20) in 11 (15.9%) participants. Table 3 shows the distribution of migraine sufferers according to the MIDAS score.

Table 2. Clinical characteristics of migraine

Variable	Effectif (N=69)	Percentage (%)
Time of occurrence		
Variable	41	59.4
Afternoon	23	33.3
Evening	16	23.2
Night	7	10.1
Noon	5	7.2
Morning	4	5.8
Triggering factor		
Insomnia or lack of sleep	55	79.71
Stress or fatigue	39	56.52
Noises	32	46.37
Lighting, light, sun	29	40.02
Physical effort	22	31.9
Heat	21	30.43
Menstruation or Fasting	13	18.9
Excess sleep	9	13.04
Prolonged intellectual effort	8	12
Cold	7	10.14
Coffee	5	7.24
Treatment		
Self-medication	35	50.7
Medical prescription	30	43.4
No treatment	14	20.3
Traditional treatment	10	14.3
Score MIDAS		
0-5 (Little or no handicap)	32	46.37
6-10 (slight disability)	8	11.60
11-20 (moderate disability)	18	26.09
≥21 (severe disability)	11	15.94

Table 3. Factors associated with migraine

Factors	Study population	Migraineurs	Non-migtaineurs	p value
Age (years)				
<20	26 (12%)	8 (30.8%)	18 (69.2)	0.04
20 – 24	152 (70.03%)	50 (32.9%)	102 (67.1)	
25-29	38 (17.51%)	10 (26.3%)	28 (73.7%)	
≥30	1 (0.46%)	1 (100%)	0 (0)	
Sex				
Female	136 (62.68%)	51 (37.5%)	85 (62.5)	0.64
Male	81 (37.32)	18 (22.2)	63 (77.7%)	
Education				
Licence	119 (54.84%)	41 (34.4%)	78 (65.5%)	0.56
Master	59 (27.19%)	18 (30.5%)	41 (69.5)	
Doctorate	39 (17.97%)	10 (25.6)	29 (74.4%)	
Residence				
Saaba	140 (64.51%)	42 (30%)	98 (70%)	0.16
Hors Saaba	77 (35.49%)	27 (35.1)	50 (64.9%)	
History of migraine	90 (41.47%)	37 (41.1)	53 (58.9%)	0.17

Factors associated with migraine

The prevalence of migraine was respectively 22.2% in men and 37.5 % in women with difference between the two groups (p=0.0434). There were no significant link between age, academic level, residence, familly history of migraine and migraine disorder.

Discussion

Migraine frequency

The prevalence of migraine in our study was higher than those observed in Africa[8,20] and in some Asian countries.[8,21,22] This high prevalence could be linked to stress linked to the mass increase in numbers, the overlapping of academic years and the lack of opportunities at the end of training. However, our results are similar to those found by other studies carried out in India, Nepal and Pakistan, suggesting an equivalent level of stress and similar socio-cultural contexts.[23,24]

The mean age of migraineurs was similar to that found in other studies, particularly in Nigeria

(24.6±4.58 years) 25and in Kuwait (20.17±2.19 years).[8] The age group of 20-24 years was the most affected, unlike the study by Ezzeala-Adikai et al in Nigeria where students aged under 20 were the most affected.20 Cette pourrait s'expliquer par des differences d'ordre psychologiques liées au changement de cycle academique. The majority

of migraineurs were undergraduate students (59.5%) in line with studies carried out in Egypt[26] and in China.[27] On the other hand, the majority of migraine sufferers were at the end of their study cycle as in Nigeria.[28] The difference between the two study groups would be linked to the sociodemographic characteristics of the study population. The majority of migraine sufferers were women, consistent with data from the literature.[8,21,29] There was also a significant association between migraine and female sex, which is commonly observed in several studies.[25, 30] After puberty, migraine becomes three to four times more frequent in women than in men.[31] The majority of migraine sufferers had a family history of chronic headache. Our results were close to those of Raju et al.[23] in India (49%) and Hatem et al.,[32] (41%). In contrast, lower prevalence of family history of migraine was present in the study of Adoukonou33 in Benin (14.6%) and in a study conducted in India (20.1%).34 The relative risk of migraine for a first-degree relative of an index case was 1.5- to 4-fold compared with the general population.[35]

Clinical characterics of migraine headaches

The classic aspects of migraine were mainly found in our study, namely the pulsatile nature, aggravation by physical activity and the duration of attacks 4-72 hours. Regarding the pulsatile nature of headaches, our results are similar to those of Orbay et al.[36] in Egypt (77%) and Ezeala-Adikai et al.[20] in Nigeria (96.6%). The frequency of migraine sufferers having attacks lasting between 4-72 hours (78.3%) was similar to that of study of Adoukonou et al. in Benin (62.6%).[14] Photophobia and phonophobia were the most frequent associated signs, according to studies of Ezeala Adikai et al.20 in Nigeria (83.1%) and of Oraby et al.[37] in Egypt (85.8%). However, nausea was minor symptoms unlike the Oraby et al.[37] study. in Egypt where it was a major symptom (53.1%). Our study observed a low monthly number of attacks per patient, in line with the study of Al Hashel et al.8 in Kuwait (4.29±1.8) et de Ibrahim et al.[21] in Saudi Arabia (4.6±1.5). Furthermore, the majority of migraine sufferers had 1-4 attacks per month.

For example,38.5% of students diagnosed with migraine had about 1–4 attacks per month.[38] Insomnia or irregular sleep was the most frequent migraine triggers, in line with the study of Osman.39 Others triggers were found in several studies: stress in China and and Iran[10, 27]; fatigue in Egypt[40] and prolonged computer work in Saoudi Arabia.[41] Reported anxiety or depression was reported in about a quarter of migraine sufferers. Migraine often presents with various comorbid psychiatric conditions such as anxiety and depression.[42] Menstruation-related migraines were reported in a quarter of female students, in line with the study of Oraby et al.[7] in Egypt (27.4%)[3] and Ibrahim et al.21 in Saudi Arabia (34.8%). Theses results were under than Osman Ali[39] in Sudan (46.7%). Rest or sleep were the most common relief factors with similar frequency than in the study of Akour et al.[40] (84.6%) and Orbay et al.[37] (78.8%). This could be explained by the fact that the management of migraine also includes non-drug means such as rest. Migraine without aura was the most common type, as than in several studies.[14,37,43] According migraine with aura, visual symptoms were most frequent in agreement with Oparah et al.[43] in Nigeria (71.8%) and Oraby et al.[37] (67.4%).

Migraine treatment and quality of life

Most students had consulted a health professional for their headaches, as like as in the study of Oparah et al.[43] in Nigeria (53.8%). On the other hand, self-medication was common among the majority of students as in the study of Oparah et al.[43] in Nigeria (53.8%). This self-medication could be a source of medication overuse headaches with a high frequency of migraine attacks. This situation could be explained by the fact that medical students have proven knowledge about treatment. However, various studies have reported different prevalence figures ranging from 43.2 to 91%.44-46 Medical students preferred to self-medicate to save both time and cost.[47] Their training and medical knowledge could have made the medical students more confident in self-medicating with analgesics for their headaches.[48,49] Most student's prennait également des médicaments traditionnels, in contrast with the previous study of Somé in which no migraine patient had taken traditional treatment. A few numbers of students declared that there was no improvement in the course of their headaches (27.5%) but in lower prevalence than in the study of Somé in Burkina Faso (50.91%). This difference could be explained by the fact that the use of self-medication and medical treatment was more frequent among medical students.

The frequency of students with severe disability was in line with the study of Raju et al.[30] in India (16.3%) and the study of Anwar et al.6 in Pakistan (29.1%). This observation confirms the findings of earlier studies involving medical students where students with migraines were significantly affected in terms of their daily academic performance, working activities and, social lives.[9, 23]

The strength of our study lay in the hetero-administered nature of the questionnaire, which made it possible to explain the questionnaire well, particularly on the symptoms of aura, and to answer questions of incomprehension from the participants. Our study encountered some limitations and constraints. The questionnaire considered long by some students, the latter gave quick answers to free themselves. As a result, the student's stress level could not be assessed. Elements relating to medical care could not be notified, such as additional examinations and medications used.

Conclusion

There was a high prevalence of migraine among medical

students in Burkina Faso. Stress and irregular sleep were the most common triggers factors. Migraine had a considerable impact on the quality of life of students.

Authors' contributions
DAA, DA, KJMA, DL, had contributed to the data collection or processing, analysis or interpetation, literature research and writing; NC, MA, KJ, had contributed to concept and design of the study. The questionnaire was administered by Doukouré L and to the selection of students.
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References

1. Steiner TJ, Stovner LJ and Birbeck GL. **Migraine: The Seventh Disabler.** *Headache: The Journal of Head and Face Pain* 2013;53(2):227-229: Doi: 10.1111/head.12034
2. Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, . . . Murray CJL. **Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016**. *The Lancet* 2017;390(10100):1211-1259: Doi: 10.1016/s0140-6736(17)32154-2
3. Steiner TJ, Stovner LJ, Katsarava Z, Lainez JM, Lampl C, Lantéri-Minet M, . . . Andrée C. **The impact of headache in Europe: principal results of the Eurolight project**. *The Journal of Headache and Pain* 2014;15(1): Doi: 10.1186/1129-2377-15-31
4. Smitherman TA, McDermott MJ and Buchanan EM. **Negative Impact of Episodic Migraine on a University Population: Quality of Life, Functional Impairment, and Comorbid Psychiatric Symptoms.** *Headache: The Journal of Head and Face Pain* 2011;51(4):581-589: Doi: 10.1111/j.1526-4610.2011.01857.x
5. Waldie KE, Hausmann M, Milne BJ and Poulton R. **Migraine and cognitive function**. *Neurology* 2002;59(6):904-908: Doi: 10.1212/wnl.59.6.904
6. Noor T, Sajjad A and Asma A. **Frequency, character and predisposing factor of headache among students of medical college of Karachi. JPMA**. *The Journal of the Pakistan Medical Association* 2016;66: 159-164
7. Johnson H, Guhl G, Arora J and Walling A. **Migraine in Students of a US Medical School.** *Family medicine* 2014;46: 615-619.
8. Al-Hashel JY, Ahmed SF, Alroughani R and Goadsby PJ. **Migraine among medical students in Kuwait University.** *The Journal of Headache and Pain* 2014;15(1):Doi: 10.1186/1129-2377-15-26
9. Menon B and Kinnera N. **Prevalence and characteristics of migraine in medical students and its impact on their daily activities.** *Annals of Indian Academy of Neurology* 2013;16(2):Doi: 10.4103/0972-2327.112472
10. Shahrakai M, Mirshekari H, Ghanbari A, Shahraki A and Shahraki E. **Prevalence of Migraine Among Medical Students in Zahedan Faculty of Medicine (Southeast of Iran)**. *Basic and Clinical Neuroscience* 2011;2: 20-25.
11. Ferri-de-Barros J, Alencar M, Berchielli L and Junior L. **Headache among medical and psychology students**. *Arquivos de neuro-psiquiatria* 2011;69(502-508 Doi: 10.1590/S0004-282X2011000400018
12. Murray CJL, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, . . . Lopez AD. **Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010**. *The Lancet* 2012;380(9859):2197-2223: Doi: 10.1016/s0140-6736(12)61689-4
13. Amayo EO, Jowi JO and Njeru EK. **Headache associated disability in medical students at the Kenyatta National Hospital, Nairobi.** *East African Medical Journal* 2002;79(10):Doi: 10.4314/eamj.v79i10.8813
14. Adoukonou T, Tognon-Tchegnonsi F, Philomène K, Alabi A, Houinato D and Preux P-M. **Prevalence of migraine among university students at Parakou, Benin: A cross-sectional study**. World Journal of Neuroscience 2014;04(01):18-24 Doi: 10.4236/wjns.2014.41003
15. Maiga Y, Soumaïla B, N'Drainy Cissoko L, Sangaré M, Diallo SH, Diallo S, . . . Sidibé O. **Epidemiology of migraine among students in Mali**. *eNeurologicalSci* 2017;7: 32-36: Doi: 10.1016/j.ensci.2017.04.001
16. Ezeala-Adikai B, Ekenze O and Onwuekwe I. **Frequency and pattern of migraine among medical and nursing students at Enugu, South East Nigeria**. *The Journal of Headache and Pain* 2013;14: Doi: 10.1186/1129-2377-14-S1-P5
17. Wang X, Zhou HB, Sun JM, Xing YH, Zhu YL and Zhao YS. **The prevalence of migraine in university**

students: a systematic review and meta-analysis. *European Journal of Neurology* 2015;23(3):464-475: Doi: 10.1111/ene.12784
18. Stewart WF, Lipton RB, Dowson AJ and Sawyer J. **Development and testing of the Migraine Disability Assessment (MIDAS) Questionnaire to assess headache-related disability**. *Neurology* 2001;56(suppl_1): Doi: 10.1212/WNL.56.suppl_1.S20
19. **Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition**. *Cephalalgia* 2018;38(1):1-211: Doi: 10.1177/0333102417738202
20. Ezeala-Adikai BA, Ekenze OS and Onwuekwe IO. **Frequency and pattern of migraine among medical and nursing students at Enugu, South East Nigeria**. *The Journal of Headache and Pain* 2013;14(S1):Doi: 10.1186/1129-2377-14-s1-p5
21. Ibrahim NK, Aloitabi AK, Alhazmi A, Alshehri R, Saimaldhr R and Murad M. **Prevalence, predictors and triggers of migraine headache among medical students and interns in King Abdulaziz University, Jeddah, Saudi Arabia**. *Pakistan Journal of Medical Sciences* 2017;33(2): Doi: 10.12669/pjms.332.12139
22. Deleu D, Khan MA, Humaidan H, Al Mantheri Z and Al Hashami S. **Prevalence and Clinical Characteristics of Headache in Medical Students in Oman**. *Headache: The Journal of Head and Face Pain* 2008;41(8):798-804: Doi: 10.1046/j.1526-4610.2001.01146.x
23. Raju S and S G. **Prevalence of migraine among medical students of a tertiary care teaching medical college and hospital in South India - A cross-sectional study.** *National Journal of Physiology, Pharmacy and Pharmacology* 2018;8(9): Doi: 10.5455/njppp.2018.8.0620111062018
24. Khan A, Khattak H, Jamali R, Rashid H, Riaz A and Khan A. **Prevalence of Migraine its Common Triggering Factors and Coping Strategies in Medical Students of Peshawar.** *Khyber Medical University Journal* 2012;4: 187-192.
25. Seifert T, Sufrinko A, Cowan R, Scott Black W, Watson D, Edwards B, . . . Kontos AP. **Comprehensive Headache Experience in Collegiate Student-Athletes: An Initial Report From the NCAA Headache Task Force**. *Headache: The Journal of Head and Face Pain* 2017;57(6):877-886: Doi: 10.1111/head.13104
26. Oraby M, Soliman R, Mahmoud M, Elfar E and Elmonem N. **Migraine prevalence, clinical characteristics, and health care-seeking practice in a sample of medical students in Egypt.** *The Egyptian Journal of Neurology Psychiatry and Neurosurgery* 2021;57: Doi: 10.1186/s41983-021-00282-8
27. Gu X and Xie Y. **Migraine attacks among medical students in Soochow University, Southeast China: a cross-sectional study**. *Journal of Pain Research* 2018;Volume 11(771-781 Doi: 10.2147/jpr.S156227
28. Ojini FI, Okubadejo N and Danesi MA. **Prevalence and Clinical Characteristics of Headache in Medical Students of the University of Lagos, Nigeria**. *Cephalalgia* 2009;29(4):472-477: Doi: 10.1111/j.1468-2982.2008.01766.x
29. Ghorbani A, Abtahi S-M, Fereidan-Esfahani M, Abtahi S-H, Shemshaki H, Akbari M and Mehrabi-Koushki A. **Prevalence and clinical characteristics of headache among medical students, Isfahan, Iran**. *Journal of research in medical sciences : the official journal of Isfahan University of Medical Sciences* 2013;18 S24-27.
30. Birru EM, Abay Z, Abdelwuhab M, Basazn A, Sirak B and Teni FS. **Management of headache and associated factors among undergraduate medicine and health science students of University of Gondar, North West Ethiopia**. *The Journal of Headache and Pain* 2016;17(1): Doi: 10.1186/s10194-016-0647-4
31. Tonini MC. **Gender differences in migraine.** *Neurological Sciences* 2018;39(S1): 77-78: Doi: 10.1007/s10072-018-3378-2
32. Hatem G, Mosleh R, Goossens M, Khachman D, Al-Hajje A and Awada S. **Prevalence and risk factors of migraine headache among university students: A cross-sectional study in Lebanon.** *Headache Medicine* 2022;13(3):213-221: Doi: 10.48208/HeadacheMed.2022.23
33. Adoukonou T, Houinato D, Kankouan J, Makoutode M, Paraiso M, Tehindrazanarivelo A, . . . Preux PM. **Migraine Among University Students in Cotonou (Benin).** *Headache: The Journal of Head and Face Pain* 2009;49(6):887-893: Doi: 10.1111/j.1526-4610.2009.01408.x
34. Nandha R. **Prevalence and clinical characteristics of headache in dental students of a tertiary care teaching dental hospital in Northern India.** *International Journal of Basic & Clinical Pharmacology* 2013;2: Doi: 10.5455/2319-2003.ijbcp20130110
35. Polderman TJC, Benyamin B, de Leeuw CA, Sullivan PF, van Bochoven A, Visscher PM and Posthuma D. **Meta-analysis of the heritability of human traits based on fifty years of twin studies**. *Nature Genetics* 2015;47(7):702-709: Doi: 10.1038/ng.3285
36. Nandha R and Chhabra M. **Prevalence and clinical characteristics of headache in dental students of a tertiary care teaching dental hospital in Northern India.** *International Journal of Basic & Clinical Pharmacology* 2013;2(1):Doi: 10.5455/2319-2003.ijbcp20130110
37. Oraby MI, Soliman RH, Mahmoud MA, Elfar E and Abd ElMonem NA. **Migraine prevalence, clinical characteristics, and health care-seeking practice in a sample of medical students in Egypt.** *The Egyptian Journal of Neurology, Psychiatry and Neurosurgery* 2021;57(1):Doi: 10.1186/s41983-021-00282-8

38. Ragab S, Zaitoun N, Elrafie A, el-Ansarey H, Srour A, Nabil N, . . . Elgamal S. **Migraine among Egyptian medical students: prevalence, disability and psychological distress-cross sectional study.** *The Egyptian Journal of Neurology Psychiatry and Neurosurgery* 2023;59 Doi: 10.1186/s41983-023-00665-z
39. Osman Ali MM, Abbasher Hussien Mohamed Ahmed K and Omer MEA. **Prevalence of migraine headaches and their impact on the academic performance of Sudanese medical students using ID-Migraine test as a screening tool: A cross-sectional study**. *Brain and Behavior* 2022;12(5): Doi: 10.1002/brb3.2588
40. Akour A, Shabi W and Ageeli A. **Prevalence of Migraine among Medical Students in Jazan University and Its Impact on Their Daily Activities**. *The Egyptian Journal of Hospital Medicine* 2018;70(5):872-876: Doi: 10.12816/0043998
41. AlNasser M, Abusrrah W, Alkhaldi G, BinSalman S, Rayees M and Alsaedi A. **Prevalence of migraine among medical students.** *International Journal of Medicine in Developing Countries* 2019;1140-1144: Doi: 10.24911/ijmdc.51-1572538465
42. Lantéri-Minet M, Radat F, Chautard M-H and Lucas C. **Anxiety and depression associated with migraine: Influence on migraine subjects' disability and quality of life, and acute migraine management.** *Pain* 2005;118(3):319-326: Doi: 10.1016/j.pain.2005.09.010
43. Oparah S, Olose E, Asibong U and Ozomma S. **Migraine Prevalence and Impact among Medical Students of the University of Calabar, Southern Nigeria**. *World Journal of Medical Sciences* 2020;17 79-85.
44. H.O G, H.M D, Prabhakaran S, P.P V, Koppad R and Acharya A. **A cross-sectional study on self medication pattern among medical students at Kannur, North Kerala**. *Journal of Evolution of Medical and Dental sciences* 2013;2: 8693-8700: Doi: 10.14260/jemds/1509
45. Patel P, Prajapati A, Ganguly B and Gajjar B. **Study on impact of pharmacology teaching on knowledge, attitude and practice on self-medication among medical students**. *International Journal of Medical Science and Public Health* 2013;2(2): Doi: 10.5455/ijmsph.2013.2.173-178
46. Al Naggar RA, Kumar N, Kanchan T, Unnikrishnan B, Rekha T, Mithra P, . . . Uppal S. **Perceptions and Practices of Self-Medication among Medical Students in Coastal South India**. *PLoS ONE* 2013;8(8): Doi: 10.1371/journal.pone.0072247
47. Alshogran O, Alzoubi K, Khabour O and Farah S. **Patterns of self-medication among medical and nonmedical University students in Jordan**. *Risk Management and Healthcare Policy* 2018;Volume 11: 169-176: Doi: 10.2147/rmhp.S170181
48. Alshahrani SM, Shaik Alavudeen S, Alakhali KM, Al-Worafi YM, Bahamdan AK and Vigneshwaran E. ** Self-Medication Among King Khalid University Students, Saudi Arabia **. *Risk Management and Healthcare Policy* 2019;Volume 12 243-249 Doi: 10.2147/rmhp.S230257
49. Gyawali S. **Knowledge, Attitude and Practice of Self-Medication Among Basic Science Undergraduate Medical Students in a Medical School in Western Nepal.** *Journal of Clinical and Diagnostic Research* 2015: Doi: 10.7860/jcdr/2015/16553.6988