

# Prevalence of migraine headache and its associated factors among male secondary school teachers

Al-Moatasem A. Al-Hazmi (1)  
Safar A. Al-Saleem (2)  
Nabil Joseph Awadallah (2)

(1) Resident, Joint Program of Family Medicine, Abha, Ministry of Health, Saudi Arabia  
(2) Family & Community Medicine Department, King Khalid University, Abha, Saudi Arabia

## Corresponding author:

Dr. Al-Moatasem A. Al-Hazmi  
Email: Dr.moatasem@outlook.sa

Received: December 2019; Accepted: January 2020; Published: February 1, 2020.

Citation: Al-Moatasem A. Al-Hazmi, Safar A. Al-Saleem, Nabil Joseph Awadallah. Prevalence of migraine headache and its associated factors among male secondary school teachers. *World Family Medicine*. 2020; 18(2): 67-76.

DOI: 10.5742/MEWFM.2020.93751

## Abstract

**Background:** Migraine constitutes a public health problem. It is more common among the productive workforce segment of the population.

**Objective:** To assess prevalence of migraine, its patterns and associated factors among male secondary school teachers.

**Methods:** This study was conducted in Abha City, Saudi Arabia, following a cross-sectional descriptive design. A total of 200 male secondary school teachers were included. A self-administered questionnaire was adopted and modified from a previous study and was used for data collection.

**Results:** The prevalence of migraine among male secondary school teachers was 42.5%. The main site for migraine was the occipital region (55.3%). Migraine was mainly pulsating/throbbing among 49.4% of participants. The main medication taken to relieve migraine was paracetamol (52.9%). About half of participants (54.1%) had moderately severe migraine. The main premonitory symptoms were aura (37.6%) and photophobia (34.1%). The main triggers for migraine were exhaustion (55.3%), strong perfumes (34.1%), and weight lifting. Prevalence of migraine was significantly associated with having children ( $p=0.024$ ), smoking ( $p=0.018$ ), having a teaching workload >20 hours/week ( $p=0.013$ ) and sleeping <8 hours/day ( $p=0.017$ ).

**Conclusions:** Prevalence of migraine headache among male secondary school teachers in Abha City is high, mainly felt as throbbing, at the occipital region. The main premonitory symptoms are aura and photophobia, while the main migraine triggers are exhaustion, exposure to strong perfumes, and weight lifting. Risk factors for migraine include smoking, having children, high teaching workload and inadequate sleep.

**Key words:** Migraine, Headache disorders, school teachers, Prevalence, Risk factors.

## Introduction

Globally, migraine constitutes a common source of burden for public health and primary care (1). It was ranked as the third most prevalent disorder and seventh-highest specific cause of disability worldwide (2). It negatively affects both quality of life and productivity whether at work or at home. It is more common among the productive workforce segment of the population. If migraine is not appropriately managed, it becomes a progressive and chronic disorder (3).

During the last decades, death toll from infectious diseases has been either declining or stabilizing and there are greater numbers of people who live longer. Therefore, disorders that cause morbidity and disability have become important causes of global health burden (4). The global years lived with disability for headache disorders have been steadily increasing since 1990. Therefore, primary headache disorders are now the leading causes of sequelae of about one third of the population (5).

The World Health Organization has recognized migraine as an important public health concern and listed it as one of the leading causes of disability worldwide (6). It is described as "a common, chronic neurovascular brain disorder that has cranial autonomic findings, characterized by recurrent, severe attacks of headaches often associated with other symptoms and much disability, as well as personal, familial and societal impact" (7).

According to the Third International Classification of Headache Disorders (ICHD-3 Beta), migraine has been classified into two major subtypes, i.e., migraine without aura (characterized by headache with specific features and associated symptoms) and migraine with aura, which is primarily characterized by the transient focal neurological symptoms that usually precede or sometimes accompany the headache. Episodic migraine is characterized by those with migraine who have 0 to 14 headache days per month, while chronic migraine is characterized by 15 or more headache days per month for 3 or more months (8).

In literature, limited evidence exists about epidemiology and risk factors for migraine (9). The prevalence slightly decreases with age. Moreover, subjects with less than a high-school education had a 3-fold greater risk compared with persons who attained a university-level education (10). Katsarava et al. (11) noted that, since there are no biological markers for migraine, its diagnosis is mainly based on clinical history and the exclusion of other headache disorders.

This study aimed to assess prevalence of migraine, its patterns and associated factors among male secondary school teachers in Abha City, Saudi Arabia, 2018.

## Methods

Following a cross-sectional descriptive design, this study was conducted in Abha City, in the southwestern part of Saudi Arabia. The minimum sample size was calculated, using Raosoft Online program for sample size calculation (12) to be 159 teachers, based on 32% prevalence, (13) 95% confidence level, 5% error and 10% for non-respondents. A total of 200 male secondary school teachers were included in the present study.

Inclusion criteria were being a male school teacher who is appointed at a governmental secondary school in Abha City, Saudi Arabia for at least one year, while the exclusion criteria were being a female or a newly appointed teacher.

The field work for this study was conducted during the period from 15 December 2018 till 15 January 2019. The official list of schools was obtained from Aseer Directorate of Education. Following a simple random sample, the researcher selected 10 governmental secondary schools that fulfilled the required study sample size. All teachers within a selected school were invited to participate in the study.

A self-administered questionnaire was adopted and modified from a previous study (13). It was validated by three family medicine consultants. The study questionnaire consists of two main parts:

- First part: socio-demographic and personal characteristics of participant teachers.
- Second part: consists of two domains:

**Domain 1:** Diagnostic criteria of episodic migraine headache: Unilateral, pulsating quality and moderate or severe intensity; aggravated by physical activity and associated with nausea and/or vomiting, photophobia and phonophobia (14).

**Domain 2:** factors associated with migraine headache: Migraine is preceded by aura, a mostly visual reversible focal neurological symptom that has duration of no longer than one hour (14).

A pilot study was conducted on 20 teachers to test the study tool and to assess the time needed to fill out the questionnaire. Modifications were made according to results of the pilot study. However, the data collected within the pilot study were not included in the main study.

All necessary official permissions were fulfilled before start of data collection. The Institutional Research Board approval was obtained from the Research Ethical Committee at King Khalid College of Medicine (REC # 2018-06-30). A written informed consent was obtained from each participant. All collected data were kept confidential and were not used except for research purposes.

Collected data were entered into a computer using the Statistical Package for Social Sciences (IBM SPSS, version 23). Descriptive statistics (i.e., frequency, percentage,

mean and standard deviation) were calculated. Chi-square test of significance was applied to compare migraineur with non-migraineur teachers. P-values less than 0.05 were considered as statistically significant.

## Results

Personal characteristics of participant teachers are described in Table 1. Age of almost half of participants (49.5%) was 40-50 years. The majority were married (94.5%), while 4% were single and 1.5% were divorced. About two-thirds of participants (61.5%) had 1-4 children, while 12 had no children and 26.5% had 5 children or more. About one quarter of participants (23.5%) were smokers. Most participants (88.5%) had a Bachelor Degree, while 11.5% had postgraduate degrees. About one quarter of participants (25.5%) were obese, 41.5% were overweight and 33% had normal body mass index. Most participants (87%) earned >10000 SR monthly income, while 13% had less than 10000 SR income per month. More than half of participants (57%) had 10-20 years' experience in teaching, 11% had less than 10 years' experience, and 32% had more than 20 years' experience. Regarding the teachers' weekly workload, 84% had 10-20 hours, 10.5% had less than 10 hours and 5.5% had more than 20 hours. The average duration of sleep among 32% of participants was less than 8 hours/day.

Figure 1 shows that 82 participant male secondary school teachers (42.5%) had migraine.

Table 2 shows that the main site for migraine was the occipital region (55.3%) followed by the eyes (25.9%) and the temporal region (18.8%). Migraine pain was mainly pulsating/throbbing among 49.4% of participants, pressure pain among 22.4%, heavy pain among 10.6% or constriction pain among 8.2%, while other types were present among 9.4%. The main medications taken by participants to relieve their migraine were paracetamol (52.9%), anti-inflammatory drugs (29.4%) and triptans (3.5%). Without receiving medication, the duration of migraine was mainly more than 4 hours among 52.9% of participants, while it was mainly less than 2 hours among 62.4% of participants, when receiving medication. During their last month, 64.7% had 1-5 migraine attacks, while 21.2% had more than 5 attacks. About half of participants (54.1%) had moderately severe migraine, while 30.6% had mild migraine and 15.3% had severe migraine.

Table 3 shows that the main premonitory symptoms for migraine were aura (37.6%), photophobia (34.1%), nausea (28.2%), sonophobia (16.5%) and vomiting (9.4%). The main triggers for migraine were exhaustion (55.3%), strong perfumes (34.1%), and weight lifting.

Table 4 shows that prevalence of migraine among male secondary school teachers was significantly associated with number of their children, with the least prevalence among those having no children ( $p=0.024$ ). Smokers had significantly higher prevalence of migraine than nonsmokers (57.4% and 37.9%, respectively,  $p=0.018$ ).

Teachers who had <10 hours/week teaching workload had the lowest prevalence of migraine (28.6%), while those who had >20 hours/week had the highest prevalence (81.8%). Difference in migraine prevalence among teachers differed significantly according to their teaching workload ( $p=0.013$ ). Teachers with less than 8 hours' average duration of daily sleep had significantly higher prevalence of migraine than those whose average duration of daily sleep was 8 hours or more (54.7% and 36.8%, respectively,  $p=0.017$ ). Teachers aged <40 years had the highest prevalence of migraine. However, difference in migraine prevalence among teachers did not differ significantly according to their age groups. Single teachers had the lowest prevalence of migraine, while divorced teachers had the highest prevalence. However, difference in migraine prevalence among teachers did not differ significantly according to their marital status. Teachers who had a postgraduate degree had higher prevalence of migraine than those who had a Bachelor Degree. However, difference in migraine prevalence among teachers did not differ significantly according to their qualification. Teachers with body mass index <25 kg/m<sup>2</sup> had the lowest prevalence of migraine, while obese teachers had the highest prevalence. However, difference in migraine prevalence among teachers did not differ significantly according to their body mass index. Teachers who had <10000 SR monthly income had higher prevalence of migraine than those who had >10000 SR monthly income. However, difference in migraine prevalence among teachers did not differ significantly according to their monthly income. Teachers who had <10 years' experience in teaching had the highest prevalence of migraine. However, difference in migraine prevalence among teachers did not differ significantly according to their duration of experience in teaching.

Table 1: Personal characteristics of study sample

Personal characteristics	No.	%
Age groups		
• <40 years	84	42.0
• 40-50 years	99	49.5
• >50 years	17	8.5
Marital status		
• Single	8	4.0
• Married	189	94.5
• Divorced	3	1.5
No. of children		
• 0	24	12.0
• 1-4	123	61.5
• 5+	53	26.5
Smoking status		
• Smoker	47	23.5
• Non-smoker	153	76.5
Qualification		
• Bachelor Degree	177	88.5
• Postgraduate	23	11.5
Body mass index (BMI)		
• <25 kg/m <sup>2</sup>	66	33.0
• 25-29.9 kg/m <sup>2</sup>	83	41.5
• ≥30 kg/m <sup>2</sup>	51	25.5
Monthly income		
• <10000 SR	26	13.0
• ≥10000 SR	174	87.0
Years of experience in teaching		
• <10 years	22	11.0
• 10-20 years	114	57.0
• >20 years	64	32.0
Teaching workload		
• <10 hours/week	21	10.5
• 10-20 hours/week	168	84.0
• >20 hours/week	11	5.5
Average duration of daily sleep		
• < 8 hours	64	32.0
• ≥ 8 hours	136	68.0

Figure 1: Prevalence of migraine among male secondary school teachers

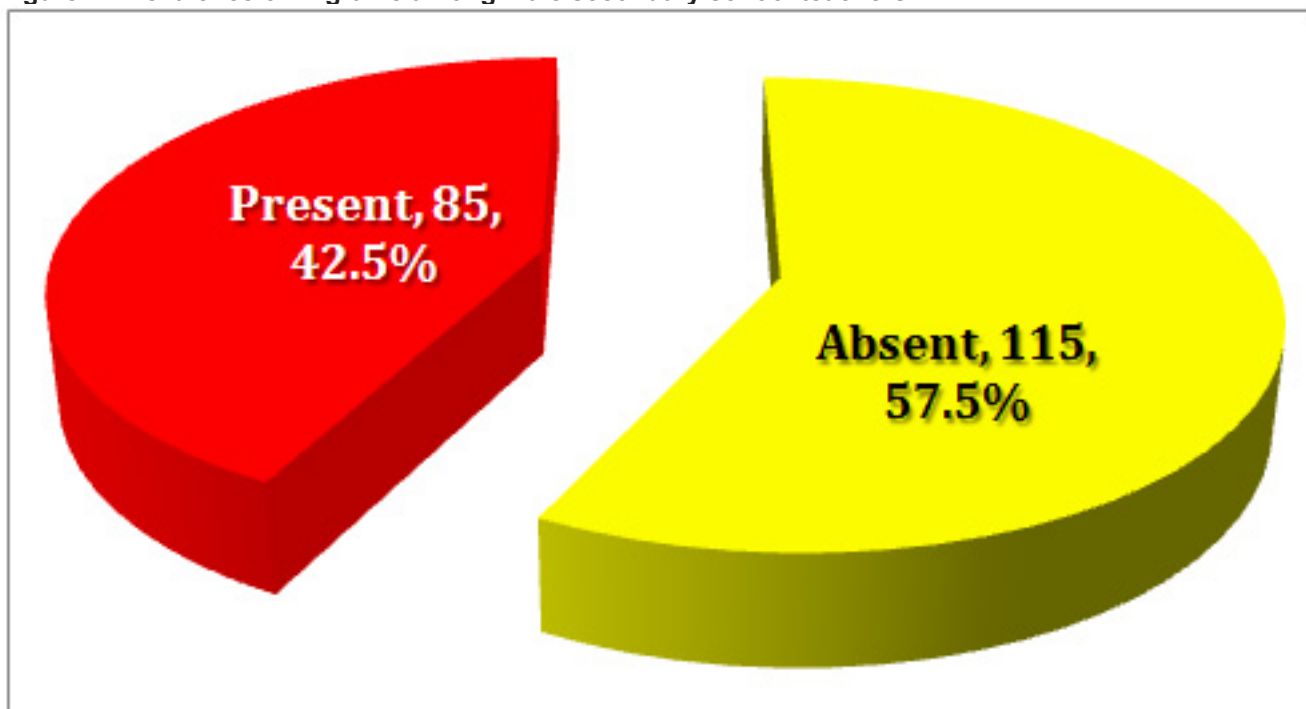


Table 2: Characteristics of participants' migraine headache (n=85)

Characteristics of migraine headache	No.	%
Site of migraine		
• Occipital region	47	55.3
• Eyes	22	25.9
• Temporal region	16	18.8
Type of migraine pain		
• Pulsating/throbbing	42	49.4
• Pressure pain	19	22.4
• Constriction pain	7	8.2
• Heavy	9	10.6
• Others	8	9.4
Medications taken to relieve migraine		
• Paracetamol	45	52.9
• Anti-inflammatory analgesics	25	29.4
• Triptans	3	3.5
• Others	12	14.1
Duration of migraine attacks without medication		
• <2 hours	17	20.0
• 2-4 hours	23	27.1
• >4 hours	45	52.9
Duration of migraine attacks after medication		
• <2 hours	53	62.4
• 2-4 hours	20	23.5
• >4 hours	12	14.1
No. of migraine attacks during last month		
• None	12	14.1
• 1-5	55	64.7
• >5	18	21.2
Severity of migraine		
• Mild	26	30.6
• Moderate	46	54.1
• Severe	13	15.3

Table 3: Main premonitory symptoms and triggers for migraine among male secondary school teachers (n=85)

Premonitory symptoms and triggers for migraine	No.	%
Premonitory symptoms		
• Aura	32	37.6
• Photophobia	29	34.1
• Nausea	24	28.2
• Sonophobia	14	16.5
• Vomiting	8	9.4
• Eyelid edema	7	8.2
• Ptosis	6	7.1
Triggers		
• Exhaustion	47	55.3
• Strong perfumes	29	34.1
• Weight lifting	18	21.2
• Others	11	12.9

Table 4: Prevalence of migraine among male secondary school teachers according to their personal characteristics

Personal characteristics	Present		Absent		P Value
	No.	%	No.	%	
Age groups					
• <40 years	37	44.0	47	56.0	0.801
• 40-50 years	42	42.4	57	57.6	
• >50 years	6	35.3	11	64.7	
Marital status					
• Single	2	25.0	6	75.0	0.421
• Married	81	42.9	108	57.1	
• Divorced	2	66.7	1	33.3	
No. of children					
• 0	4	16.7	20	83.3	0.024
• 1-4	57	46.3	66	53.7	
• 5+	24	45.3	29	54.7	
Smoking status					
• Smoker	27	57.4	20	42.6	0.018
• Non-smoker	58	37.9	95	62.1	
Qualification					
• Bachelor Degree	74	41.8	103	58.2	0.583
• Postgraduate	11	47.8	12	52.2	
Body mass index (BMI)					
• Normal (<25 kg/m <sup>2</sup> )	26	39.4	40	60.6	0.541
• Overweight (25-29.9 kg/m <sup>2</sup> )	34	41.0	49	59.0	
• Obese (≥30 kg/m <sup>2</sup> )	25	49.0	26	51.0	
Monthly income					
• <10000 SR	13	50.0	13	50.0	0.407
• ≥10000 SR	72	41.4	102	58.6	
Years of experience in teaching					
• <10 years	12	54.5	10	45.5	0.329
• 10-20 years	44	38.6	70	61.4	
• >20 years	29	45.3	35	54.7	
Teaching workload					
• <10 hours/week	6	28.6	15	71.4	0.013
• 10-20 hours/week	70	41.7	98	58.3	
• >20 hours/week	9	81.8	2	18.2	
Average duration of daily sleep					
• < 8 hours	35	54.7	29	45.3	0.017
• ≥ 8 hours	50	36.8	86	63.2	

## Discussion

Worldwide, headache disorders constitute the most common neurological disorders, (5) with a considerable debilitating effect on occupational, physical and social activities (15). They are ranked as the first cause of disability among those under the age of 50 years (16).

The present study revealed that prevalence of migraine among male secondary school teachers in Abha City was 42.5%. This finding reflects the high prevalence of migraine headache in Saudi Arabia in general, and possibly depicts its occupation-associated impact upon secondary school teachers.

Al-Jumah et al. (13) reported that prevalence of migraine among the population of Saudi Arabia was 32%. On the other hand, in USA, prevalence of migraine was reported to be about 12% (17).

Several studies documented the high prevalence rates for migraine among school teachers in some other countries. In Iran, Ayatollahi and Cheraghian (18) reported that its prevalence among teachers was 24%. Shahraki et al. (19) added that high school teachers were affected by migraine more than others. In France, Henry et al. (20) reported that teachers are most susceptible to migraine.

Farhadi et al. (21) mentioned several factors that may influence prevalence rates of migraine among different populations, including economic differences, climatic conditions, nutritional habits in addition to job conditions.

Regarding patterns of migraine among male secondary school teachers, our study showed that migraine headache was mainly throbbing in nature, and commonly felt in the occipital region. The main premonitory symptoms were aura, and photophobia, while the main triggers were exhaustion, exposure to strong perfumes, and weight lifting. Most migraine attacks were moderately severe. During their last month, the frequency of migraine attacks of the studied teachers was mostly 1-5. Paracetamol, anti-inflammatory drugs, and triptans were the main medications used to alleviate their migraine headache. Medications seemed to successfully manage migraine, since without treatment, the duration of migraine was usually more than 4 hours, while when with treatment it was less than two hours.

Our findings are in accordance with those reported by several studies. Etminan et al. (22) stated that about one quarter of migraine attacks occurs with aura. Migraine is usually unilateral, throbbing, accompanied by nausea, vomiting, photophobia, phonophobia, and is aggravated by movement and sensitivity toward strong scents (23).

Antonaci et al. (24) stated that, nowadays the choice for treatment of acute migraine attacks has increased. Effective medications for management of migraine attacks are either non-specific drugs (e.g., analgesics and non-steroidal anti-inflammatory drugs) or specific drugs (e.g., ergot derivatives and triptans).

It has been shown that paracetamol alone is effective in the treatment of acute migraine attacks. Moreover, its low cost and wide availability makes it the first-choice drug for management of acute migraine, especially among those who cannot tolerate aspirin or non-steroidal anti-inflammatory drugs (25).

The present study identified that some risk factors are significantly associated with higher prevalence of migraine among male secondary school teachers. These included having children, being a smoker, having high teaching workload (>20 hours/week) and sleeping for <8 hours/day. However, prevalence of migraine among male secondary school teachers did not differ significantly according to their age groups (higher among younger than older teachers), marital status (higher among married and divorced than single teachers), qualification (higher among postgraduate qualified teachers), body mass index (higher among overweight and obese than normal weight teachers), monthly income (higher among less earning teachers) or years of experience in teaching (highest among those with least duration of experience).

These findings suggest a strong association between migraine and high stressors among school teachers.

Farhadi et al. (21) stated that occupational stress is one of the environmental risk factors for migraine. Maleki et al. (26) explained the high prevalence of migraine among certain occupations offers a unique model to understand the consequences of repeated stressors on the brain, which can alter the normal response of physiological systems. Consequently, the brain responds abnormally to environmental conditions.

Moreover, several studies documented the association between poor sleep and migraine (27). Kachoui et al. (28) reported that inadequate sleep, tiredness and stress are the main factors associated with migraine.

López-Mesonero et al. (29) found that the prevalence of active cigarette smoking is higher in migraineurs than in non-migraineurs. They concluded that smoking is a precipitating factor for migraine. This finding has been explained by an enhancing effect of smoking on the activity of brain monoamines, a decrease in nitric oxide production, or nicotine dependence.

Moreover, Junior et al. (30) reported that migraine was higher among married than single people, with no significant differences. Momayyezi et al. (31) explained this finding by the stress of marital life, e.g., high concerns toward economic problems, child rearing and frequent routine disputes between couples.

Also similar to our findings, Queiroz et al. (32) reported no significant relationship between educational status and migraine.



## Conclusions

This study confirms the high prevalence of migraine headache among male secondary school teachers in Abha City, Saudi Arabia. It is mainly felt by migraineurs as throbbing, at the occipital region. Most migraine attacks are moderately severe. The main premonitory symptoms are aura and photophobia, while the main migraine triggers in our study are exhaustion, exposure to strong perfumes, and weight lifting. Migraine can be successfully controlled by paracetamol, anti-inflammatory drugs and triptans. Risk factors for migraine include smoking, having children, high teaching workload and inadequate sleep.

Therefore, School health programs should design and implement campaigns for prevention and management of migraine among teachers. Teachers are advised to avoid exhaustion, high teaching workload and triggers of migraine. Smokers should be strongly advised and supported to quit smoking. Paracetamol can be taken by migraineurs during their aura phase to reduce severity of migraine attacks.

## References

1. Minen MT, Loder E, Tishler L, Silbersweig D. Migraine diagnosis and treatment: A knowledge and needs assessment among primary care providers. *Cephalalgia*. 2015;36(4):358–370.
2. Martelletti P, Birbeck GL, Katsarava Z, Jensen RH, Stovner LJ, Steiner TJ. The Global Burden of Disease survey 2010, Lifting The Burden and thinking outside-the-box on headache disorders. *J Headache Pain* 2013 14(1):13.
3. Woldeamanuel YW, Cowan RP. Migraine affects 1 in 10 people worldwide featuring recent rise: A systematic review and meta-analysis of community-based studies involving 6 million participants. *J Neurol Sci*. 2017;372:307–315.
4. Woldeamanuel YW, Andreou AP, Cowan RP. Prevalence of migraine headache and its weight on neurological burden in Africa: a 43-year systematic review and meta-analysis of community-based studies. *J Neurol Sci*. 2014; 342(1–2):1–15.
5. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; 380(9859):2163–96.
6. WHO | The World Health Report 2001 - Mental Health: New Understanding, New Hope. WHO. 2013;
7. Mitsikostas DD, Rapoport AM. New players in the preventive treatment of migraine. *BMC Med*. 2015;13(1):279.
8. Olesen J. The International Classification of Headache Disorders, 3rd edition. *Cephalalgia*. 2013;33(9):629–808.
9. Lipton RB, Bigal ME. Migraine: Epidemiology, Impact, and Risk Factors for Progression. *Headache J Head Face Pain*. 2005;45(s1):S3–13.
10. Scher AI, Stewart WF, Ricci JA, Lipton RB. Factors associated with the onset and remission of chronic daily headache in a population-based study. *Pain*. 2003;106(1–2):81–89.
11. Katsarava Z, Schneeweiss S, Kurth T, Kroener U, Fritsche G, Eikermann A, et al. Incidence and predictors for chronicity of headache in patients with episodic migraine. *Neurology*. 2004;62(5):788–90.
12. Raosoft Sample Size Calculator. Available from: <http://www.raosoft.com/samplesize.html>.
13. Al-Jumah M Al, Khathaami A Al, Kojan S, Hussein M, Stovner L, Steiner T, et al. The Burden of Primary Headache Disorders in Saudi Arabia (P03.112). *Neurology*. 2013;80(7 Supplement):P03.112-P03.112.
14. Headache Classification Subcommittee of the International Headache Society. The International Classification of Headache Disorders. *Cephalalgia*. 2004;24 (Suppl 1):9–160.
15. Korolainen MA, Kurki S, Lassenius MI, Toppila I, Costa-Scharplatz M, Purmonen T, Nissilä M. Burden of migraine in Finland: health care resource use, sick-leaves and comorbidities in occupational health care. *The Journal of Headache and Pain* 2019; 20:13.
16. Steiner TJ, Stovner LJ, Vos T, Jensen R, Katsarava Z. Migraine is first cause of disability in under 50s: will health politicians now take notice? *J Headache Pain* 2018; 19:17.
17. Lipton RB, Bigal ME, Diamond M, Freitag F, Reed ML, Stewart WF, et al. Migraine prevalence, disease burden, and the need for preventive therapy. *Neurology*. 2007; 68(5):343–9.
18. Ayatollahi SMT, Cheraghian B. Headaches among Primary Schools Teachers of Shiraz, 2003. *JKMU* 2005; 12(2):85-92.
19. Shahraki MR, Heydari Sadegh B, Moghtaderi A, Mirshekari H. The Study of Prevalence of Migraine among Teachers at Zahedan, Iran. *Zahedan Journal of Research in Medical Sciences* 2006; 8(2):137-142.
20. Henry P, Michel P, Brochet B, Dartigues JF, Tison S, Salamon R, et al. A nationwide survey of migraine in France: prevalence and clinical features in adults. *Cephalalgia* 1992; 12:229-37.
21. Farhadi Z, Alidoost S, Behzadifar M, Mohammadibakhsh R, Khodadadi N, Sepehrian R, et al. The Prevalence of Migraine in Iran: A Systematic Review and Meta-Analysis. *Iran Red Crescent Med J*. 2016; 18(10):e40061.
22. Etmnan M, Takkouche B, Isorna FC, et al. Risk of ischaemic stroke in people with migraine: systematic review and meta-analysis of observational studies. *BMJ*. 2005; 330:63
23. Gordon N. Clinical Features of Migraine and Other Headache Disorders. *Rhode Island Medical Journal* 2015; February, 19-21.
24. Antonaci F, Ghiotto N, Wu S, Pucci E, Costa A. Recent advances in migraine therapy. *SpringerPlus* 2016; 5:637.
25. Derry S, Moore RA. Paracetamol (acetaminophen) with or without an antiemetic for acute migraine headaches in adults. *Cochrane Database Syst Rev*. 2013;(4): CD008040.
26. Maleki N, Becerra L, Borsook D. Migraine: maladaptive brain responses to stress. *Headache*. 2012;52 Suppl 2(Suppl 2):102–106.

27. Rains JC. Optimizing circadian cycles and behavioral insomnia treatment in migraine. *Curr Pain Headache Rep* 2008;12(3):213-219.
28. Kachoui H, Ameli J, Sharifi M, Tavalaei A, Keshavarzi N, Karami GR. Evaluation of provoking factors of migraine attacks. *Kowsar Medical J.* 2006;11(3):279–84.
29. López-Mesonero L, Márquez S, Parra P, Gámez-Leyva G, Muñoz P, Pascual J. Smoking as a precipitating factor for migraine: a survey in medical students. *The Journal of Headache and Pain* 2009; 10: 101–103.
30. Junior AS, Krymchantowski A, Moreira P, Vasconcelos L, Gomez R, Teixeira A. Prevalence of headache in the entire population of a small city in Brazil. *Headache.* 2009; 49(6):895-899.
31. Momayyezi M, Fallahzadeh H, Momayyezi M. Prevalence of Migraine and Tension-Type Headache in Yazd, Iran. *Zahedan J Res Med Sci.* 2015; 17(4):e966.
32. Queiroz LP, Barea LM, Blank N. An epidemiological study of headache in Florianopolis, Brazil. *Cephalalgia.* 2006;26(2):122