

**T.C.**  
**BAHCESEHIR UNIVERSITY**  
**GRADUATE SCHOOL OF EDUCATION**  
**NEUROLOGY HEAD OF THE DEPARTMENT**

**EPIDEMIOLOGY OF MIGRAINES IN FEMALES,  
WITH AN EMPHASIS ON DIETARY INFLUENCE IN IRAQ**

**MASTER'S THESIS**

**DINA KHAFAT**

**ISTANBUL 2023**

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**THESIS ADVISOR**  
**Dr. Bilge MERAL KOÇ**

**ISTANBUL 2023**



**T.C.  
BAHCESEHIR UNIVERSITY  
GRADUATE SCHOOL**

19/06/2023

**MASTER THESIS APPROVAL FORM**

|                                    |                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------|
| <b>Program Name:</b>               | NEUROSCIENCE (ENGLISH, THESIS)                                                         |
| <b>Student's Name and Surname:</b> | Dina Khafaf                                                                            |
| <b>Name Of The Thesis:</b>         | EPIDEMIOLOGY OF MIGRAINES IN FEMALES,<br>WITH AN EMPHASIS ON DIETARY INFLUENCE IN IRAQ |
| <b>Thesis Defense Date:</b>        | 19/06/2023                                                                             |

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|                                             | <b>Title, Name</b>                       | <b>Institution</b>                                                                                | <b>Signature</b> |
|---------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------|------------------|
| <b>Thesis Advisor:</b>                      | Assist. Prof. Dr. Bilge<br>MERAL KOÇ     | Faculty of Health Sciences,<br>Department of Nutrition and<br>Dietetics, Bahçeşehir<br>University |                  |
| <b>2nd Member</b>                           | Assist. Prof. Dr. Emre<br>Batuhan KENGER | Faculty of Health Sciences,<br>Department of Nutrition and<br>Dietetics, Bahçeşehir<br>University |                  |
| <b>3rd Member<br/>(Outside Institution)</b> | Assoc. Prof. Dr. Binnur<br>OKAN BAKIR    | Nutrition and Dietetics<br>Department, Yeditepe<br>University                                     |                  |



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## **ABSTRACT**

### **EPIDEMIOLOGY OF MIGRAINES IN FEMALES, WITH AN EMPHASIS ON DIETARY INFLUENCE IN IRAQ**

Khafaf, Dina

Neuroscience Master's Program

Supervisor: Dr. Bilge MERAL KOÇ

June 2023, 72 Pages

Migraine is a neurological condition that frequently results in a severe headache. The headache comes in episodes and is occasionally accompanied by nausea, vomiting, and sensitivity to light. Migraines can be caused by a variety of conditions and can last anywhere from three to four hours to several days, with females experiencing them three times more frequently than men. Studies have found some evidence that lifestyle variables, such as nutrition, may play an important role in the emergence of migraines. The purpose of this research is to determine the epidemiology of migraine among females with an emphasis on the relationship between headaches and the dietary habits of females who are enduring migraine attacks in Iraq. This study included a three-section online survey that was sent to the females via different online platforms. 360 females participated from Sulaymaniyah, Iraq, with ages ranging from 18 to 35. The survey's main questions focused on the characteristics of female respondents, with questions based on the (IHS) criteria for migraine diagnosis. A few questions about aura symptoms were asked to those who met the migraine diagnostic criteria. The Migraine Disability Assessment (MIDAS) questionnaire was also used, along with questions about headache treatment, headache-related signs and symptoms, headache triggers, headache relieving factors, sleep routine,

dietary consumption, and the influence of each factor on migraine. The dietary habits of the females experiencing migraines and its relationship to their headache were found to be statistically significant between headaches lasting from 4 to 72 hours in relation to (Nuts p-value= 0.000, Hot/Spicy foods p-value= 0.000, Tomato p-value= 0.005, Banana p-value=0.01, Aspartame p-value=0.012, Beverages containing caffeine p-value=0.000 and Citrusy Fruits p-value=0.008) because the result of p-value was less than the common alpha 0.05. To maintain good eating habits, healthy eating and a proper nutrition style must be followed. Further investigation is also required to find additional dietary migraine triggers. Finally, modifications to data gathering, such as face-to-face interviews, may increase research quality.

**Keywords:** Neurological Diseases, Migraines, Females, Dietary Influence, Iraq

## ÖZ

### IRAKT'A YAŞAYAN KADINLARDA MIGREN EPIDEMIOLOJISI VE BESLENME DURUMLARI İLE İLİŞKİSİ

Khafaf, Dina

Sinirbilim Yüksek Lisans Programı

Danışman: Dr. Bilge MERAL KOÇ

Haziran 2023, 72 Sayfa

Migren, sıklıkla şiddetli bir baş ağrısına neden olan nörolojik bir durumdur. Baş ağrısı bölümler halinde gelir ve ara sıra mide bulantısı, kusma ve ışığa duyarlılık eşlik eder. Migrenler çeşitli koşullardan kaynaklanabilir ve üç ila dört saatten birkaç güne kadar sürebilir ve kadınlarda erkeklerden üç kat daha sık görülür. Çalışmalar, beslenme gibi yaşam tarzı değişkenlerinin migrenin ortaya çıkmasında önemli bir rol oynayabileceğine dair bazı kanıtlar bulmuştur. Bu araştırmanın amacı, Irak'ta migren atakları geçiren kadınların beslenme alışkanlıkları ile baş ağrıları arasındaki ilişkiyi vurgulayarak kadınlardaki migrenin epidemiyolojisini belirlemektir. Bu çalışma, kadınlara farklı çevrimiçi platformlar aracılığıyla gönderilen üç bölümlü bir çevrimiçi anket içermektedir. Irak, Süleymaniye'den yaşları 18 ila 35 arasında değişen 360 kadın katıldı. Anketin ana soruları, migren teşhisi için (IHS) kriterlerini temel alan sorularla kadın katılımcıların özelliklerine odaklandı. Migren tanı ölçütlerini karşılayanlara aura belirtileri ile ilgili birkaç soru soruldu. Migren Engellilik Değerlendirmesi (MIDAS) anketi, baş ağrısı tedavisi, baş ağrısı ile ilgili belirti ve semptomlar, baş ağrısını tetikleyenler, baş ağrısını hafifleten faktörler, uyku rutini, diyet tüketimi ve her faktörün migren üzerindeki etkisi ile ilgili sorularla birlikte kullanıldı. Migreni olan kadınların beslenme alışkanlıkları ve baş ağrıları ile ilişkisi, 4 ile 72 saat arasında süren baş ağrıları arasında (Fındık p-değeri=

0.000, Sıcak/Baharatlı yiyecekler p-değeri= 0.000, Domates) ile ilişkili olarak istatistiksel olarak anlamlı bulunmuştur. p-değeri= 0,005, Muz p-değeri=0,01, Aspartam p-değeri=0,012, Kafein içeren içecekler p-değeri=0,000 ve Turunçgiller p-değeri=0,008) çünkü p-değerinin sonucu genel alfadan düşük çıktı 0,05. İyi beslenme alışkanlıklarını sürdürmek için sağlıklı beslenme ve doğru beslenme tarzı izlenmelidir. Ek diyet migren tetikleyicilerini bulmak için daha fazla araştırma yapılması gerekir. Son olarak, yüz yüze görüşmeler gibi veri toplamada yapılacak değişiklikler araştırma kalitesini artırabilir.

**Anahtar Kelimeler:** Nörolojik Hastalıklar, Migren, Kadınlar, Diyet Etkisi, Irak



## **ACKNOWLEDGMENTS**

I want to take a moment and thank GOD for all the blessings he's giving me in my life.

I wish to express my deepest appreciation to my supervisor, Dr. Bilge MERAL KOÇ, who assisted me from the beginning to the completion of my thesis journey, and who was always kind and helpful.

I would like to extend my sincere thanks to Assoc. Prof. Timuçin AVŞAR, the head of the Neuroscience Master's Program for giving me the amazing opportunity to study at Bahçeşehir University.

I would like to thank my parents, Tareq KHAFRAF, Gulala AHMED SHAWQI, Dalia KHAFRAF, from the bottom of my heart for always being there for me, motivating me to be stronger and smarter every day, and showing me that life is much better with education.

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## LIST OF ABBREVIATIONS

|       |                                 |
|-------|---------------------------------|
| CGRP  | Calcitonin gene-related peptide |
| IHS   | International Headache Society  |
| KD    | Ketogenic Diet                  |
| MAD   | Modified Atkins Diet            |
| MIDAS | Migraine Disability Assessment  |
| WHO   | World Health Organization       |

## **Chapter 1**

### **Introduction**

Migraine is a common neurological condition, it is one of the most frequent types of headache disorders, and it can have a significant impact on a person's personal, professional, and social life. According to the World Health Organization (WHO), severe migraine is one of the chronic conditions that have the potential to substantially impair one's ability to function. It is characterized by a strong and unbearable headache that is usually one-sided and pulsating. This type of headache is sometimes accompanied by other symptoms, including photophobia, nausea, vomiting, mood disturbances, dizziness, and abnormal sensory perceptions. In women's health care, headaches are one of the most prevalent health disorders and a serious medical issue. (Nazari et al. 2010a).

#### **1.1 Migraine Prevalence**

More than a billion people worldwide suffer from migraines every year, making it one of the most common neurological conditions. The prevalence of migraines are particularly high in young individuals and females. (Amiri et al. 2022). For the entire adult population worldwide, 46% suffer from headaches, 11% from migraines, 42% from tension-type headaches, and 3% from chronic daily headaches. According to (WHO), this would place headache disorders in the top ten most disabling conditions for both genders, and in the top five for females. (Stovner et al. 2007).

#### **1.2 Migraine Diagnostic Criteria**

In order to accurately identify migraines, the International Headache Society (IHS) has established a set of diagnostic criteria. Firstly, a headache attack should persist more than four consecutive hours and up to three days, with or without effective therapy. Moreover, the headache must exhibit at minimum two of the following properties: it must be unilateral, pulsating, severe or moderate intensity, or aggravate with regular exercise such as walking. Furthermore, headaches must appear with nausea, vomiting,



photophobia (sensitivity to light), or phonophobia (fear of loud sound). Lastly, the headache should not be attributed to a different disorder. (Olesen et al. 2017).

### **1.3 Migraine Prevalence and Causes Among Different Studies**

There is a lot of concern about migraines among university students. Since it is so common, it causes so many other health problems and impairments as well as a decline in educational achievement. In general, medical students put in a lot of effort and must maintain a high level of focus and studying throughout the day. This can lead to a great deal of stress, which can result in sleep disruptions, and they are exposed to extremely stressful settings. A cross-sectional study was completed among medical students in Jeddah, Saudi Arabia for a period of one year. The individuals in the study displayed a prevalence of headache and migraine that was significantly higher than expected. The prevalence showed migraines of 26.3%, with 41.6% of individuals experiencing extreme pain. The presence of Functional Gastrointestinal Disorders, a history of migraine in one's family, females, and being enrolled in the second year of university were all factors that predicted migraines. The most common triggers were stress and disturbed sleep. Throughout migraine attacks, the majority of participants reported having difficulty participating in educational sessions and a decreased educational achievement. (Ibrahim et al. 2017).

Consequently, a person's likelihood of experiencing migraine, as well as their ability to work and live better, can be considerably increased by aspects contributing to their way of life. Neurologists frequently recommend that patients who suffer from migraines adopt a routine-based lifestyle. This is due to the observation that rapid shifts in any aspect of one's lifestyle, including dietary choices, can bring on migraine symptoms. Other aspects include physical activity, getting enough sleep, balancing work, and rest, and so on. (Gazerani, 2021).

Patients who experience headaches, particularly those who suffer from migraines, often indicate that dietary triggers are the cause of their pain. Based on the study population and the methods used, the existence of any single food trigger in migraine patients ranges from 10% to 64%. Certain food types of cause headaches in just an hour of intake, though others cause headaches 12 hours later. Previously, research has focused

on identifying migraine triggers including alcohol (specifically red wine), chocolate, caffeine, dairy products like aged cheese, food preservatives like nitrates and nitrites, monosodium glutamate, and sugar substitutes like aspartame. (Zaeem et al. 2016).

The consumption of alcoholic beverages is commonly noted as a migraine trigger. Alcoholic beverages were found to be a trigger by 35.6% of migraine patients in a cross-sectional, web-based questionnaire survey. (Onderwater et al. 2019). Another prospective cross-sectional research showed that widely consumed dietary triggers were coffee (19.9%), chocolate (7.5%), and food rich in monosodium glutamate (5.6%). (Tai et al. 2018). Surveys were conducted in a study with 171 participants of 132 females and 39 males. 8.2% reported that aspartame was a definite migraine trigger. (Lipton et al. 1989).

#### **1.4 Migraine Consequences**

As a serious disease, migraine is best characterized as having episodic appearances, progressing in some people, and having a significant socio-economic consequence. Migraine patients and their family members experience stressful situations as a result of the condition, which also affects the ways of living and disrupts the daily interactions that take place within the family. Due to the fact that migraines are more prevalent in females, it is considered to be a significant health threat for them. (Nazari et al. 2010b).

#### **1.5 Statement of the problem**

Many different studies are conducted to investigate the prevalence of migraines and examine the connection between headaches and food habits. The focus of dietary influence on migraine research will help to better understand which food items and living factors trigger it. This could suggest that a change in diet and daily routine can help in migraine management.

#### **1.6 Purpose of the study**

The purpose of this research is to determine the epidemiology of migraine among Iraqi females with an emphasis on the relationship between headaches and the dietary habits of females who are enduring migraine attacks in Iraq.

### **1.7 Research questions**

1. How many females experience migraines versus how many doesn't?
2. What are the dietary habits of females experiencing migraine episodes?
3. Which factors make headaches worse, and which factors relieve headaches?

### **1.8 Significance of the study**

After researching the dietary habits of females who suffer from migraines:

- 1- An increased awareness among females that eating habits can have an effect on health.
- 2- A basic understanding of one's everyday routines and/or factors that can either trigger or relieve migraines.
- 3- Females being more considerate about their dietary choices and creating a healthier lifestyle and daily routines.
- 4- Future studies may discover more food varieties that have a correlation with migraines in addition to other daily factors that can trigger or relieve migraines using the data and analysis provided by this study.

## **Chapter 2**

### **Literature Review**

#### **2.1 Relationship Between Migraine and Diet**

Studies have shown that migraines are dietary responsive, and that a number of dietary components can trigger migraine attacks. According to a review article by (Gazerani 2020), the pathogenesis of migraine and headaches is thought to be influenced by dietary compounds. Various foods have been discovered to be related to migraine headaches. In accordance with the available research, common foods linked to migraines include chocolate, citrus fruits, ice cream, onions, dairy products, nuts, alcoholic beverages, coffee, caffeine, histamine, tyramine, monosodium glutamate (MSG), phenylethylamine, aspartame, sucralose, nitrates, and gluten.

According to the research presented by (Gazerani 2020) certain foods and ingredients, when consumed in large quantities, have been discovered to cause migraines. Particularly, the reaction to an episode of headache is primarily triggered by the quantity of food and the timing of the food. Furthermore, research shows that certain food and food component triggers may further cause headaches in patient subgroups who suffer from other medical conditions and immunological reactions to food, such as positive IgG antibodies. These patients are more likely to experience headaches as a result of the triggers. The identification of dietary triggers is made significantly more difficult by these health problems. In specific patients, migraine dietary triggers are identified through serological testing and food diaries. According to the findings of a few studies, the nutritional approaches used to treat migraines have an effect not only on the migraine itself but also on other associated symptoms, such as sensitivity to light, nausea, vomiting, loud sounds, smell, loss of appetite, tiredness, drowsiness, and gastrointestinal problems.

#### **2.2 Dietary Interventions**

The research by (Gazerani 2020) proposes a comprehensive strategy that incorporates dietary interventions to enhance the lifestyle quality of life in

several migraine patients. most recommended approach, given the challenging nature of identifying triggers. Elimination diets and migraine diets are two of the most popular methods for avoiding dietary migraines, according to their research. The goal of an elimination diet is to determine which foods your body is not able to tolerate well and then eliminate those foods from your diet. After some time has passed, the foods are gradually reintroduced, one by one time, as well as keeping an eye out for any signs of an adverse reaction. A diet diary, which is a method of keeping a record of what a person consumes and drink during the day, also assist in identifying presence and absence triggers for evaluation by a doctor. (Gazerani 2020) highlighted that exposure to a specific food does not always cause a headache, thus, other factors, such as the quantity of food consumed or the time consumed, may influence a person's response. Thus, the study adds to the literature suggesting that other triggers, such as stress, seasonal changes, and dehydration, should be considered in these situations where migraines may develop.

(Gazerani 2020) further indicates identifying special diets that are helpful to people experiencing migraine. Some have suggested that following a diet that plays no part in migraine pathogenesis may be beneficial in relieving migraine. Those nutritional interventions that have been shown to be effective alone or in combination with other nutritional interventions might be of assistance in achieving the best possible response based on diet.

### **2.3 Migraine Among Arab and Iraqi Females**

(Mustafa et al. 2021) research of migraine gender prevalence in Baghdad, Iraq, managed to find that females are more susceptible to migraine attacks than men. Positive cases in the research included 138 female and 92 male participants. The research backs up previous findings that females have a higher prevalence of migraine than men. In addition, the majority of female patients described their headaches as pounding and throbbing.

(Mustafa et al. 2021) also indicate that females between the ages of 20 and 50 are the most affected group. In early adolescence, boys are more susceptible than girls, but in old age, women outnumber men by a ratio of 2 to 3. Both the frequency and severity of migraines decrease significantly after menopause.

Another study examining the clinical characteristics of headache among a sample of Iraqi medical and dental students revealed a high prevalence of headache between both medical and dental students, with a predominance of females, verifying previous research of a high prevalence among females.(Mohammed Ali and Basim 2020)

## **2.4 Diet Types and Migraine**

(Razeghi Jahromi et al. 2019) investigated the link between diet and headache and discovered that both Ketogenic diets (KD) and Modified Atkins diets (MAD) are important in neuroprotection, mitochondrial function improvement, and energy metabolism. KD and MAD play important roles in compensating for serotonergic dysfunction, lowering CGRP levels, and suppressing neuroinflammation. These processes are critical in assessing the state of each person's neurological health. The findings of the research showed that factors such as diet and lifestyle play an important role in indicating headaches and migraines. As a result, attempting to make changes to one's diet can help prevent and treat headaches. (Razeghi Jahromi et al. 2019)

Doctors frequently implement recommendations for how people with migraine can decrease the occurrence of their attacks, particularly when it comes to the intake of certain food ingredients. Noticeably, even after these recommendations, the majority of clinical studies have revealed contradictory results. From a clinical point of view, it appears fairly clear that environmental factors can affect the course of migraine symptoms. Patients frequently indicate that external factors such as weather changes or particular food ingredients can impact the occurrence or worsen an ongoing migraine attack. (Hoffmann and Recober 2013)

## **2.5 Conclusion**

This review of the literature confirms the widespread occurrence of migraine headaches among people and particularly in females. It has determined the diet and lifestyle causes and triggers of migraine and headache. This research focused on the epidemiology of migraine among Iraqi females, as well as the relationship between migraine headaches and the dietary habits of females who are enduring migraine attacks.

## **Chapter 3**

### **Methodology**

The data collection process involved a three-section online survey that was sent to the females via internet platforms such as WhatsApp, Viber, Facebook, Instagram. When the survey was distributed to the females, an informed consent form was included. (Dear participants, I am sharing my Master's Degree research survey about the Epidemiology of Migraines in Females, with An Emphasis on Dietary Influence in Iraq. Participation is completely voluntary, and responses will be kept anonymous). To make the online survey easier for all the female respondents, it was written in a simplified form and was entirely in English. The survey's first section asked questions about the characteristics of the female respondents, including their age, marital status, etc. Next in the same section of the survey there were questions based on the (IHS) criteria for diagnosing migraines. This will distinguish between females who don't experience migraines and those who do. In addition, those who meet the migraine diagnostic criteria will also be asked a few questions about aura symptoms. The second section of the survey included an assessment of how much migraines influence the female's everyday life using a unique questionnaire called the Migraine Disability Assessment (MIDAS) designed by (W. F. Stewart et al. 2001). The assessment results established the level of disability on a scale ranging from no or little disability to severe disability. In the final section of the survey, questions regarding headache treatment, headache-related signs and symptoms, headache triggers, headache relieving factors, sleep routine, dietary consumption, and the influence of each factor on migraines was asked.

#### **3.1 Research Design**

The type of study is descriptive research and that is a quantitative method (survey). The goal of descriptive research is to collect information that may be used to make statistical interpretation about a population. This requires careful planning and a well-structured design.

#### **3.2 Setting and participants /Target population and participants**

In this research, 360 females participated from Sulaymaniyah, Iraq, with ages

ranging from 18 to 35, all participating through different online platforms.

By turning off the collect email addresses option in the survey's settings, the participants confidentiality and privacy were maintained.

### **3.3 Data collection Procedure**

An online survey was developed using Google Forms and it was used for the data collection procedure. The survey had three sections: In the first section, demographic questions such as age, marital status, occupation, working hours per week, weight, and height were listed. (Appendix B). In the same section, questions based on the (IHS) diagnostic criteria for migraines followed. (Appendix C). Those who meet the migraine diagnostic criteria will also be asked questions about aura symptoms. (Appendix D). The second section of the survey consisted of an assessment of the effect of migraines on a female's everyday life using the (MIDAS) questionnaire. (Appendix E). The assessment results indicated the degree of disability on a scale ranging from no or little disability to severe disability. In the last section of the survey, questions regarding headache treatments, headache-related signs and symptoms, headache triggers, headache relieving factors, sleep routine, dietary consumption, and the influence that each factor has on migraines were asked. The following were the questions regarding headache treatments: are you currently treating your headaches with medication? (Yes/No/None). How often do you take your medications? Daily/Weekly/Monthly/None. What is/are the medications? (Acetaminophen/paracetamol – Ibuprofen – Aspirin – Naproxen – Diclofenac Sodium/Voltaren – Others - None). Do you find that taking medicine helps relieve your headaches in any way? (Yes/No/None). How long does it often take for your headaches to calm down after taking your medication? 1-2 hours, 3-5 hours, 6-12 hours, more than a day, none. Without medications, what is the duration of your headaches? 1-2 hours, 3-5 hours, 6-12 hours, more than a day, none. (Appendix F). After that, here are the questions that were asked about signs and symptoms associated with headaches, as well as Triggers that may induce a Headache, and Factors that may relieve headaches: Which headache related sign and symptoms do you experience? Nausea/Vomiting, Dizziness, Photophobia, Diarrhea, Sweating, Feeling cold, Others, None. Which headache related factor do you feel triggers (worsen) your headache? Certain food types, Lights/Sunlight, Physical activity, Hot weather, skipping meals, Loud noises, Certain



smells, Stress, Menstrual cycle, Sleep disturbance, Feeling Sad, Others, None. Which factors do you feel it relieves your Headache? Resting, drinking caffeinated drinks, Medication, Sleeping, Vomiting, Messages, Eating, Sitting in a quiet room with no lights, None. (Appendix G). Next, these are the two questions about sleep routine that have been asked: How many hours do you sleep each night? 2-4 Hours, 5-7 Hours, 8-14 hours, more than 14 hours, Irregular Sleep. Do headaches ever disturb your sleep? (Wake you at night), Yes/No. (Appendix H). ). Finally, the females were asked about various food types to be identified as migraine triggers, what is their typical daily and weekly consumption of it? and if they detect any difference after consuming these food types, they were also questioned about whether they see any change at all. Caffeinated beverages (coffee, tea, and coke), chocolate, cheese, citrusy fruits, and their juices (including lemons, grapefruit, oranges) are among the food categories. Smoked fish, nut varieties, milk, hot/spicy food, tomato, banana, yoghurt, and aspartame (an artificial sweetener and sugar substitute) were among the other food groups. (Appendix I).

### **3.3.1 Data Analysis**

The IBM SPSS Statistics version 24. program was used to do data analysis. The data had been coded, tabulated, and presented in a descriptive form. The statistical procedure that was applied to determine the results of the present study included: Logistic Regression Model, Probability Value and to represent nominal data, frequency and percentages were utilized. The criteria of the probability level for determining the significance of the test: P -value as:

1. High significant ( $P < 0.001$ )
2. Significant ( $P < 0.05$ )
3. Non-significant ( $P > 0.05$ )
4. Very highly significant ( $P < 0.000$ )

The sample size was calculated according to a pre-established formula.

N = population size

$e$  = Margin of error (percentage in decimal form)

$Z$  = Z-score (Desired confidence level, 95%:  $z$  score=1.96)

The estimated sample size needed to achieve a precision of  $\pm 0.05\%$  with a 95% confidence interval (CI) and the study included 450 females with an 80% response rate; 90 responses were excluded due to inaccurate data in the questionnaires. A total of 360 respondents completed and returned the questionnaire via online platforms. Step by step data analysis is demonstrated in the Findings section.

### **3.3.2 Validity and Reliability**

The International Headache Society's migraine diagnostic criteria were used in the survey, which was reviewed and approved by a Neurologist, along with the Migraine Disability Assessment, which was found by (Walter F Stewart et al. 2001) to be valid and reliable. Other questions in the survey were all common questions such as participants characteristics, headache treatment, headache sign and symptoms, triggers and reliver. Sleep routine was also asked and finally the dietary consumption related questions were reviewed and approved by a Dietitian. Ethical approval was obtained from the Ministry of Higher Education and Scientific Research, The Ethics Committee of the College of Medicine, in the University of Sulaimani, Iraq. (Appendix A).

### **3.4 Limitations**

The current study's design, like the majority of studies, has limitations. The first is a lack of previous research on migraine prevalence in females, as well as a focus on dietary influence in Iraq, which is significantly low. The second limitation concerns the study sample, which, due to its small size and focus on females only, does not represent the entire population of Iraq and requires replication in larger groups. The third limitation concerns the respondents, as there is always the possibility that individuals will provide dishonest responses.

## Chapter 4

### Findings

The study's participants are entirely female. (Table 1) shows the characteristics of the participants. 173 (48.1%) were between the ages of 18 and 26, and 187 (51.9%) were between the ages of 27 and 35. There were 234 (65.0%) single females, and 126 (35.0%) married females. Their profession showed 218 (60.6%) working, 61 (16.9%) students, 50 (13.9%) students plus working and 31 (8.6%) as none. When asked how many hours they work per week as students or employees, 172 (47.8%) said they work more than 36 hours, 104 (28.9%) said they work between 17 and 35 hours, 53 (14.7%) said they work 16 hours, and 31 (8.6%) said none. According to BMI results, 8 (2.2%) females were under weight, 204 (56.7%) were normal weight, 118 (32.8%) were over weight, and 30 (8.4%) were obese.

Table 1

*Characteristics of Female Participants*

| Characteristics           |                    | N=360 | %    |
|---------------------------|--------------------|-------|------|
| Age                       | 18-26              | 173   | 48.1 |
|                           | 27-35              | 187   | 51.9 |
| Marital Status            | Single             | 234   | 65.0 |
|                           | Married            | 126   | 34.0 |
| Profession                | Student            | 61    | 16.9 |
|                           | Working            | 218   | 60.5 |
|                           | Student + Working  | 50    | 13.8 |
|                           | None               | 31    | 8.6  |
| Working Hours<br>Per Week | 16 hours           | 53    | 14.7 |
|                           | 17-35 hours        | 104   | 28.9 |
|                           | More than 36 hours | 172   | 47.8 |
|                           | None               | 31    | 8.6  |
| BMI                       | Under Weight       | 8     | 2.2  |
|                           | Normal             | 204   | 56.7 |
|                           | Over Weight        | 118   | 32.8 |
|                           | Obese              | 30    | 8.4  |

According to (Table 2), of the 360 females who responded to the survey, 159 (44.2%) said yes had headaches that lasted 4 to 72 hours, while 201 (55.8%) said they didn't.

Table 2

*Frequency and Percentages of Headaches in Females*

| Do you have headaches lasting 4 to 72 hours? |       |      |
|----------------------------------------------|-------|------|
|                                              | N=360 | %    |
| Yes                                          | 159   | 44.2 |
| No                                           | 201   | 55.8 |

For headache characteristics based on (IHS) criteria, (Table 3-4) shows detailed statistics about having pain in one side of their head, pulsating feeling, moderate or severe pain, pain increased by daily activities such as (walking, climbing stairs, exercise) or avoiding these activities, having nausea and/or vomiting and photophobia (sensitivity towards light). The highest selected criteria result is 111 (29.84%) for having pain in one side of their head and during headaches 149 (68.98%) of the respondents had Photophobia (Sensitivity toward Light, Computer screen, Sunlight) and Phonophobia (Sensitivity towards loud sounds).

Table 3

*Headache characteristics based on (IHS) Criteria*

| Your Headache Characteristics (Select up to 4 answers based on your headaches)                                         |       |       |
|------------------------------------------------------------------------------------------------------------------------|-------|-------|
|                                                                                                                        | N=159 | %     |
| Moderate or Severe pain                                                                                                | 84    | 22.58 |
| Pulsating (beating)                                                                                                    | 96    | 25.81 |
| Pain in one side of your head                                                                                          | 111   | 29.84 |
| Pain increases by routine daily activity like (Walking, Climbing Stairs, Exercise) or you avoid doing these activities | 81    | 21.77 |
| Total                                                                                                                  | 372   | 100   |

Table 4

### *Headache characteristics based on (IHS) Criteria*

| During Headaches (Select up to 2 answers based on your headaches)                                                   |       |       |
|---------------------------------------------------------------------------------------------------------------------|-------|-------|
|                                                                                                                     | N=159 | %     |
| Photophobia (Sensitivity toward Light, Computer screen, Sunlight) and Phonophobia (Sensitivity towards loud sounds) | 149   | 68.98 |
| Nausea and/or vomiting                                                                                              | 67    | 31.02 |
| Total                                                                                                               | 216   | 100   |

(Table 5-6) displays statistical details about number and percentages of the female's aura symptoms and their characteristics in daily life. The most selected aura symptom is Motor aura (Weakness in your body) 92 (30.98%) of participants and the most selected aura characteristic is (At least one aura symptom you selected previously rapidly spreads throughout 5 minutes) with a number of 51 (19.17%) of participants.

Table 5

### *Aura Symptoms*

| Do you have any of these aura symptoms along with your headaches?<br>(Select as much as you have)         |       |       |
|-----------------------------------------------------------------------------------------------------------|-------|-------|
|                                                                                                           | N=159 | %     |
| Speech and/or language (having difficulties speaking)                                                     | 19    | 6.4   |
| Motor aura (Weakness in your body)                                                                        | 92    | 30.98 |
| Brainstem (Ringing in ears, dizziness)                                                                    | 60    | 20.20 |
| Sensory aura (numbing or tingling in the limbs "hands or feet")                                           | 39    | 13.13 |
| Visual aura (seeing sparks or flashes, not seeing well, any other similar symptoms including visual lose) | 77    | 25.93 |
| None                                                                                                      | 10    | 3.37  |
| Total                                                                                                     | 297   | 100   |

Table 6

### *Aura Characteristics*

| Characteristics of these aura symptoms in your daily life?<br>(Select as much as you have) | N=159 | %     |
|--------------------------------------------------------------------------------------------|-------|-------|
| At least one aura symptom you selected previously rapidly spreads throughout 5 minutes     | 51    | 19.17 |
| At least one symptom of aura is unilateral (occur on one side of your body)                | 46    | 17.29 |
| The presence of at least one positive aura symptom (Seeing flashes or sparks)              | 47    | 17.67 |
| Two or more aura symptoms happen one after the other                                       | 26    | 9.77  |
| Headache comes with the aura or comes after it within 60 minutes                           | 48    | 18.05 |
| Each aura symptom lasts between 5 and 60 minutes                                           | 38    | 14.29 |
| None                                                                                       | 10    | 3.76  |
| Total                                                                                      | 266   | 100   |

The results for the MIDAS questionnaire is as follows, there are four score types, with 0-5 days indicating little or no disability, 6-10 days indicating mild disability, 11-20 days indicating moderate disability, and over 21 days indicating severe disability. The total number of days should be added for all five questions to define the final disability level. The statistical data were handled manually, and the answer to question were added. Results show 93 (58.49%) answered between 0-5 which indicates little or no disability, 31 (19.49%) answered between 6-10 which indicates mild disability, 24 (15.0%) answered 11-20 which indicates moderate disability and 11 (6.9%) answered more than 21 which indicates severe disability.

(Table 7) shows the results of taking medications to treat headaches and how often they are being taken (every day, every week, or every month). According to the data, 148 (41.1%) females said yes to using medications to treat headaches. 103 (64.8%) said no and 56 (35.2%) said none. The numbers for how frequently females take their medications were 27 (17.0%) for daily, 50 (31.4) for weekly, 26 (16.4%) for monthly, and 56 (35.2%) for none.

Table 7

#### *Headache Treatment and Frequency*

|                                                            |         | N=159 | Percent |
|------------------------------------------------------------|---------|-------|---------|
| Are you currently treating your headaches with medication? | No      | 56    | 35.2    |
|                                                            | Yes     | 103   | 64.8    |
| How often do you take your medications?                    | Daily   | 27    | 17.0    |
|                                                            | Weekly  | 50    | 31.4    |
|                                                            | Monthly | 26    | 16.4    |
|                                                            | None    | 56    | 35.2    |

(Table 8) demonstrates detailed statistics about the types of medications the female participants used. The most commonly used medication is Acetaminophen/Paracetamol with a number of 80 (31.3%) and the least commonly used medication is Aspirin with a number of 4 (1.56%).

Table 8

*Medication Types*

|                            | N=159 | %     |
|----------------------------|-------|-------|
| Acetaminophen/Paracetamol  | 80    | 31.3  |
| Ibuprofen                  | 50    | 19.6  |
| Diclofenac Sodium/Voltaren | 38    | 14.9  |
| Naproxen                   | 9     | 3.5   |
| Others                     | 18    | 7.05  |
| Aspirin                    | 4     | 1.56  |
| None                       | 56    | 21.96 |
| Total                      | 255   | 100   |

(Table 9) displays the results of whether using medications relieves headache, with 97 (61.0%) saying yes, 6 (3.8%) saying no, and 56 (35.2%) saying none. 78 (49.1%) reported that their headaches were relieved after 1-2 hours of using medications, 14 (8.8%) after 3-5 hours, 6 (3.8%) after 6-12 hours, 5 (3.1%) after more than a day, and 56 (35.2%) reported none. Without medication, 8 (5.0%) reported that their headache lasted 1-2 hours, 27 (17.0%) reported 3-5 hours, 38 (23.9%) reported 6-12 hours, 30 (18.9%) reported more than a day, and 56 (35.2%) reported none.

Table 9

*Medication benefit, Medication Functioning Hours, and Headache Duration*

|                                                                                      |            | N=159 | %    |
|--------------------------------------------------------------------------------------|------------|-------|------|
| Do you find that taking medicine helps relieve your headaches in any way?            | No         | 6     | 3.8  |
|                                                                                      | Yes        | 97    | 61.0 |
|                                                                                      | None       | 56    | 35.2 |
| How long does it often take for your headaches to calm after taking your medication? | 1-2 Hours  | 78    | 49.1 |
|                                                                                      | 3-5 Hours  | 14    | 8.8  |
|                                                                                      | 6-12 Hours | 6     | 3.8  |
|                                                                                      | 24+        | 5     | 3.1  |
|                                                                                      | None       | 56    | 35.2 |
| Without medications, what is the duration of your headaches?                         | 1-2 Hours  | 8     | 5.0  |
|                                                                                      | 3-5 Hours  | 27    | 17.0 |
|                                                                                      | 6-12 Hours | 38    | 23.9 |
|                                                                                      | 24+        | 30    | 18.9 |
|                                                                                      | None       | 56    | 35.2 |

(Table 10) represents the number and percentage of results for the signs and symptoms of a headache. Photophobia (Not tolerating Light) to be the highest selected with a number of 107 (30.57%) and Diarrhea to be the lowest selected with a number of 6 (1.71%).

Table 10

*Headache Sign and Symptoms*

| Which headache related sign and symptoms do you experience?<br>(You can select a few or all answers based on the symptoms that you have) | N=159 | %     |
|------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|
| Feeling cold                                                                                                                             | 30    | 8.57  |
| Dizziness                                                                                                                                | 90    | 25.71 |
| Nausea/Vomiting                                                                                                                          | 64    | 18.28 |
| Photophobia (Not tolerating Light)                                                                                                       | 107   | 30.57 |
| Sweating                                                                                                                                 | 26    | 7.42  |
| Diarrhea                                                                                                                                 | 6     | 1.71  |
| Other                                                                                                                                    | 27    | 7.71  |
| Total                                                                                                                                    | 350   | 100   |

The results for the possible headache triggers are shown in (Table 11). With a percentage of 115 (12.9%), stress is identified as the most common factor that may trigger headaches.



Table 11

*Distribution of Frequency and Percentages of Headache Triggers*

| Which Headache Related Factor do you feel it triggers (worsen) your headache? (You can select a few or all answers based on your experience). | N=159 | %    |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| Physical Activity (Exercise, Daily Activities)                                                                                                | 68    | 7.6  |
| Skipping Meals (Not Eating)                                                                                                                   | 85    | 9.5  |
| Loud Noises                                                                                                                                   | 80    | 9.0  |
| Stress                                                                                                                                        | 115   | 12.9 |
| Sleep Disturbance                                                                                                                             | 114   | 12.8 |
| Feeling Sad                                                                                                                                   | 89    | 10.0 |
| Lights/Sunlight                                                                                                                               | 86    | 9.6  |
| Hot Weather                                                                                                                                   | 64    | 7.2  |
| Certain Smells (Perfumes...etc.)                                                                                                              | 50    | 5.6  |
| Menstrual Cycle (Menstruation)                                                                                                                | 90    | 10.1 |
| Certain Food Types                                                                                                                            | 47    | 5.2  |
| Total                                                                                                                                         | 888   | 100  |

The results for possible headache-relieving factors are displayed in (Table 12). With a percentage of 121 (22.0%), Resting is identified as the most common factor that may relieve headaches.

Table 12

*Distribution of Frequency and Percentages of Headache Relivers*

| Which Factors Do you feel it relieves your Headache? (You can select a few or all answers based on your experience). | N=159 | %    |
|----------------------------------------------------------------------------------------------------------------------|-------|------|
| Drinking Caffeinated Drinks (Coffee, Coca-Cola)                                                                      | 45    | 8.1  |
| Resting                                                                                                              | 121   | 22.0 |
| Sleeping                                                                                                             | 117   | 21.3 |
| Sitting in a Quite Room with no Lights                                                                               | 73    | 13.2 |
| Medications                                                                                                          | 98    | 17.8 |
| Messages                                                                                                             | 56    | 10.2 |
| Eating                                                                                                               | 27    | 4.9  |
| Vomiting                                                                                                             | 12    | 2.1  |
| Total                                                                                                                | 549   | 100  |

The results for female participants sleeping hour and a yes or no question about whether headache disturbs their sleep are shown in (Figure 1-2). For sleeping hours, numbers and percentages were as 2 (1.26%) for 2-4 hours, 112 (70.44%) for 5-7 hours, 26 (16.35%) for 8-14 hours, 19 (11.95%) for irregular sleep and 0 (0.0%) for more than 14

hours. 87 (54.72%) answered yes for headaches disturbing their sleep and 72 (45.28%) answered as no.

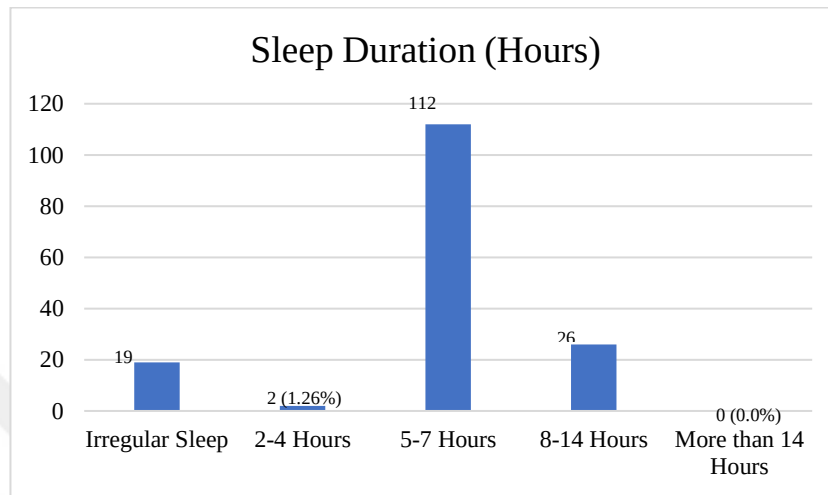


Figure 1. Vertical bar graph showing number and percentages of sleeping hours.

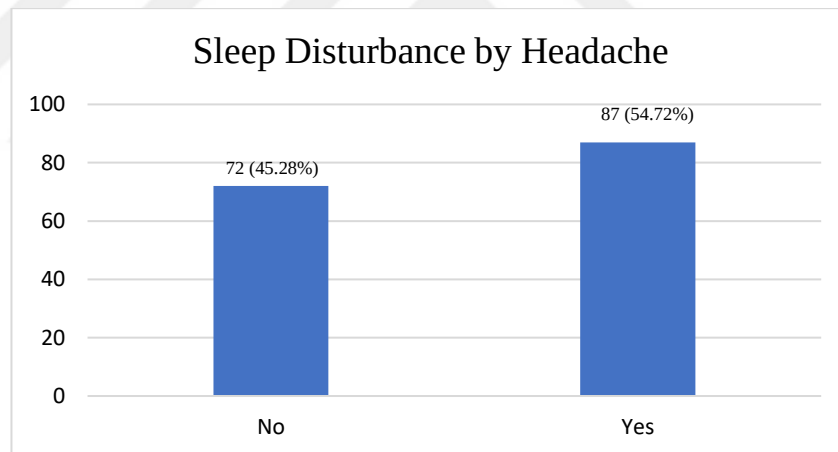


Figure 2. Vertical bar graph showing number and percentages of the participants sleep disruption by headaches.

As for the consumption of beverages containing caffeine such as coffee, tea, or coke, (Table 13) shows that 148 (93.08%) of the participants said yes while 11 (6.92%) said no. 45 (28.30%) said yes to change after consumption of these drinks.

Table 13

Participants Response to Caffeinated Beverages Consumption

|     | N=159 | %     |
|-----|-------|-------|
| Yes | 148   | 93.08 |

|                                                                           |                                 |     |       |
|---------------------------------------------------------------------------|---------------------------------|-----|-------|
| Do you drink beverages containing caffeine, such as coffee, tea, or coke? | No                              | 11  | 6.92  |
|                                                                           | Coffee                          | 107 | 38.22 |
|                                                                           | Tea                             | 125 | 44.64 |
| I drink, (You can select up to 3 as many as you drink).                   | Coke                            | 48  | 17.14 |
|                                                                           | Total                           | 280 | 100.0 |
| Do you drink coffee, tea, or coke often?                                  | Daily                           | 131 | 82.39 |
|                                                                           | 2-4 Times per week              | 17  | 10.69 |
|                                                                           | None                            | 11  | 6.92  |
| Do you detect any difference after consuming these beverages?             | Yes, it makes my Headache worse | 45  | 28.30 |
|                                                                           | No there is no difference       | 103 | 64.78 |
|                                                                           | Not sure                        | 11  | 6.92  |

(Table 14) displays participants chocolate consumption responses. 119 (74.84%) of the participants responded yes to consuming chocolate, while 40 (25.16%) responded as no, and also 36 (22.64%) responded as yes to change in their headache after the consumption of chocolate.

Table 14

*Participants Response to Chocolate Consumption*

|                                                      |                                 | N=159 | %     |
|------------------------------------------------------|---------------------------------|-------|-------|
| Do you eat Chocolate?                                | Yes                             | 119   | 74.84 |
|                                                      | No                              | 40    | 25.16 |
| Do you eat Chocolate often?                          | Daily                           | 43    | 27.04 |
|                                                      | 2-4 Times per week              | 76    | 47.80 |
|                                                      | None                            | 40    | 25.16 |
| Do you detect any difference after eating Chocolate? | Yes, it makes my Headache worse | 36    | 22.64 |
|                                                      | No there is no difference       | 83    | 52.20 |
|                                                      | Not sure                        | 40    | 25.16 |

(Table 15) displays participants cheese consumption responses. 128 (80.50%) of the participants responded as yes to consuming cheese, while 31 (19.50%) responded as no. 38 (23.90%) responded as yes to change after the consumption of cheese.

Table 15

*Participants Response to Cheese Consumption*

|                                                   |                                 | N=159 | %     |
|---------------------------------------------------|---------------------------------|-------|-------|
| Do you eat Cheese?                                | Yes                             | 128   | 80.50 |
|                                                   | No                              | 31    | 19.50 |
| Do you eat Cheese often?                          | Daily                           | 34    | 21.38 |
|                                                   | 2-4 Times per week              | 94    | 59.12 |
|                                                   | None                            | 31    | 19.50 |
| Do you detect any difference after eating Cheese? | Yes, it makes my Headache worse | 38    | 23.90 |
|                                                   | No there is no difference       | 90    | 56.60 |
|                                                   | Not sure                        | 31    | 19.50 |

(Table 16) displays participants citrus fruits consumption responses. 126 (79.25%) of the participants said yes to citrus fruits such as lemons, oranges, and grapefruit consumption, while 33 (20.75%) said no. 31 (19.50%) said yes to change after citrus fruit consumption.

Table 16

*Participants Response to Citrus Fruits Consumption*

|                                                                                                                                 |                                 | N=159 | %     |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------|-------|
| Do you eat Citrusy Fruits such as Lemons, Oranges and Grapefruit or drink their Juices?                                         | Yes                             | 126   | 79.25 |
|                                                                                                                                 | No                              | 33    | 20.75 |
| Do you eat Citrusy Fruits such as Lemons, Oranges and Grapefruit or drink their Juices often?                                   | Daily                           | 19    | 11.95 |
|                                                                                                                                 | 2-4 Times per week              | 107   | 67.30 |
|                                                                                                                                 | None                            | 33    | 20.75 |
| Do you detect any difference after eating Citrusy Fruits such as Lemons, Oranges and Grapefruit or after drinking their Juices? | Yes, it makes my Headache worse | 31    | 19.50 |
|                                                                                                                                 | No there is no difference       | 95    | 59.75 |
|                                                                                                                                 | Not sure                        | 33    | 20.75 |

(Table 17) display participants smoked fish consumption responses. Results show that 54 (33.96%) of the participants responded as yes, while 105 (66.04%) said no. 23 (14.47%) said yes to change after smoked fish consumption.

Table 17

*Participants Response to Smoked Fish Consumption*

|                                                        |                                 | N=159 | %     |
|--------------------------------------------------------|---------------------------------|-------|-------|
| Do you eat Smoked Fish?                                | Yes                             | 54    | 33.96 |
|                                                        | No                              | 105   | 66.04 |
| Do you eat Smoked Fish often?                          | Daily                           | 1     | 0.63  |
|                                                        | 2-4 Times per week              | 53    | 33.33 |
|                                                        | None                            | 105   | 66.04 |
|                                                        | Yes, it makes my Headache worse | 23    | 14.47 |
| Do you detect any difference after eating Smoked Fish? | No there is no difference       | 31    | 19.50 |
|                                                        | Not sure                        | 105   | 66.04 |

(Table 18) displays participants nuts consumption responses. Results show that 134 (84.28%) of the participants responded yes to consuming nuts like almonds and peanuts, while 25 (15.72%) responded as no. 62 (38.99%) responded as yes to change after consumption of nuts.

Table 18

*Participants Response to Nuts Consumption*

|                                                                           |                                 | N=159 | %     |
|---------------------------------------------------------------------------|---------------------------------|-------|-------|
| Do you eat Nuts? Such as Almonds, Peanuts.                                | Yes                             | 134   | 84.28 |
|                                                                           | No                              | 25    | 15.72 |
| Do you eat Nuts often? Such as Almonds, Peanuts.                          | Daily                           | 22    | 13.84 |
|                                                                           | 2-4 Times per week              | 112   | 70.44 |
|                                                                           | None                            | 25    | 15.72 |
| Do you detect any difference after eating Nuts? Such as Almonds, Peanuts. | Yes, it makes my Headache worse | 62    | 38.99 |
|                                                                           | No there is no difference       | 72    | 45.28 |
|                                                                           | Not sure                        | 25    | 15.72 |

(Table 19) displays participants milk consumption responses. Results show that 99 (62.26%) of participants said yes to drinking milk, while 60 (37.74%) said no. 41 (25.79%) responded as yes to change after milk consumption.

Table 19

*Participants Response to Milk Consumption*

|                          |     | N=159 | %     |
|--------------------------|-----|-------|-------|
| Do you drink Milk?       | Yes | 99    | 62.26 |
|                          | No  | 60    | 37.74 |
| Do you drink Milk often? |     | 24    | 15.09 |

|                                                   |                                 |    |       |
|---------------------------------------------------|---------------------------------|----|-------|
|                                                   | Daily                           |    |       |
|                                                   | 2-4 Times per week              | 75 | 47.17 |
|                                                   | None                            | 60 | 37.74 |
| Do you detect any difference after drinking Milk? | Yes, it makes my Headache worse | 41 | 25.79 |
|                                                   | No there is no difference       | 58 | 36.48 |
|                                                   | Not sure                        | 60 | 37.74 |

(Table 20) displays participants hot/spicy food consumption responses. Results show 96 (60.38%) of participants responded as yes to hot or spicy foods, while 63 (39.62%) responded as no. 32 (20.13%) said yes to change after spicy food consumption.

Table 20

*Participant Response to Hot/Spicy Foods Consumption*

|                                                            |                                 | N=159 | %     |
|------------------------------------------------------------|---------------------------------|-------|-------|
| Do you eat Hot/Spicy foods?                                | Yes                             | 96    | 60.38 |
|                                                            | No                              | 63    | 39.62 |
| Do you eat Hot/Spicy foods often?                          | Daily                           | 24    | 15.09 |
|                                                            | 2-4 Times per week              | 72    | 45.28 |
|                                                            | None                            | 63    | 39.62 |
| Do you detect any difference after eating Hot/Spicy Foods? | Yes, it makes my Headache worse | 32    | 20.13 |
|                                                            | No there is no difference       | 64    | 40.25 |
|                                                            | Not sure                        | 63    | 39.62 |

(Table 21) displays participants tomato consumption responses. Results show 144 (90.57%) of the participants said yes to consuming tomato, while 15 (9.43%) said no. 39 (45.53%) responded as yes to change after tomato consumption.

Table 21

*Participants Response to Tomato Consumption*

|                          |                    | N=159 | %     |
|--------------------------|--------------------|-------|-------|
| Do you eat Tomato?       | Yes                | 144   | 90.57 |
|                          | No                 | 15    | 9.43  |
| Do you eat Tomato often? | Daily              | 70    | 44.03 |
|                          | 2-4 Times per week | 74    | 46.54 |
|                          | None               | 15    | 9.43  |
|                          |                    | 39    | 45.53 |

|                                                   |                                 |     |       |
|---------------------------------------------------|---------------------------------|-----|-------|
| Do you detect any difference after eating Tomato? | Yes, it makes my Headache worse |     |       |
|                                                   | No there is no difference       | 105 | 66.04 |
|                                                   | Not sure                        | 15  | 9.43  |

(Table 22) display participants banana consumption responses. Results show 127 (79.87%) of participants responded as yes to banana consumption, and 32 (20.12%) said no. 60 (37.74%) said yes to change after banana consumption.

Table 22

*Participants Response to Banana Consumption*

|                                                   |                                 | N=159 | %     |
|---------------------------------------------------|---------------------------------|-------|-------|
| Do you eat Banana?                                | Yes                             | 127   | 79.87 |
|                                                   | No                              | 32    | 20.12 |
| Do you eat Banana often?                          | Daily                           | 18    | 11.32 |
|                                                   | 2-4 Times per week              | 109   | 68.55 |
|                                                   | None                            | 32    | 20.12 |
| Do you detect any difference after eating Banana? | Yes, it makes my Headache worse | 60    | 37.74 |
|                                                   | No there is no difference       | 67    | 42.14 |
|                                                   | Not sure                        | 32    | 20.12 |

(Table 23) displays participants banana consumption responses. Results show 127 (79.87%) of participants said yes to consuming yogurt, while 32 (20.13%) said no. 44 (27.67%) said yes to change after yogurt consumption.

Table 23

*Participants Response to Yoghurt Consumption*

|                           |                    | N=159 | %     |
|---------------------------|--------------------|-------|-------|
| Do you eat Yoghurt?       | Yes                | 127   | 79.87 |
|                           | No                 | 32    | 20.13 |
| Do you eat Yoghurt often? | Daily              | 35    | 22.01 |
|                           | 2-4 Times per week | 92    | 57.86 |
|                           | None               | 32    | 20.13 |

|                                                    |                                 |    |       |
|----------------------------------------------------|---------------------------------|----|-------|
| Do you detect any difference after eating Yoghurt? | Yes, it makes my Headache worse | 44 | 27.67 |
|                                                    | No there is no difference       | 83 | 52.20 |
|                                                    | Not sure                        | 32 | 20.13 |

(Table 24) display participants aspartame (an artificial sweetener and sugar substitute) consumption responses. Results show 39 (24.53%) of the participants responded yes to aspartame consumption, while 120 (75.47%) said no. 14 (8.81%) said yes to change after aspartame consumption.

Table 24

*Participants Response to Aspartame Consumption*

|                                                                                                                                             |                                 | N=159 | %     |
|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------|-------|
| Do you consume Aspartame (an artificial sweetener and sugar substitute) as part of your daily dietary intake?                               | Yes                             | 39    | 24.53 |
|                                                                                                                                             | No                              | 120   | 75.47 |
| Do you consume Aspartame (an artificial sweetener and sugar substitute) as part of your daily dietary intake often?                         | Daily                           | 20    | 12.58 |
|                                                                                                                                             | 2-4 Times per week              | 19    | 11.95 |
|                                                                                                                                             | None                            | 120   | 75.47 |
| Do you detect any difference after consuming Aspartame (an artificial sweetener and sugar substitute) as part of your daily dietary intake? | Yes, it makes my Headache worse | 14    | 8.81  |
|                                                                                                                                             | No there is no difference       | 25    | 15.72 |
|                                                                                                                                             | Not sure                        | 120   | 75.47 |

In Table (25), Relationship between headaches lasting from 4 to 72 hours and participants response to dietary consumption using logistic regression model are presented. Results shows that there is a statistical significance between headaches lasting from 4 to 72 hours in relation to (Nuts p-value= 0.000, Hot/Spicy foods p-value= 0.000, Tomato p-value= 0.005, Banana p-value=0.01, Aspartame p-value=0.012, Beverages containing caffeine p-value=0.000 and Citrusy Fruits p-value=0.008) because the result of p-value was less than the common alpha 0.05. In contrast, Results shows that there is no statistical significance between headaches lasting from 4 to 72 hours in relation to (Chocolate p-value=0.501, Cheese p-value= 0.424, Milk p-value=0.913, Yoghurt p-



value=0.684 and Smoked Fish p-value=0.06) because the result of p-value was more than the common alpha 0.05.

Table 25

*Relationship Between Headaches Lasting from 4 to 72 hours and Participants Response to Dietary Consumption Using Logistic Regression Model*

| Items                         | Exp(B) | 95% C.I.for EXP(B) |       | Sig.  |
|-------------------------------|--------|--------------------|-------|-------|
|                               |        | Lower              | Upper |       |
| Chocolate                     | 1.218  | 0.685              | 2.167 | 0.501 |
| Cheese                        | 1.281  | 0.698              | 2.35  | 0.424 |
| Nuts                          | 3.319  | 1.846              | 5.967 | 0.000 |
| Milk                          | 1.032  | 0.588              | 1.81  | 0.913 |
| Hot/Spicy foods               | 2.646  | 1.545              | 4.529 | 0.000 |
| Tomato                        | 2.833  | 1.366              | 5.873 | 0.005 |
| Banana                        | 2.01   | 1.183              | 3.417 | 0.01  |
| Yoghurt                       | 1.139  | 0.608              | 2.134 | 0.684 |
| Aspartame                     | 1.954  | 1.157              | 3.3   | 0.012 |
| Beverages containing caffeine | 5.071  | 2.701              | 9.521 | 0.000 |
| Citrusy Fruits                | 2.296  | 1.246              | 4.232 | 0.008 |
| Smoked Fish                   | 0.564  | 0.311              | 1.024 | 0.06  |

## Chapter 5

### Discussion

The purpose of this research was to investigate the prevalence of migraine headaches among Iraqi females with an emphasis on the relationship of these painful

headaches and the eating patterns of participants who experience migraines. In this research, 360 females from Sulaymaniyah, Iraq participated by providing their responses to an online survey. Following an examination of the statistical data, it was determined that migraines are experienced by 159 of the female participants (or 44.2% of the total).

### **5.1 Migraine and Migraine Symptoms**

Migraine is a neurological disorder that is a type of continual and long-term headache that is one of the leading causes of disability globally. Its widespread prevalence and associated disabilities have a wide range of negative and significant effects for not only those directly affected, but also their families, friends, coworkers, and the community in general. Migraine is more than just a headache, it is a complex disorder characterized by episodes of moderate to severe headache, most typically unilateral, and frequently associated with nausea, photophobia, and phonophobia. A migraine attack is a complex neurovascular event that can continue from several hours to several days. (Gupta and Gaurkar 2022). Females experience migraines three to four times more frequently than men do throughout their lifetime. Females' attacks are also more severe, resulting in higher levels of disabilities and longer recovery times. (Al-Hassany et al. 2020). Migraine frequency rises at menstruation, peaks in the late thirties, and then rapidly declines postmenopausal. (Pavlović 2020).

In a study about Migraine Symptoms: Results of a Survey of Self-Reported Migraineurs by (Silberstein 1994). showed that the most often mentioned migraine symptoms were pain, nausea, problems with vision, and vomiting. Of all migraineurs, over ninety percent experienced nausea. Similar to our study, nausea and vomiting were among the most frequently reported symptoms, and in contrast to our study, photophobia (not tolerating light) and dizziness were also often reported.

Another study by (Weatherall 2015) noted that the symptoms of a migraine are frequently accompanied by signs like nausea, dizziness, extreme sensitivity to lights, sounds and smells, lack of desire to eat, problems of bowel function, and others. This study was about the diagnosis and treatment of chronic migraine. Similarly, in our study, symptoms included dizziness, nausea/vomiting, photophobia (not tolerating light), diarrhea and others.

## 5.2 Discussion of Findings for Research Questions

In this study, female participants from Sulaymaniyah, Iraq were asked about their experiences with migraines. From a total of 360 females who took part in the study. It was discovered that 159 (44.2%) experience migraines while 201 females (55.8%) do not. The dietary habits of the females experiencing migraines which to some point made their headache worse were caffeinated beverages (coffee, tea, coke) as the most common with a consumption percentage of 148 (93.08%). Tomato comes after with a percentage of 144 (90.57%), then nuts 134 (84.28%), cheese 128 (80.50%), banana and yogurt 127 (79.87%), citrusy fruits 126 (79.25%), chocolate 119 (74.84%), milk 99 (62.26%), spicy foods 96 (60.38%), smoked fish 54 (33.96%), and aspartame 39 (24.53%). As for the relationship between headaches lasting from 4 to 72 hours and participants response to dietary consumption using logistic regression model are presented. Results shows that there is a statistical significance between headaches lasting from 4 to 72 hours in relation to (Nuts p-value= 0.000, Hot/Spicy foods p-value= 0.000, Tomato p-value= 0.005, Banana p-value=0.01, Aspartame p-value=0.012, Beverages containing caffeine p-value=0.000 and Citrusy Fruits p-value=0.008) because the result of p-value was less than the common alpha 0.05. In contrast, Results shows that there is no statistical significance between headaches lasting from 4 to 72 hours in relation to (Chocolate p-value=0.501, Cheese p-value= 0.424, Milk p-value=0.913, Yoghurt p-value=0.684 and Smoked Fish p-value=0.06) because the result of p-value was more than the common alpha 0.05. To answer the question of possible headache triggers and relivers, with a percentage of 115 (12.9%), stress is identified as the most common factor that may trigger headaches, and with a percentage of 121 (22.0%), resting is identified as the most common factor that may relieve headaches.

## 5.3 Migraine Prevalence Results Across Different Studies

Results from a study on gender differences and migraine prevalence in Baghdad City, Iraq by (Mustafa et al. 2021) which included 230 migraine patients, show that females are more likely than males to experience migraines, with 138 (60%) females and 92 (40%) males participating in the study. In our study, all 360 participants were females

with 159 female participants (or 44.2% of the total) reported having migraines which is comparable to what we found.

A cross-sectional study by (Qais Al-Hadeethi et al. 2020) was conducted on secondary school students in Ramadi, Iraq, to investigate the prevalence of migraine headaches. There were 1445 students in total, and 94 (6.5%) were diagnosed with migraines. The number of female students with migraine was higher than the number of male students, with 59 (8.9%) for females and 35 (4.9%) for males. This outcome is quite different from what was reported in our study, this might be due lower number of individuals of migraine also note that both males and females participated in their study.

The results of the study on the pattern of migraine headaches, which were carried out in Erbil, Iraq by (Alshimmery et al. 2009) showed that the majority of the participants who experienced migraines were females. The total number of participants in the study was 200, with 153 (or 77%) females and 47 (or 23.5%) males. Unlike our study, which has only 360 female participants, this study also includes male participants.

A study by (Aladdin et al. 2022) based in Saudi Arabia specifically in King Saud bin Abdulaziz University for Health Sciences with all female participants, found that 40.27% of the female participants in the study were positive for migraine. This outcome is relatively close to our estimated result of 44.2%.

#### **5.4 Migraine Triggers and Relivers Results Across Different Studies**

Further research by (Al-Shimmery 2010) into the factors that trigger and relieves headaches was carried out on a group of 200 patients in the city of Erbil in Iraq. Stress or psychological upset was the most common factor that triggered migraines (80%), followed by increases in physical activity (68%). Migraine relivers included nonsteroidal anti-inflammatory drugs (NSAIDs) in (50%) of patients, and sleep accounted for (45.5%). Stress was similarly found as the most prevalent migraine trigger in our study, with a different percentage of 115 (12.2%). Our study came to a different conclusion for migraine relievers, resting was considerably the most common, accounting for 121 (22.0%) of the total.

Triggering factors were also investigated the cross-sectional study by (Qais Al-Hadeethi, 2020b), with lack of sleep accounting for 21 (22%) and dietary influences such as chocolate, cheese, and coffee accounting for 13 (13.8%). These results differ from our study as sleep disturbance or lack of sleep was found to be the second most common migraine trigger with a number of 114 (12.8%) of the total.

The purpose of a study on the triggers or precipitants of an acute migraine attack by (Kelman 2007) was to examine and indicate the triggers of an acute migraine attack. Aura, headache characteristics, drug responsiveness, acute and chronic problems, sleep characteristics, and social and personal factors were all documented. A total of 1,207 International Classification of Headache Disorders-2 (1.1-1.2, and 1.5.1) patients were assessed. Stress (79.7%), hormones in women (65.1%), eating poorly (57.3%), weather (53.2%), problems with sleep (49.8%), fragrance or scents (43.7%), neck discomfort (38.4%), lights (38.1%), sleeping late (32.0%), heat (30.3%), food (26.9%), and exercise (22.1%) were the most common triggers. According to our study, physical activity (exercise, daily activities) 68 (7.6%) skipping meals (not eating) 85 (9.5%), stress 115 (12.9%), sleep disturbance 114 (12.8%), lights/sunlight 86 (9.6%), hot weather 64 (7.2%), specific smells (perfumes...etc.) 50 (5.6%) and specific food types 47 (5.2%). The differing results are due to the higher sample size of the study in comparison to our study. However, the triggers described and assessed across research are similar.

Another study on migraine trigger factors by (Mollaoğlu 2013) included patients who frequently attended the outpatient neurology clinic at Cumhuriyet University Hospital in Sivas City, Turkey. A total of 126 migraine patients were asked regarding potential migraine triggers. Emotional stress (79%), sleep disruption (64%), and dietary items (44%), were among the most frequent trigger factors. Additionally, it was observed that stress and sleep were significant triggers for women and varied greatly from men. These findings correlate with our research, which found that among the most frequent triggers of headaches of the female participants in our study were stress and sleep disruptions.

In a research by (Haque et al. 2012) about evaluating the precipitating and relieving factors of migraines with tension headache, a type of headache showed that the majority

of patients were female (67%). Between migraine and tension type headache (TTH) patients, the most prevalent triggering factors such stress, anxiety, activities, cold and hot temperatures were evenly distributed. However, the frequent migraine triggers of sleep deprivation ( $p < 0.05$ ), sunlight ( $p < 0.01$ ), and food ( $p < 0.05$ ) all showed significant differences. Different techniques were frequently employed by those who suffer from migraine in consideration of pain-relieving factors, and a significant difference was seen for both analgesic drugs and massage ( $p < 0.05$ ), which relaxed migraine headache. Since stress was also identified as the most significant trigger in our study, the findings of the triggering factors may be comparable to those of ours. However, while rest was the most prevalent relieving factor identified in our investigation, accounting for 121 (22.0%), the results of the relieving factors in our study varied.

### **5.5 Migraine and Dietary Influence Results Across Different Studies**

In a systematic literature review about the role of diet and nutrition in migraine triggers and treatment by (Hindiye et al. 2020), it has been explained that the association of dietary patterns with migraine has also been reported in a number of cross-sectional studies and surveys. As an example of a cross-sectional study in the United States, people who experience migraines with aura were found to be more likely to have a low intake of chocolate ( $P = .005$ ), cheese ( $P = 0.008$ ), ice cream ( $P = .003$ ), hot dogs ( $P < .001$ ), and processed meats ( $P = .009$ ), in comparison to those who experience migraines without aura. Different food items appeared to be associated with headaches in our study as we evaluated the relationship between participants' responses to dietary intake and headaches lasting 4 to 72 hours in both females with and without aura and our results shows that there is a statistical significance between headaches lasting from 4 to 72 hours in relation to (Nuts  $p$ -value= 0.000, Hot/Spicy foods  $p$ -value= 0.000, Tomato  $p$ -value= 0.005, Banana  $p$ -value=0.01, Aspartame  $p$ -value=0.012, Beverages containing caffeine  $p$ -value=0.000 and Citrusy Fruits  $p$ -value=0.008).

In the study by (Aladdin et al. 2022) which is based in Saudi Arabia specifically in King Saud bin Abdulaziz University for Health Sciences about Migraine Prevalence and Analysis of Dietary Habits in Relation to Headache in the Female Population, results show that chocolate, and caffeinated beverages were stated to be migraine triggers. with a

sample of 90 female participants, approximately 10% of respondents stated a correlation between chocolate consumption and caffeine consumption. 7.8% of people said that caffeine was the main cause for their headaches, only 2.2% stated chocolate. In our 159 sample of female participants, Caffeinated beverages (coffee, tea, and coke) were the most popular, accounting for 148 (93.08%) of total consumption.

An analytical case-control study was carried out by (Nazari and Eghbali 2012) about Migraine and its relationship with dietary habits in women. 170 women (separated into two groups of 85) using convenient sampling for the case group and random sampling for the control group. The findings revealed a link between headache and certain food components such as proteins, carbohydrates, lipids, fruits, and vegetables. To be more specific, there were significant associations between headaches and red meat ( $p = 0.01$ ), white meat ( $p = 0.002$ ), cereals ( $p = 0.0005$ ), vegetables ( $p = 0.009$ ), fruits ( $p = 0.0005$ ), salad dressing ( $p = 0.03$ ), and eggs ( $p = 0.001$ ). Furthermore, there was a significant link between headache and the type of oil, meat, dairy products, fruits, and vegetables ingested ( $p < 0.05$ ). In comparison to our study, different food items were included such as chocolate, cheese, nuts, milk, hot/spicy foods, tomato, banana, yogurt, caffeinated beverages, smoked fish, aspartame, and citrusy fruits, and our findings show a statistical significance between headaches lasting 4 to 72 hours and some of these food items (Nuts  $p$ -value= 0.000, Hot/Spicy foods  $p$ -value= 0.000, Tomato  $p$ -value= 0.005, Banana  $p$ -value=0.01, Aspartame  $p$ -value=0.012, Beverages containing caffeine  $p$ -value=0.000 and Citrusy Fruits  $p$ -value=0.008).

It was noted in a review article on The Relationship Between Migraine and Nutrition by (Özturan, Şanlıer, and Coşkun 2016) that dietary habits and its impact play a significant role as pain triggers in everyone, particularly in young individuals who experience migraines. In investigations on migraine triggers overall, it has been considered that at minimum one nutrition-related trigger exists, with hunger being the most frequently mentioned trigger in terms of nutrition. Additionally, it is well recognized that certain components in cheese, tea, coffee, chocolate, and tea may trigger migraines. Because cheese contains biogenic amines, particularly tyramine, it has been proposed that it can cause migraines according to a study by (Wöber and Wöber-Bingöl 2010) on foods that

cause migraines, up to 19% of the participants said cheese caused their migraines headaches. In the same study, 20% of the participants believed chocolate to be a migraine trigger. A study by (Rockett et al. 2012) on the dietary aspects of migraine trigger factors found a relationship between coffee drinking and migraine in young people and adolescents who consumed excessive doses of tea and coffee. These results correlates to our study's findings that there is a relationship between certain foods and migraines.

The Departments of Child Neurology and Child Psychiatry of Ankara University conducted a cross-sectional study on school-aged children to investigate the relationship of childhood headaches with preferences in leisure time activities, depression, anxiety, and eating habits by (Bektaş et al. 2015). With a total of 5355 school-aged students across 12 schools. According to an analysis of the results associated with nutritional habits, 252 (45.8%) of the 550 students with migraine reported that the episodes of migraine were started by consuming food. 108 (19.6%) said cola and coffee, 50 (9.1%) said food that was fried, 17 (3.1%) said spicy food, 16 (2.9%) said chocolate, 15 (2.7%) said canned products, 13 (2.4%) said tea, 13 (2.4%) said peanuts, 12 (2.2%) said cheese, and eight students (1.5%) said other foods such as (sausages, salami, fish, fruit) triggered their migraine attack. Some of these dietary items had comparable results to our study, as it found that caffeine-containing beverages, spicy foods, and nuts have an association to migraines with a  $p\text{-value}=0.000$ .

In a study by (Peatfield 1994) conducted at the Princess Margaret Migraine Clinic, Charing Cross Hospital, London, England. Patients have been asked about the foods they consume that trigger their headaches. There were 429 migraine patients, and 16.5% of them reported that cheese or chocolate, and almost always both, might cause headaches. Although cheese and chocolate were both listed as migraine triggers in our study, no statistically significant relationship between them and headaches was identified.

A study by (Lipton et al. 1988) included patients at the Montefiore Medical Center's Headache Unit in New York were surveyed to determine the significance of aspartame as a dietary factor in headache. Aspartame was reported by just over eight percent of the 171 patients who completed the survey thoroughly. The final findings showed that aspartame



is a significant dietary trigger for headache patients. This is comparable to our study's result that aspartame was among the statistically significant dietary components.

## **5.6 Migraine Triggers and Recommended Approaches for Patients**

In a research about Triggers, Protectors, and Predictors in Episodic Migraine by (Marmura M. J. 2018) It is stated that a number of research studies have tried to look into the impact of different meals and substances in migraine triggering. Caffeine is beneficial in the treatment of acute migraine when combined with painkillers, but it can create reliance and caffeine withdrawal headaches if used repeatedly. The withdrawal of caffeine increased migraine therapy response in one investigation. Moreover, dairy products are a common migraine trigger, individuals are more likely to determine cheese or yogurt as a migraine trigger rather than milk. Headaches is a highly common neurological complaint in people who use aspartame, an artificial sweetener. The relationship between aspartame and migraine is somewhat uncertain, with some studies coming back low, although certain people may be particularly vulnerable.

Sex hormones exert some effects on headaches, according to a cross-sectional population-based study involving 2,600 women by (Karlı et al. 2012). 54.3% of the females suffering with migraines reported a high frequency of getting headache during menstruation, while just 3.9% suffered headache during menstruation. It is believed that headaches that appear at the time of menstrual cycle are caused by the estrogen withdrawal that takes place shortly before the start of menstrual periods. (Loder 2006). Menstrual-related migraine may be more likely to develop near the end of a woman's cycle in a large proportion of women, implying an association to blood loss or anemia. (Calhoun and Gill 2017).

There are a few recommended approaches to use when educating patients about migraine triggers as mentioned in a research about Triggers, Protectors, and Predictors in Episodic Migraine by (Marmura M. J. 2018). Maintaining a headache diary or calendar, as individuals with migraines often find it difficult to recall their monthly frequency or severity. It is beneficial to encourage patients to keep a record of symptoms or aspects that mean something to them, such as missing activities or absences from work, nausea or vomiting. Writing a diary can often lead to the identification of previously unidentified

triggers that can be treated, such as weekend coffee withdrawal or menstrual migraines. Another approach mentioned is considering healthy lifestyle options. Keeping an ideal weight, getting enough sleep, and exercising on a regular basis are all preventive factors against the emergence of chronic migraine. According to several research, exercise is as good as or better than existing preventive drugs. Stress is not avoidable, and exposing yourself to migraine factors like noise may actually enhance your ability to cope. While screening for some food triggers, such as aspartame (an artificial sweetener) use is helpful, it is perhaps best to avoid advising certain diet for migraine because nutritional factors vary greatly across individuals. An additional approach is suggesting prevention or treatment in cases of repeated migraine attacks. It is difficult to identify triggers in patients who suffer from migraines on a regular basis. Trying to avoid triggers fails to be beneficial. Patients may refuse preventative therapy if they believe they may improve by avoiding triggers such as stress or beginning a diet that is different. While healthy habits should be promoted, it is likely that extra effective preventive medication should be provided in the majority of these individuals because the elimination of a stressful environment or dropping out of a job are rarely to improve migraine on their own.

## **Chapter 6**

### **Conclusions**

The purpose of this study was to collect data on the frequency with which migraines occur among a sample of Iraqi females who participated in the survey and on the relationship of foods, most frequently consumed by this group, which may be the cause of their migraine. Migraine trigger foods for some people include, caffeine, which is in

coffee, tea, colas. Spicy foods, nuts, aspartame, and some fruits and vegetables such as tomatoes, banana, lemons and oranges. Females are still experiencing migraines at high rates, which has a negative impact on both standard of living and performance. Migraine can trigger depression, stress, and anxiety disorders. It can also result in stroke and other heart disease such as coronary heart disease and high blood pressure. This study uncovered a variety of foods that can be consumed in excess by females without regard to their potential effects on migraines.



## **Chapter 7**

### **Recommendations**

Regarding the prevalence of migraine in the female population of Iraq, more research should be done. It is important to conduct more research with a larger sample of female participants to learn more about how each dietary item affects migraine occurrence. Healthy eating and a correct nutrition style must be followed in order to

maintain healthy eating habits. Therefore, In Iraq, public awareness of the correlation between migraine and dietary habits should be introduced, and education should be provided in schools, universities, and workplaces. Also, more research is needed to identify new dietary migraine triggers. Finally, Data collection improvements, such as face-to-face interviews, may improve research quality.



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