Triggers of Migraine during COVID-19 Pandemic Lockdown

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Abstract

**Background:** Lock down caused sudden lifestyle changes and represented a massive impact on human health. Environmental factors can trigger migraine headache. The aim of this study was to report the triggers of migraine attacks due to lifestyle changes during coronavirus disease 2019 (COVID-19) Pandemic lockdown.

**Methods:** This cross-sectional survey included patients diagnosed as migraine according to The International Classification of Headache Disorders, 3rd edition (ICDH-3). During the lockdown, we submitted an online self-reported web-based questionnaire to patients already diagnosed with primary headache disorders and attends headache clinic at Ibn Sina Hospital in Kuwait. Questions explored triggers of migraine headache attacks during COVID-19 Pandemic lockdown. Answers were transformed into data for statistical analysis.

**Results:** A total of 340 migraine patients responded to online questionnaire. The mean age of them is 34.65 years. Females were predominant 79.1%. Majority of the cohort 85 % has more than one trigger of migraine headache attack. The common triggers were smell of strong odors in 214 (62.9%), followed by certain food in 175 (51.8%), sleep disturbance in 120 (35.3%), Emotional or mental stress in 80 (23.6%), caffeine in 80 (23.6%), flickers of Light in 78 (22.9), weather changes in 68(20%), smoking in 65 (19.12), noise in 56 (16.5), sun light exposure in 41 (12.1), Fasting/ Hypoglycemia in 40 (11.7), hormonal changes in 37 (10.6%), physical excretion/fatigue in 24 (7.1), screen exposure in 20 (5.9%), and dehydration in 14 (4.1%).

**Conclusions:** Lifestyle changes during lock down may negatively impact migraine through patients exposure to many triggers. Strong odors, food, sleep disturbance and stress were the most migraine triggers during COVID-19 lockdown.

**Background:**

Coronavirus disease 2019 (COVID-19) is caused by the new strains of severe acute respiratory syndrome caused by SARS coronavirus 2 (SARS-CoV-2). [1].

In late February 2020, confirmed cases of novel coronavirus infection was observed in Kuwait. Kuwait government launched a social media campaign encouraging people to stay at home and to follow the instructions of ministry of health. Lockdown programme was started by the Government, from the 10-March 2020. It established a period of travel ban and mandatory staying home except for emergencies, health problems or regulated shopping only for bare necessities. The period lasted from March 10th until May 31st [2].

COVID-19 pandemic had negative impact on patients with migraine in Kuwait [3]. Physical distancing and self-isolation strongly impacted populations, affecting in particular eating habits and everyday behaviors and activities. [4].
Migraine trigger is known to be any stimulus that alone or in combination, contributes to the onset of a migraine attack [5]. A lot of external and internal stimuli can precipitate migraine attack [6, 7].

Migraine triggers could be stress, sleep, fatigue, fasting, physical exercise, hormonal changes, weather changes, sunlight, alcohol, and various sensory stimuli [8, 9].

Triggers are different for every migraine patient and even not the same for different attacks in the same migraine patient. Migraine attack may be triggered with single trigger or combination of different triggers [10].

Foods and drinks are the most commonly reported triggers for migraine and these often include chocolate, cheese, nuts, citrus fruits, processed meats, monosodium glutamate, aspartame, fatty foods, coffee, and alcohol [9].

The aim of our study was to assess the impact of lockdown on triggers of migraine headache attacks.

**Methods:**

It is a cross-sectional survey design to assess the impact of lockdown on precipitating of migraine headache during the epidemic of COVID-19. Online questionnaire was published on 1/04/2020 till 10/04/2020). The questionnaire was sent to migraine patients who were registered at headache clinic in Ibn Sina hospital. The questionnaire was created using Google Forms. It was written in English and then translated into Arabic. It was reviewed by two independent neurologists. The questionnaire included introduction and a brief description of the aim of the study, informed consent and questions about triggers of migraine during lock down.

Personal information was not collected. The link of questionnaire was posted on medical social media accounts in Kuwait (Instagram). It was also distributed electronically to patients registered in the headache clinic through the Whatsapp application.

The inclusion criteria were age between 18 and 65 years and migraines with or without auras, as defined by the International Headache Society Criteria for Migraine (ICHD-3) [11]

The exclusion criteria were secondary headaches and inability to complete online questionnaires. The participants were asked to choose their potential triggers for migraine headache attacks from a list of 15 trigger factors. Those triggers were selected on the basis of the results of previous studies of migraine trigger factors, and included stress/ emotional changes, sleep disturbance either excessive sleep or sleep deprivation, physical excretion/ fatigue, hormonal changes, weather changes, light, sunlight, noise, odors, fasting/hypoglycemia, dehydration, caffeine, smoking, and food as cheese, chocolate, onion dairy products or preservative foods [7, 9, 12]. We added screen exposure as mobile phone, computer or television.

**Statistical analysis**
Data were analyzed using SPSS statistical software version 21.0. We used proportions to summarize the distribution of variables.

**Results:**

Our cohort included 340 migraine patients. The mean age of them is 34.65 years. Most of our cohort were females, 79.1%. Majority of the cohort 85 % has more than one trigger of migraine headache attack. Figure 1 displays the trigger of migraine during lock down. The most frequent trigger of migraine was smell of strong odors as Arabic perfumes or incense smoke. It was reported in the majority of our cohorts, in 214 (62.9%), followed by certain food item in 175 (51.8%), sleep disturbance in 120 (35.3%), emotional or mental stress in 80 (23.6%), caffeine consumption in 80 (23.6%), flickers of Light in 78 (22.9), weather changes in 68(20%), smoking in 65 (19.12), noise in 56 (16.5), sun light exposure in 41 (12.1), fasting/ hypoglycemia in 40 (11.7), hormonal changes in 37 (10.6%), physical excretion/fatigue in 24 (7.1). Despite screen exposure (mobile phone, computer, television) was frequent during the lock down, but it was a trigger for migraine in only 20 (5.9%) and dehydration was reported as a migraine trigger in 14 (4.1%).

**Discussion:**

This study aimed to register the most common triggers of migraine during COVID-19 lock down. It included patients who are registered at headache clinic in Ibn Sina hospital in Kuwait. The results showed that most patients 85% had multiple triggers for their migraine attacks. The most frequent trigger factors for migraine were smell of strong odors, certain food items, sleep disturbance, emotional or mental stress and caffeine. Our result is supported by the finding of Chabriat H et al. [13] who reported that sleep disturbance and food or drinks are the most frequently reported migraine headache precipitants.

Strong odors such as Arabic perfumes, incense smoke, and different odors were reported as the most triggering factors for migraine attacks in 63% of our cohort. Kuwaiti population are also used to consumes a lot of Perfume especially Arabic perfume. One of traditional habits in Kuwait is smelling incense which is steam of nice volatile substance. Incense is a bioaromatic substance that releases aromatic smoke upon burning [14]. A lot of people in the Arab Gulf region believe that incense smoke can kill germs and microbes in the air. Incense smoke consumption has increased during the lockdown.

Staying at home increased exposure to incense smoke. Previous study about odorant triggered migraines showed the association of perfume odors within other factors, such as cleaning, cooking, beauty products, and foul odors [12].

Lifestyle may be changed during quarantine, with the consequent modification in sleeping and eating habits. These changes may worse migraine during COVID-19 pandemic. Staying at home and consumption of preservative food, due to the restriction in grocery shopping may play a role in precipitating migraine during lockdown COVID-12 pandemic.
Sleep disturbance, and stress were frequent trigger factors in this study and this in line with previous studies [7, 15, 16]. Sleep disturbances were reported to be 3–17 times more likely to be triggers for migraines in a population-based study [17]. Sleep deprivation results in fatigue which activates the sympathetic outflow to boost metabolic process for availability of energy. The sympathetic activation thought to precipitate migraine [18].

Our result showed that stress was a common trigger for migraine in 24% which is similar to result of Uygun who reported that stress was triggers for headache in up to 30% of the participants [19]. Hearing or reading continuously about the COVID-19 from media can be stressful. Stress also increased due to job loss that affected many people due to the COVID-19 and many small projects went bankruptcy, all these factors resulted in more stress to many people. Stress precipitate migraine. Also, stress may lead patients to toward overeating of certain food that can precipitate migraine attacks.

Caffeine was triggers for migraine in 34% of the cohort. Kuwait population consume a lot of Arabic coffee which is pure and rich in caffeine.

Sun light exposure was triggers of migraine in 12%. This study was run in April. During this month and the sun light is bright with high temperature in Kuwait. The lock down was staring at 5 pm until 5 am next day. The subjects showed finish their necessary shopping, or necessary issues during day time. Ultraviolet radiation in the sunlight alters calcitonin gene related peptide and nitric oxide release by intraepidermal sensory nerve fibers in the skin [20]. This condition may trigger migraine attack through vasodilatation. In addition to brightness of sunlight, high temperature may be considered as another triggering factor. High temperatures may stimulate cutaneous thermoreceptors, that may precipitate migraine attacks [21].

COVID-19 pandemic had a negative impact on patients with migraine in Kuwait. Majority of migraine patients experienced increase in migraine frequency and severity in addition to overuse of analgesics during and pandemic [3]. This negative impact can be explained by the change of life habits and presence of more migraine triggers. The lockdown has caused many changes in people daily life routine. Sleep pattern may have altered with the change to working from home and with schools being closed. Anxiety, and low mood may contribute to sleep disturbance. Mealtimes may also have changed with the temptation to snack, cravings for comfort food and the simplicity of takeaways leading to a change in the balance of carbohydrates, fat and protein. Smoking and caffeine intake may have increased. Some people may have exercises more than usual where others may be finding their lives are more sedentary. So, all these changes can trigger migraine.

The study had some limitations. First, we did not compare between migraine triggers before COVID-19 quarantine and during lockdown. Second, we did not assess associations between the trigger factors and the migraine frequency and severity. Third, all the analyzed datas were collected through a questionnaire, thus they were less verifiable than data issued from clinical interview.
Strength of our study is the first study to describe triggers of migraine during quarantine. To our knowledge, this study was one of the first studies to investigate the impact of the COVID-19 lockdown on migraine triggers.

**Conclusion**

The lifestyle changes during lockdown could affect the course of migraine. Migraine patients reported multiple triggers during COVID-19 quarantine. Smell of strong odors, food, sleep disturbance and stress were the most cited triggers during the lockdown. All these results suggest that lifestyle is a strong determinant of migraine course. The adjustment in lifestyle and stress management should be considered for the management of migraine.

**Declarations**

**Ethics approval and consent to participate.**

The research involves patients who gave online informed consent for publications. The study was approved by the ethical research committee of Ibn Sina hospital.

**Consent for publication**

Not applicable.

**Data availability**

The data supporting the results and conclusions of this study will be available by the authors when requested.

**Competing interests**

All authors declare that they have no conflict of interest.

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**Authors contribution**

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

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Figures

![Bar chart showing trigger factors of migraine during COVID-19 lockdown](image)

**Figure 1**

Triggers of migraine during COVID-19 lock down (N=340)