

Impact of Ramadan Fasting on Migraine Headache

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Abstract

Background: Fasting is known as a migraine trigger for migraine. Muslims fast one month every luminal year. We aimed to study the impact of The Holy month of Ramadan on episodic migraine.

Methods: This retrospective study included patients diagnosed as migraine according to The International Classification of Headache Disorders, 3rd edition (ICDH-3). Both genders, aged between 18 and 65 years were included. The impact of fasting and changing habits during the month of Ramadan was studied. Frequency, severity of migraine attacks and number of analgesic days during Ramadan were compared to those during Shaban, the Immediate previous month to Ramadan. Number of breaking fasting due to migraine was reported.

Results: This study identified 293 with migraine with mean age and mean disease duration 37.09 ± 9.36 , 12.34 ± 9.27 years respectively. Most of them were females (89.1%). During Ramadan month, the patient had significant increase in migraine days 10.42 ± 7.98 compared with 6.90 ± 6.55 migraine days during the previous month ($p < 0.001$). Also, days of analgesic use (11.32 ± 10.46 versus 6.11 ± 6.69 ; $P < 0,001$) and migraine severity (7.46 ± 2.39 versus 6.84 ± 2.25 ; $P < 0,001$) were significantly increased during Ramadan compared to Shaban. Most of the patients completed fasting the whole month of Ramadan. A minority (1.7) could not tolerate fasting whole Ramadan due intolerable migraine headache and 36.5% broke their fasting for some days during Ramadan. Some patients changed previous prophylactic therapy before fasting to reduce the impact of fasting on migraine headache. Most of our cohort (82.3%) continue on the same management plan for migraine during Ramadan. Majority of cohort (75.4%) reported that migraine interfered with their daily activities due to fasting during Ramadan.

Conclusion: Ramadan fasting has negative impact on the majority of migraine patients. Physicians should educate migraine patients who to manage their headache and habits before starting fasting.

Introduction

Migraine have a high prevalence and a high socioeconomic burden that affects quality of life. Globally, migraine is prevalent in the general population, and it preferentially affects females (1). Migraine headache is prevalent in Kuwait. The prevalence of episodic migraine is 23%, chronic migraine 5%, and medication overuse headache 2.4% (2). Migraine in Kuwait has a significant impact on daily living activities (3), During the Holy month of Ramadan every year, Muslims are required to fast from dawn until sunset, during which they must refrain from all foods and drinks, including water (4). Since the Islamic calendar is lunar, the duration of the fast varies from year to year and varies from country to country, lasting from 11 hours to over 20 hours. Those who fast will often have two main meals during the day, one after sunset and one just before dawn, and many partake in a number prayers during the night, which will result in a change in their sleeping patterns. Fasting is one of the five pillars of Islam and a very important part of the Islamic culture in which many Muslims will insist on continuing their fasting even in the presence of pain. Since the Muslim population is estimated to account for about 1.8 billion people (5),

many of whom fast during this month, and migraines having a prevalence of around 12% worldwide (6), understanding the effect of fasting and the appropriate treatment of migraines during the Holy month of Ramadan is crucial. However, fasting is obliged on sick people or young children or patients who can't tolerate fasting, in fact, sick person is blighted not to fast in Islam if fasting will cause harm for his/her health.

Fasting is a well-known migraine trigger (7), with many hypotheses on the reasons for this (8). Important factors that are associated with fasting during Ramadan are sudden caffeine withdrawal, a possible migraine trigger (9) and sleep pattern, which may also result in these headaches (7). The objective of this study is to understand the impact of fasting of the month of Ramadan on migraines.

Methods

This retrospective study included patients diagnosed as migraine according to The International Classification of Headache Disorders, 3rd edition (ICDH-3)(10). Patients were recruited from headache clinic in Ibn Sina Hospital, which is the only specialized neurology hospital in Kuwait. Patients were recruited immediately after Ramadan 2020 to minimize recall bias. Both genders, aged between 18 and 65 years were included. Patients with secondary headaches or other types of headache, or other neurological disorders were excluded from this study the impact of fasting and change of habits during the month of Ramadan was studied. A questionnaire that included the required information about migraine attacks during Ramadan and the immediately preceding month Shaban. Other variables such as age, gender, socioeconomic status were collected. Frequency, severity of migraine attacks and number of analgesic days during Ramadan were compared to those during Shaban. Number of days the fasting was broken due to migraine was reported. Patients were asked about the frequency of migraine attacks during Ramadan and the preceding month; the number of days of acute medications needed; the severity of each attack as measured by visual analogue scale (VAS) from no pain (= 0) to worst pain imaginable = 10. The diagnostic questionnaire for headache were used by headache specialist. Physical and neurological examination were performed. Laboratory tests or neuroimaging were used if indicated to rule out secondary headache.

Statistical Analysis

The data were analyzed by computer using the statistical package SPSS 25.0 software for Mac (SPSS Inc., Chicago, IL, USA). All continuous variables were expressed as means, whereas categorical ones were expressed as proportions and percentages. Paired sample *t*-test was used to compare between Migraine frequency and severity and use of analgesic days in Shaban and Ramadan. P values < 0.05 were considered to be statistically significant.

This study was carried out in accordance with the ethical guidelines of Ministry of Health in Kuwait.

The protocol was approved by the ethical committee of Ibn Sina hospital.

All subjects gave a written informed consent in accordance with the Declaration of Helsinki (11).

The study was performed in observation of the latest version of the declaration of Helsinki, and all data was anonymous and protected in accordance with the ethical guidelines of the Council for International Organizations of Medical Sciences.

Results

This study enrolled 293 participants diagnosed with migraine. Table 1 displays Demographic and clinical characters of our cohort. Most of the participants were female (89.1%). The mean age of participant was 37.09 years, have a full-time job (54.6%) and are married (65.9%). All patients used acute attack medication and eighty six used preventive medication. 82% changed their treatment plan during Ramadan regarding time of treatment administration, while 3.75% of the patients started new medications as calcitonin gene-related peptide monoclonal antibodies or Onabotulinumtoxin A treatment. While 14% discontinued their prophylactic treatment. Most of the patients continued fasting for the whole month without breaking their fast (61.8%). However, 36.5% of patients broke their fast a few days of Ramadan (29% break fasting 3 days or less and 7.5% break 4–19 days of fasting). Only 5 patients (1.7%) could not fast the whole month due to intolerable headache. More than three quarters of the patients experienced a headache that interfered with their daily activities during Ramadan.

Table 1
Demographic and clinical characters of migraine patients (N = 293)

Variables	Mean ± SD N(%)
Age	37.09 ± 9.36
Gender	32 (10.9)
● Male	261 (89.1)
● Female	
Job	160 (54.6)
● Full time job	23 (7.8)
● Part time job	30 (10.2)
● Student	22 (7.5)
● Not working	58 (19.8)
Social state	67 (25.9)
● Single	193 (65.9)
● Married	24 (8.2)
● Divorced	0
● Widow	
Disease duration	12.34 ± 9.27
Change treatment Plan before Ramadan	241 (82.3)
● No	41 (14)
● Discontinue prophylactic treatment	11 (3.7)
● Started new medications	
Break Fasting	181 (61.8)
● No	85 (29)
● 1–3 days	22 (7.5)
● 4–19 days	5 (1.7)
● Whole Ramadan	
Migraine headache interfere with daily activity during Ramadan	221 (75.4)

By comparing migraine characters in Shaban (the immediate month preceding Ramadan) to Ramadan, there was a statistically significant increase in number of migraine days, severity of headache and days of analgesic intake (Table 2). During Ramadan patients experienced more than 10 days of headache on average (mean of 10.42 with SD of 7.98) and took analgesics for an average of 11.32 days. In comparison to Ramadan, patients reported fewer days with a headache in Shaban, with a mean of 6.9 days and SD of 6.55 and they took the analgesics for an average of 6.11 days (p value less than 0.001). Regarding the severity of the migraine headache during these 2 months, the severity was greater in Ramadan with mean of 7.46 and SD of 2.39 compared to mean of 6.84 and SD of 2.25 in Shaban.

Table 2
Impact of Ramadan Fasting on Migraine characters.

Variables	Migraine characters in Shaban	Migraine characters in Ramadan	P
	Mean ± SD	Mean ± SD	
Migraine days	6.90 ± 6.55	10.42 ± 7.98	0.001*
Analgesic days	6.11 ± 6.69	11.32 ± 10.46	0.001*
Severity	6.84 ± 2.25	7.46 ± 2.39	0.001*

Discussion

This study was conducted in Kuwait immediately after end of Ramadan in May 2020. The aim of this cohort study was to determine the impact of fasting during the month of Ramadan on the frequency and severity of migraine headaches. Fasting is well known trigger for migraine and this was established in the medical literature, especially with regard to short-term fasting and the first day of Ramadan. This exacerbation is likely due to associated with dehydration, caffeine withdrawal changes in life style and change in sleep habits. It is more common among sufferers of primary headaches (12).

Our study found that the mean number of days patients experienced migraine attacks was higher in the month of Ramadan compared to that of Shaban (the month before Ramadan). This is similar to the result found by Abu Salama et al (13), where participants had a three-fold increase in the frequency of migraine attacks during Ramadan. Our results is also in agreement with previous Indian study that reported higher rates of headache-related emergency room visits during Ramadan in Muslim communities in India (14).

One of the reasons suggested for these observations in our cohort are caffeine withdrawal while fasting, especially that Arabic coffee consumption in the Kuwaiti society is quiet high. Another factor contributing to this increase is dehydration, further amplified by the fact that Ramadan was during the summer, where temperatures in Kuwait are high during April and May and the day hours are long. Islamic calendar is lunar, the duration of the fast varies from year to year. Ramadan can happen in June, July or August

where the temperature can go as high as 50 degree Celsius. Another possible theory is the sleep disturbance that occurs during this month because of night prayers and a change in the timings of meals. Increasing frequency and severity of migraine attacks could be explained by altered levels of serotonin and norepinephrine and dilation of blood vessels around the brain that are probable mechanisms of hunger-triggered headaches. Following hunger due to fasting hours, at sunset people usually break their fasting with large meals with different varieties and its quite common that deserts and sweets will follow which is a tradition in Ramadan in most of the countries. Such ingestion of an excessive carbohydrate load, may result in vascular headache may also occur in response to a rapid insulin secretion and reactive lowering of blood sugar (15). On the other hand, a study conducted in Saudi Arabia found that there was a significant decrease in the number of migraines during Ramadan, during which patients fasted for approximately the same duration of hours as those in our study (16). This may be due to differences in caffeine consumption levels and in sleep habits. This is important as it points towards the fact that there may be modifiable factors that are associated with migraines during fasting rather than just the inherent act of fasting itself.

Our study also found that the severity of headaches during the month of Ramadan was increased. One reason for this is that most patients will not break their fast in order to take analgesics, leading to more severe headaches. We also found that there was a significant increase in analgesic days in Ramadan, and this may be due to an increase in the number and severity of the headaches. However, Gabr et al (16), found that there was no difference in the severity of the attacks between Ramadan and the previous month. They also found that medication use was decreased, and they suggested that this was because the time of the headache usually occurred during the hours of fasting.

It is important to note that there is another type of headache in the international classification of headache disorder called a fasting-headache, which occurs when fasting lasts for more than 16 hours (17), whereas in our study participants only fasted for around 15 hours. As a result, we are not regarding these headaches as fasting-headaches. In addition, we only included patient that were already diagnosed with migraine headaches, in which the reported headaches in Ramadan were similar in character to those they experience when they have their usual migraine.

Another important finding was that the migraines interfered with the daily activities of 75 percent of the followed patients during the month of Ramadan, similar previous result (13), where migraines increasingly affected the quality of the patients' lives and their ability to practice their religion. This further emphasizes the importance of finding appropriate treatment modalities for these patients.

In addition, 38% of patients broke their fast due to migraine attacks. However, when we take into account the number of patients whose lives were affected by migraines during fasting, this percentage may not accurately reflect the severity of frequency of the migraines, but rather may reflect the fact that most patients would not break their fast in order to take analgesics. This needs to be taken into account when discussing patients' treatment plans and may limit the use of analgesics at the onset of the headache, as most patient would still be fasting.

Most patients with migraines will continue fasting regardless of how severe and frequent the headache get because of their strongly spiritual connection to this holy month, meaning they are extremely eager to fast despite their medical conditions. This makes the option of not fasting an unacceptable treatment plan resulting in a challenge for the physicians trying to find the best abortive and prophylactic therapy for these patients. As a result, different modalities in medical therapies should be further studied in patients with migraine attacks during the period of fasting, providing the best reduction in migraine attacks and severity. Botulinum toxin and monoclonal antibodies can be used as an effective preventive therapy and more research in using them in migraineurs during Ramadan is needed.

For these reasons it is very important to create a specialized management plan for migraine patients during the month of Ramadan. Firstly, patients should be educated about the effects of caffeine withdrawal, sleep disturbance and dehydration on their migraine attacks, and given appropriate ways to deal these problems. For example, drinking enough water during non-fasting hours and decreasing caffeine consumption gradually before the start of the month of Ramadan, as well as the importance of obtaining good sleep time and sleep pattern Reduction of caffeine consumption in the weeks preceding Ramadan is recommended. A cup of strong coffee just before the start of the fast may prevent the occurrence of fasting-Ramadan headache was recommended in previous publication(12). However, we really don't recommend this if the person is planning to sleep since caffeine may disturb the sleep pattern and may result in frequent urination adding more sleep disruption

Another important factor is pyrophytic treatment. This has to be chosen carefully as some treatment options such as topiramate have long titration periods and a twice daily regimen, limiting it's using during fasting (13). The use of botulinum toxin and monoclonal antibodies is are important possible options, however further research is needed in order to establish the best prophylactic regimens during fasting.

Conclusion

Fasting during the Holy month of Ramadan has a negative impact on most patients with migraines, in which they experience more attacks during this month resulting in an adverse effect on their quality life and forcing them to take more analgesics. Skipping meals, dehydration, decreased caffeine intake, and sleep deprivation are all factors already known to possibly exacerbate migraine attacks, which altogether lead to greater a frequency and severity of headaches during this month.

Recommendations

The management of migraine in Ramadan should start before few months from Ramadan not when Ramadan started or few days before the month. Treating physicians should discuss with migraineurs the potential exacerbation of migraine headaches during Ramadan and educate them on ways to avoid caffeine withdrawal, methods to improve their sleep habits and how to prevent dehydration. A good and effective prophylactic treatment should be started few months before Ramadan for better outcomes.

As only Muslims fast Ramadan, less motivation on non-Muslim physicians to do further research on fasting and migraine and what is the best prophylactic therapy for these patients so more research and support from different authorities are needed. However, Jewish and Christians also have days where they fast, so having deeper look from different religion on this matter is important

Limitations

The limitations of the study are the sample included only the patient list in Ibn-Sina hospital, which may not completely represent all migraine patients in Kuwait; in addition, the study did not report the prophylactic medication and analgesic of migraine and finally, the study is retrospective and may has recall baize.

Declarations

Ethics approval and consent to participate.

The study was reviewed and approved by the ethical research committee of Ibn Sina hospital. The participants provided written informed consent to participate in this study.

Consent for publication

Not applicable.

Data availability

The data supporting the conclusions of this article will be made available by the authors when requested.

Competing interests

No Competing interests.

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Authors contribution

JA-H designed the study, reviewed and criticized the manuscript. FA performed data collection. RT and AA drafted the manuscript. SFA performed statistical analysis, drafted, criticized, and reviewed the manuscript. All authors read and approved the final manuscript.

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