



Migraine Patients Perception of Food and Nutrition Triggers: A Cross Sectional Study in Bandar Abbas at Southern Iran

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ABSTRACT

Background: Migraine is recognized as the second most disabling disease in the world, which can be accompanied by Bell's palsy, hearing loss and cerebral nerve paralysis. In this study, we investigated the impact of dietary triggers on the exacerbation of migraine headaches.

Methods: Individuals were randomly selected from the population of migraine patients referred to the hospital of Shahid Mohammadi in Bandar Abbas (located in southern Iran). Two-stages questionnaire was used, with the first stage including demographic information and the second stage including the dietary habits of individuals with migraines for fasting and 15 types of nutrition's.

Results: Our study examined 200 individuals, including 133 women (66.5%) and 67 men (33.5%). The age range of participants was from 13 to 66 years old and the mean age of the study population was 31.42 years. Fasting showed the highest incidence of headache exacerbation, followed by coffee, alcoholic beverages and high-fat foods. The least stimulating type can be attributed to non-alcoholic carbonated drinks and soft drinks. Nuts and walnuts (good sources of omega-3) seemed to be the least irritating among the population, although citrus fruits were not significantly different

Conclusion: Our results confirm the role of dietary triggers, specially fasting as a factor in the onset and exacerbation of migraine headaches. Although, some dietary triggers roles in migraine physiology remains unknown. More studies are needed to clarify feasibility of migraines controlling through diet.

Keywords: Migraine; Nutrition; Headache; Fasting; Diet

INTRODUCTION

Migraine is a neurological disorder that starts with another triggering factor and continues severe headaches shape. It is recognized as the most common neurological problem in primary care and the second most disabling disease in the world, affecting 1%-2% of the general population in chronic

phase. Its prevalence is different in terms of gender each year (17% of women and 6% of men) that is more common in the age range of 30-39 years. Migraine four-stages starts with the prodrome and ends with the postdrome. This disorders include a cycle with for stages that 75% of migraine cases show the type without aura. Main stage belongs to headache and last one is postdrome stage. Migraine physiology is not

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understood very well for now but fatigue, mood changes, irritability, hearing and sensory nerve reduction and oculomotor nerve paralysis reported from patients. Headache also make Nausea, vomiting, photophobia, osmophobia and allodynia are common symptoms during this stage too. These symptoms are concluded from triggered that make stages start or intensify [1].

Dietary triggers, intensify the headache. Also, emotional stress, hormonal factors (especially during menstruation), poor diet and nutrition and sleep disorders are all significant factors in the onset and exacerbation of migraine headaches. Sensory stimuli such as olfactory stimulation, neck pain, light stimuli, alcohol, smoke, temperature stimuli, food and exercise are other effective triggers for migraine. Each of these factors affects brain activity and can contribute to the pathophysiology of migraine pain, especially if a person does not follow a proper diet while controlling sensory triggers.

Stimulating foods containing caffeine and alcoholic beverages are the most well-known dietary triggers for migraine exacerbation. Diets high in folate and low in fat, as well as rich in omega-3 and omega-6, can be effective in regulating nerve terminals and reducing the severity of headache attacks. Nutrition is the importance of providing sufficient energy for individuals to cope with the crisis of headaches and the anxiety caused by the disease. Nutrition and dietary played a significant role in recent studies as triggers in migraines. In this study, we discussed the possible role of nutrition and diet in migraine control. All patients (referred to a hospital in Bandar Abbas) identified their nutrition using that are exacerbation of migraine headaches [2].

MATERIALS AND METHODS

A cross sectional study was conducted in the city of Bandar Abbas, the center of Hormozgan Province in southern Iran. This study was single center and held in Shahid Mohammadi hospital (Bandar Abbas). This research improved by The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies [3].

Trial Design and Oversight

We conducted our research by obtained ethics approval from the ethics committee of the Hormozgan university of medical sciences. A questionnaire was prepared by neurologists' specialists at the hospital, that provided by migraine patients who visited the hospital between 2020 and 2021. Demographic information from these case participants in this trial, extracted base on self-made checklist by neurologist supervision [4].

Trial Data Collection

All necessary information collected by a two-stage electronic questionnaire:

First stage focused on demographic information such as age, gender, occupation, underlying diseases and use of specific

medications, that based on self-made checklist by neurologist supervision. This stage performed base on self-made checklist by neurologist supervision [5].

For second stage, firstly, we established a literature review between 2017-2020 in PubMed and Scopus, to find nutrition's that make migraine trigger. Next, we made a questionnaire base on extract nutrition's. All cases answered these questions to clarify role of each nutrition triggers on migraine, they had highlighted each nutrition that stimulate headache, that extracted from our literature review. A paper questionnaire was given to each person and in case of not having the necessary literacy to fill it, the companion introduced by the patient was asked to fill the questionnaire with the help of the patient [6].

All steps are mentioned in the informed consent. There was no direction to answer the questions and the principle of non-bias was observed.

Trial Population

All patients who were diagnosed with migraine between the years 2020-2021 and met the inclusion criteria were examined. The definition of migraine was reviewed according to the International Classification of Diseases 11th (ICD-11) checklist. According to this criterion, disabling attacks lasting 4 to 72 hours with moderate or severe headache that usually occur with nausea, vomiting and/or photophobia and phonophobia and sometimes preceded by a short-term aura of central nervous system dysfunction of visual, sensory or other unilateral symptoms. Each case was checked with a neurologist and finally entered into the study. We did not differentiate between migraine with and without aura and excluded those who did not consent to participate in the study. If there was no cooperation in the next contact, they were ultimately removed from the study. We focused on adult's rate age and there had no limited on it, but non-native patients ignored and remove from total participants [7].

Trial Data Analysis

The sampling method was simple random sampling among the patients referred to Shahid Mohammadi hospital in Bandar Abbas. We used "Rand Company" random number table for chose cases, totally 856 patients were access that we needed just 200 cases, based on recent studies. Acceptable type 1 error of $P=0.05$, $d=0.06$ considered for sample size that was determined.

Other information was statistically analyzed using SPSS version 23 software. Descriptive statistical indices such as median, mean, mode, etc., as well as statistical analysis using *chi-square* and t-tests were used to provide descriptive analyses. Frequency indices were used to prepare tables that made by word Microsoft [8].

RESULTS AND DISCUSSION

Trial Participant Selection

Totally, 856 patients with migraine were available to us in the considered period of time. In addition, there were 48 people with migraine who referred to the neurology department from nearby cities and were not residents of Hormozgan province. First, 200 people were randomly selected, of which 34 people were not willing to participate in the study. Finally, 34 people were randomly selected from the remaining population, similar to the previous stage (Figure 1).

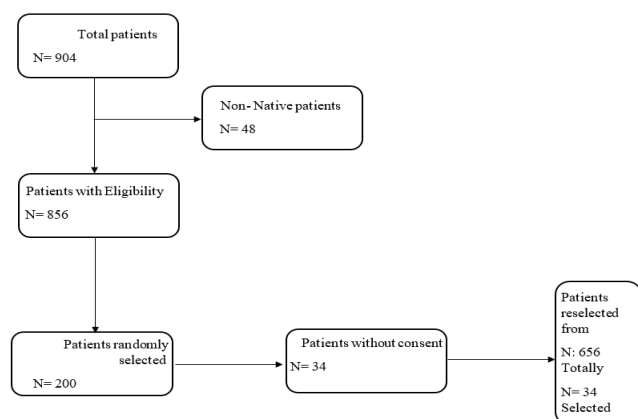


Figure 1: Participant selected steps.

Table 1: Demographic information along with family information of each person by number and percentage.

Variables	Highest	Lowest	Average
Age	66 years	13 years	31.42
Gender	Male	67	33.5
	Female	133	66.5
Occupation	Student	51	25.5
	Employee/Worker	68	34
	Housewife	52	26
	Freelance	22	11
	Unemployed	7	3.5

Main Outcome

The highest rate of headache exacerbation was seen in fasting individuals, but as expected, coffee, alcoholic beverages and fatty foods had the greatest impact on exacerbating headaches. Among the drinks, the least stimulating type can be attributed to non-alcoholic carbonated drinks and soft drinks. Nuts and walnuts (omega-rich sources) seemed to be the least irritating among the population, although citrus fruits were not significantly different. Cheese and milk were

Out of the 200 individuals studied, 133 were female (66.5%) and 67 were male (33.5%). The age range of the participants was from 13 to 66 years old, with a mean age of 31.42 years (Table 1). Contrary to previous reports that introduced migraine as a disabling and limiting disease, a small proportion of the study population (7% of the total population) were unemployed. However, considering the age range starting from 13 years old, this low number can be overlooked and it can be concluded that migraine does not interfere with employment. Based on the low number of self-employed individuals on one hand and the high proportion of students (about one-fourth of the population) and employees/workers (34%) on the other hand, it can be inferred that migraine is not a limiting factor for attending educational and administrative environments (Table 1) [9].

also considered as irritating as hot dogs and sausages in close proportions. It may be concluded that foods that have almost similar raw materials in them stimulate migraines in almost the same proportion. The results of other foods are evident in Table 2 [10].

Table 2: Foods associated with migraine exacerbation that are used and not used regularly in the affected population. The food was determined according to previous studies and approved by the department of neurology.

Food items	Used percent	Not used percent
Cheese	12.5	87.5
Chocolate	11.5	88.5
Citrus	8	92
Hot dog	20.5	79.5
Bologna	22.5	77.5
Ice cream	12.5	87.5
light coffee	23.5	76.5
Strong coffee	37	63
Alcoholic drinks	29	71
Non-alcoholic carbonated drink	14	86
An onion	20	80
Milk	12	88
Nuts	7	93
Soft drinks	14	86
Walnut	5	95
Greasy	34	66
Fasting	70.5	29.5

Fasting had the greatest role in exacerbating migraine headaches. Maintaining a constant glucose level in the blood with frequent and small meals and snacks can be a suitable strategy for reducing migraine headaches and preventing fasting. Avoiding food and fasting can be a trigger and exacerbating factor for migraine headaches, based on our results, stimulant foods such as caffeine and coffee had the highest rate after fasting. Hufnagl believes that starting and exacerbating headaches is the result of more than one dietary stimulant. They state that 12 to 60 percent of people attribute food as a migraine stimulant, which can stimulate the migraine cycle in terms of smell or food sensitivity. Nevertheless, low fried foods, dairy products, less caffeine products, white bread and meat may be useful in reducing symptoms or frequency of migraines. Additionally, diets rich in fat, carbohydrates or caffeine and alcoholic beverages are considered exacerbating factors for migraine attacks by activating the sympathetic system and inhibiting the parasympathetic system [11].

In the process of pain, nerve transmitters are usually involved, which can be mentioned as Serotonin (5-HT), Hypocretins (HCRT), Norepinephrine (NE) and Gamma-Aminobutyric Acid (GABA). Serotonin recognized as the most probable substance in migraine physiology, that play main role in both the neural and vascular pathways. Perhaps an excessive increase in blood glucose levels may be a stimulant for reducing serotonin and intensifying migraines, but an excessive decrease in glucose

levels also indicates the exacerbation of migraines through processes that are not yet well understood. Diabetic patients show a positive correlation between hypoglycemic attacks and migraines and Lorenzo Del Moro knows that the high demand for brain cells and glucose receptors in the brain during headaches exacerbates attacks. This high demand, along with a decrease in blood sugar, intensifies attacks in both diabetic and non-diabetic individuals. A study showed that fasting and hunger control enzymes that are effective in serotonin synthesis and regulate its synthesis pathway. These conditions reduce serotonin levels, which is a common condition in migraines and make conditions favorable for migraine attacks.

Vegan and low-fat diets have been useful in reducing headaches and improving their outcomes. Sanders was able to reduce the prevalence of headaches in patients by following a diet rich in unsaturated fatty acids and omega-3s. Diets that rich in omega-3s, along with less omega-6 (or nutrition same as nuts and walnuts), has also been shown to be effective in reducing the frequency and duration of chronic headaches in patients. In addition, ketogenic diets with lower glycemic index have been identified as a factor in reducing headaches in migraine patients. Obesity alone has a significant association with migraine headaches, on the other hand, obesity-dominant diets are usually high-calorie, high-fat and high-carbohydrate, which according to our results are a strong stimulant for starting migraine attacks. In these

individuals, weight loss and replacing stimulant foods with healthier foods are suitable solutions for controlling chronic headaches [12].

Contradictory results are available regarding alcoholic beverages. Matias reported a negative correlation between alcohol consumption and the risk of migraine, in another study, alcohol was identified as one of the most common migraine triggers, which we confirmed in our results. These contradictory findings can perhaps be justified by individual differences, as some individuals may show greater sensitivity to alcoholic beverages for exacerbating migraines, while others may not consider it a trigger for migraine attacks. However, patients may benefit from limiting alcoholic beverages, especially red wine. As mentioned earlier, starting or exacerbating attacks is the result of more than one dietary stimulant; therefore, the role of alcoholic beverages should be followed in the individual's diet routine.

Deleting foods such as wheat, citrus fruits, eggs, caffeine, cheese, chocolate and milk from the diet of individuals has been associated with a decrease in the frequency and intensity of migraine headaches (base on our results). Chocolate was identified by a small percentage of individuals as an exacerbating factor for migraine headaches in our results, but LIPPI and colleagues do not recommend avoiding chocolate and cocoa in migraines based on scientific evidence. However, it may be said that these products alongside other stimulants such as hot dogs, ice cream, canned foods and carbonated non-alcoholic beverages can have a strong potential to exacerbate migraine headaches.

In summary, fasting diet and avoiding eating food for a long time can be a factor for the onset and exacerbation of migraine. Also, high-fat and high-carb diets are considered as an important factor in aggravating headaches. Alcohol and coffee are need more studies to make a decision. According to the results, we suggest that migraine sufferers avoid these substances. Results show that maintaining stable glucose levels by eating small, frequent meals and snacks can be a strategy that may prevent headaches caused by fasting. Also, avoiding food for a long time can initiate and aggravate migraine headaches. Nevertheless, diets rich in sugar and fat along with caffeine or alcohol can stimulate the nerve pathways effective in aggravating headaches (sympathetic and parasympathetic). We emphasize that nutrition therapy is considered one of the important ways in headache control and this issue can be cited from our results. We hope specialized studies strengthen our results [13].

CONCLUSION

Overall, it can be stated that food has an impact on the onset and severity of attacks, some nutrition's such as caffeine, high-fat foods and high-carbohydrate diets are clearly effective in exacerbating migraine headaches, but the debate over alcohol consumption and alcoholic beverages or chocolate-related products remains unresolved. Given that dietary therapy is recognized as a supportive treatment worldwide, it may be possible to provide a food-based

treatment program for migraines with better knowledge of effective diets in exacerbating migraine pain. We recommend more comprehensive intervention studies to examine the role of each of these foods in the diet of people with migraines.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors. The present study is part of a Doctor of Medicine (MD) dissertation (ethics code: IR.HUMS.REC.1400.360) in social work approved by the university of Hormozgan medical sciences consent for publication. All the participants were informed about the publication of information obtained and informed consent was obtained from them. This article does not contain any studies with animals performed by any of the authors.

DATA AVAILABILITY

The datasets used or analyzed during the current study available from the corresponding author on reasonable request.

COMPETING INTERESTS

The authors declare no competing interests.

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