

МЕДИЦИНСКИЕ НАУКИ

PREVALENCE AND CLINICAL CHARACTERISTIC OF MIGRAINE AMONG ADULT POPULATION OF MONGOLIA

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Objective: Migraine is the most prevalent public-health problem, affecting people in all countries. Epidemiological data on headache and migraine are not available in Mongolia. Aim of our study was to estimate the prevalence and characteristic of migraine in Mongolia.

Methods: We interviewed randomly selected 2043 biologically unrelated adults (aged 18–65 years) in a door to door survey from Ulaanbaatar and four aimags using a pilot-tested, validated, structured HARDSHIP questionnaire. ICHD-II diagnostic criteria were applied. **Results:** 1-year prevalence of primary headache was 63.9 %, with a female preponderance of 2:1. The age-standardized 1-year prevalence of migraine was 24.2 %, higher among females than males (OR=2.4, 95% CI [1.7-2.6]) and among those with high education (OR=3.0, 95% CI: 1.5-5.8)]. The estimated prevalence of all headache on ≥ 15 days/month was 11.2 % (that of pMOH was about 70%). **Conclusion:** Prevalence of primary headache was 63.9% with migraine having 24.2%. Female gender, education level and family history were associated with Migraine.

Keywords: Migraine, tension type headache, medication-overuse headache, prevalence, clinical characteristics

Background

Migraine is the most prevalent public-health problem, affecting people in all countries. [1]. The Global Burden of Disease Study 2010 (GBD2010) found the migraine is the 3rd most prevalent disorders worldwide [2] while low productivity in the workplace and financial burden, spending a lot of money for diagnostics and medications. Spending 1222 EURO per year for migraine in European countries [3]. Nevertheless, knowledge of migraine and headache disorders prevalence, on which GBD depends, remains incomplete [4]. Regional headache prevalence variations have been noted. Of particular interest in this context are the data from Russia [5] and China [6], countries with a common border with Mongolia. Across the world, the knowledge gap is slowly being filled by a series of population-based studies supported by Lifting the Burden (LTB) conducting the Global Campaign against Headache in official relations with the World Health Organization Methodology has been developed for this purpose. We focused on the headache disorders of public-health importance: migraine, TTH, medication-overuse headache (MOH) and headache occurring on ≥ 15 days/month. This paper describes the 1-year prevalence of migraine in this population and their associations with some socio-demographic factors.

Materials and Methods

Study design

The study is a cross-sectional, population-based survey. Through cluster-sampling, it is selected and interviewed a sample representative of general population of the country. The access was door-to-door cold calling, with random selection of households and of one adult member of each biologically-unrelated

family within each household. This selected participant (and only this person) was included in the sample. Trained interviewers employed a structured questionnaire applying ICHD diagnostic criteria for primary headache disorders.

Study population and sample size

The survey was limited to a total of 2043 citizens aged 18–65 years, from five study areas to provide an appropriate mix of urban/rural participants throughout the country. These areas were Ulaanbaatar (40%) and other content 60% from four aimags of rural

Data collection instrument

Data was collected using the HARDSHIP structured questionnaire. Diagnostic questions based on the International Classification of Headache Disorders, 2nd edition (ICHD-II) and enquiries into burden for those reporting headache. In the previously conducted validation study, the diagnostic part of the questionnaire had a specificity and sensitivity for migraine of 85 % (95 % CI: 81–89) and 63 % (52–72).

Statistics and analyses

Data were entered into a secure database and statistical analysis performed using EPI INFO and SPSS 15. Diagnosis were made not by the interviewers but by computerized algorithm from the recorded survey responses. To all others, the algorithm applied ICHD-II diagnostic criteria [7] in the order: migraine, TTH, probable migraine, probable TTH. Cases of migraine and probable migraine, and of TTH and probable TTH, were then combined for prevalence estimation and further analysis. We used proportions, 95% confidence intervals (CIs), medians, means and standard deviations (SDs) to summarize the distributions of variables and chi-squared, Student's t-test for significance of differences. We calculated odds

ratios (ORs) to test for associations in bivariate analysis, and adjusted odds ratios (AORs) using multivariate logistic regression. We set the level of significance at 5 %.

Ethical statement

The Ethics Committee of the Mongolian National University of Medical Sciences approved the study protocol. Informed consent was obtained from all participants.

Results

A total of 2,379 households were visited. Those who not responded (n=299) were excluded, since it

could not be ascertained whether any occupants were eligible. There were 36/2,080 refusals (non-participation proportion 1.7%). There were 2,043 participants (812 [39.7%] males and 1,231 [60.3%] females, mean age of 38±13.4years, 843[41.3%] from Ulaanbaatar 1,200 [58.7%] from urban area. The distributions of gender, age and habitation in the participating sample have been described, and were comparable to those of the population of Mongolia (as far as they are available) from the 2015 population and housing census in Table.1

Table 1

Socio demographic characteristics of the participating sample (N= 2,043) and national population

Variable		Sample N (%)	National population %
Habitation			
Urban		843 (41.3)	
Rural		1200(58.7)	
Gender			
	Male	812 (39.7)	48.45
	Female	1231 (60.3)	51.55
Age (years)			
	18-25	446 (21.8)	17.42
	26-35	536 (26.2)	29.3
	36-45	427 (20.9)	21.3
	46-55	370 (18.1)	17.5
	56-65	264 (12.9)	12.04
Education			
	Elementary	814.0	Data not available
	Secondary	691 (33.8)	
	College	291 (14.2)	
	University	980 (48.0)	
Marital status			
	Married	1326 (64.9)	
	Single/other	717 (35.1)	
Employment			
	Employed	1183 (57.9)	
	Unemployed	349 (17.1)	
	Student	274 (13.4)	
	Retired	237 (11.6)	
Total		2043	

1. Prevalence of Migraine

The age-standardized 1year prevalence of migraine was 24.2 %, TTH was 29.0 %, 5.7% of pMOH

and 0.2% of cluster headache respectively in Mongolia (See Figure 1).

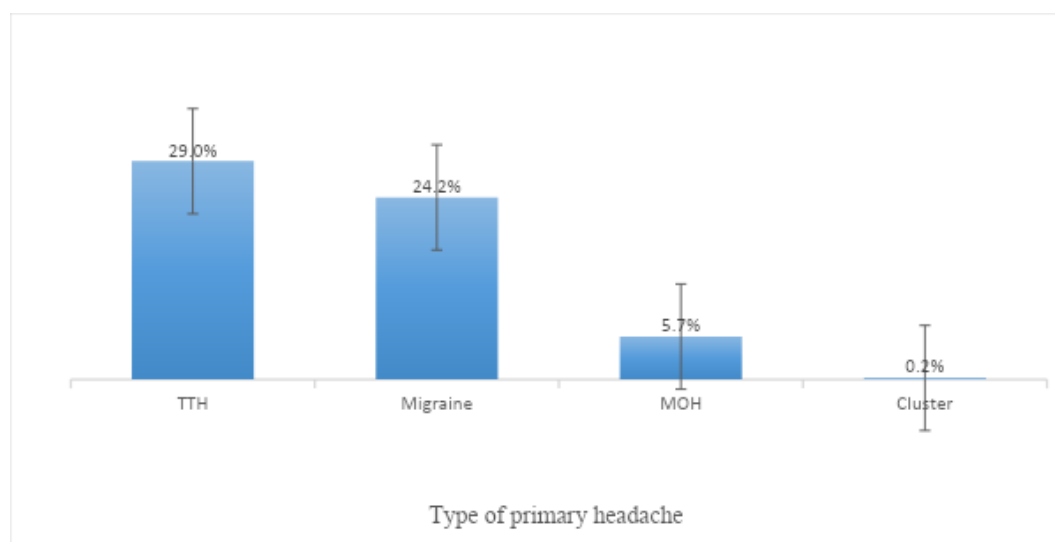


Figure 1. Prevalence of primary headache disorders

The crude 1year prevalence of migraine was 24.2 % (n = 494), 36.2% (n=179) definite and 63.7% (n=315) probable respectively, 70.6% (n = 349) of the women who were diagnosed with migraine (p=0.0001)

in all age groups. Prevalence of migraine is increasing in young adulthood (18-25 years) and reaching to the maximum during 26-35 years (See Figure 2).

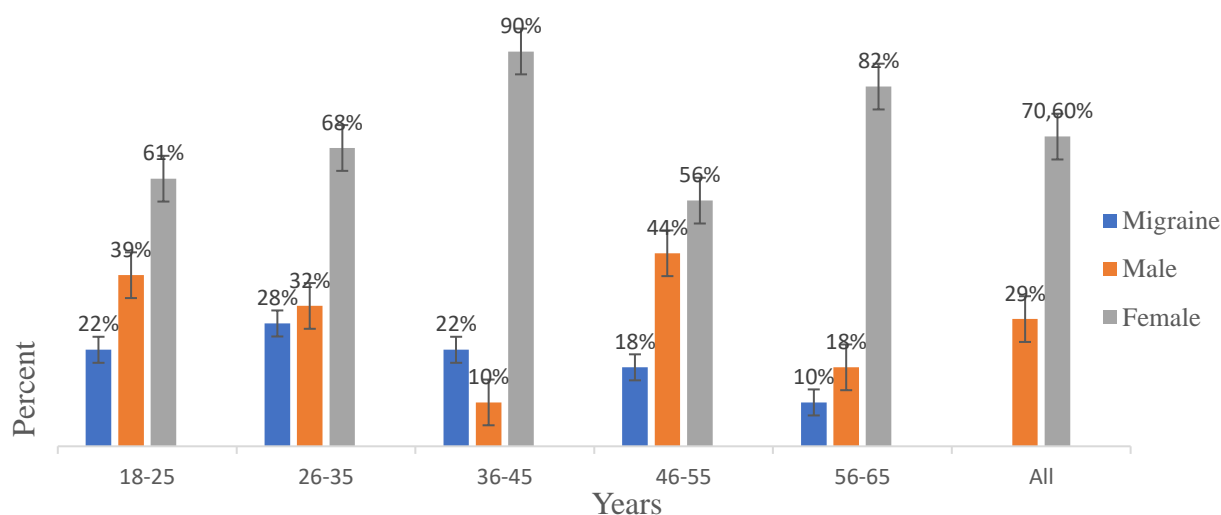


Figure 2. Migraine by gender and age

2. Migraine associated factors

Multivariate logistic regression confirmed the occurrence of migraine was associated with sex, education and family history (OR=2.4 [95%CI:1.9 - 2.9]; p≤0.0001). Moreover, there was an increase of prevalence of migraine related to the level of education,

having increased gradually from the elementary to high, [OR=3.0 [95% CI: 1.5-5.8]; p=0.002 (Table2). Family history (p≤0.0001) and smoking (p=0.004) were also associated with the prevalence of migraine (See Table 2).

Table 2.

Logistic regression analysis of associations of migraine with gender, age, education, family history, alcohol consumption and smoking

Variable	Binary logistic regression	95% C.I		P value	Multiple logistic regression	95% C.I		P value
	OR	lower bound	upper bound		OR	lower bound	upper bound	
Gender								
Male	1				1			
Female	2.37	1.91	2.94	0.0001	1.912	1.416	2.582	0.0001
Age groups								
18-25	1				1			
26-35	1.10	0.83	1.47	0.503	1.003	0.711	1.417	0.985
36-45	1.10	0.81	1.49	0.558	1.027	0.714	1.478	0.884
46-55	0.99	0.72	1.37	0.951	0.751	0.517	1.092	0.133
56-65	0.80	0.56	1.13	0.199	0.806	0.53	1.226	0.313
Educational level								
Elementary	0.34	0.17	0.66	0.002	0.355	0.169	0.744	0.006
Secondary	0.84	0.67	1.04	0.108	0.942	0.724	1.225	0.655
College	0.94	0.70	1.25	0.666	1.114	0.788	1.575	0.54
University	1				1			
Family history								
No	1				1			
Yes	1.81	1.42	2.30	0.0001	1.822	1.412	2.35	0.0001
Alcohol								
No	1				1			
Yes	0.68	0.52	0.88	0.004	1.074	0.782	1.476	0.658
Smoking								
Nonsmoker	1				1			
Smoker	0.84	0.65	1.09	0.193	1.155	0.803	1.662	0.438

P=0.0001

There was a statistically significant correlation on migraine with education levels. (See Figure 3)

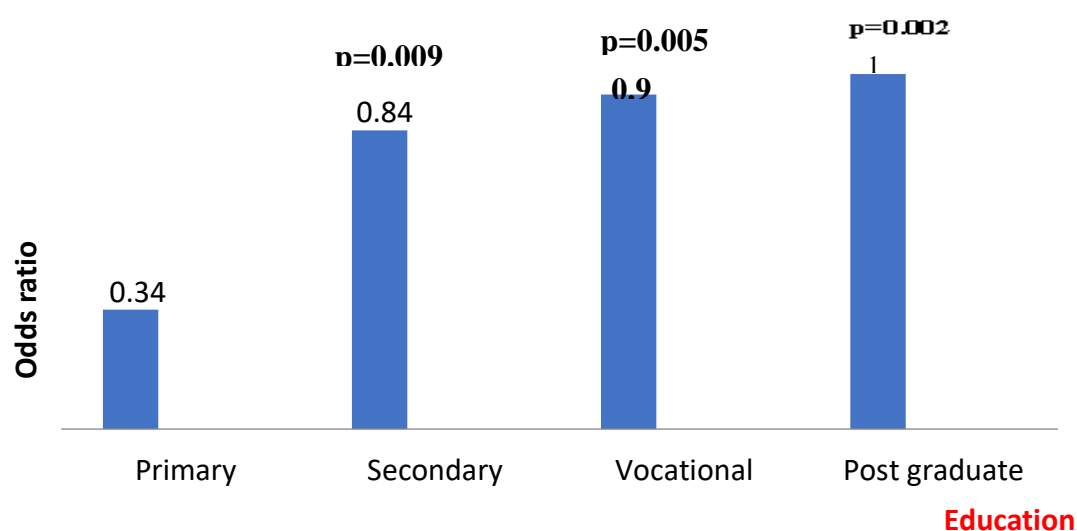


Figure 3. Migraine by education

3. Clinical characteristic of migraine

Primary headache was often found in young adults, especially in girls is coincided with puberty, whereas in our study, migraine did not show gender

difference on average age at 15. Clinically, migraine without aura was presented (74,3%) predominantly than 25,5 % of migraine with aura. (See Figure 4).

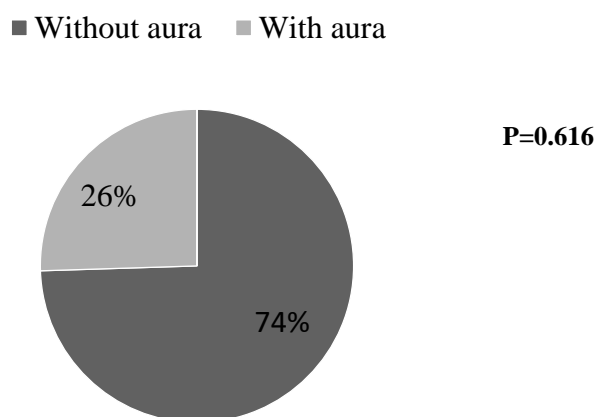


Figure 4. Clinical form of Migraine

Migraine headache is 2-3 times more common in women, but there is no statistically significant difference between clinical forms. (See Figure 5).

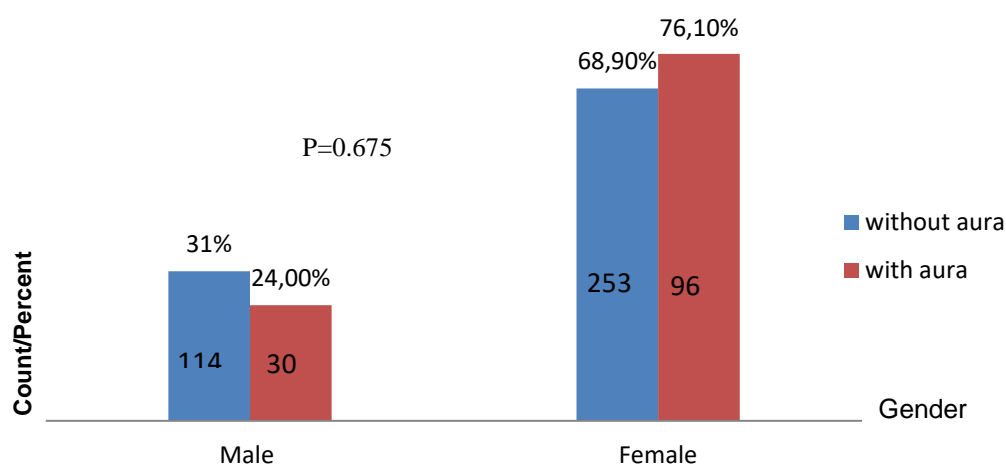


Figure 5. Migraine type by gender

The accompanying symptoms of migraine were statistically significant. (See Table 3)

Table 3.

Accompanying symptoms of migraine				
Performance	Value	n	%	P value
Pulsating one side	no	96	43.4	0.003
	yes	125	56.6	
	total	221	100.0	
Worsened by physical activity	no	101	45.7	0.0001
	yes	120	54.3	
	total	221	100.0	
Nausea	no	83	37.6	0.0001
	yes	138	62.4	
	total	221	100.0	
Vomit	no	147	66.5	0.0001
	yes	74	33.5	
	total	221	100.0	
Photophobia	no	96	43.4	0.0001
	yes	125	56.6	
	total	221	100.0	
Phonophobia	no	42	19.0	0.0001

	yes	179	81.0	
	total	221	100.0	

Migraine were repeated 5.7 times a month, duration of movement was 5.77 + 5.43 for men and 5.74 + 5.58 for women, for 72 hours or longer migraine status with persistent headache was 6% (n = 30). A migraine-specific factor is triggered by food, nuts,

chocolate, wine, emotional discomfort and insomnia. Our study found that migraine-induced stimuli were significantly influenced by loud noise, poor sleep, fast food, menstruation, and stress (Table 4),

Table 4.

Trigger factors of Migraine				
Performance	[CI 95%]			P value
	OR	Low rate	High rate	
Strong noise	5.0	3.7	6.7	0.0001
Poor sleep	4.2	3.4	5.3	0.0001
Meal	3.7	2.1	6.7	0.0001
Menstruation	3.3	2.3	4.8	0.0001
Stress	3.3	2.7	4.1	0.0001
Oversleep	2.8	1.9	4.2	0.0001
Weather	2.5	1.7	3.6	0.0001
Tired and fast	2.5	2.0	3.2	0.0001
Cough	2.4	1.8	3.2	0.0001
Smells	2.3	1.8	2.9	0.0001
Physical activity	2.3	1.5	3.4	0.0001
Alcohol	2.3	1.7	3.2	0.0001
Strong light	2.1	1.4	3.0	0.0001
Smoke	1.6	1.0	2.6	0.042
Snuff	1.6	0.9	2.8	0.142
Medicine	2.7	0.7	10.7	0.168

4. Burden of migraine

Table 5.

Principal revisions in HALT to the wording of MIDAS					
MIDAS equivalent item					
	N	low value	high value	Mean	SD
How many days did you skip work or school due to headache in last 1 month?	134	1	30	4.25	5.4
How many days did your productivity at work or school decrease by 50% or more due to headache in last 1 month? (exclude Q 1 days skipped (work or school))	261	1	30	4.19	4.5
How many days were you unable to do household work (such as housework, home repair and maintenance, shopping, taking care of children and relatives) due to headache in last 1 month?	308	1	30	5.02	5.5
How many days did your productivity in household work decrease by 50% or more due to headache in last 1 month? (exclude days in Q3 for household work)	328	1	30	4.78	4.8
How many days did you miss family, social or friend activities due to headache in last 1 month?	155	1	30	3.46	4.3
Total				4.3 day/month	

Disability adjusted life (MIDAS score) years was 4.3 days per month approximately and there is no adverse effect on quality of life.

Table 6.

Negative impacts of migraine			
Performance	Migraine		
	n	n (%)	P value
Have your headache interfered with your education	107	(11.8)	0.019
Do you believe your headache have made you less successful in your career	142	(14.2)	0.108
Have your headache reduced your earning	56	(6.9)	0.383
Do you feel that your employer and work colleagues understand and accept your headache	378	(24.3)	0.015
Do you feel that your family and friends understand and accept your headache	495	(27.7)	0.0001
Do you avoid telling people that you have headache	107	(11.9)	0.001

Migraine has negative impact on personal learning and education, loss of confidence in the future, activity and resulting low self-estimation in future, hiding his or

her headache from their family and employer, and isolate from society.

Table 7.

Do you treat your headache and migraine							
Taking into account everything you do to treat headache, how well do you think you control them							
Performance		Primary headache		Migraine		Total	
		Count	Row Valid N %	Count	Row Valid N %	Count	P value
1	Can not	157	68.6%	72	31.4%	229	0.0001
2	Less	410	55.9%	323	44.1%	733	
3	more	179	54.4%	150	45.6%	329	
4	excellent	43	75.4%	14	24.6%	57	

68.6% of the total patient who suffer from primary headache consider that they do not need any information and regimen to prevent from headache, while people suffer from migraine usually look for way to prevent from its movement and 24.6% of them can prevent it. ($p < 0.0001$)

This indicate that migraine's movement has a certain burden on individual and society.

Discussion.

Results of our study revealed that crude 1-year prevalence of all headaches is 66.1%, from which 1305 (63.9%) reported symptoms consistent with primary headache. Prevalence of migraine was age-related, increasing from 18-25 years and reaching to the maximum during 26-45 years. Migraine was substantially more common among females than males, with age- and gender-adjusted 1-year prevalence of 24.2% [9]. According to the results of some studies, the prevalence of primary headaches varies in different countries. Studies carried out in Russian Federation, China, Turkey, Tibet and Brazil showed that the prevalence of primary headache was 52.3%, 23.8%, 44.6%, 45.3% and 67.6% respectively [5,6,8,9,10]. Results of our study showed relatively high prevalence of primary headache compared to other countries, but it coincides with results of Russian study. Prevalence of migraine among population of Mongolia relatively higher than the mean global estimate of 14.7%. [11]. The mean global estimate is based on a large number of heterogeneous studies, performed with varying methods during a period of >30 years. Our finding of

24.2% in Mongolia is considerably higher than the 9.3% reported in neighbouring China, but similar to the prevalence in another neighbour Russia (20.8%) We used same methodology and same diagnostic questionnaire as China and Russia; indeed, LTB has supported studies using similar methods and the same questionnaire in many other countries, cultures and languages: Zambia, Ethiopia, Nepal, Pakistan, Saudi Arabia, Morocco [12,13,14,15,16,17]. The highest prevalence of migraine was estimated in Nepal (34.1%) and in India (25.2%). China, as noted earlier appears to be matched by Japan [18] and Taiwan [19], although the 20-year-old studies in these countries used different methodologies and may not have included probable migraine.

In China the prevalence of migraine has increased by 5.2% over 7 years (2011; 4.3%, 2018; 9.1%) while, the distribution in France 7.9 %, United States 15.3%, Sweden 13.2%, Spain 8.4% and Korea 17.5% [20].

Gender-related increase of prevalence was especially significant in migraine, women having higher prevalence. Moreover, there was an increase of prevalence of migraine related to level of education, having increased gradually from the elementary to high.

Other studies discovered relatively lower prevalence of primary headache compared to our results. For instance, in Australia prevalence of migraine was 10.2%, in Canada 8.3% with 11.8% and 4.7% in women and men respectively [21, 22]. The comparisons we make is with Mongolia's neighbors

countries, Russia and China, as we noted before. Mongolian headache matches Russian headache very closely migraine 24.1% versus 20.8%.

The prevalence of migraine without aura had as similar pattern as of primary headache prevalence across the world. On the other hand, the frequency and duration of primary headache were slightly higher than the average of most countries. In Nigeria, 5.6% had headache four or more times per week, 9.7% had headache 2–3 times in a month while 8.2% had headache 1–3 times in 3 months [23]. In 2016, the worldwide, age-standardized prevalence of migraine was estimated to be 14.4%: 18.9% for women and 9.8% for men. Peak prevalence of migraine in East Asia was among women aged 30 to 49 years. In Mongolia, disability adjusted life years is 4.3 days per month (MIDAS score) and no decrease of productivity and neither on quality of life, which coincides with the studies done in East Asia countries.

Conclusion

Prevalence of primary headache disorders among adult population of Mongolia was relatively high compare to the world average. Migraine is mostly associated with female gender, education level and family history. This new evidence will inform national health policy and provide a basis for the health-care needs assessment.

References.

- 1.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. doi:10.1111/j.1468-2982.2007.01288.x
- 2.Headache in top 10 of who disability index. Headache in top 10 of who disability index. <http://fayllar.org/headache-in-top-10-of-who-disability-index-headache-in-top-10.html>. Accessed October 16, 2019.
- 3.Linde M, Gustavsson A, Stovner LJ, et al. The cost of headache disorders in Europe: The Eurolight project. *Eur J Neurol*. 2012;19(5):703-711. doi:10.1111/j.1468-1331.2011.03612.x
- 4.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(1). doi:10.1186/s10194-018-0846-2
- 5.Stovner LJ, Al Jumah M, Birbeck GL, et al. The methodology of population surveys of headache prevalence, burden and cost: Principles and recommendations from the Global Campaign against Headache. In: *Journal of Headache and Pain*. Vol 15. Springer-Verlag Italia s.r.l.; 2014. doi:10.1186/1129-2377-15-5
- 6.Ayzenberg I, Katsarava Z, Sborowski A, et al. Headache yesterday in Russia: its prevalence and impact, and their application in estimating the national burden attributable to headache disorders. *J Headache Pain*. 2015;16(1):1-6. doi:10.1186/1129-2377-16-7
- 7.ICHHD-3 The International Classification of Headache Disorders 3rd edition. <https://ichd-3.org/>. Accessed January 6, 2020.
- 8.Yu S, Liu R, Zhao G, et al. The prevalence and burden of primary headaches in China: A population-based door-to-door survey. *Headache*. 2012;52(4):582-591. doi:10.1111/j.1526-4610.2011.02061.x
- 9.Luvsannorov O, Tsenddorj B, Baldorj D, et al. Primary headache disorders among the adult population of Mongolia: prevalences and associations from a population-based survey. *J Headache Pain*. 2019;20(1):114. doi:10.1186/s10194-019-1061-5
- 10.Aygül R, Deniz O, Koçak N, Orhan A, Ulvi H. The clinical properties of a migrainous population in eastern Turkey-Erzurum. *South Med J*. 2005;98(1):23-27. doi:10.1097/01.SMJ.0000145390.12710.D5
- 11.Carod-Artal FJ. High-altitude headache and acute mountain sickness. *Neurol (English Ed)*. 2014;29(9):533-540. doi:10.1016/j.nrleng.2012.04.021
- 12.Queiroz LP, Silva Junior AA. The prevalence and impact of headache in Brazil. *Headache*. 2015;55(S1):32-38. doi:10.1111/head.12511
- 13.Stovner LJ, Nichols E, Steiner TJ, et al. Global, regional, and national burden of migraine and tension-type headache, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Neurol*. 2018;17(11):954-976. doi:10.1016/S1474-4422(18)30322-3
- 14.Mbewe E, Zairenthiama P, Yeh HH, Paul R, Birbeck GL, Steiner TJ. The epidemiology of primary headache disorders in Zambia: a population-based door-to-door survey. *J Headache Pain*. 2015;16(1). doi:10.1186/s10194-015-0515-7
- 15.Zebenigus M, Tekle-Haimanot R, Worku DK, Thomas H, Steiner TJ. The prevalence of primary headache disorders in Ethiopia. *J Headache Pain*. 2016;17(1). doi:10.1186/s10194-016-0704-z
- 16.Manandhar K, Risal A, Steiner TJ, Holen A, Linde M. The prevalence of primary headache disorders in Nepal: a nationwide population-based study. *J Headache Pain*. 2015;16(1):1-10. doi:10.1186/s10194-015-0580-y
- 17.Huda Kafeel, Ramsha Rukh. Prevalence of headache in general population of karachi Pakistan. *J App Pharm Vol. 6; Issue 3: 308-313; July, 2014*
- 18.Almalki ZA, Alzhirani MAG, Altowairqi AT, et al. Prevalence of Migraine Headache in Taif City, Saudi Arabia. *J Clin Med Res*. 2018;10(2):125-133. doi:10.14740/jocmr3277w
- 19.Steiner TJ, Stovner LJ, Vos T. (No Title). doi:10.1186/s10194-016-0699-5
- 20.Takeshima T, Wan Q, Zhang Y, et al. Prevalence, burden, and clinical management of migraine in China, Japan, and South Korea: a comprehensive review of the literature. *J Headache Pain*. 2019;20(1):111. doi:10.1186/s10194-019-1062-4
- 21.Wang S-J, Fuh J-L, Young Y-H, Lu S-R, Shia B-C. Prevalence of Migraine in Taipei, Taiwan: A Population-Based Survey. *Cephalalgia*. 2000;20(6):566-572. doi:10.1046/j.1468-2982.2000.00085.x
- 22.Shaid Booth, Richard Prsons, Bruce Sunderland, Tin Fei. Migraine in Australia Whitepaper Contents.12,2019(16). PubMed 31871835. doi:10.7717/j.8134
- 23.Ramage-Morin PL, Gilmour H. Prevalence of migraine in the Canadian household population. *Heal Reports*. 2014;25 (6):10-16.