Migraine Prevalence and Analysis of Dietary Habits in Relation to Headache in the Female Population: A Single-Center Study From Jeddah, Saudi Arabia

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Abstract
Introduction
Lifestyle-related factors including dietary intake can significantly increase the chances of developing migraine. Some components of food items are thought to induce the release of vasoactive substances leading to the dilation of blood vessels, which in turn results in migraine episodes. This research aimed to assess the prevalence of migraine and examine the relation of the headache to the dietary patterns of female students and employees of King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) - Jeddah experiencing migraine attacks as well as to assess the relationship between the migraine attacks and the available dietary items served at the food outlets within the campus.

Methods
Two questionnaires were developed for this study. The first questionnaire was a short survey asking about the characteristics of headaches. This survey aimed to estimate the prevalence of migraine among female students and employees in KSAU-HS. Of the participants who filled the first questionnaire, those who met the International Classification of Headache Disorders (ICDH-III) criteria for migraine were given a second questionnaire to further understand the characteristics of their migraine headaches and to assess lifestyle and diet-related aggravating factors.

Results
The final sample size for the calculated prevalence was 410; 352 were students and 58 were faculty members. It has been found that 165 (40.24%) participants of the KSAU-HS female population met the criteria for migraine. Two (2.2%) reported an association between chocolate consumption and headaches and seven (7.8%) reported a significant association between caffeine and headaches. No specific association was perceived by the respondents between migraine attacks and the following food items: citrus fruits, pickles, cheese, and dairy products.

Conclusion
Our study revealed that the widespread trends for excessive consumption of coffee and caffeinated beverages at food outlets within the educational institution are occult triggers for headache attacks in a significant portion of students with migraine. The recent shift in dietary habits in our community for excessive consumption of coffee and other tyramine-rich food items has negative consequences on productivity and the economy. Our results can be conceivably extrapolated to reflect the effect of dietary habits on other streams of society, including companies, firms, schools, and workplaces that are driven by the new dietary trends.

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The second section contains questions about sleep quality and duration and the changing pattern of sleep.

The second questionnaire starts with questions about demographic information. It includes three main choices that apply. Lastly, participants who met the criteria for migraine were asked if they experienced any history of trauma, and the presence, type, and duration of aura were asked. In addition, previous diagnoses average frequency of headaches per month, aggravating and alleviating factors, medication history, previous sections. The first section contains questions for a general assessment of migraine. Questions about the average frequency of headaches per month, aggravating and alleviating factors, medication history, previous diagnoses of migraine as well as to assess the relationship between the migraine attacks and the available dietary items served at the food outlets within the campus.

Materials And Methods
Two questionnaires were developed for this study. Each question in both questionnaires was typed in English and translated into Arabic. The first questionnaire was a short survey asking about the characteristics of headaches. This survey aimed to estimate the prevalence of migraine among female students in KSAU-HS. Of the participants who filled the first questionnaire, those who met the International Classification of Headache Disorders (ICHD-III) criteria for migraine were given a second questionnaire to further understand the characteristics of their migraine headaches and to assess lifestyle and diet-related aggravating factors. In this study, a convenience sampling technique was used. Data were collected from participants by visiting their colleges. Participants were asked to sign an informed consent form before participating in the study.

Data acquisition
The first questionnaire was used as a quick screening tool for migraine. It was distributed by the research group members. It contained four direct questions. In the first question, the participants were asked about the duration of the headache. The second and third questions listed the features of headache, including the character of pain, aggravating factors, and associated symptoms. Participants were asked to check all the choices that apply. Lastly, participants who met the criteria for migraine were asked if they experienced any aura symptoms and were given the second questionnaire.

The second questionnaire starts with questions about demographic information. It includes three main sections. The first section contains questions for a general assessment of migraine. Questions about the average frequency of headaches per month, aggravating and alleviating factors, medication history, previous history of trauma, and the presence, type, and duration of aura were asked. In addition, previous diagnoses of other primary headache disorders and other health conditions were asked.

The second section contains questions about sleep quality and duration and the changing pattern of sleep.
habits during holidays and weekends and whether it had an effect on the frequency and severity of their headaches. The last section is about diet. In this section, participants were asked about their dietary habits. There were questions about particular food items that are believed to have an impact on migraine. Participants were asked about their consumption of the food item, and if they noticed it triggers a migraine episode. The food items included were: types of chocolate, dairy products, caffeine, citrus fruits, and pickles. Also, they were asked to mention any other food item that they noticed triggered their migraine episodes.

Analysis
Data analysis was performed using the SPSS Statistics v. 23 (IBM Corp., Armonk, NY). Frequency and percentages were used to display categorical variables, while mean and standard deviation were used to display continuous variables. The chi-square test was used to test for the presence of an association between categorical variables. ANOVA test was utilized to check the association between sleeping hours and frequency of headaches per month. The level of significance was set at 0.05.

Validation and ethical approval
The process of validation included a review of the questionnaire by three neurologists and then distributing the questionnaire to a sample of 31 participants. Ethical approval was obtained from the Institutional Review Board (IRB), King Abdullah International Medical Research Center (KAIMRC), Jeddah, Saudi Arabia.

Results
The questionnaire was handed to 418 participants. Eight chose not to complete the questionnaire. The final sample size for the calculated prevalence was 410; 352 were students and 58 were faculty members at the College of Applied Medical Sciences (CAMS-J), College of Medicine (COM-J), College of Nursing (CON-J), and College of Science and Health Professions (COSHJ). It has been found that 165 (40.24%) participants of the KSAU-HS female population have met the criteria for migraine.

Among the 352 students who responded to the questionnaire, 137 (38.9%) met the IHS criteria for migraine diagnosis. Among the 137 students who have migraine, only 48 students (35.04%) have an aura (Tables 1-2).

| College                          | Migraineur | Non-migraineur | Total number of students taken from each college |
|---------------------------------|------------|----------------|-----------------------------------------------|
| College of Science and Health Professions (COSH-J) | 65 (40.88%) | 94 (59.12%) | 159                                           |
| College of Medicine (COM-J)     | 23 (41.07%) | 33 (58.93%)   | 56                                            |
| College of Nursing (CON-J)      | 34 (42.5%)  | 46 (57.5%)    | 80                                            |
| College of Applied Medical Sciences (CAMS-J) | 15 (26.32%) | 42 (73.68%) | 57                                            |
| Total number of students from all colleges | 137 (38.92%) | 215 (61.08%) | 352                                           |

TABLE 1: Number and percentage of students who have migraine.

| College                          | with aura | without aura | total number of migraineur students |
|---------------------------------|-----------|--------------|------------------------------------|
| College of Science and Health Professions (COSH-J) | 22 (33.85%) | 43 (66.15%) | 65                                 |
| College of Medicine (COM-J)     | 5 (21.74%) | 18 (78.26%)  | 23                                 |
| College of Nursing (CON-J)      | 14 (41.18%) | 20 (58.82%) | 34                                 |
| College of Applied Medical Sciences (CAMS-J) | 7 (46.67%) | 8 (53.33%) | 15                                 |
| Total number of migraineur students from all colleges | 48 (35.04%) | 89 (64.96%) | 137                                |

TABLE 2: Number and percentage of students who have aura associated with their migraine.

The total number of employees surveyed was 58. It has been found that 48.28% of the total number of female...
employees at KSAU-HS who completed the survey have met the IHS criteria for migraine (Table 3).

| College of Science and Health Professions (COSHP-J) | Migraineur | Non-Migraineur | Total number of employees taken from each college |
|--------------------------------------------------|------------|----------------|-----------------------------------------------|
| College of Medicine (COM-J)                       | 9 (75%)    | 3 (25%)        | 12                                            |
| College of Nursing (CON-J)                        | 9 (45%)    | 11 (55%)       | 20                                            |
| College of Applied Medical Sciences (CAMS-J)      | 5 (62.5%)  | 3 (37.5%)      | 8                                             |
| Total number of students from all colleges        | 28 (48.28%)| 30 (51.72%)    | 58                                            |

**TABLE 3: Number and percentage of employees who have migraine.**

Among the 28 faculty members who met the criteria of migraine, 50% of them reported that they experience an aura phase (Table 4).

| College of Science and Health Professions (COSHP-J) | with aura | without aura | total number of migraineur employees |
|--------------------------------------------------|-----------|--------------|-------------------------------------|
| College of Medicine (COM-J)                       | 3 (33.33%)| 6 (66.67%)   | 9                                   |
| College of Nursing (CON-J)                        | 6 (66.67%)| 3 (33.33%)   | 9                                   |
| College of Applied Medical Sciences (CAMS-J)      | 3 (60%)   | 2 (40%)      | 5                                   |
| Total number of migraineur faculty members from all colleges | 14 (50%) | 14 (50%) | 28 |

**TABLE 4: Number and percentage of employees who have aura associated with their migraine.**

Of the 165 participants who met the criteria for migraine, only 90 returned the second questionnaire. Table 5 shows the sociodemographic profile of the participants. The mean age of participants was 22.4±5.7.
### TABLE 5: Socio-demographic profile of participants (n = 90).

Table 6 displays the medical history of the participants. Only four (4.4%) were diagnosed with epilepsy or were taking anti-epileptic medications. Seven (7.8%) have once had a head or a neck injury requiring medical treatment. When asked if participants have ever been diagnosed with hypertension, asthma, heart disease, gastric ulcer, or dental problems such as temporomandibular joint, 21 (23.3%) said yes; 16 (17.8%) had sinusitis and five (5.6%) had deviated nasal septum.

| Demographical Characteristics                  | n   | %   |
|-----------------------------------------------|-----|-----|
| **Age (mean, standard deviation)**            | 22.4| 5.7 |
| **Collage**                                   |     |     |
| College of Medicine (COM-J)                   | 32  | 35.6|
| College of Science and Health Professions (COSHP-J) | 16  | 17.8|
| College of Applied Medical Sciences (CAMS-J)  | 21  | 23.3|
| College of Nursing (CON-J)                    | 21  | 23.3|
| **Nationality**                               |     |     |
| Saudi                                         | 89  | 98.9|
| Non-Saudi                                     | 1   | 1.1 |
| **Marital Status**                            |     |     |
| Single                                        | 84  | 93.3|
| Married                                       | 6   | 6.7 |
| **Occupation**                                |     |     |
| Student                                       | 84  | 93.3|
| Employee                                      | 6   | 6.7 |
| **BMI Class**                                 |     |     |
| Underweight                                   | 16  | 17.8|
| Normal Weight                                 | 46  | 51.1|
| Overweight                                    | 15  | 16.7|
| Obesity Class 1                               | 8   | 8.9 |
| Obesity Class 2                               | 1   | 1.1 |
| Obesity Class 3                               | 4   | 4.4 |

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| Question                                                                 | n  | %  |
|-------------------------------------------------------------------------|----|----|
| Q1/ Have you been diagnosed with epilepsy/take any anti-epileptic medications? |    |    |
| Yes                                                                     | 4  | 4.4|
| No                                                                      | 86 | 95.6|
| Q2/ Have you ever had a head or a neck injury requiring medical treatment? |    |    |
| Yes                                                                     | 7  | 7.8|
| No                                                                      | 83 | 92.2|
| Q3/ Have you ever been diagnosed to have any health disorders (e.g. high blood pressure, asthma, heart disease, gastric ulcers, dental problems such as temporomandibular joint)? |    |    |
| Yes                                                                     | 21 | 23.3|
| No                                                                      | 69 | 76.7|
| Q4/ Have you been diagnosed with one of the following?                   |    |    |
| Sinusitis                                                               | 16 | 17.8|
| Nasal polyps                                                            | 0  | 0  |
| Deviated nasal septum                                                   | 5  | 5.6|
| None                                                                    | 69 | 76.7|

**TABLE 6: Medical history of participants (n = 90).**

Table 7 demonstrates participants' responses toward frequency and types of headaches. The mean frequency of headaches was 5.67±5.32. Among the participants, only 13 (14.4%) had their headaches evaluated before. Among those who were evaluated before, 10 (11%) had migraine, two (2.2%) had both tension and migraine headaches, and one (1.1%) had a diagnosis other than headaches.
Table 7: Headache profile - frequency and type of headache (n = 90).

| Question                                                                 | n   | %    |
|--------------------------------------------------------------------------|-----|------|
| Q1/ How many headaches do you experience per month on average?           |     |      |
| Mean                                                                     | 5.67|      |
| Standard deviation                                                       | 5.32|      |
| Minimum                                                                 | 1   |      |
| Maximum                                                                 | 25  |      |
| Q2/ Have you had your headaches evaluated before?                        |     |      |
| Yes                                                                      | 13  | 14.4 |
| No                                                                       | 77  | 85.6 |
| Q3/ If you had your headache evaluated before, what was the diagnosis?  |     |      |
| Tension headache                                                         | 0   | 0.00 |
| Migraine headache                                                        | 10  | 11.1 |
| Both tension and migraine headache                                       | 2   | 2.2  |
| Cluster headache                                                         | 0   | 0    |
| Other                                                                    | 1   | 1.1  |

Table 8 shows the participants' attitudes and experiences with headache management. When asked if participants are taking any prescribed medication to treat headaches, only eight (8.9%) said yes. When asked if the participants are taking any over-the-counter medication, 72 (80%) said yes. As for the duration of time the headaches last after taking the medication, 59 (65.6%) reported no more than two hours, 23 (25.6%) reported three to four hours, five (5.6%) reported 5-12 hours, two (2.2%) reported several days, and one (1.1%) reported one week or longer. When asked how long the headache would last if a medication is not taken, 10 (11.1%) reported no more than two hours, 22 (24.4%) reported three to four hours, 28 (31.1%) reported 5-12 hours, 14 (15.6%) 12-24 hours, 14 (15.6%) reported several days, and two (2.2%) reported one week or longer. Also, 60 (66.7%) stated they were using painkillers in the past three months and 20 (22.2%) stated they were taking painkillers at least three times a week.
| Question                                                                 | n  | %   |
|-------------------------------------------------------------------------|----|-----|
| Q1/ Are you taking any prescription medications to treat your headaches?|    |     |
| Yes                                                                     | 8  | 8.9 |
| No                                                                      | 82 | 91.1|
| Q2/ Are you taking any over-the-counter medications to treat your headaches? |    |     |
| Yes                                                                     | 72 | 80  |
| No                                                                      | 18 | 20  |
| Q3/ How long do your headaches usually last after you take your medicine?|    |     |
| No more than 2 hours                                                   | 59 | 65.6|
| 3-4 hours                                                               | 23 | 25.6|
| 5-12 hours                                                              | 5  | 5.6 |
| Several days                                                            | 2  | 2.2 |
| 1 week or longer                                                        | 1  | 1.1 |
| Q4/ How long do your headaches usually last if you do not take your medicine? |    |     |
| No more than 2 hours                                                   | 10 | 11.1|
| 3-4 hours                                                               | 22 | 24.4|
| 5-12 hours                                                              | 28 | 31.1|
| 12-24 hours                                                             | 14 | 15.6|
| Several days                                                            | 14 | 15.6|
| 1 week or longer                                                        | 2  | 2.2 |
| Q5/ Have you been using any painkillers for the past 3 months?          |    |     |
| Yes                                                                     | 60 | 66.7|
| No                                                                      | 30 | 33.3|
| Q6/ Have you been using painkillers for at least 3 times per week?      |    |     |
| Yes                                                                     | 20 | 22.2|
| No                                                                      | 70 | 77.8|

**TABLE 8: Headache profile - management of headache (n = 90).**

Table 8 displays the participants’ responses to questions surveying the severity and nature of headaches. When asked about the severity of headaches using a scale from 1-10, mild headaches between 1-3 were reported by 8.9%, moderate headaches from 4-6 were reported by 53.3% and severe headaches from 7-10 were reported by 37.8%. When participants were asked if headaches ever awaken them at night, 7.8% said often while 33.3% said occasionally. As for the location of headaches, 45 (50%) reported a frontal site, 28 (31.1%) reported an occipital site, 42 (46.7%) reported a behind eyes site, 33 (37%) reported both temples site, and 37 (41.1%) reported a one temple site. As for the nature of headaches pain, 69 (76.7%) reported a throbbing / pounding pain, 48 (53.3%) reported an aching / pressure pain, 21 (23.5%) reported a tight band pain, and 10 (11%) reported a dull pain. When asked if routine physical activity (walking or climbing stairs) can aggravate pain, 49 (54.4%) said yes.
### Table 9: Headache profile - severity and nature of headache (n = 90).

| Question                                                                 | n   | %   |
|--------------------------------------------------------------------------|-----|-----|
| Q1/ How painful are your headaches (from a scale of 10)?                 |     |     |
| 1 - 3 (Mild)                                                             | 8   | 8.9 |
| 4 - 6 (Moderate)                                                          | 48  | 53.3|
| 7 - 10 (Severe)                                                           | 34  | 37.8|
| Q2/ Do your headaches awaken you at night?                                |     |     |
| Never                                                                    | 53  | 58.9|
| Occasionally                                                              | 30  | 33.3|
| Often                                                                    | 7   | 7.8 |
| Q3/ Where are your headaches usually located?                             |     |     |
| Frontal                                                                  | 45  | 50  |
| Occipital                                                                | 28  | 31.1|
| Behind the eyes                                                           | 42  | 46.7|
| Both temples                                                             | 33  | 37  |
| One temple                                                               | 37  | 41.1|
| Q4/ How would you describe your headaches?                                |     |     |
| Throbbing / pounding                                                     | 69  | 76.7|
| Ache / pressure                                                          | 48  | 53.3|
| Like a tight band                                                         | 21  | 23.3|
| Dull                                                                     | 10  | 11  |
| Q5/ Does routine physical activity (e.g. walking or climbing stairs) aggravate the pain? |     |     |
| Yes                                                                      | 49  | 54.4|
| No                                                                       | 41  | 45.6|

Table 9 demonstrates the participants’ responses to questions about sleeping patterns. When asked how long they usually sleep, 45 (50%) reported a sleep duration of three to five hours, 38 (42.2%) reported a sleep duration of six to eight hours, and seven (7.8%) reported sleeping hours more than eight hours. As for sleeping duration during holidays, three (3.3%) reported a sleep duration of three to five hours, 34 (37.8%) reported a sleeping duration of six to eight hours, and 53 (58.9%) reported a sleeping hour of more than eight hours. When asked if participants noticed any change in their headache pattern on the weekends and during holidays, only 29 (32.2%) said yes.
### Questionnaire Results

#### Q1/ How many hours do you usually sleep?
- 3-5 hours: 45 (50%)
- 6-8 hours: 38 (42.2%)
- More than 8 hours: 7 (7.8%)

#### Q2/ How many hours do you sleep over the weekends and holidays?
- 3-5 hours: 3 (3.3%)
- 6-8 hours: 34 (37.8%)
- More than 8 hours: 53 (58.9%)

#### Q3/ Have you noticed any changes in headache pattern in the weekends and during holidays?
- Yes: 29 (32.2%)
- No: 61 (67.8%)

### Table 10: Sleeping patterns of the participants (n = 90).

| Question                                                                 | n   | %   |
|--------------------------------------------------------------------------|-----|-----|
| Q1/ How many hours do you usually sleep?                                 |     |     |
| 3-5 hours                                                               | 45  | 50  |
| 6-8 hours                                                               | 38  | 42.2|
| More than 8 hours                                                       | 7   | 7.8 |
| Q2/ How many hours do you sleep over the weekends and holidays?         |     |     |
| 3-5 hours                                                               | 3   | 3.3 |
| 6-8 hours                                                               | 34  | 37.8|
| More than 8 hours                                                       | 53  | 58.9|
| Q3/ Have you noticed any changes in headache pattern in the weekends and during holidays? |     |     |
| Yes                                                                     | 29  | 32.2|
| No                                                                      | 61  | 67.8|

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**Figure 1** shows the signs and symptoms the participants experience during or before the headaches. The most commonly experienced symptoms were being bothered by noise and light (72; 80%), difficulty in concentrating (60; 66.7%), nausea (56; 40%), feeling light headiness (30; 33.3%), and blurred/double vision (17; 18.9%). The least commonly experienced symptoms were the weakness of arms (2; 2.2%) and eyelid drops (2; 2.2%).

**Figure 2** displays the participants’ gynecological factors associated with headaches. Thirty-two (35.6%) reported menstrual periods to be associated with headaches, three (3.3%) reported birth control pills/injections, and two (2.2%) reported hormonal drugs. No association was reported between headaches and the following factors: pregnancy, lactation, and intrauterine hormonal-based devices.
Figure 2 demonstrates the factors reported by participants to trigger or worsen headaches. The most commonly reported factors were lack of sleep (75; 83.3%), fatigue (68; 75.6%), stress (66; 73.3%) (worry/anger), fasting (28; 31.1%), and certain smells or perfumes (27; 30%). The least commonly reported factors were sexual activity (1; 1.1%), certain foods (2; 2.2%), and air travel (5; 5.6%).

Figure 3 shows the factors reported by participants to relieve headaches. The most commonly reported factors were rest (74; 82.2%), quiet and darkness (70; 77.8%), pressure over headache areas (39; 43.3%), and massage (33; 36.7%).
Table 11 displays participants’ dietary habits and their association with headaches. Two (2.2%) reported an association between chocolate consumption and headaches and seven (7.8%) reported a significant association between caffeine and headaches. No specific association was perceived by the respondents between migraine attacks and the following food items: citrus fruits, pickles, cheese, and dairy products.

| Question                                                                 | n   | %     |
|--------------------------------------------------------------------------|-----|-------|
| Chocolate                                                                |     |       |
| Q1/ How often do you consume chocolate per week?                         |     |       |
| 1-3 times per week                                                       | 55  | 61.1  |
| 5-10 times a week                                                        | 13  | 14.4  |
| More than 10 times a week                                                | 4   | 4.4   |
| I do not consume chocolate                                               | 18  | 20    |
| Q2/ Does consuming chocolate bring your headaches or make them worse?   |     |       |
| Yes                                                                      | 2   | 2.2   |
| No                                                                       | 59  | 66.6  |
| I don’t know                                                             | 29  | 33.2  |
| Dairy products                                                           |     |       |
| Q1/ How often do you consume dairy products per week?                    |     |       |
| 1-3 times per week                                                       | 45  | 50    |
| 5-10 times a week                                                        | 29  | 32.2  |
| More than 10 times a week                                                | 10  | 11.1  |
| I do not consume chocolate                                               | 6   | 6.7   |
| Q2/ Does consuming dairy bring your headaches or make them worse?       |     |       |
| Yes                                                                      | 0   | 0     |
| No                                                                       | 60  | 66.7  |
| I don’t know                                                             | 30  | 33.3  |
| Cheese                                                                   |     |       |
| Q1/ How often do you consume cheese per week?                            |     |       |
| 1-3 times per week                                                       | 44  | 48.9  |
| 5-10 times a week                                                        | 31  | 34.4  |
More than 10 times a week & 6 & 6.7; 
I do not consume chocolate & 9 & 10; 
Q2/ Does consuming cheese bring your headaches or make them worse? 
Yes & 0 & 0; 
No & 63 & 70; 
I don’t know & 27 & 30; 
Caffeine 
Q1/ How often do you consume caffeine (coffee, tea, soft drinks) per week? 
1-3 times per week & 22 & 24.4; 
5-10 times a week & 36 & 40; 
More than 10 times a week & 24 & 26.7; 
I do not consume chocolate & 8 & 8.9; 
Q2/ Does consuming cheese bring your headaches or make them worse? 
Yes & 7 & 7.8; 

**TABLE 11: Dietary habits of participants and their association with headaches (n = 90).**

Table 11 shows the association between sleeping hours and headaches frequency and severity. No significant relationship was found between sleeping hours and headache frequency per month, headache severity (out of 10), and being awakened at night from headaches.

| Sleeping Hours | Headaches Frequency per Month (Mean + SD) | P-value |
|----------------|------------------------------------------|---------|
| 3-5 hours      | 5.73 + 6.1                               |         |
| 6-8 hours      | 5.82 + 4.9                               | 0.816   |
| More than 8 hours | 4.43 + 0.98                        |         |

| Sleeping hours | Headache pain severity (out of 10) | P-value |
|----------------|-----------------------------------|---------|
| Mild (1 - 3)   | 3 (6.7%)                          |         |
| Moderate (4 - 6) | 20 (44.4%)                     | 22 (48.9%) |
| Severe (7 - 10) |                                  |         |

| Sleeping Hours | Do your headaches awaken you at night? | P-value |
|----------------|---------------------------------------|---------|
| Never          | 26 (57.8%)                            |         |
| Occasionally   | 16 (35.6%)                            |         |
| Often          | 3 (6.7%)                              |         |

| Sleeping Hours | P-value |
|----------------|---------|
| 3-5 hours      | 0.194   |
| 6-8 hours      |         |
| More than 8 hours | 0.959   |

**TABLE 12: The association between sleeping hours and headaches frequency and severity (n = 90).**

Discussion

The purpose of this study was to measure the prevalence of migraine among the female population of KSAU-2022 Aladdin et al. Cureus 14(5): e24848. DOI 10.7759/cureus.24848
HS - Jeddah and to assess whether the patients’ dietary habits had an impact on their headache frequency and severity. In this study, 410 subjects were interviewed and assessed using the ICHD-III migraine criteria. After statistically analyzing the data, it was concluded that migraine is prevalent among 40.24% of the female population at KSAU-HS.

This result differs significantly from what was reported by Muayqil et al. [2] about the prevalence of migraine among females in Saudi Arabia, which was found to be 20.1%. This difference may be attributed to the fact that all of our participants were either working women or students of health sciences. Comparably, Al Jumah et al. found that the prevalence of migraine is 56% among females in a population-based study in Saudi Arabia [11], which is close to our findings.

Variable prevalence among female students was reported in several other local studies. A higher prevalence was reported in a study done at Taibah University, which found the migraine prevalence to be 61.8% among female students [12]. A similar result (61.5%) was also reported in a study done at Jazan University [13]. On the other hand, two other studies in Taif University and the KSAU-HS Riyadh branch showed a lower prevalence of 52.5% and 5.30%, respectively [14, 15].

When comparing female students to employees, we found that the employees had a higher prevalence of migraine; 48.28% as compared to 38.92% of students. It was previously reported that migraine prevalence is the highest in females aged 25 to 55 years old, which is the peak of economic productivity, and several other studies have noticed that migraine is more prevalent among economically active individuals [16-18]. This may be attributed to increased responsibilities and work-related stressors.

The only food items reported to be triggers of migraine by participants were chocolate and caffeinated beverages. About 10% reported an association between the consumption of chocolate and caffeine. Only 2.2% reported that chocolate caused them to experience headaches, while 7.8% reported that caffeine caused them to develop headaches. Caffeinated beverages and chocolate are classically associated with migraine. However, the evidence is still not sufficient to make recommendations. A prospective study that evaluated the relationship between caffeine and migraine found that caffeine's effect is complex and follows a dose-dependent pattern. Consumption of high amounts of caffeine has been reported to trigger migraine headaches on the same day of consumption [19]. A recent review about chocolate as a trigger for migraine headaches evaluated 25 studies, and the conclusion was that there was no sufficient evidence to link chocolate consumption with the precipitation of migraine attacks. In some of the studies included, a small percentage of participants reported that chocolate was a trigger for their migraine headaches. However, these results can be questioned due to the study designs used and the possibility of recall bias [20]. This limitation also applies to the present study, as participants were asked to choose triggers from a list of food items. Also, by using a cross-sectional study design, we were unable to prove any associations.

Our study is not designed to discover new dietary triggers for migraine but to assess the hidden and neglected effects of the new trends in dietary cultures on migraine patients. The food industry with the unprecedented expansion in coffee shops needs to address dietary factors that may precipitate significant days of headache and loss of productivity in patients with migraine if calculated on an annual level. Public awareness is needed to highlight the neglected effects of coffee and tyramine-rich food on patients with migraine. Investing in dietary alternatives such as decaffeinated beverages or plant-based milk products may provide a range of new options for patients with migraine. Our study should prompt further impact assessment of the new trend in the coffee industry and its effect on health, quality of life, and economy on a nationwide level.

Conclusions

Migraine remains a highly prevalent disorder among student populations with a significant impact on productivity and quality of life. Migraine may represent undervalued social and economical burdens entailing absenteeism, excessive medical costs, and impaired quality of life. Our study revealed that the widespread trends for excessive consumption of coffee and caffeinated beverages at food outlets within the educational institution are occult triggers for headache attacks in a significant portion of students with migraine. The recent shift in dietary habits in our community for excessive consumption of coffee and other tyramine-rich food items has negative consequences on productivity and the economy. Our results can be conceivably extrapolated to reflect the effect of dietary habits on other streams of society, including companies, firms, schools, and workplaces that are consumed by the new dietary trends.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. King Abdullah International Medical Research Center (KAIMRC) issued approval IRBC/0983/19. Ethical approval was obtained from the Institutional Review Board (IRB), King Abdullah International Medical Research Center (KAIMRC), Jeddah, Saudi Arabia. Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue. Conflicts of interest: In compliance with the ICMJE uniform disclosure
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