Prevalence of migraine and non-migraine headache and its relation with other diseases in the adults of Aseer Region, Saudi Arabia

Mohammed Abdullah AlQarni¹, Khalid Ali Fayi¹, Mohammad Nassir Al-sharif¹, Aesha Farheen Siddiqui¹, Adel ALI Alhazzani²

¹College of Medicine, King Khalid University, Abha, ²Neurology Section, Department of Medicine, College of Medicine, King Saud University, Riyadh, Saudi Arabia

Abstract

Background and Aims: Headache is a common yet neglected health problem. There is a lack of information about its distribution, disease characteristics and associated co morbidities in Aseer region of KSA. This study aims to estimate the migraine and headache prevalence, its epidemiological and disease characteristics and relation with other co morbid conditions among general population of Aseer region, Saudi Arabia. **Methods:** A descriptive cross-sectional survey of 1123 adult participants during the period from Apr 2018 to Dec 2018. The questionnaire was sent to total of 1420 participants, but only 1123 agreed to participate and completed the questions (response rate 79.1%). Participants were recruited through an online survey from 4 main cities in Aseer region. Participants who refused were excluded. Adults were invited to answer a 25-question electronic survey to assess the prevalence of headache (migraine and non-migraine) and its relations with other diseases. **Results:** The participant's ages ranged from 17 to 60 years old, with mean age of 32.4 ± 10 years. No history of frequent headaches was reported by 152 (13.5%) while 833 (74.2%) had non-migraine headache (NMH) and 138 (12.3%) had migraine headache (MH). Female gender (2:1), poor sleep duration, cerebrovascular disease, dyslipidemia, chronic sinusitis and depression showed a significant association with migraine. **Conclusions and Recommendations:** The current research revealed a high prevalence of headache either migraine or non-migraine, twice as common in females and in those with insufficient sleeping hours. Most headache attacks were associated mainly with light in form of flashes, sensitivity or aggravated episodes.

Keywords: Co-morbidities, headache, migraine, Saudi Arabia

Background

Headache disorders are among the most common disorders of the nervous system that present to primary care. It has been estimated that half to three quarters of adults aged 18-65 years in the world have had headache in the last year and, among those individuals, 30% or more have reported migraine. Migraine headache has a world-wide occurrence. It is characterized by recurrent episodes of neurological, gastrointestinal, and autonomic symptoms, alone or in combination.[1-4] Migraine affects nearly 15% of the population or about one billion people worldwide. The lifetime prevalence of migraine is 10-20%, depending on the case definition and on the age and sex distribution of the study population.[3-5] after puberty, the incidence of migraine increases, and it does so more rapidly in women than in men.[5,6] Approximately 90% of all patients have their first attack before the age of 50 years. As a leading cause of disability, migraine has considerable impact on quality of life and imposes a substantial burden on society.[7-9] Migraine

Access this article online

Quick Response Code:

Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_962_19

How to cite this article: AlQarni MA, Fayi KA, Al-sharif MN, Siddiqui AF, Alhazzani AA. Prevalence of migraine and non-migraine headache and its relation with other diseases in the adults of Aseer Region, Saudi Arabia. J Family Med Prim Care 2020;9:1567-72.

headache was associated with an increased long-term risk of cardiovascular and cerebrovascular events.[10] This effect was due to an increased risk of stroke (both ischemic and hemorrhagic) and MI.[10] Many other diseases have been postulated to be related with migraine and headache, such as restless leg syndrome,[11] hypertension,[12] syncope,[13] depression,[14] and increased risk of vascular incidents.[15]

Up to our knowledge, there is currently no such study in Aseer region. With high prevalence rates, headache and migraine are important contributors to the burden of care in primary settings. In Saudi Arabia, primary care services are pressed for human and non-human resources.[16] There is a huge burden of non-communicable diseases in the community. Chronic diseases like diabetes and hypertension have taken the priority, and efforts are directed towards their containment and prevention, while other conditions like headache may be neglected. This is evident by the lack of literature focused on this issue. There is no study in the Aseer region that has documented the burden of headache and migraine in the community. People in today's world are more health conscious and know about a lot of different diseases. But despite the tremendous advancements in the field of health, there seems to be a limited knowledge among the public and health personnel about neurological disorders, especially about the difference between migraine and other types of headache and its relations with other diseases. We aimed to assess the prevalence of headache in general population, with focus on migraine, to elucidate its distribution and characteristics, and try to understand its relationship with other diseases.

In order to decrease the burden of headache in the community and strengthen the efforts to improve the patient's quality of life, it is imperative to understand its distribution and associated sociodemographic and clinical factors, and pathogenic mechanisms. Identifying the associated factors would consequently lead to improved prevention strategies and the early identification of populations who are at risk.

Methods

This is a descriptive cross-sectional study which included 1123 adult participants from Aseer region, Saudi Arabia, and was conducted between April-December 2018 (July 30th 2018). The questionnaire was sent to total of 1420 participants, but only 1123 agreed to participate and completed the questions (response rate 79.1%). Adults were invited to answer a 25-question electronic survey to assess the prevalence of migraine and headache with its relations with some other diseases. A letter of consent was included in the beginning of the questionnaire. The information sought in the questionnaire included demographics of the participants and headache history. Migraine was assessed according to the ICHD-III criteria for migraine[17] For migraine pain severity, participants were asked to rate pain according to the familiar numeric pain scale (0 "no pain," 10 "worst pain ever"), with scores of 4 or higher considered in the moderate severe range. The personal information of the participants was kept

confidential and secure. Participants belonging to the four main cities in Aseer region i.e. Abha, Khamis Mushayt, Al-Namas and Bisha were included.

Statistical analysis

After data were collected it was revised, coded and fed to statistical software IBM SPSS version 21. The graphs were constructed using Microsoft excel software. All statistical analysis was done using two tailed tests. *P* value less than or equal to 0.05 was considered to be statistically significant. Descriptive statistics including frequencies and percent were used to describe the frequency of each categorical variable items. Chi square test/Mont Carlo exact test and Fishers exact test (if there were many small expected values) were used to test for association between participants' bio demographic characteristics and headache data and also testing association between headache and co-morbidities.

Results

The study included 1123 participants whose ages ranged from 17 to 60 years old with mean age of 32.4 ± 10 years. Most of the participants were females (56.6%) and 59.8% were working. Among the participants, 152 (13.5%) had no frequent headache history while 833 (74.2%) had non-migraine headache (NMH) and 138 (12.3%) had migraine headache (MH) [Figure 1].

On relating type of headache to characteristics [Table 1], it was clear that migraine headache (MH) was recorded mainly among those who were less than 30 years old (50%) compared to 43.5% of non-migraine headache (NMH) cases with no statistical significance. The female: male ratio for MH was 2:1, and for NMH was 1.45:1. MH was recorded mainly among females (67.4%) compared to 59.3% of NMH with statistically significant difference ($P = 0.001$). Considering work, about 60% of MH was recorded among who work specially at civil jobs, compared to 61% of NMH cases with no significant difference. As for daily work hours, about 86% of MH recorded among those who work for more than 5 hours daily, compared to 85.1%
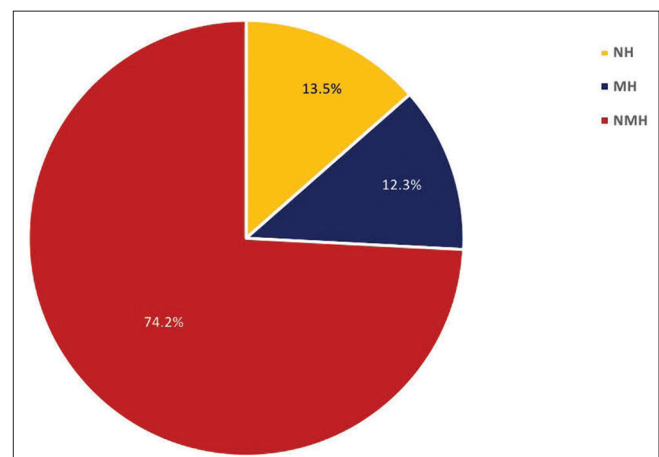

Figure 1: Prevalence of different types of headache among participants

of NMH cases without recorded statistical significance. With regard to sleeping hours, 60.2% of MH was recorded among those who sleep less than 7 hours daily, compared to 59.3% of NMH cases with significant difference (*P* =0.001).

On studding frequency of headache among the participant adults [Table 2], Around 65% of MH occurred for more than 7 times per month compared to only nearly 1% of episodes with statistically significant difference (*P* =0.001). MH was usually associated with unilateral pain compared of NMH (*P* =0.001). About 48% of MH attacks was frequent for the first time

from 1 to 10 years ago while about 20% of the NMH attacks were infrequent (*P* =.001). Headache score as recorded by the participants was more than 5 out of 10 among 94.2% of MH cases, compared to 59.5% of NMH cases with significant difference recorded (*P* =.00).

With regard to prodromal symptoms [Figure 2], flashes was recorded among 42.8% of MH cases compared to 27% of NMH, numbness with hypesthesia was recorded among 18.8% of MH compared to 10.9% of NMH cases, while speech disorders was recorded among 18.1% of MH compared to 5% of NMH cases.

Table 1: Socio-demographic characteristics of the study participants according to type of headache

Socio-demographic characteristics		Headache						P
		NH		MH		NMH		
		No	%	No	%	No	%	
Age in years	<30 years	80	52.6%	69	50.0%	362	43.5%	0.272
	30-	38	25.0%	33	23.9%	231	27.7%	
	40-	24	15.8%	24	17.4%	182	21.8%	
	50+	10	6.6%	12	8.7%	58	7.0%	
Gender	Male	103	67.8%	45	32.6%	339	40.7%	0.001*
	Female	49	32.2%	93	67.4%	494	59.3%	
Marital status	Un-married	73	48.0%	71	51.4%	364	43.7%	0.180
	Married	79	52.0%	67	48.6%	469	56.3%	
Work	Not working	12	7.9%	12	8.7%	83	10.0%	0.234
	Civil job	75	49.3%	80	58.0%	483	58.0%	
	Military job	6	3.9%	2	1.4%	25	3.0%	
	Student	59	38.8%	44	31.9%	242	29.1%	
Daily work hours	<2 h	6	4.3%	4	3.2%	25	3.3%	0.487
	2-4 h	21	15.0%	13	10.3%	87	11.6%	
	5-7 h	78	55.7%	77	61.1%	485	64.7%	
	8 h or more	35	25.0%	32	25.4%	153	20.4%	
Daily sleeping hours	4 h or less	9	5.9%	24	17.4%	73	8.8%	0.001*
	5-6 h	54	35.5%	40	29.0%	324	38.9%	
	6-7 h	7	4.6%	19	13.8%	97	11.6%	
	7-8 h	52	34.2%	43	31.2%	253	30.4%	
	8 h or more	30	19.7%	12	8.7%	86	10.3%	

*P<0.05 (significant)

Table 2: Frequency of headache among the study participants

Frequency of headache		Headache				P
		MH		NMH		
		No	%	No	%	
Frequency of monthly headache	Once/month	0	0.0%	390	46.8%	0.001*
	2-6 times	0	0.0%	435	52.2%	
	7-12 times	89	64.5%	6	0.7%	
	13 time or more	49	35.5%	2	0.2%	
Unilateral pain	Rarely	0	0.0%	121	14.5%	0.001*
	Sometimes	90	65.2%	453	54.4%	
	Usually	48	34.8%	259	31.1%	
Onset of headache	No frequent headache	0	0.0%	161	19.3%	0.001*
	1-10 years	66	47.8%	314	37.7%	
	11-20 years	44	31.9%	221	26.5%	
	20 years or more	28	20.3%	137	16.4%	
Headache score	1-4	8	5.8%	337	40.5%	0.001*
	5-7	62	44.9%	354	42.5%	
	8-10	68	49.3%	142	17.0%	

*P<0.05 (significant)

Table 3 demonstrates the nature of different types of headache as 89.9% of MH was pulsating compared to 80.8% of NMH. Also 84.1% of MH episodes recorded after daily work compared to 73% of NMH and 60.9% of MH improved after rest compared to 75.5% of NMH attacks. About 82% of MH attacks increase with activities compared to 71% of NMH. About 84% of MH episodes aggravated by bright light compared to 64.7% of NMH attacks. Also, 58% of adults with MH were more photosensitive compared to 43% of NMH cases. About 85% of MH attacks lasts for more than four hours without treatment compared to 63.5% of NMH attacks and 47.8% of MH attacks lasts for more than 72 hours without treatment compared to 20.2% of NMH attacks. All these differences were found to be statistically significant ($P < 0.05$).

With regard to triggering factors [Figure 3], light was recorded among 46.4% of MH compared to 30.7% of NMH, anxiety was recorded among 73.2% of MH cases compared to 64.6% of NMH cases, lack of sleep was recorded among 84.1% of MH cases compared to 76.1% of NMH, and fasting was recorded among 50% of MH cases compared to 37.8% of NMH.

Finally, on exploring association between type of headache and co-morbid disease [Table 4], it was found that 8.7% of adults with MH had elevated intra-cerebral pressure compare to 3.8% of NMH cases and 3.3% of free adults with recorded statistical significance ($P = 0.028$). Also 18.8% of cases with MH were hypertensive compared to 13.4% of NMH cases and 7.2% of free adults ($P = 0.014$). About 30% of MH cases were hypotensive compare to 19.4% of NMH cases and 6.6% of normal adults with statically significant difference ($P = .001$). Elevated lipid profile was recorded among 21% of MH cases compared to 16.1% of NMH and 6.6% of free adults with significant difference ($P = .002$). Depression was recorded among 26.1% of MH cases compared to 10.9% of NMH and 6.6% of normal ($P = .001$). Chronic sinusitis was recorded among 37% of MH cases compared to 21.4% of NMH and 9.9% of normal adults ($P = .001$).
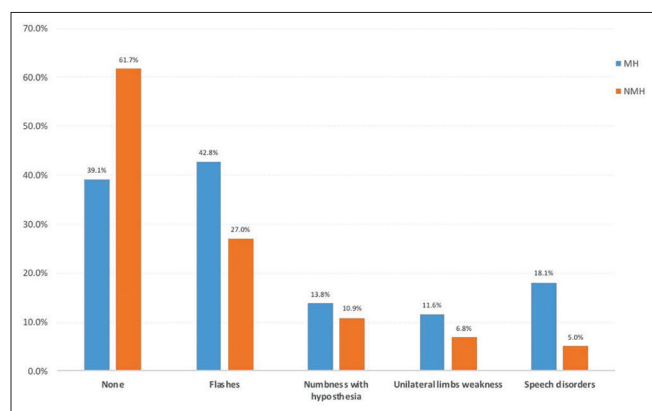
Discussion

This study on headache types, distribution, characteristics, and associated diseases among 1123 adult participants revealed some interesting results, unreported as yet from this region of Saudi Arabia. In the current study, a very high prevalence of headache was reported by the participants. Recent studies on populations living in high altitude regions has shown a high prevalence of headache, particularly migraine.[18] This high prevalence of migrainous headache is also similar to that reported in a previous study from Taif, which is another city in the Sarawat mountain ranges of Saudi Arabia.[19] Another recently published study from Riyadh, the capital of Saudi Arabia reported a prevalence of 84%.[4] These results are in contrast with the studies from the past decade and thus pose interesting questions. A review published in 2010 that focused on the epidemiology of headache in the Arab region included two community-based studies with large sample size from Saudi Arabia.[20] This review had reported the prevalence of headache to be much lower at 8-12% than that reported in the current study and some recent studies from the region.[4,19] This is an interesting observation as it suggests an extraordinary increase in headache prevalence in the Kingdom. Though these

Table 3: Distribution of headache characteristics among the participants by the type of headache

Headache data	Headache				*P*
	MH		NMH		
	No	%	No	%	
Pulsating headache	124	89.9%	673	80.8%	0.010*
Headache after daily work	116	84.1%	608	73.0%	0.006*
Headache improve after rest	84	60.9%	629	75.5%	0.001*
Less headache at week ends	66	47.8%	577	69.3%	0.001*
Headache increases with activities	113	81.9%	591	70.9%	0.008*
Had unilateral redness of eye with headache	56	40.6%	216	25.9%	0.001*
Light aggregates headache	116	84.1%	539	64.7%	0.001*
More photosensitivity with headache	80	58.0%	358	43.0%	0.001*
Sounds increase headache	128	92.8%	630	75.6%	0.001*
Nausea with headache	71	51.4%	337	40.5%	0.015*
Vomiting with headache	30	21.7%	124	14.9%	0.041*
Attack last 4 h without treatment	117	84.8%	529	63.5%	0.001*
Attack last 72 h without treatment	66	47.8%	168	20.2%	0.001*

*$P<0.05$ (significant)

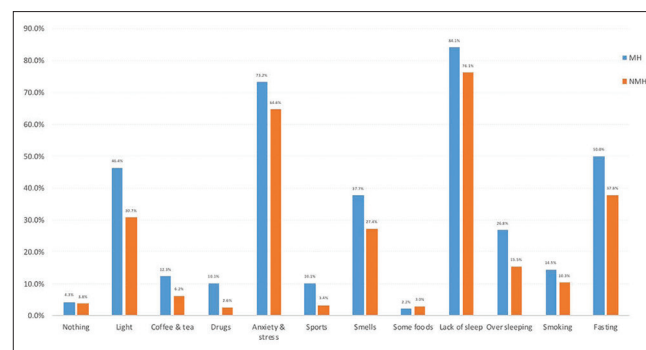**Figure 2:** Prodromal symptoms recorded among the study participants according to type of headache

Figure 3: Headache triggering factors recorded by study participants according to type of headache

Co-morbidities	Headache						P
	NH		MH		NMH		
	No	%	No	%	No	%	
Cerebrovascular disease	5	3.3%	12	8.7%	32	3.8%	0.028*
Meningitis	2	1.3%	3	2.2%	10	1.2%	0.635
Epilepsy	2	1.3%	3	2.2%	21	2.5%	0.657
LL thrombus	3	2.0%	3	2.2%	15	1.8%	0.951
Cardiac thrombus	3	2.0%	2	1.4%	11	1.3%	0.822
Cardiac valve disease	5	3.3%	10	7.2%	29	3.5%	0.098
Cardiac congenital anomalies	3	2.0%	4	2.9%	10	1.2%	0.281
Asthma	12	7.9%	17	12.3%	90	10.8%	0.440
DM	9	5.9%	8	5.8%	53	6.4%	0.954
HTN	11	7.2%	26	18.8%	112	13.4%	0.014*
Hypotension	10	6.6%	40	29.0%	162	19.4%	0.001*
Elevated lipid profile	10	6.6%	29	21.0%	134	16.1%	0.002*
Thyroid disorders	11	7.2%	26	18.8%	108	13.0%	0.013*
Depression	10	6.6%	36	26.1%	91	10.9%	0.001*
Emotional disturbance	3	2.0%	4	2.9%	9	1.1%	0.206
Obstructive sleep apnea	6	3.9%	6	4.3%	21	2.5%	0.366
Ophthalmic disorders	12	7.9%	24	17.4%	104	12.5%	0.048*
Chronic sinusitis	15	9.9%	51	37.0%	178	21.4%	0.001*
Neoplasms	3	2.0%	2	1.4%	9	1.1%	0.642
MS	2	1.3%	4	2.9%	13	1.6%	0.491

*P<0.05 (significant)

differences could be purely due to methodological reasons, different populations and different area, however the increased use of digital gadgets, especially handheld device like smartphones, warrants further studies to understand this phenomena.

Prevalence of migraine in this study is in concordance with other studies. Aura consisting of visual, sensory, or speech symptoms was reported by two out of five participants reporting migraine.[21] In the current study, the distribution of migraine conformed to the established pattern; being more common among the young and among females.[20] Studies have concluded that though biological factors may explain some of the differences, but the main explanation is presumably gender disparities in work, economy, daily living, social life and expectations between women and men and deeper societal changes are needed to reduce the inequities in pain experiences between women and men.[22] Significant association of headache with other socio-demographic and personal characteristics like job type, working hours, sleeping hours was also revealed. Civil workers, those with more working hours and less sleeping hours suffered more with migraine than non-migraine headache. Migraine has previously shown to be significantly associated with unemployment in other studies,[19] however no such relationship was found in the current study, typical migraine headache pattern accompanied with flashes, numbness, hypesthesia and speech disorder was observed. The frequency of migraine per month at 7 days was quite high, so also was the pain duration in untreated episodes. The intensity of migraine headache was also more severe than the NMH. A study in Nepal reported that the median frequency of migraine increased with increasing altitude. It also reported that both migraine duration and pain intensity increased significantly with rising altitude.[18] Previous studies have suggested that altitude can have a "migraine-aggravating" effect. This translates to increase in frequency, duration, and intensity of the headaches.[18] It is noteworthy that high-altitude headaches are unlikely to be a factor in this study because the participants are residents of high altitude and thus expected to be fully adapted to its low-oxygen environment. This poses a challenge to understand the mechanisms and thus require further investigation.

Typical features of migraine headache like pulsating headache, sensitivity to light, episodes recorded after daily work, little improvement after rest, aggravation with activities, bright light, and were observed. With regard to triggering factors too established patterns were observed with light, anxiety, lack of sleep and fasting as main triggers. On exploring the association between type of headache and co-morbid diseases, a significant association between migraine and various co-morbidities was found. These included Hypertension, Hypotension, Elevated lipid profile, Thyroid disorders, Depression, Ophthalmic disorders, Chronic sinusitis and Elevated intra-cerebral pressure. These associations have been suggested in previous studies. Migraine may be an important risk factor for most cardiovascular diseases. A recent study reported that migraine with aura is associated with an increased risk of carotid thickening, and migraine without aura is associated with a low risk of carotid plaques and arterial stiffening.[23] Janoska[24] reported the association of migraine with dyslipidemia. Another study reported that women with migraine have a higher relative risk of developing hypertension compared to women without migraine.[25] A study on the effect of headache on visual quality of life concluded that it is significantly adversely affected in migraine sufferers.[26] Depression, anxiety and stress have shown to be related to migraine.[27]

Substantial and complicating co-morbidities like those observed in this study contribute to most of the burden of headache. On the individual level, headaches cause disability, suffering, and loss of quality of life that is on a par with other chronic disorders. On a broader level, headache causes large costs to society, mostly indirect through loss of work time.

Conclusions and Recommendations

The current research revealed that majority of adults who responded had type of headache either migraine or non-migraine which more in females with insufficient sleeping hours. Most headache attacks were associated mainly with light in form of flashes, sensitivity or aggravated episodes. There also many other aggravating factors for both types of headache including daily work, effort sounds, and stress with sleeping disorders. Blood pressure, depression and sinusitis were the most important co-morbidities associated with headache. The study underscores the need for improved headache diagnosis and management in primary care settings coupled with awareness programs in sleep management and prevention of headaches in the community. There is a need to not only recognize the burden of headache but also to strengthen the efforts to improve the understanding of risk factors and pathogenic mechanisms that would consequently

lead to improved prevention strategies and the early identification of patients who are at risk. It is recommended to have sensitization sessions for healthcare personnel in primary health centers towards the need of the community for this condition which is considered a mild problem and often neglected.

Financial support and sponsorship

Nil.

Conflict of interest

There is no conflict of interest.

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