

The prevalence of primary headache disorders in Russia: A countrywide survey

Cephalalgia
32(5) 373–381
© International Headache Society 2012
Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/0333102412438977
cep.sagepub.com



**I Ayzenberg¹, Z Katsarava², A Sborowski², M Chernysh³,
V Osipova⁴, G Tabeeva⁴, N Yakhno⁴, TJ Steiner⁵ and On behalf
of Lifting the Burden**

Abstract

Objective: To estimate the 1-year prevalences of primary headache disorders and identify their principal risk factors in the general population of Russia.

Methods: A countrywide population-based random sample of 2725 biologically unrelated adults in 35 cities and nine rural areas were interviewed in a door-to-door survey using a previously validated diagnostic questionnaire.

Results: Of the 2725 eligible adults contacted, 2025 (74.3%) responded (females 52.6%, mean age 39.5 ± 13.4 years). Of these, 1273 (62.9%) reported headache 'not related to flu, hangover, cold, head injury' occurring at least once in the previous year. The gender- and age-standardized 1-year prevalence of migraine was 20.8%. Female gender (OR) = 3.8; 95% confidence interval (CI) 2.8–5.1) and obesity (OR = 1.5; 1.1–2.1) were positively associated with this type of headache. The gender- and age-standardized 1-year prevalence of tension-type headache (TTH) was 30.8%. TTH was more prevalent in urban than in rural areas (OR = 1.6; 1.3–2.0).

Headache on ≥ 15 days/month was reported by 213 (10.5%) respondents (gender- and age-standardized prevalence 10.4%), and associated with low socioeconomic status (OR = 3.4; 2.4–4.9), obesity (OR = 3.0; 2.1–4.3), female gender (OR = 2.9; 2.1–4.1) and age over 40 years (OR = 2.6; 1.9–3.6). The majority of these respondents (68.1%) overused acute headache medications.

Conclusion: The study demonstrated a high prevalence of migraine and a very high prevalence of headache on ≥ 15 days/month, and revealed unmet health-care needs of people with headache in Russia.

Keywords

migraine, tension-type headache, chronic daily headache, prevalence, Russia

Date received: 14 September 2011; revised: 20 October 2011; 8 November 2011; 27 November 2011; 16 December 2011; 10 January 2012; accepted: 17 January 2012

Introduction

Primary episodic headache disorders, mostly migraine and tension-type headache (TTH), and a group of chronic headache disorders occurring on ≥ 15 days/month, with or without medication overuse, affect up to 80% of general populations in countries worldwide where prevalences have been estimated (1). They are important causes of morbidity, loss of productivity and impaired quality of life, and they place substantial and largely unmet demands on health services. Recent studies in the small Republics of Georgia and Moldova revealed that, in these countries, headache disorders are underestimated in scope and scale, under-recognized as a medical problem and undertreated (2,3). Very little is known of the prevalence and burden of headache

disorders elsewhere in Eastern Europe, and particularly in Russia.

We present here the results of a survey conducted countrywide in Russia on a random population-based sample of adults. Its objective was to estimate the prevalences, among adults, of the headaches of

¹Department of Neurology, University of Bochum, Germany

²University of Essen, Germany

³Russian Academy of Sciences, Russia

⁴First Moscow State Medical University, Russia

⁵Norwegian University of Science and Technology, Norway

Corresponding author:

Ilya Ayzenberg, Gudrunstraße 56, Bochum, 44791, Germany
Email: ilya_ayzenberg@yahoo.com

public-health importance: migraine, TTH and headache occurring on ≥ 15 days/month, particularly medication-overuse headache (MOH).

Methods

Ethics

The study protocol was approved by the ethics committee of the Russian Academy of Sciences. All respondents were informed of the purpose of the survey and gave their verbal consent before participating.

Survey

The survey was conducted in 2008. The study sample comprised 2725 randomly selected biologically unrelated adults aged 18–65 years. The sampling procedure has been reported in detail previously (4). Briefly, the survey was carried out in 44 settlements in six of the seven Federal districts of Russia (approximately 6% of the population, living in areas geographically difficult to reach or with very low population density, including the seventh, Far-East region, were ignored). To make it representative of the population of the country, the sample was derived according to the multi-clustering procedure and probability proportional to size principle as previously reported (5). The survey was conducted face-to-face by trained non-medical interviewers employed by the Russian Institute of Sociology, who called unannounced at households and followed a structured questionnaire.

Questionnaire

We used the Russian-language translation of the questionnaire developed by *Lifting the Burden*: the Global Campaign against Headache (4). It had four parts: (a) personal and demographic data; (b) medical enquiry, including questions related to migraine, TTH and the use of acute and preventative headache medication; (c) headache-related burden evaluation, including quality of life (QoL); and (d) socioeconomic status and enquiry into willingness to pay (WTP) for effective treatment. Respondents reporting headache 'not related to flu, hangover, cold or head injury' occurring at least once in the previous year were classified as cases. Further diagnostic questions were based on ICHD-II criteria (6), with the limited aim of identifying migraine and TTH, the headache disorders of major public-health significance. Diagnoses were not made during the interview; afterwards, responses were translated into diagnoses according to an algorithm following ICHD-II and applying the criteria first for definite migraine, then definite TTH, then probable migraine and, finally,

probable TTH. Respondents identifying more than one type of headache were asked to focus on the one that was subjectively most bothersome. The algorithm developed to translate responses into a diagnosis accordingly allowed the diagnosis of only one headache entity, either migraine, which could be definite or probable, or TTH, again definite or probable. The validation of the questionnaire in the Russian language has been reported previously: the sensitivity and specificity for migraine were 77% and 82% and for TTH were 64% and 91%, respectively (4).

Burden was assessed in three domains: headache-attributed lost time (from work, from home chores and socially) by the HALT Index (7); impact of headache on QoL by the WHOQoL-8 question set (8) (applied also to a control sub-sample without headache) and utilization of health care. WTP was determined through a question set based on the bidding game method (9). The results of this enquiry will be reported elsewhere.

Statistics

The principal outcome variables of the study were the crude and gender- and age-standardized 1-year prevalences of migraine, TTH and any headache occurring on ≥ 15 days/month.

Data analysis was performed by SPSS 15.0. Comparisons of interval-scaled variables were made using Student's t-test and of ordinal-scaled variables using the χ^2 test. Crude prevalences of headache disorders were calculated in percentages, with 95% confidence intervals (CI). We standardized the prevalences to the general population of Russia in terms of age and gender (10). We used univariate and multivariate logistic regression models to evaluate characteristics associated with each headache type. The following variables were included into the model: gender (male vs. female), age (≥ 40 vs. < 40 years), marital status (married vs. single), habitation (urban vs. rural), education (high school or university graduate vs. primary or secondary school only), wealth (wealthy and intermediate vs. poor) and body mass index ($BMI \geq 30$ vs. $BMI < 30$). We calculated crude and adjusted odds ratios (OR) and their corresponding 95% CI.

Results

Of 2725 eligible people contacted, 588 (21.6%) refused the interview and another 112 (4.1%) interrupted the interview or provided inconsistent and unusable answers. Therefore, data from 2025 (74.3%) respondents were available for analysis, of whom 1484 (73.3%) were city-dwelling and 541 (26.7%) lived in rural settlements. Distribution of the sample

population across six Federal districts by urban vs. rural dwelling corresponded those in the country population (data not shown). The demographic characteristics of the sample (age, gender, marital status and educational level) were highly comparable to those in the All-Russia Population Census 2002 (10) (Table 1).

Table 1. Comparison of country and survey populations for gender, age and education

	General population	Study sample
Gender (male:female) (%)	46.6:53.4	47.4:52.6
Age (%)	39.2	39.5 ± 13.4
18–29 years	26.4	29.1
30–39 years	22.0	20.1
40–49 years	24.9	25.3
50–59 years	21.2	16.5
60–64 years	5.3	9.0
Marital status (%)		
Married	61.4	63.7
Never married	22.6	22.9
Divorced/widowed	16.0	13.4
Educational level (%)		
High	23.8	20.7
Low	76.2	79.3

Of the 2025 respondents, 1273 reported headache in the previous year, a 1-year prevalence of 62.9% (95% CI 60.8–64.5%). The calculated gender- and age-standardized 1-year prevalence was 63.1% (95% CI 61.0–65.2%). Episodic headache was reported by 1060 and headache on ≥15 days/month by 213 (Figure 1). Headache type could not be classified in 23 (1.1%) respondents with episodic headache and 6 (0.3%) with headache on ≥15 days/month. Over one-quarter (27.2%) of respondents reported more than one type of headache.

Migraine

Definite migraine was diagnosed in 192 (9.5%; 95% CI 8.2–10.8%) respondents and probable migraine in a further 219 (10.8%; 95% CI 9.5–12.2%). Thus the overall 1-year prevalence of migraine (all migraine) was 20.3% (95% CI 18.5–22.1%). Distribution of all migraine by age and gender is shown in Figure 2A. The calculated gender- and age-standardized 1-year prevalence of all migraine in the general population was 20.8% (95% CI 19.0–22.6%).

The average frequency of all migraine was 4.4 ± 3.5 days/month (females 4.6 ± 3.5, males 3.7 ± 3.5); 49 (12%) respondents with all migraine reported headache on < 1 day/month, 164 (40%) on 1–3 days/month and 197 (48%) on 4–14 days/month. Migraine attacks

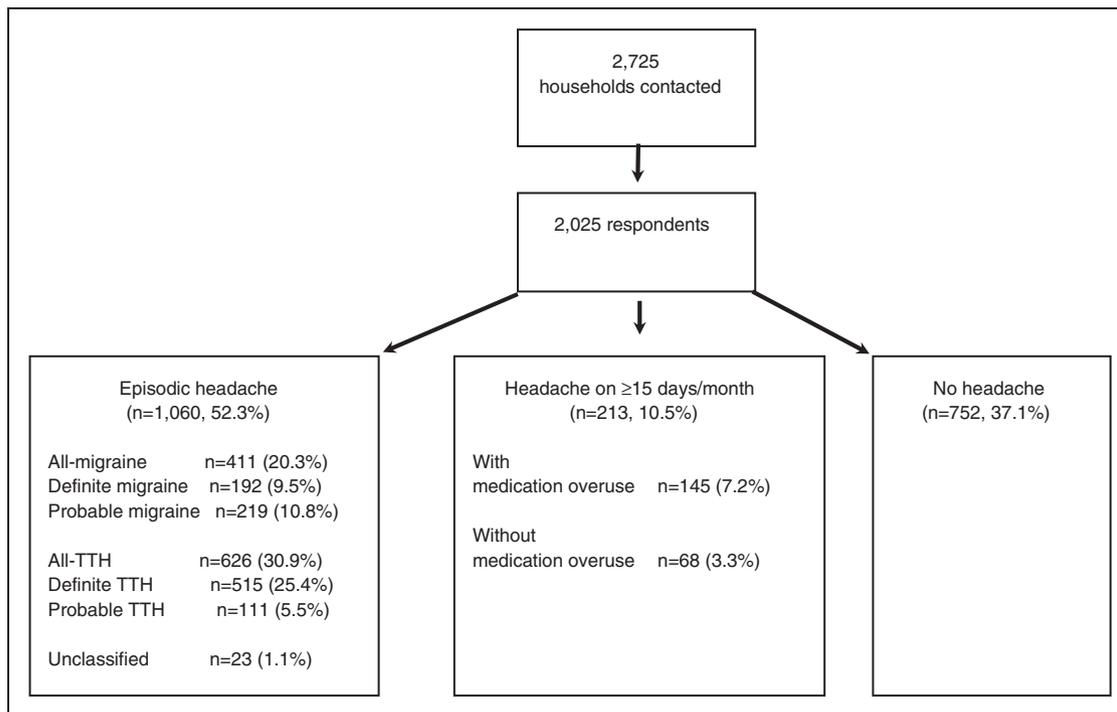


Figure 1. Distribution of headache disorders in the surveyed sample.

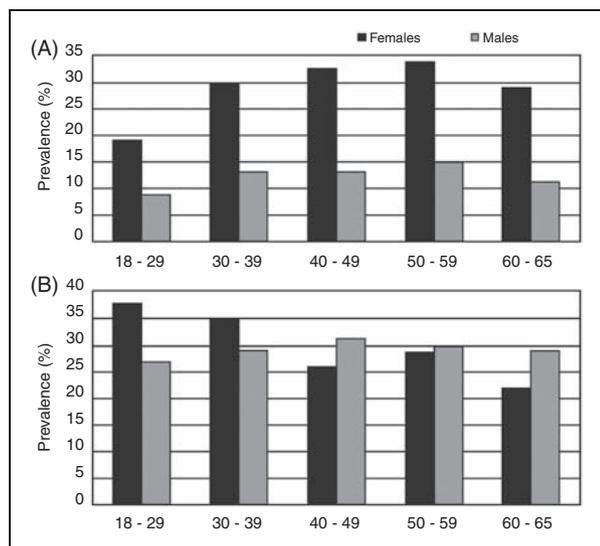


Figure 2. One-year prevalence of all migraine (A) and all TTH (B) in relation to age (years) and gender in the studied population.

lasted on average 15.0 ± 30.3 hours (females 15.8 ± 20.4 , males 13.0 ± 47.3).

Only one-quarter (101; 24.6%) of respondents with all migraine had consulted a doctor because of headache: three had seen a headache specialist, 32 a neurologist and 66 had visited general practitioners. Nearly two-thirds (64.5%) reported taking acute headache medications: 94 (22.9%) used only simple analgesics, 167 (40.6%) used combined analgesics, two (0.5%) used triptans and one used ergotamine; another used a selective cyclooxygenase-2 (COX-2) inhibitor. Only three respondents with all migraine (0.7%) had preventative treatment.

Univariate regression analysis found female gender, obesity and low socioeconomic status to be associated with all migraine (Table 2). Multivariate regression analysis identified positive associations with female gender (OR 3.8; 95% CI 2.8–5.1) and obesity (OR 1.5; 95% CI 1.1–2.1).

Tension-type headache

We found 515 respondents with definite TTH (25.4%, 95% CI 23.5–27.3%) and a further 111 with probable TTH (5.5%; 95% CI 4.5–6.5%). Therefore, the overall 1-year prevalence of TTH (all TTH) was 30.9% (95% CI 28.9–32.9%). Distribution of all TTH by age and gender is shown in Figure 2B. The calculated gender- and age-standardized 1-year prevalence of all TTH in the general population was 30.8% (95% CI 28.8–32.8%).

The mean frequency of all TTH was 3.5 ± 3.1 days/month (females 3.7 ± 3.0 , males 3.2 ± 3.3): 111 (17.7%)

respondents reported headache on <1 day/month, 284 (45.4%) on 1–3 days/month and 231 (36.9%) on 4–14 days/month. Duration of all TTH was, on average, 7.4 ± 18.1 hours (females 6.2 ± 14.3 , males 8.7 ± 21.6).

Just 59 (9.4%) respondents with all TTH had visited a doctor because of headache: one had seen a headache specialist, 15 a neurologist and 43 a general practitioner. A small majority (55.6%) reported using acute headache medications: 108 (17.3%) used only simple analgesics, 239 (38.2%) used combined analgesics and one used a selective COX-2 inhibitor.

Univariate regression analyses revealed higher education level and urban habitation to be associated with all TTH (Table 2). In multivariate regression analysis, only the association with urban habitation survived (OR 1.6; 95% CI 1.2–2.2).

Headache on ≥ 15 days/month

We found 213 respondents reporting headache on ≥ 15 days/month (1-year prevalence 10.5%; 95% CI 9.2–11.9%). The calculated gender- and age-standardized 1-year prevalence of headache on ≥ 15 days/month was 10.4% (95% CI 9.1–11.7%). Average headache frequency in this group was 23.1 ± 6.7 days/month. The headache characteristics described by 138 (64.8%) of these corresponded phenotypically to definite or probable migraine, and those described by 69 (32.4%) to definite or probable TTH. In six cases the headache type could not be classified. However, over two-thirds (145; 68.1%) were overusing acute headache medications: either simple (40; 18.8%) or combined analgesics (105; 49.3%); none overused ergots or triptans. Only four (1.9%) respondents reported having preventative medication.

Just over half (51.2%) had visited a doctor because of headaches: five (2.3%) had consulted a headache specialist, 41 (19.2%) a neurologist and 63 (29.6%) a general practitioner.

Univariate regression analysis identified associations with female gender, poverty, higher age, obesity, lower education and rural habitation (Table 3), and multivariate regression analysis confirmed age, female gender, obesity and low socioeconomic status as independent. Average income was 36% lower among respondents with headache on ≥ 15 days/month than among those with episodic headache. Medication overuse was not included in this modelling (see Discussion).

Discussion

In this study we present the first countrywide population-based door-to-door survey on primary headache disorders in Russia. We were able to achieve a response rate of 74.3%. Socio-demographic characteristics of the

Table 2. Characteristics associated with episodic migraine and tension-type headache (1-year prevalence, bold where significant)

Characteristic	Definite migraine n (%)	Odds ratio (95% CI)	All migraine n (%)	Odds ratio (95% CI)
Gender	58 (6.0)	Referent 1.0	143 (14.9)	Referent 1.0
Male (n = 960)				
Female (n = 1065)	216 (20.3)	4.0 (2.9 – 5.4)	406 (38.1)	3.5 (2.8–4.4)
Marital status	170 (13.3)	Referent 1.0	351 (27.4)	Referent 1.0
Married (n = 1282)				
Single/divorced/widowed (n = 737)	104 (14.1)	1.1 (0.8 – 1.4)	194 (26.3)	0.9 (0.8–1.2)
Educational level	222 (13.8)	Referent 1.0	426 (26.5)	Referent 1.0
Low (n = 1609)				
High (n = 414)	52 (12.6)	0.9 (0.7–1.2)	123 (29.7)	1.2 (0.9–1.5)
Habitation	63 (12.4)	Referent 1.0	137 (27.0)	Referent 1.0
Rural (n = 507)				
Urban (n = 1518)	211 (13.9)	1.1 (0.8–1.5)	412 (27.1)	1.0 (0.8–1.3)
Wealth	96 (12.7)	Referent 1.0	191 (25.2)	Referent 1.0
High/intermediate (n = 757)				
Low (n = 1003)	153 (15.2)	1.2 (0.9–1.6)	302 (30.1)	1.3 (1.0–1.6)
BMI	164 (13.0)	Referent 1.0	322 (25.5)	Referent 1.0
<30 (n = 1265)				
≥30 (n = 251)	43 (17.1)	1.4 (1.0–2.0)	96 (38.2)	1.8 (1.4–2.4)
Definite TTH				
Characteristic	Definite TTH n (%)	Odds ratio (95% CI)	All TTH n (%)	Odds ratio (95% CI)
Gender	266 (27.7)	Referent 1.0	310 (32.3)	Referent 1.0
Male (n = 960)				
Female (n = 1065)	310 (29.1)	1.1 (0.9–1.3)	385 (36.2)	1.2 (1.0–1.4)
Marital status	368 (28.7)	Referent 1.0	444 (34.6)	Referent 1.0
Married (n = 1282)				
Single/divorced/widowed (n = 737)	206 (28.0)	1.0 (0.8–1.2)	249 (33.8)	1.0 (0.8–1.2)
Educational level	439 (27.3)	Referent 1.0	538 (33.4)	Referent 1.0
Low (n = 1609)				
High (n = 414)	135 (32.6)	1.3 (1.0–1.6)	155 (37.4)	1.2 (1.0–1.5)
Habitation	108 (21.3)	Referent 1.0	136 (26.8)	Referent 1.0
Rural (n = 507)				
Urban (n = 1518)	468 (30.8)	1.6 (1.3–2.1)	559 (36.8)	1.6 (1.3–2.0)
Wealth	221 (29.3)	1.1 (0.9–1.4)	265 (35.1)	1.1 (0.9–1.3)
High/intermediate (n = 757)				
Low (n = 1003)	272 (27.0)	Referent 1.0	339 (33.6)	Referent 1.0
BMI	372 (29.4)	Referent 1.0	448 (35.4)	Referent 1.0
<30 (n = 1265)				
≥30 (n = 251)	67 (26.7)	0.9 (0.6–1.2)	85 (33.9)	0.9 (0.7–1.2)

Table 3. Characteristics associated with headache on ≥ 15 days/month (1-year prevalence, bold where significant)

Characteristic		Headache on ≥ 15 d/m n (%)	Odds ratio (95%CI)
Gender	Male (n = 960)	54 (5.6)	Referent 1.0
	Female (n = 1065)	159 (14.9)	2.9 (2.1–4.1)
Marital status	Married (n = 1282)	127 (9.9)	Referent 1.0
	Single/divorced/widowed (n = 737)	85 (11.5)	1.2 (0.9–1.6)
Educational level	High (n = 414)	32 (7.7)	Referent 1.0
	Low (n = 1609)	181 (11.2)	1.5 (1.0–2.2)
Habitation	Urban (n = 1518)	141 (9.3)	Referent 1.0
	Rural (n = 507)	72 (14.2)	1.6 (1.2–2.2)
Wealth	High or intermediate (n = 757)	38 (5.0)	Referent 1.0
	Low (n = 1003)	153 (15.3)	3.4 (2.4–4.9)
BMI	<30 (n = 1265)	99 (7.8)	Referent 1.0
	≥ 30 (n = 251)	51 (20.3)	3.0 (2.1–4.3)
Age	≤ 40 years (n = 1049)	66 (6.3)	Referent 1.0
	>40 years (n = 975)	147 (15.1)	2.6 (1.9–3.6)

2025 respondents did not differ from those of general population. The previously validated Russian-language questionnaire had good specificity and sensitivity for migraine and moderate sensitivity and high specificity for TTH (4). Taking all of this into account, we present here what we believe to be reliable data for all Russia.

The 1-year headache prevalence of 63.1% in Russia is comparable to findings in the USA and elsewhere in Europe (11–17). The 1-year prevalence of migraine, at 20.8% (including definite and probable migraine), is higher than the mean of 13.7% reported in Europe (18) but in line with estimates from the Netherlands (19), France (20), Croatia (21), Brazil (22) and Korea (23). It is important to recognize the methodological differences between studies. Many surveys report the prevalence only of definite migraine and exclude probable migraine. We believe this approach to be incorrect and misleading, provided that diagnostic criteria are correctly applied. Only migraine and TTH occur in the general population as episodic headaches with high prevalence: therefore, except in a small number of cases, which can be ignored for epidemiological purposes, episodic headaches are one or the other. If they meet the criteria for neither definite migraine nor definite TTH but do fulfil those for probable migraine, then they probably are migraine and should, for epidemiological purposes, be considered as such. It is likewise for probable TTH. It should be recognized, too, that all questionnaire diagnoses are ‘probable’, the likelihood of their being correct defined by the true and false positive rates established in the validation study (4). Furthermore, the validation study itself combined definite and probable migraine as well as definite

and probable TTH to calculate these rates against ‘gold standard’ specialist diagnoses of migraine and TTH. The alternative approach treats probable migraine and probable TTH as though they were separate entities, which is unhelpful as well as nosologically absurd. Including both definite and probable migraine of course increased the estimated overall prevalence of migraine in our study, as it did in the FRAMIG study (from 11.2% to 21.3% (24)), and according to our argument this was correct. On the other hand, our questionnaire was less sensitive and more specific for TTH than for migraine, both of which, we acknowledge, would tend to under-diagnose TTH in favour of migraine, but not hugely.

Female gender and obesity are the principal factors associated with migraine in the Russian population. Greater prevalence of migraine in women is universally documented. Bigal et al. reported the association of obesity with migraine attack frequency and severity and with some clinical features such as photophobia, phonophobia and disability (25). Association of migraine with low socioeconomic status, which we found only with univariate analysis and which, therefore, was not independent, has been demonstrated in several countries with large socioeconomic disparities, such as the USA (26), Brazil (22) and the Republic of Georgia (2), and in Norway, with low disparities (27).

The 1-year prevalence of TTH in Russia is 30.8% (including definite and probable TTH). Worldwide, estimates of TTH prevalence are highly variable, but this figure is comparable to other estimates in Europe (e.g. 38% in Germany (12), 34.8% in Croatia (16) and 37.3% in the Russian-neighbour country of Georgia

(2)) and to 40.3% in the USA (14). It is, however, considerably lower than estimates 79% – 87% (2 studies) in Denmark (28,29), which were very careful to include infrequent episodic TTH. This disorder, occurring by definition less than once a month, is hardly significant as a cause of ill-health, and very likely to be ignored by respondents. Another possible reason for underestimating the prevalence of TTH is that we focused on the ‘most bothersome’ headache when two or more headache types coexisted in one respondent. The reasons were pragmatic: in questionnaire surveys of this type, respondents need to have only one headache type in mind when responding, or the results would be meaningless. Of migraine and TTH, when they coexisted, migraine was far more likely to be the more bothersome, which would mean that TTH could not in such cases be diagnosed by our questionnaire. Although it was theoretically possible to rerun the questionnaire for second (and third) most bothersome headaches, in practice few respondents would wish to give time to this, having already expounded on what troubled them most. In fact, 27.2% of respondents reported more than one type of headache, indicating that we might have underestimated the prevalence of TTH by up to this percentage. Here probably lies, to a large extent, the explanation of the insensitivity of our questionnaire to TTH. It is not the only one reason: the non-specific features of TTH themselves lead to insensitivity in diagnosis by questionnaire.

Only urban habitation, among the characteristics included in the model, was positively associated with TTH in Russia. In Croatia, the same was found to be associated with a higher prevalence of headache in general (30). A Danish study demonstrated an association between TTH and a stressful way of life (31). We did not study stressful life events, but urban dwelling, especially in multimillion metropolises such as Moscow or St Petersburg, may well be more stressful than living in rural areas of Russia. We could not confirm a higher prevalence of TTH in women, as has been reported elsewhere (31,32).

Most interestingly, we come to the prevalence of headache on ≥ 15 days/month: at 10.4%, this is more than double what has been reported in studies in Western Europe and the USA (33–37), but closer to (although still higher than) the estimated prevalences in neighbouring Georgia (7.6% (2)) and another developing country, Brazil (6.9–7.3% (15,38)). The key difference between our finding and the one from Georgia is that many of our cases were overusing medication (in the Brazil study, medication overuse was not mentioned).

We associated other factors with headache on ≥ 15 days/month: female gender, increased age, poverty and obesity. All these associations have been reported

previously (2,37–39). However, as in a number of other studies, overuse of headache drugs was the most potent risk factor by far: the majority of people with headache on ≥ 15 days/month were overusing medication, whereas we did not find anyone with low-frequency episodic headaches who was doing this. We did not include medication overuse in the regression model because the high OR would have overwhelmed it. Medication overuse is a behaviour largely driven by headache frequency, but promoted by advertising and made affordable by generic low-price over-the-counter analgesics. As in the Georgian study (2), we found that poverty was associated with headache on ≥ 15 days/month, surviving multivariate analysis despite the fact that it might be expected to reduce the probability of medication overuse. In both Georgia and Russia, countries of the former Soviet Union, transition from the socialist system to a market economy has resulted in large socioeconomic disparities. Few people with headache receive adequate medical care, as demonstrated by the finding, in Russia, that only 0.7% of people with migraine receive preventative medication. There is no formal evidence that adequate medical care does actually prevent the development of headache on ≥ 15 days/month, but it is expected to do so.

Although we observed in our sample that the headache phenotypes among those with headache on ≥ 15 days/month corresponded with migraine in 6.8% and TTH in 3.4% (another 0.3% could not be classified), those who were overusing acute headache medications (68.1%) must, according to ICHD-II (6), be classified as probable MOH. After exclusion of these, the *suggested* prevalence of chronic migraine is 2.0% and of chronic TTH 1.2%. Great caution is needed here, because the sensitivity and specificity of our questionnaire, as of many other questionnaires, are very limited in distinguishing these entities. Highly frequent headache is prone to over-estimation through selection bias: those to whom a survey is of personal interest are more likely to participate. This has a larger potential impact on disorders with lower prevalences. However, respondents were asked to participate in the survey without first knowing its focus (only that it related to health).

The strengths of our study are several. We covered the whole country, which is geographically enormous, except the Far-East region. We collected data from 44 urban and rural settlements, and achieved a high response rate and high correspondence between the sample and the general population of Russia in terms of age, gender, level of education, marital status and habitation. Face-to-face interviews raised the quality of data. We also acknowledge the limitations identified earlier, especially the likely (but not substantial) overestimate of migraine prevalence and the certain

underestimate of the prevalence of (infrequent) TTH. Of course, the rare headaches were neglected.

But, in conclusion, we believe we achieved our objective: to estimate the prevalence among adults of the headache disorders of public-health importance in Russia: migraine, TTH and MOH. Although migraine is common in Russia, the unusually and very high prevalence (10.4%) of headache on ≥ 15 days/month represents, if it is a true estimate, very serious public ill-health in the country with no apparent health-care initiative to counter it. Among these 10.4% of the population alone, with an average headache frequency of 23 days/month, nearly 8% of Russian adults have headache on any particular day, and this is probably due to medication overuse in two-thirds of cases. The 8% is nearly doubled when episodic headaches are included. Interventional programmes are needed urgently to change this situation.

Funding

This work was supported by *Lifting the Burden*: the Global Campaign against Headache and the Russian Linguistic Special Interest Group of the International Headache Society.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

References

- Stovner L, Hagen K, Jensen R, Katsarava Z, Lipton R, Scher A, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia* 2007; 27: 193–210.
- Katsarava Z, Dzagnidze A, Kukava M, Mirvelashvili E, Djibuti M, Janelidze M, et al. Primary headache disorders in the Republic of Georgia: prevalence and risk factors. *Neurology* 2009; 73: 1796–1803.
- Moldovanu I, Odobescu S and Craciun C. Medication overuse in Moldova. Chronic migraine with and without medication overuse: the role of drug phobia and associated factors (according to the data of Headache Centre, Chisinau, the Republic of Moldova). *Cephalalgia* 2008; 28: 1229–1233.
- Ayzenberg I, Katsarava Z, Mathalikhov R, Chernysh M, Osipova V, Tabeeva G, et al. The burden of headache in Russia: validation of the diagnostic questionnaire in a population-based sample. *Eur J Neurol* 2011; 18: 454–459.
- Kalton G (ed.) *Introduction to survey sampling*. London: Sage Publications, 1983.
- IHS Classification Subcommittee. The International Classification of Headache Disorders: 2nd edition. *Cephalalgia* 2004; 24 Suppl 1: 9–160.
- Steiner T. The HALT and HART indices. *J Headache Pain* 2007; 8 Suppl 1: 22–25.
- Schmidt S, Mühlhan H and Power M. The EUROHIS-QOL 8-item index: psychometric results of a cross-cultural field study. *Eur J Public Health* 2006; 16: 420–428.
- Frew E, Wolstenholme J and Whyne D. Comparing willingness-to-pay: bidding game format versus open-ended and payment scale formats. *J Health Policy* 2004; 68: 289–298.
- All-Russia Population Census 2002. <http://www.perepis2002.ru>. (Accessed 6 February 2012).
- Dahlof C and Linde M. One-year prevalence of migraine in Sweden: a population-based study in adults. *Cephalalgia* 2001; 21: 664–671.
- Gobel H, Petersen-Braun M and Soyka D. The epidemiology of headache in Germany: a nationwide survey of a representative sample on the basis of the headache classification of the International Headache Society. *Cephalalgia* 1994; 14: 97–106.
- Boardman HF, Thomas E, Croft PR and Millson DS. Epidemiology of headache in an English district. *Cephalalgia* 2003; 23: 129–137.
- Schwartz BS, Stewart WF, Simon D and Lipton RB. Epidemiology of tension-type headache. *JAMA* 1998; 279: 381–383.
- Wiehe M, Fuchs SC, Moreira LB, Moraes RS and Fuchs FD. Migraine is more frequent in individuals with optimal and normal blood pressure: a population-based study. *J Hypertens* 2002; 20: 1303–1306.
- Zivadinov R, Willheim K, Sepic-Grahovac D, Jurjevic A, Bucuk M, Brnabic-Razmilic O, et al. Migraine and tension-type headache in Croatia: a population-based survey of precipitating factors. *Cephalalgia* 2003; 23: 336–343.
- Nikiforow R. *Headache* in a random sample of 200 persons: a clinical study of a population in northern Finland. *Cephalalgia* 1981; 1: 99–107.
- Stovner LJ, Zwart JA, Hagen K, Terwindt GM and Pascual J. Epidemiology of headache in Europe. *Eur J Neurol* 2006; 13: 333–345.
- Launer LJ, Terwindt GM and Ferrari MD. The prevalence and characteristics of migraine in a population-based cohort: the GEM study. *Neurology* 1999; 53: 537–542.
- Henry P, Auray JP, Gaudin AF, Dartigues JF, Duru G, Lanteri-Minet M, et al. Prevalence and clinical characteristics of migraine in France. *Neurology* 2002; 59: 232–237.
- Zivadinov R, Willheim K, Jurjevic A, Sepic-Grahovac D, Bucuk M and Zorzon M. Prevalence of migraine in Croatia: a population-based survey. *Headache* 2001; 41: 805–812.
- Queiroz LP, Barea LM and Blank N. An epidemiological study of headache in Florianopolis, Brazil. *Cephalalgia* 2006; 26: 122–127.
- Roh JK, Kim JS and Ahn YO. Epidemiologic and clinical characteristics of migraine and tension-type headache in Korea. *Headache* 1998; 38: 356–365.
- Lanteri-Minet M, Valade D, Geraud G, Chautard MH and Lucas C. Migraine and probable migraine—results of FRAMIG 3, a French nationwide survey carried out according to the 2004 IHS classification. *Cephalalgia* 2005; 25: 1146–1158.
- Bigal ME, Liberman JN and Lipton RB. Obesity and migraine: a population study. *Neurology* 2006; 66: 545–550.

26. Lipton RB and Bigal ME. The epidemiology of migraine. *Am J Med* 2005; 118 Suppl 1: 3S–10S.
27. Hagen K, Vatten L, Stovner LJ, Zwart JA, Krokstad S and Bovim G. Low socio-economic status is associated with increased risk of frequent headache: a prospective study of 22718 adults in Norway. *Cephalalgia* 2002; 22: 672–679.
28. Rasmussen BK, Jensen R, Schroll M and Olesen J. Epidemiology of headache in a general population—a prevalence study. *J Clin Epidemiol* 1991; 44: 1147–1157.
29. Lyngberg AC, Rasmussen BK, Jorgensen T and Jensen R. Has the prevalence of migraine and tension-type headache changed over a 12-year period? A Danish population survey. *Eur J Epidemiol* 2005; 20: 243–249.
30. Vukovic V, Plavec D, Pavelin S, Janculjak D, Ivankovic M and Demarin V. Prevalence of migraine, probable migraine and tension-type headache in the Croatian population. *Neuroepidemiology* 2010; 35: 59–65.
31. Lyngberg AC, Rasmussen BK, Jorgensen T and Jensen R. Incidence of primary headache: a Danish epidemiologic follow-up study. *Am J Epidemiol* 2005; 161: 1066–1073.
32. Rasmussen BK. Epidemiology of headache. *Cephalalgia* 1995; 15: 45–68.
33. Castillo J, Munoz P, Guitera V and Pascual J. Kaplan Award 1998. Epidemiology of chronic daily headache in the general population. *Headache* 1999; 39: 190–196.
34. Colas R, Munoz P, Temprano R, Gomez C and Pascual J. Chronic daily headache with analgesic overuse: epidemiology and impact on quality of life. *Neurology* 2004; 62: 1338–1342.
35. Lanteri-Minet M, Auray JP, El Hasnaoui A, Dartigues JF, Duru G, Henry P, et al. Prevalence and description of chronic daily headache in the general population in France. *Pain* 2003; 102: 143–149.
36. Lucas C, Auray JP, Gaudin AF, Dartigues JF, Duru G, Henry P, et al. Use and misuse of triptans in France: data from the GRIM2000 population survey. *Cephalalgia* 2004; 24: 197–205.
37. Scher AI, Stewart WF, Liberman J and Lipton RB. Prevalence of frequent headache in a population sample. *Headache* 1998; 38: 497–506.
38. Queiroz LP, Peres MF, Kowacs F, Piovesan EJ, Ciciarelli MC, Souza JA, et al. Chronic daily headache in Brazil: a nationwide population-based study. *Cephalalgia* 2008; 28: 1264–1269.
39. Lu SR, Fuh JL, Chen WT, Juang KD and Wang SJ. Chronic daily headache in Taipei, Taiwan: prevalence, follow-up and outcome predictors. *Cephalalgia* 2001; 21: 980–986.