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# Dilemma of migraine diagnosis and management among non-neurologists

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## Abstract

**Background:** Migraine is a common and debilitating disorder however there is a wide gap in its diagnosis and management. Many migraine patients present to non-neurologists, so it is of utmost importance that non neurologists become well oriented with the diagnostic criteria and different lines of management. The aim of the study was to assess the knowledge and attitude of non-neurologists towards migraine.

**Results:** About 45% of physicians in our study refer migraine patients to non-neurologists, only 20.96% are aware of both classic and novel treatments, 43% had poor knowledge of migraine symptoms and management, 32.34% recommended using medical tailored programs to increase the awareness of non-neurologists regarding migraine.

**Conclusions:** There is a wide gap of knowledge concerning migraine among non-neurologists.

**Keywords:** Headache, Migraine, Diagnosis, Education

## Background

Migraine affects more than 10% of the population worldwide. It is considered the second leading cause of years lived with disability [1]. Despite the availability of international guidelines for migraine diagnosis and treatment [2, 3], the management of migraine is still far from ideal as many of the patients did not reach a medical diagnosis and did not receive proper acute and preventive treatment [4]. This could be due to many reasons; including lack of public awareness, physician knowledge and that the management of headache patients could be by a primary physician or other specialties that are not aware of the proper diagnosis and management of migraine [5]. It was estimated that 80% of patients seen by primary care physicians are migraineurs and that less than 20% are correctly diagnosed and treated [6, 7]. And according to the WHO, 50% of headache patients are self-treated and only 10% are seen by a neurologist [8]. Since most patients with migraine did not receive a correct diagnosis, they mostly depend on over the counter analgesics which if

used too frequently can lead to medication overuse headache leading to more disability [1]. And this is more evident in the developing countries [8]. In Egypt, the studies for migraine prevalence and management are scarce, the prevalence of migraine was found to be 10.5% in a study done in Assiut government [9], another recent study was done in Upper Egypt showed that the life time prevalence of migraine was 3.38%. The prevalence of migraine was found to be 17% in another study [10], and despite its effect on quality of life, only 8.5% of the patients received preventive treatment [11]. At our country many of the headache patients are seen by physicians other than neurologists, who could be a family doctor, ophthalmologist, otolaryngologist, cardiologist, internal medicine physician or others, this could lead to a proper treatment gap, so our study aimed to evaluate the knowledge and awareness of the non-neurologist doctors about migraine diagnosis and management.

## Methods

This study was a cross-sectional study. A self-developed questionnaire was used. One hundred sixty seven physicians from different specialties were included in this study and completed a self-administered questionnaire

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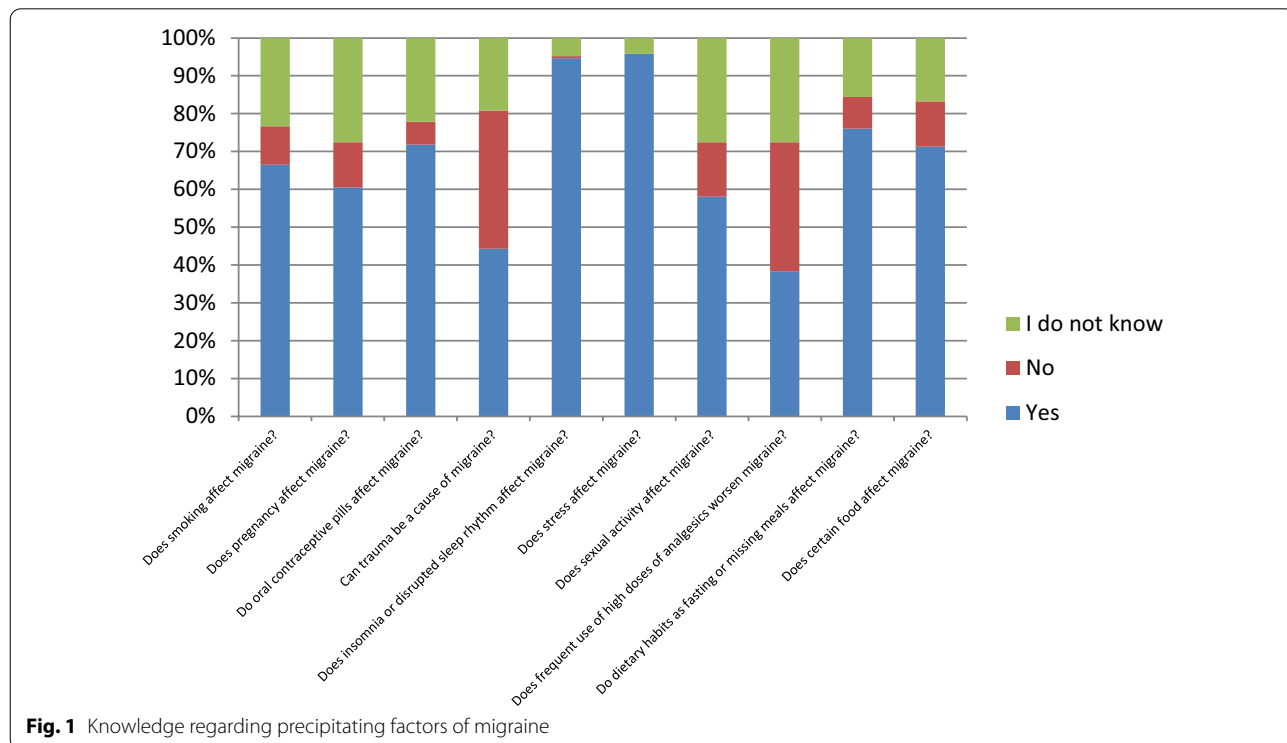
that was sent online including the informed consent (Additional file 1). The questionnaire included 36 questions regarding; age, years of experience and specialty, questions regarding referral, causes of migraine, precipitating factors, associated symptoms, clinical characteristics, management, how they obtained their knowledge and how do they prefer to obtain further knowledge. Questions assessing knowledge were structured as direct questions with three answering options (yes, no, or I do not know), regarding questions with one correct answer a point was scored for the correct answer, regarding questions with more than one correct answer a point was scored for participants who chose  $\geq 50\%$  correctly. Participants who scored  $< 50\%$  correct answers were considered to have poor knowledge, participants who scored 50–70% correct answers were considered to have average knowledge, participants who scored  $> 70\%$  correct answers were considered to have good knowledge.

**Statistical analysis**

Descriptive data were represented as mean and standard deviation for continuous variables and as number and percentage for categorical ones. The chi-square test was used to compare categorical variables, with statistical significance set at  $p < 0.05$ . The analysis was done on SPSS ver. 25 (IBM SPSS, NY, USA, 2017).

**Results**

The study included 167 participants. The mean age of the participants was  $37.311 \pm 6.846$  with mean years of experience of  $12.826 \pm 6.720$ . The study included 58 (34.73%) internal medicine physicians, 31 (18.56%) ophthalmologists, 26 (15.57%) otolaryngologists, 24 (14.37%) cardiologists, 17 (10.18%) neurosurgeons and 11 (6.59%) emergency medicine physicians. Most of the participants 91 (54.49%) accounted that they refer their patients to neurologists, however 76 (45.51%) accounted that they refer their patients to non-neurologists; 30 (17.96%) to internal medicine, 25 (14.97%) to otolaryngologists, 19 (10.78%) to ophthalmology and 3 (1.8%) to others. Most of the participants 128 (76.65%) accounted that mild (140 to 159/90 to 99 mmHg) or moderate (160 to 179/100 to 109 mmHg) chronic arterial hypertension can cause headache. Among the participants, 145 (86.83%) had the knowledge that headache can be a primary disorder, 132 (79.04%) had the knowledge that it can be a treatable disorder. Knowledge regarding precipitating factors of migraine is demonstrated in Fig. 1. Knowledge regarding clinical characteristics of migraine is demonstrated in Table 1. Knowledge regarding effect of migraine on fertility and daily functions is demonstrated in Fig. 2. Regarding the associated symptoms of migraine, the most known symptoms were vomiting 130 (77.84%), photophobia 128 (76.65%), phonophobia 127 (76.05%) and mood changes 107 (64.07%) (Fig. 3), 31 (19.57%) participants



**Table 1** Knowledge regarding clinical characteristics of migraine

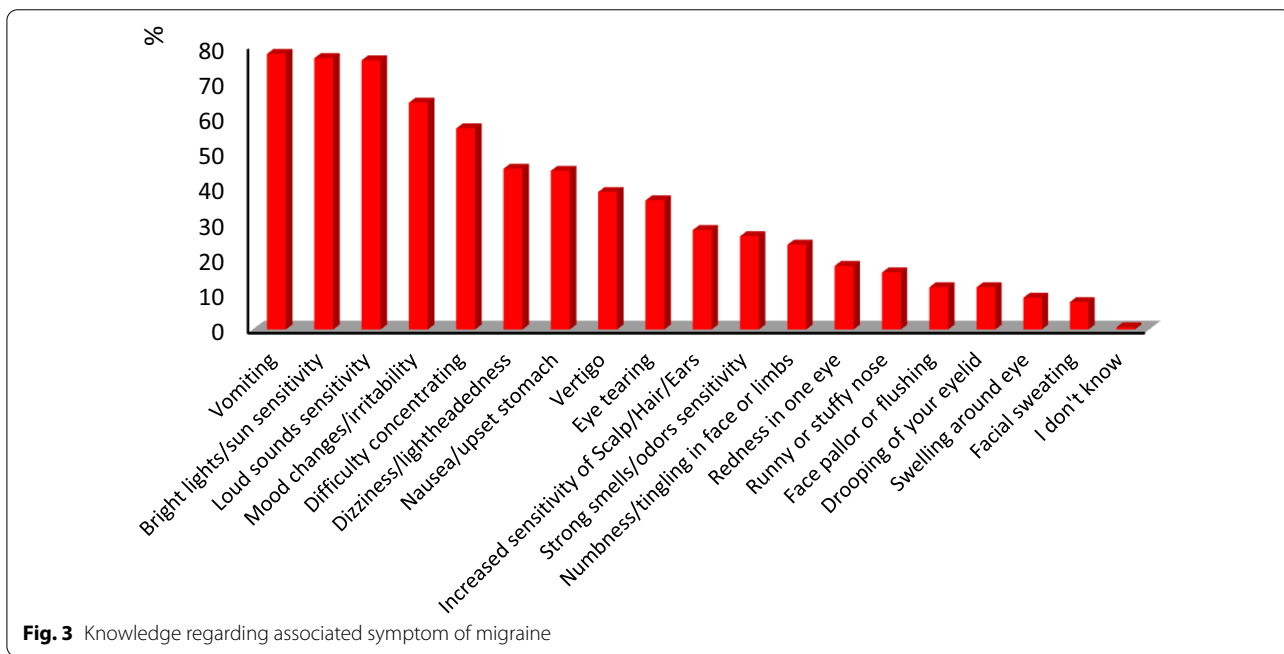
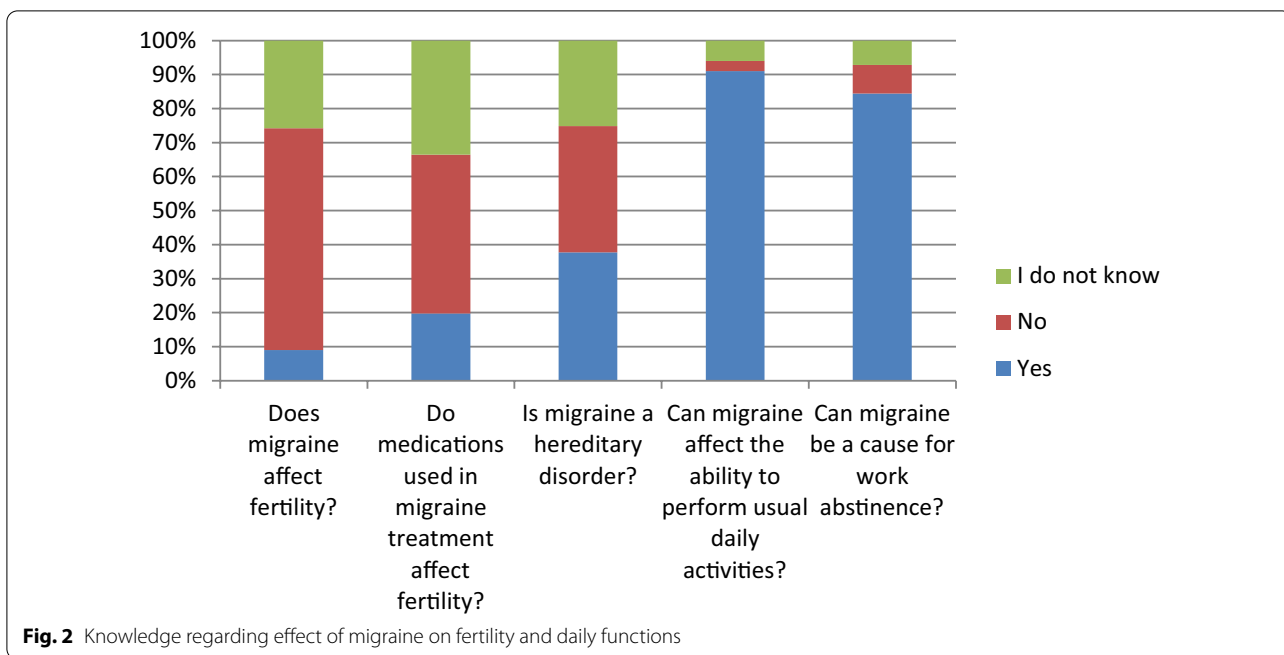
		n (%)
What is the common age of migraine onset?	Less than 20 years	23 (13.77)
	20–40 years	127 (76.05)
	More than 40 years	5 (2.99)
	I do not know	12 (7.19)
How long does the migraine attack last?	Less than 4 h	24 (14.37)
	4–72 h	122 (73.05)
	More than 72 h	7 (4.19)
	I do not know	14 (8.38)
Is migraine commonly	Unilateral	120 (71.86)
	Bilateral	9 (5.39)
	Both	35 (20.96)
	I do not know	3 (1.80)
What is the most common character for migraine?	Dull aching	26 (15.57)
	Numbness	2 (1.20)
	Pressure tight band	24 (14.37)
	Throbbing	82 (49.10)
	Burning	3 (1.80)
	Stabbing	23 (13.77)
	I do not know	7 (4.19)
What is the most common site for migraine?	Forehead	27 (16.17)
	Vertex	14 (8.38)
	Temple	84 (50.30)
	Behind eyes	29 (17.37)
	Back of head	5 (2.99)
	I do not know	8 (4.79)
What is the usual onset for migraine?	Sudden/abrupt	59 (35.33)
	Gradual	100 (59.88)
	I do not know	8 (4.79)

were aware of  $\geq 10$  of associated symptoms of migraine. Regarding the knowledge concerning management of migraine, 9(5.39%) reported that migraine patients require preventive treatment, 13(7.78%) reported that they require acute treatment and 145(86.83%) reported that they require both, 98(58.68%) accounted that they are well aware of classic treatments (antiepileptic drugs, antidepressants,  $\beta$  blockers and calcium channel blockers), 5(2.99%) are well aware of novel treatments (Botulinum toxin injection, monoclonal antibodies and nerve block) and 35(20.96%) are well aware of both (Figs. 4,5). When asked about how did the participants mainly learned about migraine and its management 106(63.47%) accounted that they received most of their knowledge from undergraduate lectures, 32(19.16%) from medical conferences, 16(9.58%) from medical tailored programs and 13(7.78%) from social media, and when asked about what do they think is the best way to increase physician's awareness about migraine, 54(32.34%) recommended using medical tailored programs, 48(28.74%)

recommended medical conferences, 43(25.75%) recommended social media and 22(13.17%) recommended undergraduate lectures (Table 2). Only 7(4.19%) had good knowledge of migraine, 88(52.69%) had average knowledge and 72(43.11%) had poor knowledge. There was significant difference in knowledge regarding years of experience being higher in participants with more years of experience ( $p=0.022$ ), there was significant difference showing poor knowledge among participants who gained their knowledge mainly through undergraduate lectures ( $p=0.001$ ), and significantly better knowledge among participants who prefer medical tailored programs ( $p=0.010$ ). However there was no significant difference in knowledge between participants with different specialties (Table 3).

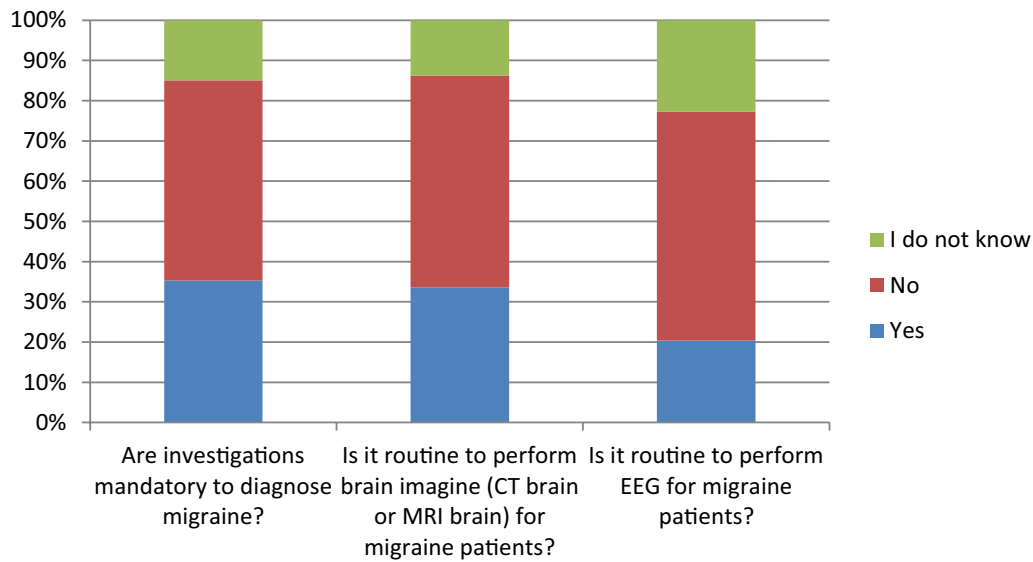
## Discussion

There is a knowledge gap regarding migraine among non-neurologists and more over there is paucity of research from low and middle income countries. Increasing the

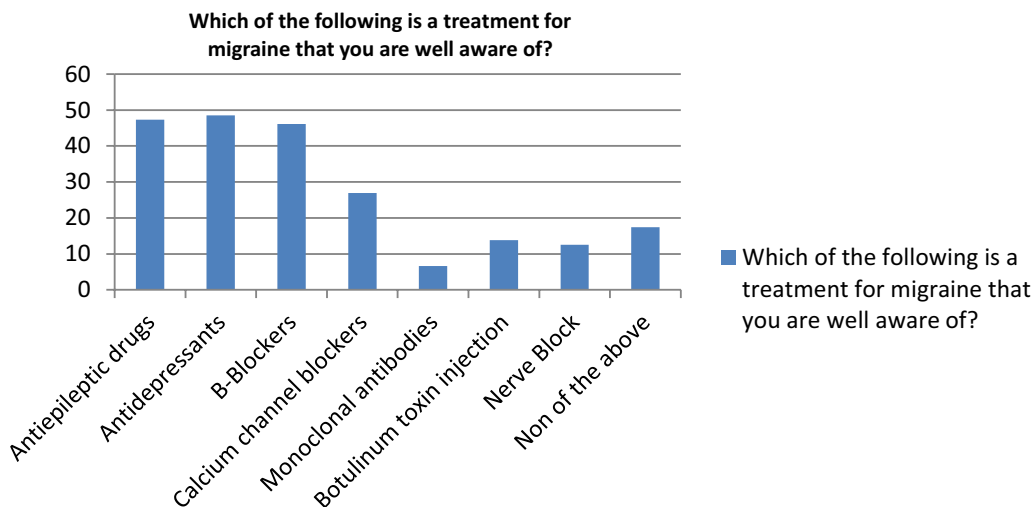


awareness of primary care physicians and other medical specialties is mandatory to improve the attitude towards referral and treatment [12, 13]. This knowledge gap impacts the management of migraine patients and interferes with reaching a proper diagnosis. In a study conducted in England, it was found that two-thirds of patients did not receive proper diagnosis for their

headache from primary care physicians [14]. In this study only 4.19% of participants were able to achieve good knowledge of clinical characteristics and management tools of migraine. Gültekin and colleagues showed that only 10.5% of their participants were able to complete the diagnostic criteria of migraine [15]. Also a study done in Jeddah showed that primary care physicians had



**Fig. 4** Knowledge regarding investigations for migraine. *CT* computed tomography, *MRI* magnetic resonance imaging, *EEG* electroencephalogram



**Fig. 5** Knowledge regarding treatment of migraine

low knowledge levels and inappropriate attitudes toward chronic migraine [16]. This study showed that 54.49% will refer headache patients to a neurologist, indicating poor referral. Mehrotra mentioned that only 5% of general physicians refer headache patients to neurologists [17]. Electroencephalogram (EEG) is not an essential tool to diagnose or follow up migraine patients [18], however 20.36% of the participants said that they consider it a routine to order EEG for migraine patients. Verhaak and colleagues mentioned that 35% of medical practitioners will order brain imaging for new onset headache [19]. Patients

with normal examination and typical clinical presentation will only have 0.18% significant brain pathology [20] hence, it is unnecessary to perform brain imaging for the vast majority of migraine patients, however 33.53% of the participants consider it a routine to perform brain imaging for migraine patients. The study showed that 86.83% will use both preventive and abortive therapy in the management of migraine. Takaki and colleagues stated that physicians are reluctant in prescribing preventive therapy and more over the patients are hesitant to use those drugs [21], 58% said they will use the classic treatments. Takaki

**Table 2** Physician's preference regarding increasing awareness:

Specialty	What do you think is the best way to increase physician's awareness about migraine?			
	Undergraduate lectures	Medical conferences	Social media	Medical tailored program
	n (%)	n (%)	n (%)	n (%)
Neurosurgery	2 (9.09)	5 (10.42)	1 (2.33)	9 (16.67)
Ophthalmology	1 (4.55)	9 (18.75)	9 (20.93)	12 (22.22)
Otolaryngologists	7 (31.82)	6 (12.50)	8 (18.60)	5 (9.26)
Internal medicine	8 (36.36)	17 (35.42)	13 (30.23)	20 (37.04)
Cardiology	1 (4.55)	7 (14.58)	8 (18.60)	8 (14.81)
Emergency medicine	3 (13.64)	4 (8.33)	4 (9.30)	0 (0.00)

**Table 3** Comparing knowledge among non-neurologists with methods of education

		Headache knowledge		ANOVA	
		N	Mean $\pm$ SD	F	P-value
How did you learn about migraine and its management?	Undergraduate lectures	106	28.198 $\pm$ 7.045	11.158	< 0.001*
	Medical conferences	32	25.031 $\pm$ 7.329		
	Social media	13	19.308 $\pm$ 5.513		
	Medical tailored program	16	33.063 $\pm$ 6.351		
What do you think is the best way to increase physician's awareness about migraine?	Undergraduate lectures	22	24.273 $\pm$ 7.192	3.901	0.010*
	Medical conferences	48	26.688 $\pm$ 7.452		
	Social media	43	26.442 $\pm$ 8.172		
	Medical tailored program	54	29.963 $\pm$ 6.619		

and colleagues also stated that anticonvulsants are less prescribed by primary care physician, while  $\beta$ -blockers and anti-depressants are prescribed almost equally by primary care physicians and specialized care physicians [21]. Higher years of experience were significantly correlated to better knowledge, indicating the important role of clinical experience in enhancing knowledge. The majority of participants pointed out under graduate lectures as the major source of knowledge about migraine headache. Patwardhan and colleagues mentioned that continued medical education programs poses significant impact on knowledge and attitude of physicians [22]. Migraine is one of the most common disabling diseases yet it is still under diagnosed, under estimated and under treated [23]. It is very important to provide medical tailored programs for non-neurologists to provide better care for such patients. The study had some limitations, as it mainly shed light on migraine rather than all types of primary headache as it was difficult to structure a longer questionnaire. Also the sample size limits the generalization of the findings without further larger scale studies. The strengths of this study are that it is one of the few studies done across different specialties, most studies

address primary care physicians which is different from the health care system in Egypt. It is also the first study to shed light on the knowledge gap among non-neurologists aiming to improve patients' outcome.

### Conclusions

Knowledge regarding migraine diagnosis and treatment was unsatisfactory among non-neurologists. This has a major effect on the level of patients care and detrimentally affects the referral to neurologists consequently affecting the patient's diagnosis and management, so it is of utmost importance to address non-neurologists about different types of headache, how to diagnose and how to manage. Most of the participants preferred medical tailored program and social media. Undergraduate lectures proved to be the least effective method of education while medical tailored programs proved to be more effective, so it is important to address members of different specialties according to their preferred method and it is important to enhance the undergraduate programs with updated knowledge and shed light on the importance of such prevalent disorder to provide better management and lessen its burden.

**Abbreviation**

EEG: Electroencephalogram.

**Supplementary Information**

The online version contains supplementary material available at <https://doi.org/10.1186/s41983-021-00371-8>.

**Additional file 1.** Questionnaire.

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**Authors' contributions**

MF: Designed and conceptualized the study, drafting the manuscript. AS: Conception of the work, manuscript revision. SF: data collection and research project execution. SH: data collection and research project execution. AA: Conception of the work, data collection, drafting the manuscript. The content of the manuscript has not been published, or submitted for publication elsewhere. All authors have agreed to conditions noted on the Authorship Agreement Form and have read and approved the final manuscript.

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**Availability of data and materials**

The corresponding author takes full responsibility for the data, has full access to all of the data; and has the right to publish any and all data separate and apart from any sponsor.

**Declarations****Ethics approval and consent to participate**

All procedures performed in the study were in accordance with the ethical standards of the faculty of medicine, Ain Shams university research and ethical committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. We obtained approval from research ethics committee no. FWA 000017585. On 19/1/2021. Written informed consent was obtained from participants for participation. We obtained approval from research ethics committee no. FWA 000017585. On 19/1/2021.

**Consent for publication**

Not applicable.

**Competing interests**

None of the authors has any conflict of interest.

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