Original Article
Cent Asian J Med Sci. 2019 Dec;5(4):308-316. https://doi.org/10.24079/CAJMS.2019.12.008
Central Asian Journal of Medical Sciences
CAJMS

Some Associations of Primary Headache Disorders in Mongolia: A Nationwide Population-Based Study

Byambasuren Tsenddorj[1], Dorjkhand Baldorj[2], Delgermaa Purev[3], Selenge Enkhtuya[2], Undram Lkhagvaa[4], Burmaajav Badrakh[1], Otgonbayar Luvsannorov[2]

[1]Department of Neurology, Ach Medical University, Ulaanbaatar, Mongolia; [2]Department of Neurology, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia; [3]Department of Neurology, Mungun guur Clinical Hospital, Ulaanbaatar city, Mongolia; [4] Department of Health Policy, School of Public Health, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia

Submitted: September 24, 2019
Revised: November 15, 2019
Accepted: December 3, 2019

Corresponding Author
Otgonbayar Luvsannorov, Assoc Prof, MD, PhD
Department of Neurology, Mongolian National University of Medical Sciences, Ulaanbaatar 14210, Mongolia.
Tel: +976-99038586
E-mail:
Otgonbayar.l@mnums.edu.mn

Objective: Headache disorders are the most prevalent public-health problem, affecting people in all countries. Epidemiological data on headaches are not available in Mongolia. Our study aimed to estimate the prevalence of each headache disorders of public health importance and examine their socio-demographic associations, in urban and rural areas. **Methods:** There were 2,043 biologically unrelated adults (aged 18–65 years) in a door to door survey randomly sampled from Ulaanbaatar (capital of Mongolia) and four aimags (rural), and interviewed by trained researchers using a pilot-tested, validated, structured questionnaire. ICHD-II diagnostic criteria were applied. **Results:** The observed prevalence of any headache was 66.1%, with a female preponderance of 2:1. The age-standardized prevalence of migraines was 24.2%; prevalence was higher among females than males (OR 2.4, 95% CI 1.9; 2.9, p = .0001), and among those with high education (OR 3.0, 95% CI 1.5; 5.8, p = .002). The age-standardized prevalence of tension-type headache was 29.0%, higher among younger people. The estimated prevalence of all headaches on ≥15 days/month was 11.2% (that of probable medication-overuse headaches was about 70%). **Conclusion:** The prevalence of primary headaches was 63.9%, with migraines being 24.2%, and tension-type headaches 29.0%. Female gender, higher education level, and family history were associated risk factors for primary headaches. There was a relatively high prevalence of headaches on ≥15 days/month and those with probable medication overuse headaches.

Keywords: Migraine, Tension-type headache, Medication-overuse headache, Prevalence, Mongolia.

Introduction

Headache disorders are the most prevalent public-health problem, affecting people in all countries [1]. The Global Burden of Disease Study 2010 found tension-type headache (TTH) and migraines to be the 2nd and 3rd most prevalent disorders worldwide [2]. Besides low productivity in the workplace, individuals with primary headachesalso incur a financial burden, spending money ondiagnostic tests, procedures, and medications. In some European countries, an individual with

medication-overuse headaches (MOHs), migraines, and TTHs spend 3561, 1222, and 303 EURO per year, respectively [3]. Nevertheless, knowledge of headache disorder prevalence, on which the Global Burden of Disease depends, remains incomplete [4]. Furthermore, a charitable nongovernmental organization registered in the United Kingdom called Lifting The Burden: in conjunction with the WHO, has developed specific standardized headache assessment methodologies [5,6]. Using Lifting The Burden assessment tools, regional variations in headache prevalencehave been identified. Of particular interest are the data from Russia and China countries which border Mongolia [7,8]. These countries have a strikingly different prevalence for three types of headaches, with a high prevalence in Russia for migraines (20.8%) and TTHs (30.8%) and, especially, headaches on ≥15 days/month (10.5%), compared to China, where the prevalencefor these headaches were notably below global averages (9.3%, 10.8%, and 1.0%, respectively). However, headache disorders were still a substantial cause of illness.

There are no epidemiological data on headaches in Mongolia. Across the world, the knowledge gap is slowly being filled by a series of population-based studies supported by Lifting The Burden [9-12]. We undertook a population-based survey in Mongolia as part of this series. We focused on the headache disorders of public-health importance: migraine, TTH, medication-overuse headache, and headaches occurring on ≥15 days/month. This paper describes the prevalence of these disorders 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, we selected and interviewed a sample representative of the general population of the country. Using door-to-door cold calling, and a random selection of house holds, one adult member of each biologically-unrelated family within each household was surveyed. The selected participant (and only this person) was included in the sample. Trained interviewers employed a structured questionnaire applying the International Classification of Headache Disorders diagnostic criteria for primary headache disorders. The survey also recorded current treatments used and health-care utilization for headaches.

We performed a pilot study to ensure the methods used in this study worked before the commitment of resources to the research we report here.

Study Population and Sample Size

The survey included a total of 2043 citizens 18-65 years of age, from five study areas to provide an appropriate mix of urban/rural participants from throughout the country. Forty percent were from Ulaanbaatar, and 15 percent were from each offour aimags, Zavkhan (Western region), Arkhangai (Khangai region), Omnogovi (Gobi region), and Dornod (Eastern region).

Data Collection Instrument

Data was collected using the HARDSHIP structured questionnaire [13]. The questionnaire was adapted and translated into the Mongolian language following Lifting The Burden's translation protocol for hybrid documents. It included demographic inquiry and a headache screening question ("Have you had a headache during the last year?"), followed by diagnostic questions basedon the International Classification of Headache Disorders, 2nd edition (ICHD-II), and inquiries into the burden for those reporting headaches. We asked any participant reporting more than one headache type to focus only on the one that was subjectively the most bothersome for purposes of description, diagnosis, and prevalence counting. In the pilot study, the diagnostic part of the questionnaire had a specificity and sensitivity for migraines of 85% (95% CI: 81–89) and 63% (52–72), and for TTHs of 81% (76–86) and 57% (48–65) [14].

Statistics and Analyses

Data were entered into a secure database, and statistical analyses performed using EPI INFO and SPSS 15. Diagnoses were made not by the interviewers but by computerized algorithms from the recorded survey responses. Participants reporting headaches on ≥15 days/month were first separated, and described as a distinct group, with those also reporting regular use of acute headaches medication on >10 days/month considered tohave a probable medication-induced headache (pMOH). To all others, the algorithms applied ICHD-II diagnostic criteria in the order: migraine, TTH, probable migraine, probable TTH [15]. Cases of migraines, probable migraine, and TTHs, and probable TTH, were then combined for prevalence estimation and further analyses [16]. The remaining cases were unclassified. We used proportions,

95% confidence intervals (CIs), medians, means, and standard deviations (SDs) to summarizethe distributions of variables and chi-square, Student's t-test for significant differences. We calculated odds ratios (OR) to test for associationsin bivariate analysis and adjusted odds ratiosusing 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. We obtained informed consent from all participants.

Results

A total of 2,379 households were visited. Those who did not respond (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 of which 812 were male, 39.7%, 1,231 female (60.3%), with a mean age 38 ± 13.4 years, 843 (41.3%) from Ulaanbaatar, and 1,200 (58.7%) from urban areas. 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 Table1.

Headache Prevalence

Of the 2,043 participants, 1,350 reported headaches in the

Table 1. The sociodemographic 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	123 (60.3)	51.55
Age (years)		
18-24	446 (21.8)	17.42
25-34	536 (26.2)	29.3
35-44	427 (20.9)	21.3
45-54	370 (18.1)	17.5
55-65	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	

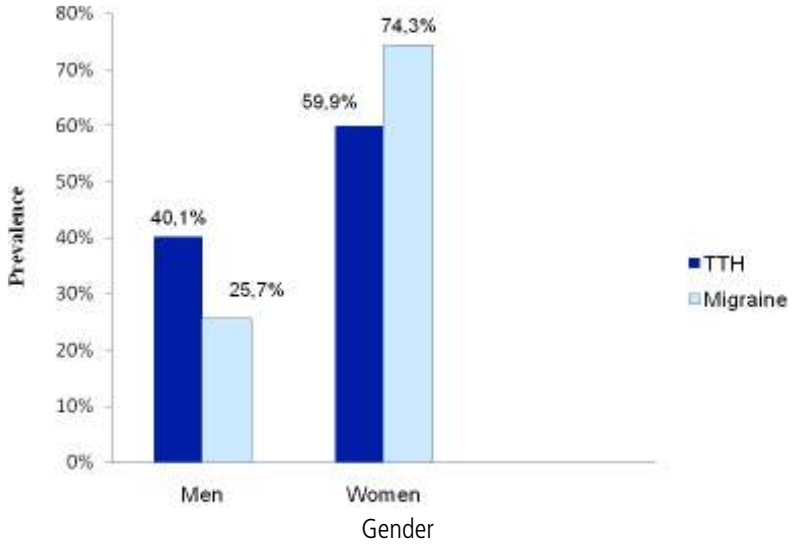

Figure 1. Primary headaches by gender

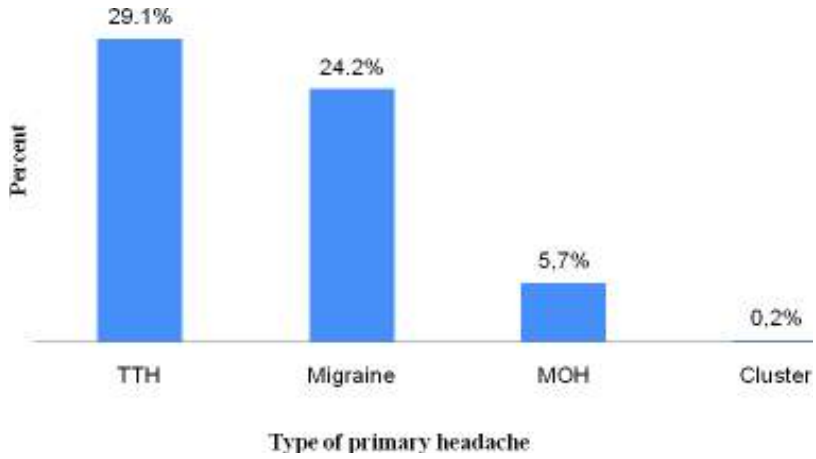

Figure 2. Prevalence of primary headache disorders.

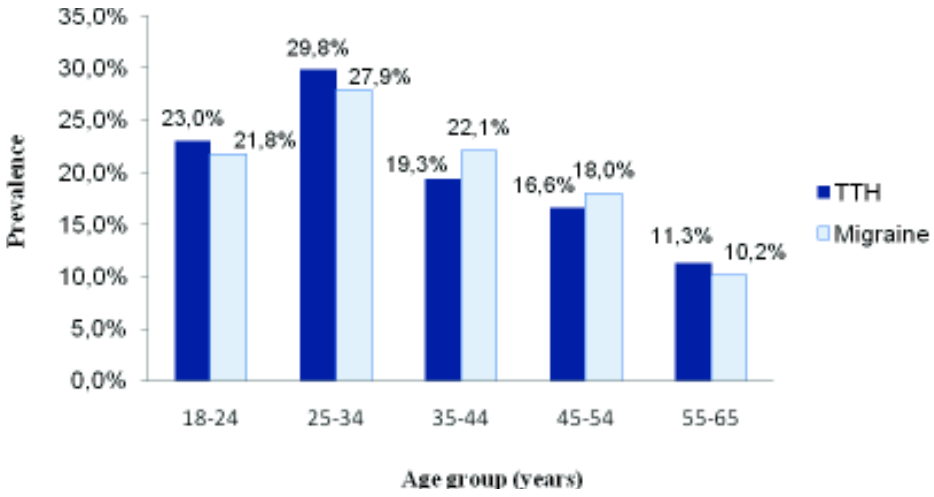

Figure 3. Tension-type headaches and migraines by age group.

last year. The crude prevalence of any headache in the study population was 66.1%, with female preponderance (95.3% vs. 48.0% in males; p ≤ .0001). The crude prevalence of migraines and TTHs was higher in women compared to men (p < .0001) (Figure 1).

Migraine

The crude prevalence of migraines was 24.2% (n = 492), 8.7% (n = 178) definite and 15.4% (n = 314) probable, significantly greater in female than male participants (p<.0001) in all age groups. The prevalence of migraines increased from young adulthood (18-24 years), reaching the maximum between 25-34 years of age (Figure 3).

Multivariate logistic regression confirmed that the occurrence of migraines was associated with sex, education, and family history (OR 2.4, 95% CI 1.9; 2.9, p≤ .0001). Moreover, there was an increase in the prevalence of migraines related to the level of education, having increased gradually from the elementary to high school (OR 3.0, 95% CI 1.5; 5.8, p = .002) (Table 2). Family history (OR 1.81, 95% CI 1.42; 2.30, p≤ .0001) was also associated with an increased prevalence of migraines.

Tension-Type Headaches

The crude prevalence of TTHs was 29.1% (596), of which 20.7% (n = 423) were definite and 8.4% (n = 173) probable. The mean age of those with TTHs was 37.7 ± 5.24 years, with no significant gender difference (males 29.4% vs. female 29.0%), increasing from young adulthood (18-24 years) and peaking at 25-34 years of age (p = .198) (Figure 2). TTHs tended to increase with the higher education level (p = .137) but had a strong association with a family history of TTHs (p ≤ .0001) (Table 3).

Headaches ≥15 days/month and probable medication over-

Table 2. Logistic regression analyses of associations of migraines with risk factors.

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	.0001	1.912	1.416	2.582	.0001
Age groups									
	18-24	1				1			
	25-34	1.10	0.83	1.47	.503	1.003	0.711	1.417	.985
	35-44	1.10	0.81	1.49	.558	1.027	0.714	1.478	.884
	45-54	0.99	0.72	1.37	.951	0.751	0.517	1.092	.133
	55-65	0.80	0.56	1.13	.199	0.806	0.53	1.226	.313
Educational level									
	Elementary	0.34	0.17	0.66	.002	0.355	0.169	0.744	.006
	Secondary	0.84	0.67	1.04	.108	0.942	0.724	1.225	.655
	College	0.94	0.70	1.25	.666	1.114	0.788	1.575	.54
	University	1				1			
Family history									
	No	1				1			
	Yes	1.81	1.42	2.30	.0001	1.822	1.412	2.35	.0001
Alcohol									
	No	1				1			
	Yes	0.68	0.52	0.88	.004	1.074	0.782	1.476	.658
Smoking									
	Nonsmoker	1				1			
	Smoker	0.84	0.65	1.09	.193	1.155	0.803	1.662	.438

Table 3. Logistic regression analyses of associations of tension-type headaches (TTHs) with risk factors.

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	1.02	0.84	1.24	.816	2.00	1.49	2.69	.0001
Female	1				1			
Age groups								
18-24	1				1			
25-34	1.15	0.87	1.52	.317	0.95	0.68	1.35	.789
35-44	0.84	0.62	1.13	.244	0.71	0.49	1.03	.071
45-54	0.88	0.64	1.20	.408	0.90	0.62	1.30	.558
55-65	0.74	0.53	1.03	.075	0.94	0.62	1.43	.777
Educational level								
Elementary	0.67	0.40	1.14	.137	0.89	0.47	1.67	.706
Secondary	0.75	0.61	0.93	.009	0.76	0.59	1.00	.046
College	0.88	0.66	1.16	.359	0.90	0.63	1.28	.555
University	1							
Family history								
No	1				1			
Yes	0.35	0.27	0.46	.0001	0.38	0.29	0.49	.0001
Alcohol								
No	1				1			
Yes	1.21	0.96	1.53	.115	0.91	0.67	1.25	.566
Smoking								
Nonsmoker	1				1			
Smoker	0.93	0.73	1.19	.567	0.74	0.52	1.05	.09

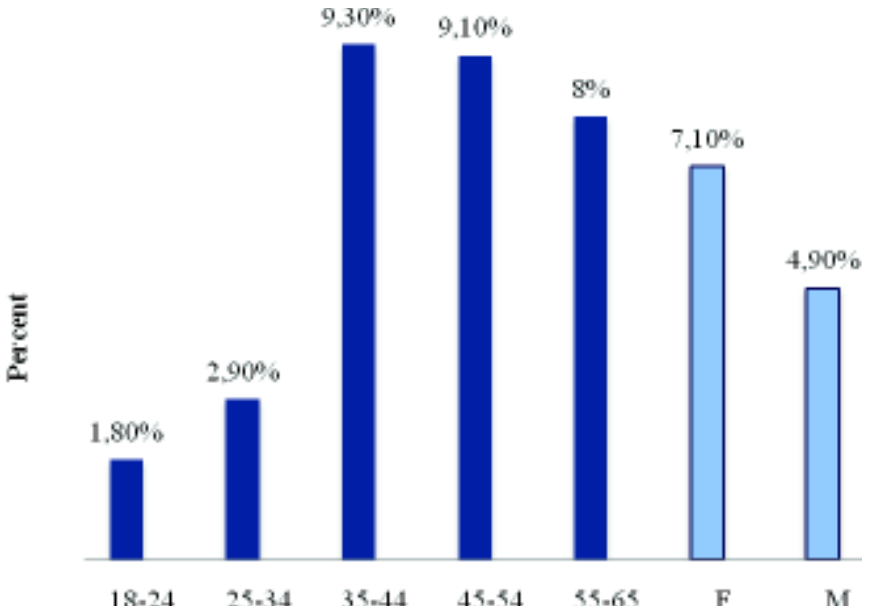

Figure 4. Probable medication over-use headaches (pMOHs) by age in years and gender.

use headache (pMOH).

The crude prevalence of all headaches on ≥15 days/month was 10.7%, among which pMOHs were diagnosed in 5.7% (116) participants, of whom 29.4% were men and 70.5% were women with an average age of 45.6 ± 11.4 and 43 ± 12.7 years, respectively (Figure 4).

The prevalence of pMOHs was related to gender (female to male ratio 1:4), age (increasing 3-fold in age groups above 35-65 years), and low education (odds ratios for secondary vs. elementary education: 0.35: college+ vs. elementary: 0.20). The most commonly overused medications were compound analgesic drugs (acetylsalicylic acid, acetaminophen, and caffeine).

Among the participants 38.6% used medications, 28% of the people took one drug, 8.5% took two drugs, and 2% used three or more drugs. Non-steroid anti-inflammatory drugs (NSAID) were the most commonly taken byheadache patients.

We compared the urban dwellers of Ulaanbaatar (n = 817) with the rural participants from the four aimags (n = 1,226) using binary logistic regression. Migraines were less frequent among the latter (OR 0.80, 95% CI 0.56; 1.13, p= .0326). TTHs showed no differences, but, on the other hand, pMOHs were considerably more common in rural areas (OR 2.4, 95% CI 1.1; 3.5, p = .032). There were no differences in migraines comparing single participants (n = 481) with those who were married (n = 1,341), widowed, divorced, or separated (n = 221). TTHs wereless common in married females than single (OR 0.75, 95% CI 0.8-1.1, p = .0497). Marital status had no impact on the risk of pMOHs.

Discussion

We found that the crude prevalence of all headaches was 66.1%, from which 1305 (63.9%) reported symptoms consistent with primary headaches. The prevalence of headaches was higher in women than in men. More than half of people with primary headaches suffered from TTHs and migraines. The prevalence of migraines and TTHs was age-related, increasing from 18-24 years and reaching the maximum during 25-34 years. Migraine was substantially more common among females than males, with age- and gender-adjusted prevalence of 24.2%. TTH, with no gender difference, had an age- and gender-adjusted prevalence of 29.1%. Associations with age were not strong, but prevalences for TTHs and migraines were least for those between 55-65 years of age. Headache on ≥15 days/month (age- and gender-adjusted prevalence 10.7%) was also more common in females than males. Over half of cases (5.7%) were pMOH, which showed a strong association with age, peaking in middle years with a 5-fold increase in prevalence.

According to some studies, the prevalence of primary headaches varies in different countries. Studies carried out in the Russian Federation, China, Turkey, Tibet, and Brazil showed that the prevalence of primary headaches was 44.6%, 52.3%, 23.8%, 45.3%, and 67.6%, respectively [7,8,17,18,19]. Our study showed a relatively high prevalence of primary headaches compared to other countries but is very similar to the results in Russians.

The prevalence of migraines among the population of Mongolia relatively high compared to the mean global estimate of 14.7%. 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 neighboring China butsimilar to the prevalence in another neighbor, Russia, at 20.8%. We used the same methodology and same diagnostic questionnaire as China and Russia indeed, Lifting The Burden has supported studies using similar methods and the same questionnaire in many other countries, cultures, and languages: Zambia, Ethiopia, Nepal, Pakistan, Saudi Arabia, and Morocco. The highest prevalence of migraines was estimated in Nepal (34.1%) and in India (25.2%). As noted earlier, the prevalence in China appears to match Japan and Taiwan although these studies were done 20 years earlier using different methodologies and may not have included probable migraines [20].

A gender-related increase in the prevalence of migraines in women was especially significant. Moreover, there was an increase in the prevalence of migraines related to the level of education, increasing gradually from elementary to high school. Other studies identified a relatively lower prevalence of primary headaches compared to our results. For instance, in Australia, the prevalence of migraines was 10.2%, in Canada, 8.3%, with 11.8% and 4.7% in women and men, respectively [20].

It is intriguing to see how Mongolia compares with its neighbors, Russia and China. The prevalence of headaches in Mongolians matches Russian very closely: migraines 23.1% vs. 20.8%, TTHs 29.1% vs. 30.8%, and headaches on ≥15 days/month 10.7% vs. 10.5%. Our study, therefore, nicely corroborates

the Russian study. However, the prevalence of headaches in Mongolians is greatly at odds with China, its southern neighbor (9.3%, 10.8% vs.1.0%, respectively). Factors influencing the occurrence of TTHs are lifestyle, social factors, and stress. In our study, the TTHs prevalence was 29.0%, whereas, in Russia, it was 30.8%, and in China, 10.8%. The results of more than 80 studies involving more than 66,000 people showed that the prevalence of TTHs was higher in developed countries with a higher level of urbanization and stress.

The level of education influences the occurrence of headaches. The higher the level of education there is, the higher the prevalence. Migraines and TTHs occur three times and one and half times higher in people with ahigher level of education. Moreover, among university students included in our study, 35.4% were diagnosed with TTHs.

We estimated that the prevalence of chronic headache disorders in Mongolia is high compared to many other countries worldwide, although similar to that reported in neighboring Russia.

This study was nationwide and conducted according to the published standardized methodology gathering, a representative sample of adults with a very high participation rate (98.3%). The most relevant limitation of this study was evidence of gender-biased sampling because male workers were commonly absent for extended periods, reducing their probability of selection, despite many efforts on our part to minimize this bias by multistage randomization.

Conclusions

The prevalence of primary headache disorders among the adult population of Mongolia was relatively high compared with the world average. The 5.7% prevalence of medication overuse headaches could be the result of the irrational use of pain killers among the population with headaches. Primary headache disorders were associated with female gender, education level, and family history. However, research is needed to study other associations of primary headaches. These disorders require special attention, best provided within structured headache services coupled with public educational programs, both of which are needed in Mongolia. This new evidence will inform national health policy and provide a basis for the health-care needs assessment.

Acknowledgment

The project was conducted within the Global Campaign against Headache, led by the nongovernmental organization Lifting The Burden in official relations with the World Health Organization.

Conflict of Interest

The authors declare that they have no competing interests.

References

1. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Steiner TJ, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia 2007. DOI:10.1111/j.1468-2982.2007.01288.x.
2. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M. 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. DOI:10.1016/S0140-6736(12)61729-2.
3. Jensen R, Stovner LJ. Epidemiology and comorbidity of headache. Lancet Neurol 2008. DOI:10.1016/S1474-4422(08)70062-0.
4. Steiner TJ. Lifting the bBurden: the global campaign to reduce the burden of headache worldwide. J Headache Pain 2005. DOI:10.1007/s10194-005-0241-7.
5. Steiner TJ, Birbeck GL, Jensen R, Katsarava Z, Stovner LJ, et al. Lifting the burden: the first 7 years. J Headache Pain 2010. DOI:10.1007/s10194-010-0264-6.
6. Timothy JS, Birbeck GL, Jensen. R, Katsarava.Z, Stovner LJ, et al. The global campaign, world health organization and lifting the burden: collaboration in action. J Headache Pain 2011. DOI:10.1007/s10194-011-0342-4.
7. Timothy JS, Gururaj G, Andrée C, Katsarava Z, Ayzenberg I, Sheng-Y. Diagnosis, prevalence estimation and burden measurement in population surveys of headache: presenting the HARDSHIP questionnaire. J Headache Pain 2014. DOI:10.1186/1129-2377-15-3.
8. Girish B, Gururaj G, Rajesh K, Subbakrishna D, Timothy J, et al. The burden of headache disorders in India: methodology and questionnaire validation for a community-based survey in karnataka state. J Headache Pain 2012. DOI:10.1007/

s10194-012-0474-1.

9. Stovner LJ, Jumah M, Birbeck GL, Gururaj G, Jensen R, Katsarava Z. The methodology of population surveys of headache prevalence, burden and cost: principles and recommendations from the globalcampaign against headache. J Headache Pain 2014. DOI:10.1186/1129-2377-15-5.
10. Steiner TJ. World headache alliance: lifting the burden: the global campaign against headache. Lancet Neurol 2004. DOI:10.1016/S1474-4422(04)00703-3.
11. Steiner TJ, Jacob Stovner L, Katsarava Z, Jensen R, Birbeck GL, Martelletti P. Lifting the burden: The global campaign against headache. In: handbook of headache. Milano: Springer Milan 2011. DOI:10.1007/978-88-470-1700-9_58.
12. Ayzenberg I, Katsarava Z, Sborowski A, Chernysh M, Osipova V, Tabeeva G. The prevalence of primary headache disorders in Russia: A countrywide survey. Cephalalgia. 2012. DOI:10.1177/0333102412438977.
13. Headache classification subcommittee of the international headache society. The international classification of headache disorders. Cephalalgia 2004;1: 24-49.
14. Sheng Y, Xiu C, Gang Z, Xiao Y, Xiang Q, Timothy J. The prevalence and burden of primary headaches in China: a population-based door-to-door survey. Headache 2012;52: 582-91.
15. Mbewe E, Zairemthiama P, Yeh H, 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. DOI:10.1186/s10194-015-0515-7.
16. Girish N, Kulkarni B, Gururaj G, Rajesh K, Kumaraswamy D, Timothy J. The burden of headache disorders in India: methodology and questionnaire validation for a community-based survey in Karnataka. J Headache Pain 2012; 13: 543–50.
17. Steiner TJ, Gururaj G, Andrée CZI, Sheng Y. Diagnosis, prevalence estimation and burden measurement in population surveys of headache: presenting the HARDSHIP questionnaire. J Headache Pain 2014. DOI:10.1186/1129-2377-15-3.
18. Dong Z, Di H, Dai W, Liang J, Pan M, Zhang M, et al. Application of ICHD-II Criteria in a Headache Clinic of China. PLoS ONE 2012. DOI:10.1371/Journal.pone.0050898.
19. Guntev TS, Tsagaankhuu D. Neurology 3rd edition. Ulaanbaatar, Mongolia: Admon print; 2014. p 756.
20. Stovner LJ, Steiner TJ. Migraine is the third cause of disability in under 50s. J Headache Pain 2016. DOI: 10.1186/s10194-015-0544-2.