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**ORIGINAL ARTICLE**

# Primary Headache among University Students: Across Sectional Study

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## ABSTRACT:

**Background**: Recent studies have shown an increase in prevalence of different types of headache among students all over the world.

**Objective**: To determine the prevalence of, triggering and associated factors primary headaches among medical students with the aim of increasing awareness about this particular health issue.

**Participants and Methods:** Descriptive cross-sectional study was conducted from September to December 2019 on 196 students, college of medicine, Northern Border University (NBU).

**Results:** A one hundred and nighty six student participants, their mean age was 21.73 ±15.6 with prevalence of headache 88.7% among them. headache participants aged 22 years and younger accounting for 88.7% compared to 88.9% for those aged more than 22 years with statistically insignificant finding. The study revealed that, 100% of the female participants reported headache compared to 80% of males with statistically significant results (p<0.001), OR 0.8 (0.72-0.87). Higher grade group (more than 3rd year) reported headache 92.4% compared to 85.6% for lower grade group (3rd and less) but the difference was statistically none significant. Regarding effect of BMI on headache prevalence among our Participants showed, those with normal weight were insignificantly more likely to suffer from headache 90.6% compared to overweight and obese 85.5% p>0.05. Most common cited triggering factors were sleep disturbance (86.2%), noise exposure (83.3%), over study (81.6%) and fatigue (75.9%), More than two thirds (69%) mentioned anxiety. More than half (60.9%) reported bright light and hunger sensation (59.8%). more than two thirds (72.4%) of the participants had social troubles in the last year. Most of the participants (60.9%) received analgesics for headache and physician was the source of advice in 33%

**Conclusion:** Primary headache is highly prevalent among medical students with female predominant which was mainly related to sleep disturbance, noise exposure, over study, fatigue, hunger sensation. social troubles reported in more than two thirds of headache participants and Most of the participants (60.9%) received analgesics for headache and physician was the source of advice in 33% only.

**Keyword:** Prevalence, Headache, headache characteristics, triggering factors, associated symptoms.

## INTRODUCTION

Headache as Medical disorder is considered as a common worldwide health problem due to its high prevalence and considerable disability load upon the sufferers as it is one the top 10 causes of disability worldwide.[1] It is frequently impairs daily activity and lowers patient's quality of life [2-4]

Headache disorders constitute 13% of total neurology outpatient complaints and represent 1/1000 of hospital consultations in kingdom of Saudi Arabia(KSA).[5]

The majority of people of people experience at least one headache episode per year; therefore, effective methods for control and treatment of headache is considered as a major goal in health programs. [6,7] Headache disorders considered as is the most common complaint in neurology clinics.[8, 9]

A Saudi study conducted among medical students southern region revealed that the headache prevalence among them was 70.4% throughout the past year.[10] Moreover another similar study in the same country in western area reported 77% prevalence of headache among University students.[11]

A study conducted on undergraduate pharmacy students in United Arab of Emirates(UAE) reported that 82.6% of them have had headache in the last 12 months, most of them were females.[12] Headache disorders among students have negatively impacted their academic performance if under diagnosed and under treated[13].

The quality of life for individuals with headaches can be affected by several factors. These factors include physical and emotional limitations, a negative impact on professional and academic activities and a drop in individual productivity. A headache patient's social and family life can also be affected since headache may limit the victim's activities. Such factors can represent a considerable financial burden to society.[4, 14]

Headache is responsible for a large global burden up on the sufferer. [15] But unfortunately this burden is widely disregarded.[16] Among student populations headache disorders leads to their absenteeism and poor academic performance due to lack of clear and effective headache management programs[13]

Lack of sleep, stress, examinations, over study, exposure to intense light, smell and noise are the most common headache aggravating.[12]

Lifestyle modification can decrease primary headache episodes, that may cause considerable daily pain and increase school absenteeism.[17]

The study of headache epidemiology opens the way to valuable knowledge such as variation in the occurrence and severity of headache in the population. Additionally these studies may provide clues to proper treatments and preventive strategies of headache[17]

University students have been identified as a significant and distinguishing population who required more care about their health and quality of life for better academic performance, achievements, engagement in varied social activities and various aspects of their future life. [18]

The medical study requires continuous concentration, extreme effort and inflexible work, frequent absence from study can affect the student's school performance and success. Evaluating and managing headaches among medical students becomes particularly important for students.[19]

To date there no research conducted into the headache prevalence on undergraduate medical students in northern Saudi Arabia hence we focused on studying headache prevalence among them. Our study here will scope on the epidemiology and associated factors of headache among medical students, with view to assess the use of this study to design future health-treatment and educational programs in headache management hence, reducing the harm to both individuals and community.

## PARTICIPANTS AND METHODS

**Study Design:** Descriptive cross-sectional study was conducted from September to December 2019 on 196 students, College of medicine, Northern Border University (NBU), a governmental University in the northern KSA.

**Sample Size:** Epi Info Statcalc program version 7.2.4.0 was used for sample size calculation. The assumptions made for the sample

size calculation were, 95 % confidence interval, 50 % expected frequency and 5 % margin of error). The calculated sample size was 196.

**Sampling Method:** In this research, taken in consideration the flow of study and enrolment year a stratified random sampling was adopted. After obtaining informed verbal consent, each of the participants were selected randomly when they were joining class. The study was not expected to cause any physical or psychological harm to the respondents.

**Data Collection:** A self-administered structured questionnaire developed by the authors' thorough review of relevant literature and revised by two experts for the validity and pretested through a pilot study was distributed and each student was requested to complete it. The questionnaire included section about the background personal information about the participants such as age, gender, grade, weight, and height. Also sections covered the following subjects were included: Prevalence of headache, type of headache, its frequency, duration, clinical presentation, family history of headache, intensity, associated symptoms, triggering factors impact of headache, and management of headache.

**Study Inclusion Criteria Were:**

(1) Being the student of College of medicine, NBU
(2) Agreed to participate in the study

**Study Exclusion Criteria:** Incomplete response to all questionnaire items

**Data Analysis:** Collected data were revised, coded and entered using Statistical Package for the Social Sciences (SPSS, version20) for Windows. Simple descriptive statistics including frequencies and percent were used to describe categorical variable items and mean and standard deviation are used to describe the numerical values of the sample. Chi square test ($\chi 2$) and Fisher's exact test were used for association between categorical variables. A P-value less than 0.05 were considered a significant level.

## RESULTS

Table (1) shows the personal data of participants, mean age of 196 students was 21.73 ±15.6 with prevalence of headache 88.7% among them. The demographic data of headache and non-headache participants are showing, regarding age, headache participants aged 22years and younger accounting for 88.7% compared to 88.9% for those aged more than 22 years with statistically insignificant finding.

Table 1: Distribution of participants according to their personal characteristics, grade and BMI

| Variables | Having Headache 1 time in the last 3 month | | | | P-Value | OR* | CI# |
|---|---|---|---|---|---|---|---|
| | Yes (no=174 ) | | No (no=22) | | | | |
| | No. | % | No. | % | | | |
| Mean age: 21.73±156 | | | | | | | |
| Age | | | | | | | |
| ≤ 22 | 118 | 88.7 | 15 | 11.3 | 0.97 | 0.98 | 0.38-2.54 |
| >22 | 56 | 88.9 | 7 | 11.1 | | | |
| Gender | | | | | | | |
| Male | 88 | 80 | 22 | 20 | 0.000 | 0.8 | 0.72-0.87 |
| Female | 86 | 100 | 0 | 0 | | | |
| Grade | | | | | | | |
| 3rd and less | 89 | 85.6 | 15 | 14.4 | 0.13 | 0.44 | 0.19 -1.25 |
| More than 3rd year | 85 | 92.4 | 7 | 7.6 | | | |
| Body mass index | | | | | | | |
| Normal | 115 | 90.6 | 12 | 9.4 | 0.28 | 1.62 | 0.66-3.9 |
| Overweigh t & obese | 59 | 85.5 | 10 | 14.5 | | | |

*Odds ratio # Confidence interval

Regarding gender differences among respondents the study revealed that 100% of the female reported headache compared to 80% of males with statistically significant results (p<0.001), OR 0.8(0.72-0.87).

Higher grade (more than 3rd year) participants reported headache 92.4% more than lower grade (3rd and less) with prevalence of 85.6% but the difference was statistically non-significant. Regarding impact of BMI on headache prevalence, Participants with normal weight showed 90.6% prevalence that was insignificantly higher compared to over-weight and obese 85.5%, (p->0.05).

Table (2) illustrates the distribution of headache participants, according to headache characteristics. Regarding headache site, around a quarter of the participants (24.1%) experienced frontal headache, followed by undetermined headache site (22.4%), 17.8% for occipital, 17.8% for temporal, 15.5% bilateral, 10.3% for vertex and lastly 9.8% for occipital. More than third (36.6%) of headache patients mentioned that headache occurred at night with similar percentage (35.1%) at any time whoever mid-day headache expressed in 18.4% then morning 10.9%. In this study higher percentages (44.8%) of participants mentioned that, nature of headache is pressure (dull aching) pain, more than quarter (27.6%), Pulsating, a fifth (20.1%) sharp and a minor group (4%) as paresthesia. More than half (58%) of the headache group reported that Frequency of headache per month two or less and 42% mentioned more than 2. Regarding Duration of headache two years or less stated by 25.3% of the participants while 74.7 experienced headache for more than 2 years. Minor group of participants (4.6%) reported that headache occurred after head trauma.

Table 2: Distribution of participants according to headache Characteristic

| Variables | No (%) | Variables | No(%) |
|---|---|---|---|
| Site of headache | | Associated symptoms | |
| Frontal | 42 (24.1) | Photophobia or Phonophobia | 59(33.9) |
| Un determined (Generalized) | 39(22.4) | Lack of concentration | 54(31.0) |
| Temporal(M | 31(17.8) | Nausea or vomiting | 22 (12.6) |
| Bilateral | 27 (15.5) | Lacrimation, redness of The eye or nasal Congestion. | 17(9.8) |
| Timing of headache | | Epigastric pain | 15(8.6) |
| Night | 62 (35.6) | Weakness of extremities &Sweating | 7(4.0) |
| At any time | 61 (35.1) | Headache occurring Periodically | |
| Mid –day | 32 (18.4) | Yes | 26(14.9) |
| Morning | 19 (10.9) | No | 148(85.1) |
| Vertex | 18 (10.3) | Family history of similar condition | |
| Occipital | 17(9.8) | Yes | 57(32.8) |
| Nature of headache | | No | 117(67.2) |
| Pressure, dull aching | 78(44.8) | Headache progressively with time | |
| Pulsating | 48(27.6) | Yes | 71(40.8) |
| Sharp | 35(20.1) | No | 103(59.2) |
| Paresthesia | 7(4.0) | Having headache awaking you from a sleep | |
| Other(as electric sensation ) | 6(3.4) | Yes | 39(22.4) |
| Frequency of headache per month | | No | 135(77.6) |
| ≤ 2 | 101 (58) | Having rest or sleep relieving headache | |
| >2 | 73 (42) | Yes | 133(76.4) |
| Duration headache in years | | No | 41(23.6) |
| ≤ 2 years | 91 (52.3) | Headache limit daily activities | |
| >2 years | 83 (47.7) | Yes | 123 (70.7) |
| Headache after head trauma | | No | 51(29.3) |
| Yes | 8 (4.6) | Having Headache causing college absenteeism | |
| No | 166 (95.4) | Yes | 50(28.7) |
| | | No | 124(71.3) |

The main associated symptoms were Photophobia (31%) and lack of concentrations (33.9%) were recorded the common

associated symptoms of headache followed by (12.6%), (9.8%), (8.6) and (4%) for Nausea or vomiting, Lacrimation, redness of the eye, Epigastric pain and Weakness of extremities & Sweating respectively. Small percentage (14.9%) of the participants recorded that headache occurred periodically with nearly a third mentioned family history of similar condition, 40.8% of the headache group reported headache progression. With regard to headache and sleep only 22.4% of the participants recorded that headache awaking them from asleep while 76.4% reported that, headache was relieved by sleep. Interference with daily activities because of headache was reported by more than two thirds of students while 28.7% expressed that; headache was responsible for college absenteeism.

Table (3) demonstrates the triggers of headache attacks, the majority of participants reported sleep disturbance (86.2%), noise exposure (83.3%), over study (81.6%) and fatigue (75.9%), More than two thirds (69%) mentioned anxiety, More than half (60.9%) reported bright light and hunger sensation (59.8%), nearly half (48.9%) indicated certain odors, 32.2% weather changes, colds as ice cream were reported by 28.2% and small groups expressed physical activity (17.2%), however receiving certain drugs and certain types of foods were reported by (10.9%) and (8%) respectively.

Table 3: Distribution participants according to the triggering factors of headache

| Variables | No.(%) | Variables | No.(%) |
|---|---|---|---|
| Sleep disturbance | | Certain odors (Smoke smell or perfume) | |
| Yes | 150 (86.2) | Yes | 85(48.9) |
| No | 24 (13.8) | No | 89(51.1) |
| Noise exposure | | Weather changes | |
| Yes | 145(83.3) | Yes | 56 (32.2) |
| no | 29 (16.7) | No | 118 (67.8) |
| Over study | | Colds as ice cream | |
| Yes | 142 (81.6) | Yes | 49 (28.2) |
| No | 32 (18.4) | No | 125 (71.8) |
| Fatigue | | Physical activity | |
| Yes | 132(75.9) | Yes | 30 (17.2) |
| No | 42 (24.1) | No | 144 (82.8) |
| Stress or Anxiety | | Receiving certain drugs | |
| Yes | 120 (69.0) | Yes | 19 (10.9) |
| No | 54 (31.0) | No | 155 (89.1) |
| Bright light exposure | | Certain types of Food or drinks | |
| Yes | 106 (60.9) | Yes | 14 (8.0) |
| No | 68 (39.1) | No | 160 (92.0) |
| Hunger sensation (missed meal) | | | |
| Yes | 104 (59.8) | | |
| no | 74 (40.2) | | |

Table 4: Distribution participants according Factors preceding headache attack

| Variables | No | % |
|---|---|---|
| Mood changes | | |
| Yes | 88 | 50.6 |
| No | 86 | 49.4 |
| Sleep Tendency | | |
| Yes | 86 | 49.4 |
| No | 88 | 50.6 |
| Visual disorders | | |
| Yes | 77 | 44.3 |
| No | 97 | 55.7 |
| Worry or stress | | |
| Yes | 76 | 43.7 |
| No | 98 | 56.3 |
| Drowsiness | | |
| Yes | 68 | 39.1 |
| No | 106 | 60.9 |
| Hungary sensation | | |
| Yes | 52 | 29.9 |
| No | 122 | 70.1 |
| Pallor | | |
| Yes | 24 | 13.8 |
| No | 150 | 86.2 |

Table (4) focused on factors preceding headache attack. The main preceding factors for headache attack were mood changes (50.6%), sleep tendency (49.4%), visual disturbance (44.3%), worry (43.7%) and drowsiness however 39.1% and 13.8% recorded for hanger sensation and pallor respectively.

Table (5) shows that more than two thirds (72.4%) of the participants had social troubles in the last year otherwise nearly quarter of the headache patients had sinusitis. Most of the participants (60.9%) received analgesics for headache and physician was the source of advice in 33% followed by friends (10.4%) and lastly pharmacist (9.4%).

Table 5: Distribution participants according to associated medical problems and treatment received

| Variables | No | % |
|---|---|---|
| Presence of sinusitis | | |
| Yes | 42 | 24.1 |
| No | 132 | 75.9 |
| Presence of Social trouble or stress during the last year | | |
| Yes | 126 | 72.4 |
| No | 48 | 27.6 |
| Analgesic received | | |
| Yes | 106 | 60.9 |
| No | 68 | 39.1 |
| Advice to take analgesic was by (no=106) | | |
| Physician | 35 | 33 |
| Friends | 11 | 10.4 |
| Pharmacist | 10 | 9.4 |
| Other: Colleagues, family member, neighbors. | 50 | 47.2 |

## DISCUSSION

This study was conducted among medical students, faculty of medicine, Northern Border University in the academic year of 2019 – 2020. The study aimed to the assess headache prevalence, its characteristics, triggering and preceding factors among medical students.

There is no university survey evaluating the prevalence of headache, Northern Border University prior to our study.

The current study revealed that the majority of the participants (88.7%) suffered from one headache attack within the last three months before the study. Our findings are similar to those recorded from other national or international studies done on University students [4, 7, 11, 12, 20-25].

Female participants were more affected by headache compared to males. This is in agreement with other similar studies [4, 14, 24]. Furthermore this study demonstrated that headache prevalence increased at older age group than younger one, however this statistically insignificant which may be due to limited age group within the study sample, and this came in line with other studies [25].

With regards to BMI our results indicated that participants with normal weight were insignificantly more likely to suffer from headache compared to overweight and obese. Obesity and headache association data are limited but Wang et al, mentioned that the increased BMI associated with increasing tension headache prevalence, while in migraine and chronic daily Headache the prevalence slightly decreased initially and then increased with increasing BMI in China [26]. Furthermore, Yu et al, found that headache prevalence significantly increased in the morbidly obese participants among general population of both reproductive and post reproductive groups in the same country [27]. The difference of these results from our finding may be due to the characteristics of our study group and did not separate the morbidly obese one.

Frontal headache reported as the most common type of headache (24.1%), nearly similar findings recorded by Shehata et al, in Saudi Arabia [22] and Nandha & Chhabra [7] in India.

With regard to the quality of headache pressure and pulsation were the commonest. These finding agrees with Momayyezi et al [28] who reported that (50.9%) ,(25.9%) and

(22.6%) of the participants mentioned pressing , pulsating and lancinating pain respectively.

Positive Family history of headache was observed in 32.8% of the headache group. Nearly similar results stated in previous studies[7, 10, 12],while a nearby Yemen country study found recorded higher prevalence76.4% among adults and elderly[29].

Photophobia and lack of concentration came on top of associated symptoms of headache in this study, a research conducted by Zarea et el in Iran confirmed that [4, 28]

In this study we found that headache triggering factors, sleep disturbance, noise exposure, reading for long time, fatigue, stress, bright light exposure and hunger sensation were significant and supported by finding of other studies([12, 22, 24, 28, 30].

For example, Zarea el al, reported that among the Iranian medical students triggering factors were stress (63%), sunlight or florescent light (55.6%), loud noise (48.1%), fatigue (77.8%), odors like cigarette smoke or perfume (37%) and overheating (51.9%) [4].

Moreover Birru el al in his study discussed that too little sleep, stress/tension, change in mood, reading for longer time and intense light exposure were the likely triggering factors of headache among students [25]. The proper understanding of these triggers is helpful in decreasing the frequency and alleviate the severity of headache attacks[30].

Among the studied students they expressed headache the majority 60.9% received analgesic medications, nearly third, thought medical advice from the physician and the rest of other participants used self-medication either from friend or direct purchasing from pharmacist. These results supported by finding reported by Biruu el al, who found that nearly two thirds of students received drug medication for headache[25].

Our research had two strengths. First, it was the first study in Northern Border University to assess the prevalence and associated factors of headache among medical students. Second, the random sampling technique associated with the high response rate avoiding the selection bias.

**Limitations of the Study:** Limitation of the study attributed to its design. The study has significant limitations that should be considered during interpretation of results. Thus, being a descriptive cross sectional study makes it not helpful to detect accurate cause and effect relationship. The study might be affected by relatively suspected bias because all data are based on self-reporting.

## CONCLUSIONS AND RECOMMENDATIONS

Primary headache found to be with high prevalence among medical students, with female predominant which was mainly related to sleep disturbance, noise exposure, over study, fatigue, and hunger sensation. Social troubles reported in more than two thirds of headache participants and Most of the participants (60.9%) received analgesics for headache and physician was the source of advice in 33% only.

The College of Medicine should perform regular campaigns among students to increase their awareness about the high prevalence and triggers of headache. Moreover, the importance of consulting a specialist if a person suffers from a headache should be focused. Regulation of sleep, avoid noise exposure and stress can help in alleviating headache.

**Competing interests**: Authors have declared that no competing interests exist.

**Authors' Contributions:** Author M.M designed the study, performed the statistical analysis, wrote the protocol, reviewed the literature, wrote the discussion and wrote the first draft of the manuscript. Author H H and Author Y E managed the analyses of the study and conducted the data collection. Author H managed the literature searches. All authors read and approved the final manuscript

**Ethical Consideration:** All steps conducted in this research were in agreement with the ethical standards outlines in Helsinki Declaration of 1975 as revised in 2000. The objective of the research was demonstrated for the respondents and they were aware that participation is completely voluntary and the gathered data will be used only for the scientific purpose. No names were registered in the questionnaires and Confidentiality strictly ensured.

## REFERENCES


1. Steiner TJ, Birbeck GL, Jensen RH, Katsarava Z, Stovner LJ, Martelletti P: Headache disorders are third cause of disability worldwide. In.: BioMed Central; 2015.
2. Falavigna A, Teles AR, Velho MC, Vedana VM, Silva RCd, Mazzocchin T, Basso M, Braga GLdJAdn-p: Prevalence and impact of headache in undergraduate students in Southern Brazil. 2010, 68(6):873-877.
3. Albers L, Straube A, Landgraf MN, Filippopulos F, Heinen F, von Kries RJTjoh, pain: Migraine and tension type headache in adolescents at grammar school in Germany–burden of disease and health care utilization. 2015, 16(1):1-7.
4. Zarea K, Rahmani M, Hassani F, Hakim AJCE, Health G: Epidemiology and associated factors of migraine headache among iranian medical students: A descriptive-analytical study. 2018, 6(3):109-114.
5. Al-Rajeh S, Bademosi O, Ismail H, Awada AJHTJoH, Pain F: Headache syndromes in the eastern province of Saudi Arabia. 1990, 30(6):359-362.
6. Adoukonou T, Houinato D, Kankouan J, Makoutode M, Paraiso M, Tehindrazanarivelo A, Viader F, Preux PMJHTJoH, Pain F: Migraine among university students in Cotonou (Benin). 2009, 49(6):887-893.
7. Nandha R, Chhabra MKJIJBCP: Prevalence and clinical characteristics of headache in dental students of a tertiary care teaching dental hospital in Northern India. 2013, 2(1):51-55.
8. Al-Khamis FAJS: Spectrum of neurological disorders: Neurology clinic experience of university tertiary care hospital. 2016, 5(1):11-14.
9. Benamer HT, Deleu D, Grosset DJTjoh, pain: Epidemiology of headache in Arab countries. 2010, 11(1):1-3.
10. Abdullah AS, Al-Musa HMAJKKUJoHS: Prevalence of recurrent headache and its association with academic performance among King Khalid University male medical students. 2016, 1(1):24.
11. Al-Hassanl E, Al-Mulifi AA, Al-Khudhayr AM, Al-Quraini AW, Al-Omran A, Al-Musallam EJIJSR: Prevalence of headache in female students in King Faisal University: a questionnaire study. 2013, 5(6):256-260.
12. Bostanudin MF, Al Atassi S, Fei TS: Epidemiology of Headache Disorders among Pharmacy Students. 2020.
13. Mitsikostas D, Gatzonis S, Thomas A, Kalfakis N, Llias A, Papageoergiou CJHTJoH, Pain F: An epidemiological study of headaches among medical students in Athens. 1996, 36(9):561-564.
14. Al-Hashel JY, Ahmed SF, Alroughani RJFin: Prevalence and burden of primary headache disorders in Kuwaiti children and adolescents: a community based study. 2019, 10:793.
15. Stovner L, Hagen K, Jensen R, Katsarava Z, Lipton R, Scher A, Steiner T, Zwart JJC: The global burden of headache: a documentation of headache prevalence and disability worldwide. 2007, 27(3):193-210.
16. Manandhar K, Risal A, Linde M, Steiner TJJTjoh, pain: The burden of headache disorders in Nepal: estimates from a population-based survey. 2015, 17(1):1-10.
17. Hershey ADJTLN: Current approaches to the diagnosis and management of paediatric migraine. 2010, 9(2):190-204.
18. Yu L, Shek DT, Zhu XJFip: The influence of personal well-being on learning achievement in university students over time: Mediating or moderating effects of internal and external university engagement. 2018, 8:2287.
19. Al-Hashel JY, Ahmed SF, Alroughani R, Goadsby PJJTjoh, pain: Migraine among medical students in Kuwait University. 2014, 15(1):1-6.
20. Khairoalsindi OA, Saber WK, Althubaiti NA, Alshareef EF, Almekhlafi MAJN: Primary headache characters and coping strategies among medical students of Umm Al-Qura University in the Western Region of Saudi Arabia. 2018, 23(4):308-313.
21. Al-Jabry NT, Abduljabbar Z, Maqsud AN, Alhadad BA, Almukhtar NM, Al-Mutairy SA, Sahla SM, Al-Harbi WSR, Alsihaty WJIJoASR: Prevalence and risk factors of tension headache among 3rd year female medical students at Taibah University in Saudi Arabia. 2015, 3(4):46-53.
22. Shehata SF, Al-Malki AQ, Alqahtani AJ, Tamraa AAA, Almutlaq AH, Alshamrani AS, Alotaibi AE, Alotaibi KM, Almutairi KH, Alqahtani SAJMEJoFM: Prevalence of primary headache among King Khalid University students in 2019. 2020, 7(10):57.

23. Adnyana IMOJI: Prevalence of headache among medical students in Universitas Udayana, Denpasar, Bali-Indonesia. 2020, 14(1):26-31.
24. Desouky DE, Zaid HA, Taha AAJJotEPHA: Migraine, tension-type headache, and depression among Saudi female students in Taif University. 2019, 94(1):1-9.
25. Birru EM, Abay Z, Abdelwuhab M, Basazn A, Sirak B, Teni FSJTjoh, pain: Management of headache and associated factors among undergraduate medicine and health science students of University of Gondar, North West Ethiopia. 2016, 17(1):1-9.
26. Wang Y, Xie J, Yang F, Wu S, Wang H, Zhang X, Liu H, Deng X, Yu SJTjoh, pain: The prevalence of primary headache disorders and their associated factors among nursing staff in North China. 2015, 16(1):1-7.
27. Yu S, Liu R, Yang X, Zhao G, Qiao X, Feng J, Fang Y, Cao X, He M, Steiner TJJTjoh et al: Body mass index and migraine: a survey of the Chinese adult population. 2012, 13(7):531-536.
28. Momayyezi M, Fallahzadeh H, Momayyezi MJZJoRiMS: Prevalence of migraine and tension-type headache in Yazd, Iran. 2015, 17(4).
29. Abdo SA, Amood AL-Kamarany M, Alzoubi KH, Al-Maktari MT, Al-Baidani AHJNri: Primary headache in Yemen: prevalence and common medications used. 2014, 2014.
30. Levy D, Strassman AM, Burstein RJHTJoH, Pain F: A critical view on the role of migraine triggers in the genesis of migraine pain. 2009, 49(6):953-957.