



Cohort Study

Frequency of migraine according to the ICHD-3 criteria and its association with sociodemographic and triggering factors in Pakistan: A cross-sectional study

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ABSTRACT

Background: Migraine is a primary headache disorder marked by episodes of moderate to severe headache that is unilateral, throbbing in character, having a duration of 4 h to three days, and associated with nausea, vomiting, photophobia, and phonophobia.

Aims: Our study aims to determine the frequency of migraine in Pakistan, its association with sociodemographic variables and triggering factors, and the coping mechanisms used.

Methods: A cross-sectional study was conducted through an online survey from March 19, 2022, to June 15, 2022. The snowball sampling technique was used for data collection. The questions asked included those on sociodemographic information, screening questions, and questions on triggering factors and coping mechanisms. The screening was done using the ICHD-3 criteria and percentages were calculated using SPSS.

Results: Of the 986 respondents, 393 suffered from migraine. The majority of them were female (78.1%), belonged to the age group 20–29 years (69.2%), and were students (76.1%). 32.8% of the migraineurs had a family history of migraine. Most frequent triggers included sleep disturbance (70.5%), stress (66.7%) and fatigue (64.4%). Of the female migraineurs, 31.8% had menstruation as a trigger. The coping mechanisms used included taking rest, medication, staying in a quiet and dark place, and doing massage.

Conclusion: The findings suggest that young adults, especially females, with a stressful and sleep-deprived lifestyle are more vulnerable to migraine. However, further studies must focus on trigger synergy and interrelation of triggers that precipitate migraine so a better understanding can be developed for the prevention, diagnosis, and treatment of migraine.

Availability of data and material

The data collected is available and can be acquired by contacting the corresponding author.

Code availability

None.

1. Introduction

Migraine is a primary headache disorder marked by episodes of moderate to severe headaches. Typically, these attacks are unilateral, throbbing in character, and have a duration of 4 h to three days, usually associated with nausea, vomiting, photophobia, and phonophobia [1]. The attack may be preceded by an aura and followed by fatigue [2].

The progression of a migraine attack consists of four stages, namely pro-drome, aura, attack, and post-drome. Every patient does not necessarily experience all these stages [3]. Migraine attacks can be

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brought upon or worsened by certain factors that act as triggers which vary among different people but a few are more common in the population as compared to the others [4]. These include stress, sleep disturbance, weather changes, certain foods, certain smells, traveling, physical activity, certain medications, and smoking.

The two major types of migraine headaches are migraine with aura (classical migraines) and migraines without aura (common migraines). Aura happens in about 25% of people with migraine headaches. It precedes the attack and can continue for about an hour [5].

Migraine has an approximate prevalence of 14.7%, making it the third most common disease in the world. It occurs three times more commonly in women as compared to men, which is most probably due to hormonal differences. More than 75% of the patients suffer from one or more attacks per month and more than 50% experience severe impairment during attacks [6]. Migraine also poses a great economic burden on individuals as well as the nation as a whole due to decreased productivity of people. According to a study, the economic impact of migraine was estimated to be around \$ 11 billion in direct cost and \$11 billion indirect cost in the United States [7].

The purpose of the study is to determine the frequency of migraine in relation to age, gender, occupation, and family history in the people of Pakistan. Furthermore, the identification of triggers would help establish the association of triggering factors with the migraine attacks and their frequency in the sample. The importance of the study lies in the fact that very few research articles have been conducted on migraine in Pakistan so it will help raise awareness and pave the way for further research on the topic.

2. Material and METHODS

We designed a cross-sectional study with no identification of the participants to determine the frequency of migraine with its triggering factors, and coping mechanisms in the population of Pakistan. The snowball sampling technique was used for data collection. The participants included were residents of Pakistan belonging to age groups 10–69 years, who could understand English, had access to the internet, and suffered from migraine according to the ICHD-3 criteria. All other participants were excluded. An online questionnaire, developed using Google Forms, was distributed first among the students and they were asked to forward it to others. The form was circulated through social media sites (WhatsApp, Facebook, Twitter, and Instagram) because of the prevalent pandemic and its associated restrictions imposed by the Government. Voluntary completion of the questionnaire was considered informed consent. The responses were collected from April 8, 2022, to April 17, 2022. The survey consisted of five parts including (1) Sociodemographic variables (Age, Gender, and Occupational status); (2) Questions for the screening of headache and migraine (Frequency, duration, location, character, and severity of headache and associated symptoms including nausea, vomiting, photophobia, and phonophobia); (3) Triggering factors (Stress, loud noise, sleep disturbance, certain smells, bright sunshine, excess screen time, weather changes, traveling, fatigue, exercise, heavy lifting, sexual activity, certain foods, dieting, dehydration, smoking and gynecological factors including menstrual periods, pregnancy, birth control pills, and other hormonal drugs); (4) Coping mechanisms to relieve pain (taking rest, medication, massage and staying in a quiet and dark place); (5) Association with family history. The screening for frequency of migraine was done manually by the authors according to the ICHD-3 criteria and its association with age, gender, occupational status, and family history was determined using Statistical Package for Social Sciences version 26.0 (IBM SPSS Statistics, New York, United States). The frequencies of common triggering factors and the coping mechanisms used were calculated using SPSS and presented as percentages. The study and research were approved by the Institutional Review Board of King Edward Medical University, Lahore-Pakistan. The work is reported in line with the STROCCS criteria [8].

3. RESULTS

3.1. Survey respondents

Of the total 986 responses received, 899 participants experienced headaches, and the remaining 87 who did not were excluded. For the screening of migraine, the ICHD-3 criteria (International Classification of Headache Disorders, published in 2018) was applied to the responses. After the screening process, 393 participants were found to be suffering from migraine and the remaining 506 responses were excluded.

3.2. Sociodemographic variables

Of the 393 participants that suffered from migraine, the majority were female (78.1%). The majority of migraineurs were in the age group 20–29 (69.2%). 299 participants (76.1%) of the 393 migraineurs were students.

3.3. Family history

Of the 393 respondents, only 129 (32.8%) had a family history of migraine.

3.4. Triggering factors

The migraine attacks were most frequently triggered by sleep disturbance (70.5%), stress (66.7%), fatigue (64.4%), excess screen time (61.1%), loud noise (58.8%), dehydration (49.9%), and missed meals or dieting (49.1%). Other common triggering factors were traveling (39.9%), bright sunshine (39.2%), and certain smells or perfume (30.8%). The migraine attacks were triggered by smoking in only 8.1% of the migraineurs and by exercise in only 10.4% of the migraineurs [Table 1].

Of the female migraineurs, 109 (31.8%) participants had their migraine attacks triggered by menstrual periods. 65.6% of the female participants did not have menstrual periods, pregnancy, birth control pills, and other hormonal drugs as triggering factors for their migraine

Table 1
Triggering factors.

	Triggering Factors	Frequency (n)	Percentage (%)	
Psychological and Sensory	Stress	262	66.7	
	Loud noise	231	58.8	
	Sleep Disturbance (Too much or too little)	277	70.5	
	Certain smells or Perfume	121	30.8	
	None of the above	9	2.3	
Environmental	Bright sunshine	154	39.2	
	Excess screen time	240	61.1	
	Weather changes	50	12.7	
	Traveling	157	39.9	
	None of the above	44	11.2	
Physical Activity	Fatigue	253	64.4	
	Exercise	41	10.4	
	Heavy lifting	36	9.2	
	Sexual activity	9	2.3	
	None of the above	114	23.0	
Diet	Certain foods (Chocolate, Caffeine)	35	8.9	
	Missed meals or Dieting	193	49.1	
	Dehydration	196	49.9	
	Smoking	32	8.1	
	None of the above	87	22.1	
	Gynecological	Menstrual Periods	109	31.8
		Pregnancy	3	0.9
Birth control pills		4	1.2	
Other hormonal drugs		7	2.0	
None of the above		225	65.6	

attacks [Table 1].

3.5. Coping mechanisms

The coping mechanisms most frequently used by migraineurs to relieve pain included taking rest (65.9%), medication (58.8%), staying in a quiet and dark place (53.4%), and doing massage (19.3%).

4. Discussion

The use of the International Classification of Headache Disorders (ICHD-3) [9] has been considered a Gold standard for the correct diagnosis of headaches, including Migraine with and without aura [10]. The sociodemographic factors including gender, age, employment status, family history, triggering factors associated with migraine, and its coping mechanisms were studied. A variety of findings was observed-some consistent with other studies, some contradictory, and some odd.

4.1. Gender

Of the respondents that were diagnosed with migraine, the majority were females (78.1%) [Fig. 1]. It has been found that Migraine is two to three times more common in women as compared to men. Women suffer a more severe form of migraine with increased duration and frequency of attacks [11]. The greater prevalence of migraine in females is suspected to be strongly associated with genetics according to Reinal Shyti et al. [12].

4.2. Age

The major groups that were seen as migraineurs were adolescents and young adults i.e., the age group 10–29 years [Fig. 2]. These findings are consistent with many studies [13–15]. Many studies stress on psychosocial factors to be a major cause of increasing migraine incidents among this age group. These factors include family problems, increasing stress in schools, colleges, and universities, increasing use of electronic devices, and disturbed relationships with peers [16].

4.3. Employment status

Although our results showed the presence of migraine incidents in people belonging to all walks of life, the most prevalent group was students [Fig. 3]Fig. 3. The ever-increasing workload, stressing about grades, and living away from families in hostels may be some of the prominent causes of these findings. The studies conducted in Cotonou [17] Thailand [18], Saudi Arabia [19], and Mali [20] associated migraine among students with the aforementioned factors.

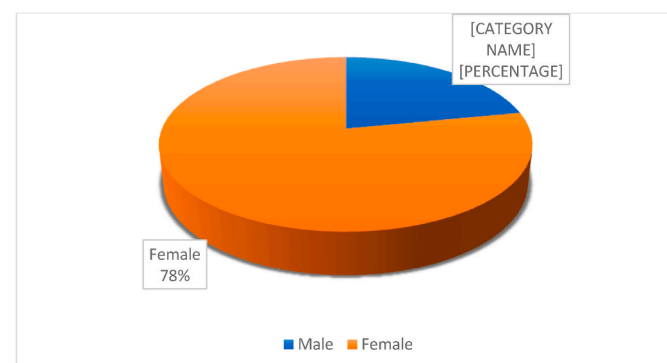


Fig. 1. Prevalence according to gender.

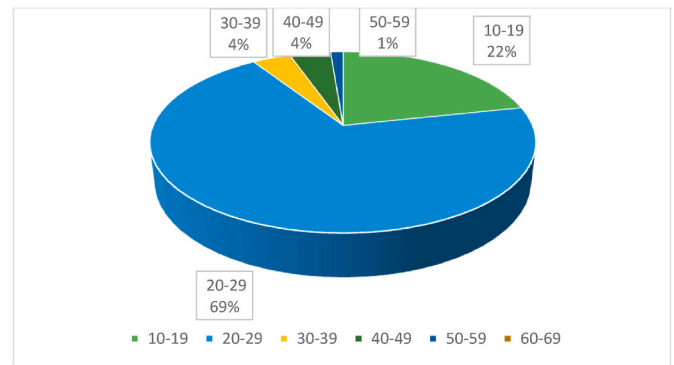


Fig. 2. Prevalence according to age.

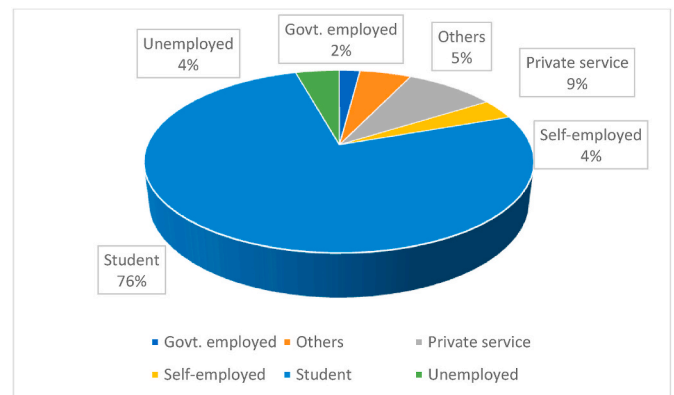


Fig. 3. Prevalence according to employment status.

4.4. Family history

Our study shows a lesser prevalence of family history of migraine attacks among migraineurs [Fig. 4]. It is contradictory to the socio-demographic and genetic studies that have established a strong association between migraine with family history [21].According to de Boer et al., the genetic variation linked with migraine is greater in familial cases of migraine as compared to non-familial ones [22].Our inconsistent findings may be because many migraine cases remain undiagnosed in Pakistan, so the participants may have been unaware of the prevalence of migraine among their family members.

4.5. Triggering factors

There are at least 60 potential triggering factors for migraine [23]. There are a lot of difficulties in establishing a definite relation between a trigger and a migraine attack as stated by JN Blau [24].There may be

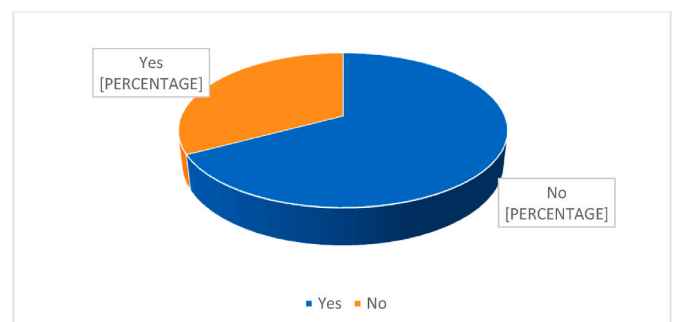


Fig. 4. Prevalence according to family history.

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more than one factor that cumulatively starts a headache. At times, there is confusion regarding the factor, whether it acted as a trigger or was brought upon by the migraine attack itself. For example, anxiety and lack of sleep are precipitating factors for migraine, but it can be a possibility that severe migraine is making a person anxious and sleep deprived. Moreover, it is not necessary that the triggers remain consistent throughout life. They may change with age, a person's social conditions, lifestyle modification, and medicines. Although the intricate association and overlapping of triggers remain an interesting area of further study [25], we studied the association of individual triggers in migraineurs that are included in our results. Some of the prominent triggers shown by our findings are explained as follows.

4.5.1. Excess screen time

[Table 1] shows a very high contribution of excess screen time towards migraine incidents (61.1%). A cross-sectional study conducted by Ilaria Montagni et al. shows a consistent finding of high rates of migraine-type headaches among students who excessively use mobile phones and other gadgets [26].

4.5.2. Sleep disturbance

Sleep disturbance has a very strong association with migraine [27]. This study shows a 70.5% prevalence of sleep disturbance with migraine. [Table 1]. Poor sleeping habits, waking up late at night, depriving oneself of proper daily sleep, and doing excessive night shifts contribute to this [25].

4.5.3. Stress

This study shows that Stress is also a major trigger for migraine with a prevalence of 66.7% [Table 1]. Stress along with other mental illnesses is considered to be the psychiatric comorbidities of migraine [28]. Houle TT et al. [29] established stress as a predictor of migraine attacks.

4.5.4. Exercise

Exercise is believed to alter the threshold of migraine triggers. Although infrequent exercise is believed to trigger migraine, regular exercise has a prophylactic effect on migraine [30]. Our results show only a 10.1% association of migraine with exercise [Table 1].

4.5.5. Fatigue

Although our study shows a 66.4% association of Fatigue with migraine, it is still not conclusive as to whether fatigue is a trigger or a prodromal symptom of migraine. Nonpharmacological treatment of fatigue in migraine includes acupressure which has been proved to be very effective [31].

4.5.6. Diet

Diet is a modifiable factor that influences migraine epigenetics and pathophysiology [32]. Missed meals and dieting significantly trigger migraine [Table 1]. Studies have shown that sudden caffeine withdrawal also triggers migraine [33]. Although some studies show chocolate to be a migraine trigger, there is still inconclusive data regarding this [34].

4.5.7. Women's health

[Table 1] shows a notable association between menstrual periods with migraine in females. This is consistent with the study by Wober et al. who considers menstruation to be one of the most important risk factors for persistent headaches including migraine [35].

4.6. Coping mechanisms

These are shown in [Fig. 5]. To cope with migraine, taking rest from daily activity is the most prevalent mechanism adopted by our respondents [36]. Medication, including NSAIDs (Ibuprofen, etc.), amitriptyline, and venlafaxine, taken as a prophylactic measure [37], is the second most prevalent coping mechanism according to our findings.

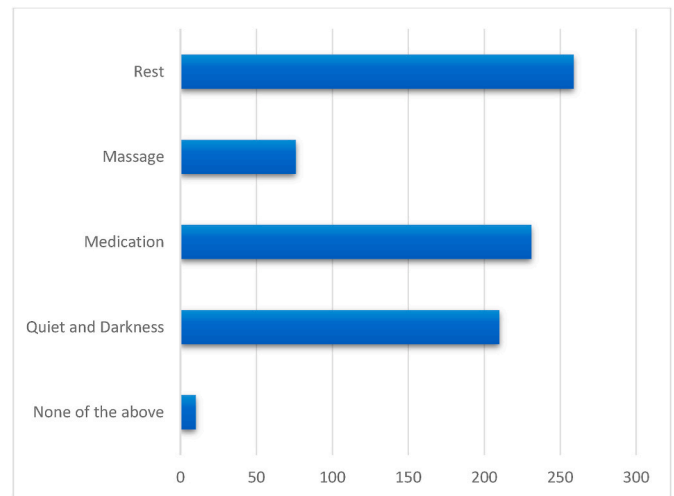


Fig. 5. Coping mechanisms used by the migraineurs.

A good number of migraineurs also prefer quietness and darkness, as migraine can be strongly associated with photophobia [38] and loud noise.

5. Conclusion

The present study explains a general idea regarding sociodemographic factors and triggers that contribute to the existence and prevalence of migraine. The overall conclusion that can be drawn from the findings is that adolescents and young adults, especially females, with a stressful and sleep-deprived lifestyle are more vulnerable to migraine. However, further studies must focus more on trigger synergy and interrelation of different triggers that precipitate migraine so a better understanding can be developed to prevent, diagnose and treat migraine.

Limitations of the study

The sample size for this study was limited. Most of the responses were from younger people. Further diagnosis according to aura was not made. Our study was also geographically limited to one area. These may limit the validity of the study. There were more than one triggering factors for a lot of migraineurs so a conclusive relation of which factor is the decisive one cannot be drawn. There may be a possibility that participants may not recall all the triggers, hence over-reporting or wrongly reporting a trigger.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Registration of research studies

Unique Identifying number or registration ID: MS.300/RC/KEMU 07/04/2021.

Ethical approval

The study was approved by the Institutional Review Board of King Edward Medical University, Lahore-Pakistan.

Sources of funding

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Author contribution

Farwa Athar, Afra Zahid and Minaam Farooq conceptualized the study, contributed to the study design, data collection and verification of the analytical methods. Muhammad Ayyan performed the statistical analysis and compiled the results. Dr. Mohammad Ashraf supervised the research project. All authors contributed to the original draft preparation. Mukarram Farooq, Muhammad Ehsan, Ayesha Hussain, Faiza Naeem, Muhammad Abdullah Ilyas and Aamna Badar reviewed the manuscript to make corrections for any potential errors. All authors approved the final manuscript.

Trial register number

Not Applicable.

Guarantor

Farwa Athar, Afra Zahid, Minaam Farooq.

Consent

Voluntary completion of the questionnaire by the participants was considered an informed consent. No personal information was sought and complete anonymity was ensured.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104589>.

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