


RESEARCH

Open Access



# Perception of the general population towards migraine in Jeddah, Saudi Arabia

Hussein Algahtani<sup>1,2,3\*</sup> , Bader Shirah<sup>4</sup>, Mouaz Bamsallm<sup>2</sup>, Kenan Nejaim<sup>2</sup>, Hussain Alobaidi<sup>2</sup> and Meshal Alghamdi<sup>2</sup>

## Abstract

**Background:** Migraine is a chronic episodic neurological disorder characterized by a myriad of neurological symptoms including multi-phase attacks of headache, photophobia, phonophobia, and dizziness. To the best of our knowledge, there are no studies conducted about the public perception and attitudes towards migraine in Saudi Arabia. This study aims to determine the public perception and attitudes towards migraine in Jeddah, Saudi Arabia. This cross-sectional study was conducted during the period between September 2019 and January 2020 in various public places including malls in Jeddah, Saudi Arabia. The study utilized a 40-item self-administered survey questionnaire divided into two sections: demographic data of the participants and perception of participants towards migraine, which consisted of three parts—knowledge towards migraine, attitudes towards migraine, and the expected behavior of migraine patients.

**Results:** The total number of participants was 385. Three hundred and thirty-nine of the participants (88.1%) heard about migraine before. Relatives and friends are the main source of information for 213 participants (55.3%). In gender predominance, 137 (35.6%) believed that migraine affects both genders equally. Complications of migraine headache are not known for 240 participants (62.3%). The existence of medications or methods for treating migraine is not known for 195 (50.6%). The quality of life for patients with migraine is negatively affected according to 275 (70.9%). One hundred sixty-six participants (43.1%) believe that depression and anxiety are more common in migraineurs. Two hundred forty-four (63.4%) considered migraine to cause a huge psychological and social impact. Two hundred fifteen (55.8%) do not have the knowledge to deal with migraineurs.

**Conclusion:** The present study demonstrated a lack of knowledge in certain aspects of migraine in Jeddah, Saudi Arabia. This study will serve as a basis for developing a health educational program aiming to increase public awareness about migraine. It will also improve the understanding of society regarding migraine, which will subsequently improve the way they interact with migraineurs and understand their difficulties. In addition, finding a trusted source for information about different kinds of medical conditions including migraine is crucial in educating the community and providing them with the most recent and correct information.

**Keywords:** Perception, Attitude, Migraine, Saudi Arabia

## Background

Migraine is a chronic episodic neurological disorder characterized by a myriad of neurological symptoms including multi-phase attacks of headache, photophobia, phonophobia, and dizziness [1]. According to the World Health Organization statistics, migraine is the third most prevalent condition and the second most disabling disorder worldwide [2]. It is one of the major public health

\*Correspondence: halgahtani@hotmail.com

<sup>1</sup> King Abdulaziz Medical City, P.O. Box 12723, Jeddah 21483, Saudi Arabia  
Full list of author information is available at the end of the article

concerns with more than one billion individuals affected worldwide. Approximately, 1 in 16 men and 1 in 5 women suffer from migraine, and this disorder causes more burden in females [3]. Migraine is considered a disorder of the trigeminovascular system, and progress in the fundamental understanding of pathophysiology has led to novel and specific therapeutic interventions [4].

Over the past decade, several studies were conducted to evaluate the prevalence of migraine in the Gulf region and Arab countries. In a study done by Al Jumah and colleagues [5], the estimated 1-year prevalence of migraine in Saudi Arabia was 25%. In a cross-sectional community-based study conducted in Kuwait by Al-Hashel and colleagues [6], the 1-year prevalence of migraine was 23%. In a study conducted by El-Sherbiny and colleagues in Egypt, the 1-year prevalence of migraine in Fayoum Governorate was 17.3% [7].

There are many conflicting beliefs, and public awareness about migraine varies widely among different countries. Public awareness studies are important to identify misunderstandings and misconceptions and will help in the successful designing of targeted campaigns to improve the overall knowledge of the community. It is imperative to raise public awareness about migraine, which will assist the patients and their families in seeking medical advice at the earliest and in receiving medical therapy as soon as possible [8, 9]. To the best of our knowledge, there are no studies conducted about the public perception and attitudes towards migraine in Saudi Arabia. This study aims to determine the public perception and attitudes towards migraine in Jeddah, Saudi Arabia.

## Methods

This cross-sectional study was conducted during the period between September 2019 and January 2020 in various public places including malls in Jeddah, Saudi Arabia. A non-probability convenience sample technique was used in the selection of respondents, in which those who were invited and voluntarily agreed to participate were included in the study. The inclusion criteria were age  $\geq 18$  years and residents of Jeddah city. Non-residents and individuals who were diagnosed with migraine were excluded from the study. Based on the Raosoft sample size calculator, of the 3.5 million estimated population size, a sample size of 385 was obtained (95% confidence interval, 5% margin of error, and 50% response distribution).

The 40-item self-administered survey questionnaire used in this study was developed based on literature review and expert opinions (expert neurologists). The development of the survey questionnaire consisted of two phases. The questionnaire items were designed in

both Arabic and English language utilizing the back-translation method by two native speakers to make sure that the meaning of each item in the questionnaire was retained. The main language used was Arabic, which is the official language for all participants. A pilot survey was conducted with 20 participants to examine the reliability of the questionnaire. Cronbach alpha reliability coefficients calculated were 0.75–0.82 for each scale of the questionnaire. The survey questionnaire was divided into two sections: demographic data of the participants and perception of participants towards migraine, which consisted of three parts—knowledge towards migraine, attitudes towards migraine, and the expected behavior towards migraine patients.

The demographic data of the participants and their perception of migraine were calculated and presented by frequency and percentage. IBM Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., Armonk, NY, USA, 2018) was used for all statistical analyses. The participants were ensured about the anonymity and confidentiality of the data. This study was approved by the Institutional Review Board (IRB) of King Abdullah International Medical Research Center (KAIMRC), Jeddah, Saudi Arabia.

## Results

The total number of participants was 385, 367 (95.3%) of them were Saudi nationals. There were 269 (69.9%) males and 113 (29.4%) females in the study. The majority of participants were at the age of 21–30 years old (143 individuals representing 37.1%). Table 1 shows other important demographic data obtained from the questionnaire.

Three hundred and thirty-nine of the participants (88.1%) heard about migraine before. Headache is considered a symptom of migraine by 336 (87.3%), and 170 (44.2%) selected photophobia or photophobia. Relatives and friends are the main source of information for 213 participants (55.3%). Two hundred seventy-three (70.9%) considered migraine to occur as sudden attacks. More than half of the participants (58.2%) do not think migraine is a serious condition that can lead to death. Complications of migraine headache are not known for 240 participants (62.3%). In gender predominance, 137 (35.6%) believed that migraine affects both genders equally. The quality of life for patients with migraine is negatively affected according to 275 (70.9%). In addition, 299 (77.7%) believe that migraine interferes with the functionality of patients. Psychological status can trigger migraine in the opinion of 283 (73.5%). The existence of medications or methods for treating migraine is not known for 195 (50.6%) (Table 2, Figs. 1, 2, 3, 4, 5, 6, 7).

**Table 1** Demographic profile of the participants

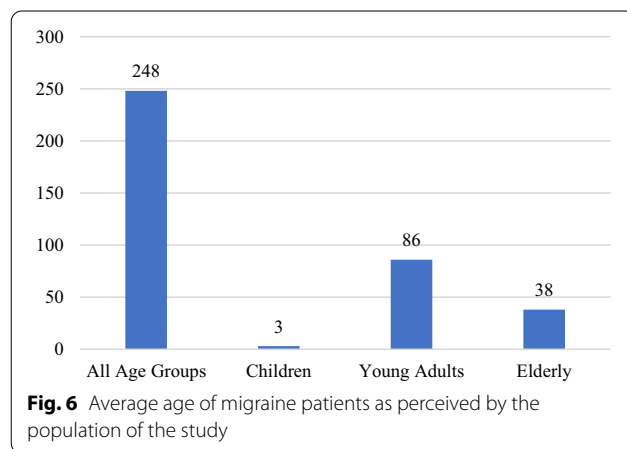
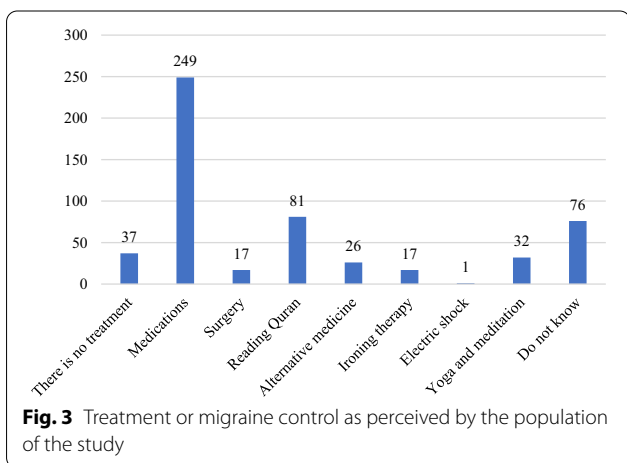
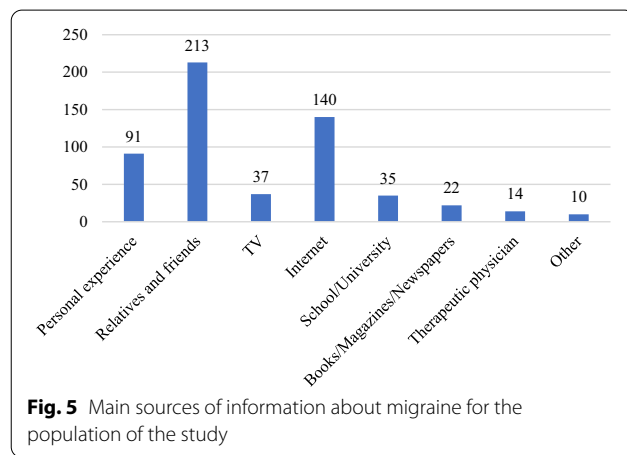
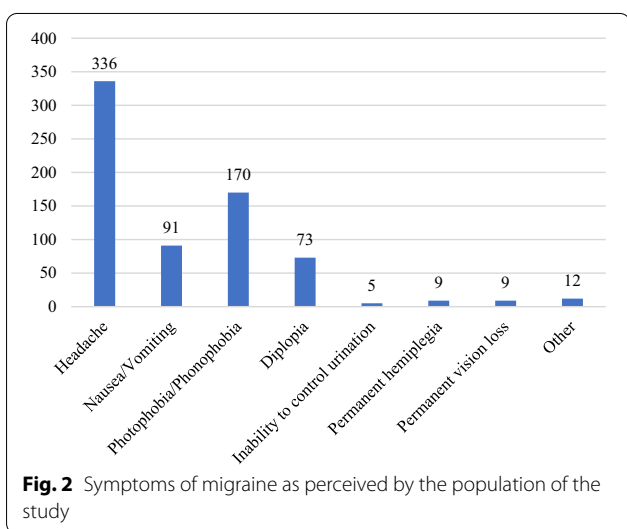
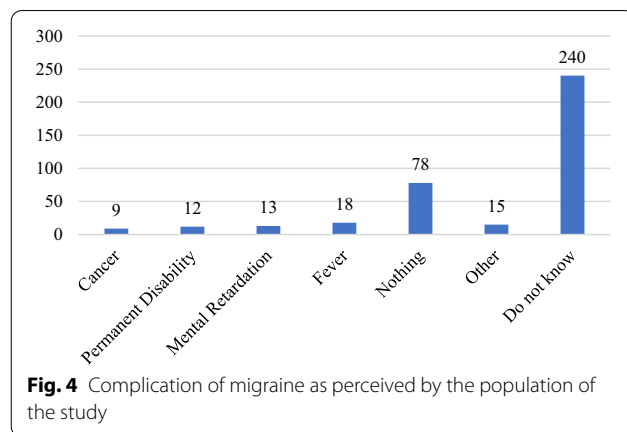
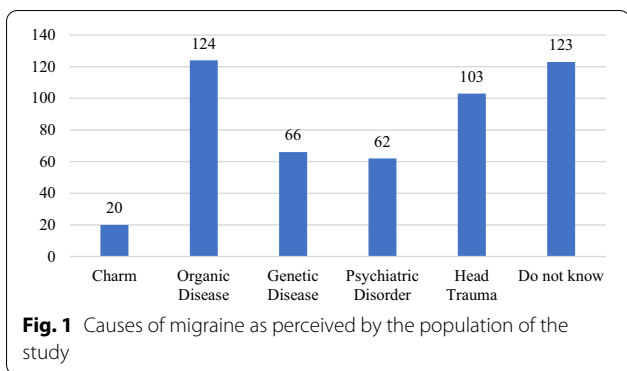
Item	Frequency	%
Gender		
Male	269	69.9
Female	116	30.1
Age range		
18–20	63	16.3
21–30	145	37.7
31–40	77	20.0
41–50	78	20.3
51–60	14	3.6
More than 60	8	2.1
Education level		
Uneducated	23	6.0
Less than bachelor	149	38.7
Bachelor	170	44.2
Masters	24	6.2
PhD	19	4.9
Living condition		
Alone	37	9.6
With family	205	53.3
Other	143	37.1
Monthly income		
Less than 5000 SR	142	36.9
5000–10,000 SR	90	23.4
10,000–15,000 SR	74	19.2
15,000–20,000 SR	59	15.3
More than 20,000 SR	20	5.2

**Table 2** General Information About Migraine

Questions	Yes	%	No	%	Do Not Know	%
1 Have you heard about migraine before now?	339	88.1	46	11.9	0	0
2 Do you think migraine last with the patient his whole lifetime and does not improve with age?	100	26.0	106	27.5	179	46.5
3 Does migraine occur as sudden attacks?	273	70.9	29	7.5	83	21.6
4 Does migraine have a negative impact on the lives of patients?	275	71.4	43	11.2	67	17.4
5 Is migraine a serious condition that could lead to death?	16	4.1	224	58.2	145	37.7
6 Are there many medications/methods for treating and preventing migraine?	145	37.6	43	11.2	197	51.2
7 Can certain kinds of food trigger migraine headache?	89	23.1	69	17.9	227	59.0
8 Can psychological status (mood) trigger migraine headache?	283	73.5	16	4.2	86	22.3
9 Does using smart devices set off migraine headache?	268	69.6	18	4.7	99	25.7
10 Does migraine interfere with functionality?	299	77.7	19	4.9	67	17.4
11 Does migraine exert unfavorable influence on sexual activity?	111	28.8	45	11.7	229	59.5
12 Does migraine have adverse effects on public finance?	104	27.0	97	25.2	184	47.8

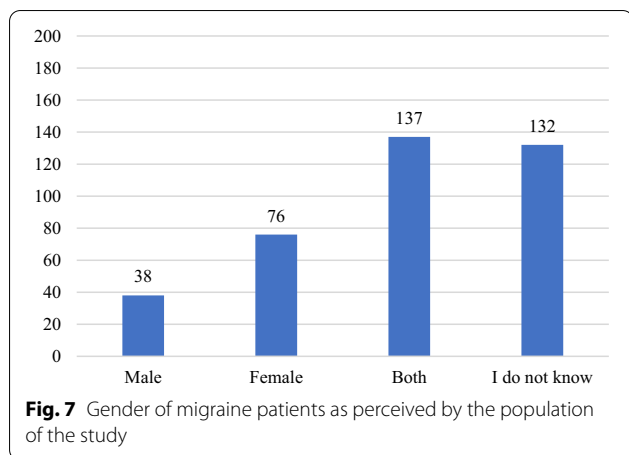
One hundred seventy-eight participants (46.2%) have a family member or a friend who has migraine. Two hundred sixty-one participants (67.8%) believe that migraineurs are not a burden on their families. Three

hundred twenty-five (84.4%) think migraineurs should not be isolated from society and 199 (51.7%) agreed to let one of their family marry someone with migraine. More than 70% of the participants (74.3%) do not think



migraineurs are suffering from stigmatization. Two hundred fifteen (55.8%) do not have the knowledge to deal with migraineurs. Two hundred forty-four (63.4%) considered migraine to cause a huge psychological and social impact (Table 3).

One hundred sixty-six participants (43.1%) believe that depression and anxiety are more common in migraineurs, and 142 (36.9%) do not think they need psychotherapy. Two hundred sixty participants (67.5%) believe migraineurs can play sports, whereas 137 (35.6%)



thought that migraineurs have a risk for car driving. Of all the participants, 229 (59.5%) believed migraineurs to have a normal life span and 254 (66%) agreed they also have normal mental abilities (Table 4).

**Discussion**

This study was conducted in Jeddah city, the second-largest city in Saudi Arabia and the main gateway to the holy cities of Makkah and Medina. Although migraine is a common disorder that requires research, education, and public awareness, this is the first comprehensive publication that assesses perception and attitudes towards

migraine in Saudi Arabia. The results of this paper will be a landmark for any future publication evaluating changes in the perception and knowledge of migraine in the Saudi community, and whether there is a difference between Jeddah city and other cities and regions in the kingdom.

Our study targeted the general public in Jeddah city in Saudi Arabia with the majority of participants being male (69.9%) and less than the age of 40 (74.0%). Most of the respondents were living with family (90.4%) reflecting the strong social attachment and the belief in the family structure. The monthly income ranged from less than 5000 SR to 20,000 SR with only 5.2% having income more than 20,000 SR. The demographics of the respondents were similar to the other published studies about other neurological disorders from the Kingdom of Saudi Arabia [8, 9]. Therefore, this study can be considered as a representation of the general public.

In the past few years, there has been significant progress in the understanding of the pathophysiology, etiology, and therapeutic aspects of migraine [10]. This was observed in our study since the majority of the participants heard previously about migraine reflecting on the contribution of the government towards education. The percentage of respondents who did not hear about migraine was still considered high (11.9%), and comparison with other nations is not possible since such data are not available in the literature.

Almost half of the sample do not know whether migraine lasts with the patient his whole life and does

**Table 3** Information About Migraine in the General Population

Questions	Yes	%	No	%	Do Not Know	%
1 Is there anyone in your family/friends having migraine?	178	46.2	161	41.8	46	12.0
2 Do you know how to deal with a migraineur?	88	22.9	215	55.8	82	21.3
3 Do you think migraine causes a huge psychological and social impact?	244	63.4	54	14.0	87	22.6
4 Do you believe that migraineurs are being a burden on their families?	66	17.1	261	67.8	58	15.1
5 Do you think migraineurs are suffering from stigmatization?	19	4.9	286	74.3	80	20.8
6 Do you think migraineurs should be isolated from the society?	17	4.4	325	84.4	43	11.2
7 Will you allow one of your family to marry someone suffering from migraine?	199	51.7	53	13.8	133	34.5

**Table 4** General information about persons with migraine

Questions	Yes	%	No	%	Do Not Know	%
1 Do you think that the lifespan of persons with migraine is like others?	229	59.5	39	10.1	117	30.4
2 Can persons with migraine drive the car without any risk?	122	31.7	137	35.6	126	32.7
3 Do you think that persons with migraine can play sports?	260	67.5	45	11.7	80	20.8
4 Do you think that the mental abilities of persons with migraine are like others?	254	66.0	50	13.0	81	21.0
5 Do you think that persons with migraine have depression and anxiety?	166	43.1	78	20.3	141	36.6
6 Do you think persons with migraine need psychotherapy?	106	27.5	142	36.9	137	35.6

not improve with age, and 26.0% believe that migraine is a chronic disease that never remits. The classic teaching is that migraine onset is sudden as it takes up to an hour for the headache to reach its peak. In our study, 70.9% of the participants believe that migraine occurs as sudden attacks, which is a correct response.

Although migraine is a chronic condition with intense, pulsating, and often unbearable pain, it is not considered a serious condition that leads to death [11]. In our study, more than one-third of the participants do not know (37.7%) or believe (4.1%) that migraine is a serious condition that could lead to death. In addition, around two-thirds of the participants do not know (51.2%) or believe that there is no medication or method for treating and preventing migraine. It is known as a fact that certain kinds of food may trigger migraine headaches. These include chocolate, cheese, nuts, cured meats, and alcohol [12]. Unfortunately, 59.0% of the participants do not know the kinds of food that trigger a migraine headache, and 17.9% believe that food has no relationship or triggering effect on migraine.

The use of smartphones in daily life has increased and became an important part of many activities including communication with other people, calling family and friends, doing business, and connecting to the internet [13]. In a cross-sectional comparative study, smartphone use has been observed to increase headache duration and frequency in migraine patients [14]. This was also confirmed in another study that showed a significant increase in headache and its duration after the end of a phone call [15]. Basic science researchers suggested that during or after smartphone use, changes occur in the blood–brain barrier and dopamine–opioid system [14]. In our study, more than two-thirds of participants believe that using smart devices set off migraine headaches.

In 2015, migraine was ranked the seventh leading cause of years lived with disability among different age groups [16]. In a study performed by Steiner and colleagues [17], migraine was the first cause of disability in people under the age of 50. Migraine negatively impacts the quality of life, especially in young patients, patients with frequent attacks, those not using a preventive medication, and those suffering from chronic diseases [16]. This was reflected in our study since more than two-thirds of participants believe that migraine has a negative impact on the life of the patients and interferes with functionality. More than two-thirds of the sample surveyed in our study believe that migraineurs are not considered a burden on their families. This is not consistent with studies performed on the burden of migraine on families of migraine patients. In a study published by Buse and colleagues [18], a pervasive burden of migraine on the

family was quantified, highlighting the impact on family activities and relationships.

Migraine is a costly disease with a total cost that ranges between \$2649 and \$8243 per year based on whether it is episodic or chronic. Around two-thirds of the cost are related to direct medical ones [19]. In our survey, almost half of the participants do not know whether migraine has an adverse effect on public finance, and 25.2% believe that migraine has no effect on this important aspect. In addition, 14.0% of the sample surveyed do not believe that migraine causes social impact, and 22.6% have no idea about this matter.

Migraine is a chronic condition that negatively affects sexual functions. In addition, the impairment in sexuality in migraineurs has no relationship to age, educational level, occupational status, duration of the marriage, and fertility. Several studies conducted by different authors and countries reported considerable declines in multiple areas of sexuality [20]. In our study, around 88.0% do not know (59.5%) or believe (28.8%) that migraine does not exert an unfavorable influence on sexual activity.

In a study done by Buce and colleagues, both depression and anxiety levels were reported to be high in migraine sufferers, and migraine has been indicated to cause disability and affect functioning in many areas of life [21]. In our study, subjects surveyed confirmed that migraine headaches can be triggered by psychological status and mood changes (73.5%). They think that migraine causes a huge psychological impact. In a study by Eraslen and colleagues [20], 60% of the patients had mild, moderate, or severe depression on Beck Depression and Anxiety Inventory score. This was also reflected in our study where 43.1% of respondents believe that persons with migraine have depression and anxiety, and 27.5% of migraine sufferers need psychotherapy.

Cultural stigma and misconceptions about migraine were not observed in our study when compared to other neurological conditions such as epilepsy [8, 9]. These beliefs and attitudes towards different health conditions are known to be affected by culture and tradition [22]. Less than 5% of the respondents believe that migraineurs are suffering from stigmatizations. The majority of the sample surveyed believe that migraineurs should not be isolated from society and will allow one of their family to marry someone suffering from migraine.

History of the family and close friends having migraine was reported in 46.2% of the sample with more than half of the respondents being unaware of how to deal with a migraineur. Around 60% of the respondents believe that the life span of persons with migraine is like others. Around two-thirds of the sample believe that the mental abilities of persons with migraine are like others and that persons with migraine can play sports. On the other

hand, more than two-thirds of the sample do not know (32.7%) or believe (35.6%) that migraine sufferers should not drive cars.

Over the past two decades, several changes have been observed in the Saudi community including the widespread use of the internet and social media and the decline in the use of paper-based knowledge sources such as magazines, newspapers, educational pamphlets, and books [23]. This was reflected in our study since the internet was a major source of information. In addition, personal experience and communications with relatives and friends were two other sources of information. Although the Saudi healthcare system has witnessed a significant improvement with more than 500 hospitals being established, the contribution of physicians is minimal [24]. This indicates that hospitals and physicians should close the gap and contribute more by educating society about common neurological disorders including migraine.

Regarding the knowledge of the public about the clinical presentation of migraine, most of the participants believe that migraine affects all age groups with no specific gender predilection. Only 86 participants (22.3%) know that this disease affects young adults and 76 participants (19.7%) believe in the female predilection of the disease. Although most of the participants (81.3%) believe that headache is the major presentation of migraine, misconceptions of the clinical presentation include permanent visual loss (2.3%), permanent hemiplegia (2.3%), and inability to control urination (1.3%).

Regarding causes of migraine, a substantial number of the participants (31.9%) do not know the cause of migraine, while 185 participants (48.1%) believe that the cause is not organic or genetic (head trauma, psychiatric disorder, and charm). Most of the participants do not know the complications of migraine and misconceptions regarding this aspect include fever (4.7%), mental retardation (3.4%), permanent disability (3.1%), and cancer (2.3%). Only 78 participants believe that migraine is a relatively benign condition with no complications.

In our survey, most of the participants believe that migraine is a medical condition with several medications available. Misconceptions regarding the treatment of migraine include surgery (4.4%), ironing therapy (4.4%), and electric shock (0.3%). Other treatments include reading Quran (21.0%), and yoga and meditation (8.3%).

This study had several limitations such as selecting a sample from only one city in Saudi Arabia, the small sample size, and the recall bias. Conducting this study in multiple cities in Saudi Arabia would be of extreme importance to identify knowledge gaps and allow for the development of nationwide targeted educational endeavors. Furthermore, a larger sample size would be

much more representative of the population's knowledge and attitude as well as provide a more accurate understanding. Finally, recall bias, which is common in studies using self-reporting, is an inevitable limitation of cross-sectional studies.

## Conclusions

The present study demonstrated a lack of knowledge in certain aspects of migraine in Jeddah, Saudi Arabia. This study will serve as a basis for developing a health educational program aiming to increase public awareness about migraine. It will also improve the understanding of society regarding migraine, which will subsequently improve the way they interact with migraineurs and understand their difficulties. In addition, finding a trusted source for information about different kinds of medical conditions including migraine is crucial in educating the community and providing them with the most recent and correct information.

## Abbreviations

IBM: International Business Machines; SPSS: Statistical Package for the Social Sciences; IRB: Institutional Review Board; KAIMRC: King Abdullah International Medical Research Center; SR: Saudi Riyal.

## Acknowledgements

None.

## Author contributions

All authors have contributed substantially to the paper. HA and BHS analyzed the data and wrote and edited the manuscript. MB, KN, HA, and MA participated in conducting the study and data collection. All authors read and approved the final manuscript.

## Funding

This study did not receive any funding.

## Availability of data and materials

Data are available upon request.

## Declarations

### Ethics approval and consent to participate

This study was approved by the institutional review board (IRB) of King Abdulah International Medical Research Center (KAIMRC) on 30/6/2019 with an IRB number IRBC/1034/19. Informed written consent to participate in the study was obtained from participants prior to filling the questionnaire.

### Consent for publication

Not applicable.

### Competing interests

The authors declare that they have no competing interest.

### Author details

<sup>1</sup>King Abdulaziz Medical City, P.O. Box 12723, Jeddah 21483, Saudi Arabia.

<sup>2</sup>King Saud Bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia.

<sup>3</sup>King Abdullah International Medical Research Center, Jeddah, Saudi Arabia.

<sup>4</sup>Department of Neuroscience, King Faisal Specialist Hospital and Research Centre, Jeddah, Saudi Arabia.

Received: 13 August 2021 Accepted: 27 May 2022  
Published online: 08 June 2022

## Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## References

1. Ashina M. Migraine. *N Engl J Med*. 2020;383(19):1866–76.
2. Dodick DW. Migraine. *Lancet*. 2018;391(10127):1315–30.
3. Stovner L, Hagen K, Jensen R, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia*. 2007;27(3):193–210.
4. Goadsby PJ, Holland PR, Martins-Oliveira M, Hoffmann J, Schankin C, Akerman S. Pathophysiology of migraine: a disorder of sensory processing. *Physiol Rev*. 2017;97(2):553–622.
5. Al Jumah M, Al Khathaami AM, Kojan S, Hussain M, Thomas H, Steiner TJ. The prevalence of primary headache disorders in Saudi Arabia: a cross-sectional population-based study. *J Headache Pain*. 2020;21(1):11.
6. Al-Hashel JY, Ahmed SF, Alroughani R. Burden of migraine in a Kuwaiti population: a door-to-door survey. *J Headache Pain*. 2017;18(1):105.
7. El-Sherbiny NA, Masoud M, Shalaby NM, Shehata HS. Prevalence of primary headache disorders in Fayoum Governorate, Egypt. *J Headache Pain*. 2015;16(1):85.
8. Algahtani H, Shirah B, Alzahrani A, Shaheen M. Perception and attitude of the general population towards epilepsy in Jeddah, Saudi Arabia. *J Epilepsy Res*. 2019;9(1):42–50.
9. Algahtani H, Shirah B, Alhazmi A, Alshareef A, Bajunaid M, Samman A. Perception and attitude of the general population towards Alzheimer's disease in Jeddah, Saudi Arabia. *Acta Neurol Belg*. 2020;120(2):313–20.
10. May A, Schulte LH. Chronic migraine: risk factors, mechanisms and treatment. *Nat Rev Neurol*. 2016;12(8):455–64.
11. AlHarbi FG, AlAtteeq MA. Quality of life of migraine patients followed in neurology clinics in Riyadh, Saudi Arabia. *J Family Community Med*. 2020;27(1):37–45.
12. Kelman L. The triggers or precipitants of the acute migraine attack. *Cephalalgia*. 2007;27(5):394–402.
13. Leena K, Tomi L, Arja R. Intensity of mobile phone use and health compromising behaviors-how is information and communication technology connected to health-related lifestyle in adolescence? *J Adolesc*. 2005;28:35–47.
14. Demir YP, Sumer MM. Effects of smartphone overuse on headache, sleep and quality of life in migraine patients. *Neurosciences (Riyadh)*. 2019;24(2):115–21.
15. Mayda Domaç F, Boylu E, Adigüzel T, Özden T. Evaluation of disability in migraine cases with MIDAS. *Duzce Med J*. 2012;14:1.
16. Leonardi M, Raggi A. A narrative review on the burden of migraine: when the burden is the impact on people's life. *J Headache Pain*. 2019;20(1):41.
17. Steiner TJ, Rao GN, Kulkarni GB, Gururaj G, Stovner LJ. Headache yesterday in Karnataka state, India: prevalence, impact and cost. *J Headache Pain*. 2016;17(1):74.
18. Buse D, Manack A, Serrano D, et al. Headache impact of chronic and episodic migraine: results from the American Migraine Prevalence and Prevention study. *Headache*. 2012;52(1):3–17.
19. Messali A, Sanderson JC, Blumenfeld AM, et al. Direct and indirect costs of chronic and episodic migraine in the United States: a web-based survey. *Headache*. 2016;56(2):306–22.
20. Eraslan D, Yalınay Dikmen P, Ilgaz Aydınlar E, Incesu C. The relation of sexual function to migraine-related disability, depression and anxiety in patients with migraine. *J Headache Pain*. 2014;15:32.
21. Buse DC, Manack AN, Fanning KM, et al. Chronic migraine prevalence, disability, and sociodemographic factors: results from the American Migraine Prevalence and Prevention Study. *Headache*. 2012;52(10):1456–70.
22. Vilanilam GK, Badi MK, Meschia JF. Destigmatizing migraine. *Cureus*. 2018;10(5):e2711.
23. Meo SA, Hassan A, Usmani AM. Research progress and prospects of Saudi Arabia in global medical sciences. *Eur Rev Med Pharmacol Sci*. 2013;17:3265–71.
24. Ministry of Health. Statistical Yearbook [Internet]. Riyadh: Ministry of Health, [cited 2021 Jan 29]. Available at: <https://moh.gov.sa/en/Ministry/Statistics/Book/Pages/default.aspx>.

Submit your manuscript to a SpringerOpen® journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► [springeropen.com](https://www.springeropen.com)