Original Research Article

Migraine: prevalence, predisposing factors, and impact on quality of life among Saudi board family medicine residents in Riyadh, KSA.

Abstract:

Background: Migraine is a prevalent and incapacitating neurological illness that affects a considerable section of the global population. In a community context, the purpose of this study was to examine the prevalence of migraine and its associated comorbidities, triggers, and impact on quality of life.

Methodology: A cross-sectional study was undertaken among Saudi Board Family residents. A standardized questionnaire was used to collect information on migraine prevalence, related comorbidities, triggers, and impact on quality of life. Additionally, demographic information was collected. Using descriptive statistics, chi-square tests, and logistic regression analysis, the data were evaluated.

Results: The prevalence of migraine was 23.8% among the individuals. Multiple comorbidities, including bronchial asthma, depression, and irritable bowel syndrome, were found to be strongly linked with migraine. Participants cited stress, sleep deprivation or disturbance, and dehydration as the most prevalent migraine triggers. Participants with migraine reported a considerably higher prevalence of physical activity limitation, missed work, and abstinence from social events as a result of their migraine headache compared to participants without migraine.

Conclusion: This study provides important insights into the prevalence, comorbidities, triggers, and impact of migraine on quality of life among Saudi Board Family residents. The findings underscore the substantial impact of migraine on individuals and society and emphasize the need for appropriate therapy techniques that account for the unique nature of migraine and its associated comorbidities and triggers.

Introduction:

Migraine headaches characterizes by throbbing headaches that mostly occur on one side of the head and are accompanied by following symptoms nausea, vomiting, photophobia, and phonophobia [1]. It is typically a chronic condition that affects persons under the age of 35 years and worsens over time [2].

Migraine is a special type of headache that leads to severe pain and intense, impulsive sensation at a specific head. This scenario is followed by other symptoms like nausea or photophobia and phonophobia [3]. In addition to this, there are other symptoms like nausea or vomiting. The attacks of this type of disease, characterized by severe pain in the head, can last for hours or even for days. The pain can be so intense that it might even affect the daily activities of the affected person [4]. The patient experience of chronic migraine is more narrative dysfunction of the pain pause network. The preventive treatment of migraine and the biomarkers could predict the patient's response through treatment [5]. Along with a better understanding of migraine will lay the way of development for improvement on treatments that are specially designed for those migraine affected patients. This type of pain experience includes affective, cognitive, and sensory brain networks. The practical perspective of pain includes prefrontal, anterior cingulated, insular and cortex of somatosensory, which is demonstrated for chronically migraine patients. This type of pain experience is similar to the former findings for the patient in episodic migraine.

The exact pathophysiology of migraine is still not fully understood, but it is believed to involve complex interactions between genetic, environmental, and neurochemical factors. Current theories suggest that migraine is initiated by activation of the trigeminovascular system, which involves the release of pro-inflammatory peptides such as calcitonin gene-related peptide (CGRP) and substance P in response to various triggers. This leads to vasodilation and neurogenic inflammation, which in turn activate pain fibers in the meninges and other structures surrounding the brain [6].

There are several different treatment options available for migraine, depending on the severity and frequency of the attacks. Acute treatments include over-the-counter pain relievers, such as ibuprofen or acetaminophen, as well as prescription medications such as triptans and ergotamine's. These drugs work by targeting specific receptors involved in the pathophysiology of migraine, such as serotonin receptors and CGRP receptors. However, their efficacy is limited

by side effects and contraindications, and they may not be effective for all patients [7]. Preventive treatments are also available for patients who experience frequent or severe migraine attacks. These include beta blockers, calcium channel blockers, antidepressants, and anti-seizure medications. They work by decreasing the frequency and severity of attacks by modulating various mechanisms involved in migraine pathophysiology. However, their efficacy is also limited by side effects and potential drug interactions [8].

Family Medicine residents are a critical group of healthcare professionals who play a significant role in patient care. If they are suffering from migraine, it can impact their ability to provide quality patient care and affect patient outcomes. Therefore, it is essential to identify the risk factors associated with migraine in this population and develop interventions to mitigate them. Migraine can have a significant impact on an individual's quality of life, affecting their work, social life, and personal relationships. By identifying the prevalence of migraine and associated risk factors among Family Medicine residents, we can help improve their quality of life and well-being.

This study will provide valuable insights into the prevalence of migraine among Family Medicine residents, which can inform future research in this area. It can also serve as a baseline for future studies on the effectiveness of preventive and management strategies for migraine in this population.

Methodology:

This was a cross-sectional study, and the gathering of first-hand data is needed. Therefore, detailed data gathering was needed to assess the retrieved data and get the needed outcome. The data collection and analysis process started on April 31, 2023, and completed prior to June 2023. Data gathered would be analyzed using appropriate statistical packages.

1.1 Study Area/Setting:

This study was conducted at the primary health care of all health sectors which they have residency program accredited by SCFHS in Riyadh City, Saudi Arabia.

Study Subjects:

The study included all Saudi board family medicine residents training in Riyadh, KSA.

Study Design:

The study was a cross-sectional study since we contacted the subjects of the study one time only.

1.2 Eligibility Criteria:

Inclusion criteria:

The study targets all levels of Saudi board family medicine residents training in Riyadh city.

Exclusion criteria:

The study excluded all physicians who are not involved in a residency program accredited by SCFHS.

1.3 Sample Size:

This is a convenience sampling. It is estimated that almost more than 400 Saudi board family medicine residents training in Riyadh, KSA. Accordingly, the representative sample size in the current study was determined using the epi Info (http://www.raosoft.com/samplesize.html) with a margin of error of 5%, a confidence level of 95%, and the response distribution of the prevalence counted for 50% for the lack of local studies. To which we added 10% as a non-response rate. Therefore, the final sample size was 199 participants.

1.4 Data Collection Methods:

Multiple-choice questionnaires would be implemented through the conduction of a survey for gathering the data, and the analysis would involve quantitative assessment of the data (Spector, 2019). The questionnaires were electronically distributed by a team through WhatsApp, Telegram, etc. (using Google Forms) among the family residents across all residency programs in Riyadh. The questionnaire was anonymous to ensure confidentiality and increase the response rate. The questionnaire covered areas of demographics, trigger factors, history of migraine or any other chronic diseases, the ID Migraine test was used to screen for migraine, and the questionnaire also included their general lifestyle and the impact on work and social activities. The numeric pain rating scale (NPRS) was used to assess the severity of the headache. This scale was validated in previous studies [9,10].

2 Statistical Consideration:

The data analysis was conducted using the Statistical Package for Social Science (SPSS) Application for Windows Operating System (version 25). Descriptive statistics were applied to both continuous and categorical variables to describe them. The significant differences between categorical variables were determined by employing the chi-square test and Fisher's exact test. On the other hand, the independent samples t-test wase used to test the differences between means. Any P-value below 0.05 was regarded as statistically significant.

3 Ethical Consideration:

The research was conformed to Helsinki Declaration. The protocol of the study was approved by the institutional Review Board (IRB) of King Saud Medical City (KSMC), with a reference number of H1R1-09-Apr23-01. A written informed consent was taken from each resident accepted participant. Administrative approvals were also taken.

Results:

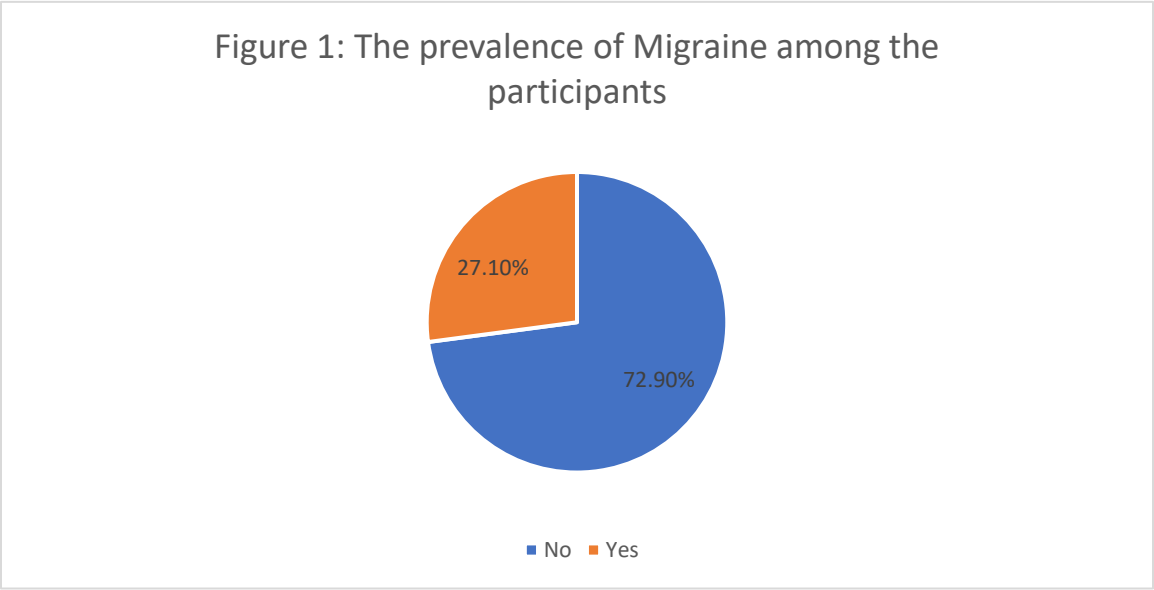
According to Table 1, there were 199 participants in the study, of which 59.3% were female and 40.7% were male. The participants' mean age was 27.91 years, with a standard deviation of 2.19 years. In terms of training level, 27.1% were in R1, 28.6% were in R2, and 44.2% were in R3. The bulk of participants (75.9 %) were unmarried, while 23.1% were married and 0.5% were either divorced or widowed. Regarding a migraine family history, 25.6% of subjects reported having a migraine family history. Regarding smoking status, 32.7% of participants reported having smoked at least one cigarette in their lifetime. Regarding comorbidities, the majority of individuals (76.8 %) did not indicate having any. In contrast, 11.1% reported having irritable bowel syndrome, 7.6% depression, and 5.1% asthma or generalized anxiety disorder. Participants reported hypothyroidism and gastrointestinal disorders at rates of 4.5% and 2.0%, respectively. Only 0.5% of individuals reported having type 2 diabetes.

Table 1: Demographic factors of the participants (N=199)

		Count	Column N %
Gender	Female	118	59.3%
	Male	81	40.7%
Age	Mean (SD)	27.91 (2.19)	
Residency level	R1	54	27.1%

	R2	57	28.6%
	R3	88	44.2%
Marital status	Single	151	75.9%
	Married	46	23.1%
	Divorced	1	0.5%
	Widow	1	0.5%
Do you have family history of migraine?	No	148	74.4%
	Yes	51	25.6%
Have you ever smoked a cigarette?	No	134	67.3%
	Yes	65	32.7%
Comorbidities	None	152	76.8%
	Bronchial asthma	10	5.1%
	Depression	15	7.6%
	Irritable bowel syndrome	22	11.1%
	Gastrointestinal disorder	4	2.0%
	Generalized Anxiety disorder	10	5.1%
	Hypothyroidism	9	4.5%
	Diabetes mellitus	1	0.5%

Figure 1 shows the prevalence of migraine among the participants in the study. Out of 199 participants, 54 of them reported having migraine, which represents a prevalence rate of 27.1%. The majority of participants (72.9%) reported not having migraine.



The relationship between the occurrence of migraine and the participants' demographic characteristics is depicted in Table 2. Males had a greater migraine prevalence (37.0%) than females (20.3%), and the difference was statistically significant (p=0.009). Male participants were 2.38 times more likely than female participants to have migraine (95 percent CI: 1.35-4.19), showing that male participants were 2.38 times more likely to have migraine than female participants. There was no connection between migraine prevalence and age (p=0.682) or level of education (p=0.890). In terms of marital status, the prevalence of migraine was greater among married participants (34.8%) than among single participants (25.2%), but the difference was not statistically significant (p=0.493). Participants who had a family history of migraine had a substantially higher migraine prevalence (49.0 %) than those without a family history of migraine (19.6 %; p = 0.000). The odds ratio (OR) for having migraine with a family history of migraine was 4.89 (95 percent confidence interval [CI]: 2.71-8.81), indicating that participants with a family history of migraine were nearly 5 times more likely to experience migraine than those without a family history of migraine. There was no significant correlation between migraine prevalence and smoking (p=0.253). Those who reported having comorbidities had a considerably higher prevalence of migraine (51,1 percent) than those who did not report having comorbidities (19.7 %) (p = 0.000). The odds ratio (OR) for having migraine with comorbidities was 4.90 (95 % confidence interval [CI]: 2.52-9.54), showing that people with comorbidities were nearly 5 times more likely to have migraine than those without comorbidities.

Table 2: The relation between prevalence of migraine and demographic factors of the participants

		Migraine				
		No		Yes		P-value
		Count	Row N %	Count	Row N %	
Gender	Female	94	79.7%	24	20.3%	0.009*
	Male	51	63.0%	30	37.0%	
Age	Mean (SD)	27.95 (2.26)		27.81 (1.98)		0682
Residency level	R1	38	70.4%	16	29.6%	0.890
	R2	42	73.7%	15	26.3%	
	R3	65	73.9%	23	26.1%	

Marital status	Single	113	74.8%	38	25.2%	0.493
	Married	30	65.2%	16	34.8%	
	Divorced	1	100.0%	0	0.0%	
	Widow	1	100.0%	0	0.0%	
Do you have family history of migraine?	No	119	80.4%	29	19.6%	0.000*
	Yes	26	51.0%	25	49.0%	
Have you ever smoked a cigarette?	No	101	75.4%	33	24.6%	0.253
	Yes	44	67.7%	21	32.3%	
Comorbidities	Yes	23	48.9%	24	51.1%	0.000*
	No	122	80.3%	30	19.7%	

The relationship between various comorbidities and the prevalence of migraine among the individuals is depicted in Table 3. Participants with bronchial asthma, depression, and irritable bowel syndrome had significantly higher migraine prevalence than those without these comorbidities, as indicated by p-values of 0.002, 0.018, and 0.000, respectively. The odds ratios for migraine with these comorbidities were 5.55 (95 percent confidence interval: 1.66-18.56), 2.31 (95 percent confidence interval: 1.00-5.35), and 3.67 (95 percent confidence interval: 1.73-7.27), respectively. These findings indicate that bronchial asthma, depression, and irritable bowel syndrome are important migraine risk factors. In contrast, no significant connection was found between migraine prevalence and gastrointestinal illness, generalized anxiety disorder, hypothyroidism, or diabetes.

Table 3: The relation between different comorbidities and prevalence of migraine

		Migraine				
		No		Yes		P-value
		Count	Row N %	Count	Row N %	
Bronchial asthma	No	142	75.1%	47	24.9%	0.002*
	Yes	3	30.0%	7	70.0%	
Depression	No	138	75.0%	46	25.0%	0.018*
	Yes	7	46.7%	8	53.3%	
Irritable bowel syndrome	No	136	76.8%	41	23.2%	0.000*
	Yes	9	40.9%	13	59.1%	
	No	143	73.3%	52	26.7%	0.299

Gastrointestinal disorder	Yes	2	50.0%	2	50.0%	
Generalized Anxiety disorder	No	139	73.5%	50	26.5%	0.348
	Yes	6	60.0%	4	40.0%	
Hypothyroidism	No	139	73.2%	51	26.8%	0.669
	Yes	6	66.7%	3	33.3%	
Diabetes mellitus	No	144	72.7%	54	27.3%	0.541
	Yes	1	100.0%	0	0.0%	

Table 2 displays the headache symptoms reported by participants and their relationship to migraine. Participants who reported symptoms of depression, trouble concentrating, photophobia, phonophobia, irritability, extreme weariness, and nausea had a significantly higher prevalence of migraine, as measured by p-values of 0.000, compared to those who did not report these symptoms. The odds ratios for having migraine with these symptoms ranged between 2.89 and 11.37, showing that persons with these symptoms were considerably more likely to have migraine than those without them. With a p-value of 0.541, there was no significant connection between the prevalence of migraine and the presence of aura.

Table 2: Symptoms reported by the participants related to headache and its relation to migraine

		Total		Migraine				
				No		Yes		P-value
		N	Percent	N	Percent	N	Percent	
Symptoms	None	107	53.8%	102	95.3 %	5	4.7 %	0.000*
	Depressed mode	41	20.6%	18	43.9 %	23	56.1 %	0.000*
	Difficulty concentrating	66	33.2%	27	40.9 %	39	59.1 %	0.000*
	Photophobia	38	19.1%	7	18.4 %	31	81.6 %	0.000*
	Phonophobia	30	15.1%	7	23.3 %	23	76.7 %	0.000*
	Irritability	41	20.6%	16	39.0 %	25	61.0 %	0.000*
	Extreme fatigue	37	18.6%	15	40.5 %	22	59.5 %	0.000*

	Nausea	32	16.1%	5	15.6 %	27	84.4 %	0.000*
	Aura	1	0.5%	1	100 %	0	0.0%	0.541

Figure 2 depicts how individuals cope with migraine headaches under intense pain. Taking analgesics (42,2 %) and napping were the most often cited pain relief methods (36.2 %). Resting (29.1 %) and dimming the lights (20.6%) were also frequently cited techniques. Less frequently stated tactics included consuming coffee (10,6 %), experimenting with hot or cold compressors (2.5 %), and engaging in regular physical activity (3.5 %). Notably, a sizeable minority of individuals (45.7%) reported not employing any specific migraine headache pain management method during intense pain.

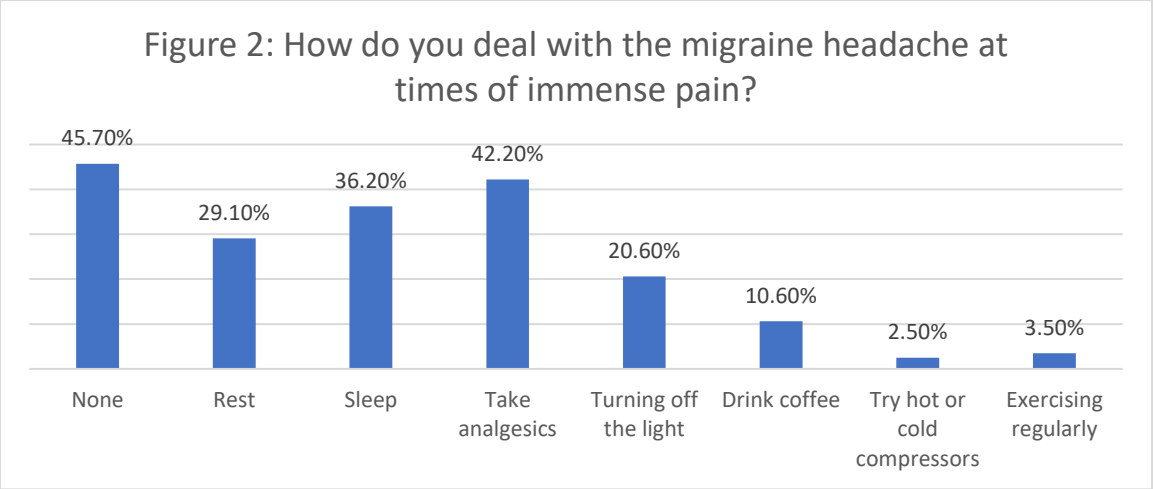
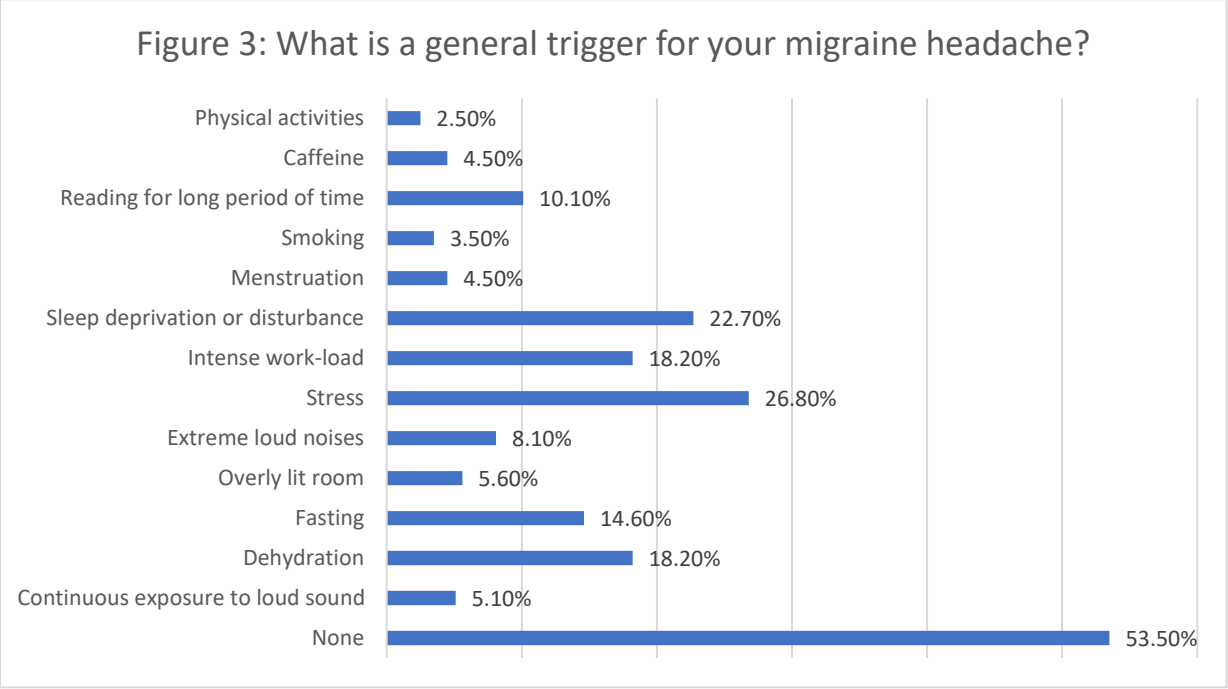


Figure 3 depicts the common migraine headache triggers identified by participants. The most often cited cause was stress (26.8 %), followed by sleep deprivation or disturbance (22.7 %) and dehydration (18.2 %). Participants also indicated fasting (14.6%), severe job load (18.2%), and prolonged reading as triggers (10.1 percent). Notably, a considerable majority of patients (53.5%) reported having no identifiable migraine headache cause. Other identified triggers by participants included continuous exposure to loud sound (5.1%), an overly lighted environment (5.6%), extremely loud noises (8.1%), menstruation (4.5%), smoking (3.5%), caffeine (4.5%), and physical activities (2.5 %).



The relationship between migraines and participants' quality of life is depicted in Table 3. With a p-value of 0.000, participants with migraine reported a considerably higher prevalence of physical activity limitation than those without migraine. The odds ratios for migraine and physical activity limitation were 16.93 (95 % confidence interval: 5.83-49.18) for "often" and 51.29 (95 % confidence interval: 14.99-175.51) for "always" compared to "never" Participants with migraine were substantially more likely to miss work and withdraw from social activities due to their migraine headache, with p-values of 0.000 and 0.001, respectively, compared to those without migraine. The odds ratios for migraine and missing work or avoiding social activities were 5.77 (95 % confidence interval: 1.92-17.32) and 5.91 (95 % confidence interval: 2.45-14.21), respectively.

Table 3: The relation between migraine and quality of life

		Total		Migraine				
				No		Yes		P-value
		Count	Column N %	Count	Row N %	Count	Row N %	
Does your headache prevent you from	Never	99	49.7%	90	90.9%	9	9.1%	0.000*
	Rarely	58	29.1%	41	70.7%	17	29.3%	

doing any type of physical activities?	Often	35	17.6%	12	34.3%	23	65.7%	
	Always	7	3.5%	2	28.6%	5	71.4%	
Have you ever missed work due to migraine headache?	No	180	90.5%	142	78.9%	38	21.1%	0.000*
	Yes	19	9.5%	3	15.8%	16	84.2%	
Have you ever refrained from participating in social activity due to migraine headache?	No	161	80.9%	136	84.5%	25	15.5%	0.00*
	Yes	38	19.1%	9	23.7%	29	76.3%	

Discussion:

The aim of the current study was to determine the prevalence of migraine among Saudi Board Family residents as well as the study of the associated comorbidities, triggers, and the impact of the migraine in the quality of life and work of this population. In the current study, the prevalence of migraine among Saudi Board Family residents was 23.8 % which is similar to that reported by different studies. In a comprehensive review undertaken by Albalawi M et al. of 36 Saudi Arabia-based research, the authors observed a 22.56 % prevalence (95 % confidence interval of 17.27-28.33 percent). In addition, several studies conducted in Saudi Arabia reported a prevalence of migraine among general population to be ranged between 2.5 %- 37.5 % [9,11–17] while among the university students, the prevalence of migraine increased to between 7.1 %- 71.6 % [18–21]. This result highlights the significant burden of migraine on individuals and society.

In addition, it was reported in the current study, that there is a significant difference in the prevalence of migraine among genders where the prevalence of migraine was significantly higher among male residents than females with higher level of risk of migraine in men by 2.38 times than females. This finding contradicts prior study that demonstrated a higher prevalence of migraines in women [22–24]. The study found no significant correlation between migraine prevalence and age or residency level. These results are in agreement with the results reported by different previous studies which showed no correlation between the prevalence of migraine and the age or education of the population [25,26]. However, this results may be associated with some limitations of the study including the small sample size, therefore, further research using higher sample size is important to investigate the possible association between migraine prevalence and

those demographic factors. In addition, the current study found that the prevalence of migraine was insignificantly different between participants according to the marital status which is consistent with the results of previous study which showed that there is no association between marital status and the prevalence of migraine [27]. Moreover, the current study showed that having family history of migraine increase the risk for development migraine by 4.89 times compared with those without family history of migraine. This result is consistent with previous research indicating that migraine has a major hereditary component [26,28].

Moreover, the current study showed that there are many comorbidities that was found to be associated with the incidence of migraine. The study showed that prevalence of migraine with higher among participants reported having bronchial asthma, depression, and irritable bowel syndrome (IBS). On the other hand, no association was reported between incidence of migraine and incidence of gastrointestinal disorders, generalized anxiety disorders, diabetes mellitus, or hypothyroidism. As reported by different previous study, there is a strong association between incidence of migraine and presence of bronchial asthma, depression, and IBS [13,29–31]. These findings provide support for this conclusion. Our results showed that having those comorbidities increase the risk for developing migraine by 2.31-5.55 times.

One reason for the correlation between incidence of migraine and bronchial asthma is the sharing of the two disorders with some underlying causes as inflammation and autonomic dysfunction [32,33]. Different previous studies showed that both disorders share similar pathophysiological pathways including the higher level of pro-inflammatory cytokine levels, the activation of mast cell, and the dysfunction of the autonomic nervous system [34]. Considering the relation between depression and incidence of migraine, some shared genetic and environmental risk factors between the two disorders as stressful life events, neurotransmitter imbalances, and fluctuations of different hormones may be the reason of this relation [35,36]. Multiple studies have shown that depression is a migraine risk factor and can worsen migraine symptoms [26,37]. Moreover, there is different reasons for the correlation between migraine and IBS including the common underlying processes as the disturbance of gut-brain axis, the altered gut flora, and visceral hypersensitivity [38,39]. Several previous studies have demonstrated that IBS and migraine have similar pathophysiological pathways, including the presence of higher levels of pro-inflammatory cytokines, altered gut microbiota, and central nervous system sensitivity [40].

According to the study, stress, sleep deprivation or disturbance, and dehydration were the most often reported migraine triggers. In addition to hunger, heavy workload, and prolonged reading, participants cited these as additional triggers. These results are consistent with prior research identifying stress and sleep disturbance as key migraine triggers [41–43]. The fact that 53.5% of patients reported having no identified migraine headache trigger demonstrates the complexity of migraine and the need for tailored treatment choices.

Moreover, the current study also investigate the impact of migraine of the quality of life of the participants where patients with migraine were found to report a higher prevalence of physical activity restriction, missing of work day, and social event avoidance because of the migraine. This is consistent with several previous studies which showed that migraine has a significant negative impact on the patients' daily activities, social functioning, job productivity [44–47]. The odds ratios for having migraine and limiting physical activity, missing work, or refraining from social activities ranged from 5.77 to 51.29, indicating that individuals with migraine were substantially more likely to have these adverse impacts than those without migraine.

In conclusion, the findings of this study provide valuable insights into the prevalence, comorbidities, triggers, and quality of life impact of migraine among Saudi Board Family residents. In addition, our results shed the light on the significant negative impact of migraine on patients and society and the importance for presence of management strategies that consider the particular characteristics of migraine and its triggers. This study's findings can inform the development of individualized migraine management approaches that take into consideration the distinct demands and limitations faced by individuals with this condition.

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