

Prevalence and Characteristics of Migraine in Women of Reproductive Age in Istanbul, Turkey: A Population Based Survey

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BÖRÜ, Ü.T., KOÇER, A., LÜLECI, A., SUR, H., TUTKAN, H. and ATLI, H. *Prevalence and Characteristics of Migraine in Women of Reproductive Age in Istanbul, Turkey : A Population Based Survey.* Tohoku J. Exp. Med., 2005, **206** (1), 51-59 — Migraine is more common in female and onset of migraine is most commonly seen in the second and third decades of life. In this study, we aimed to estimate the prevalence and characteristics of migraine among women of ages between 15 to 45 years in Turkey. This is the first study to target this age group. The women were interviewed on a door-to-door basis, from early morning to late evening. Once responded positively to headache, an in-depth interview was performed questioning for migraine features. Diagnosis was made from a questionnaire by eight neurologists. One thousand eight hundred thirty five (1,835) out of 96,000 women living in Maltepe which is a town of Istanbul participated in this study. The prevalence of migraine in females aged 15-45 (reproductive ages) was 15.8% (95% CI, 0.142-0.176). This study showed that migraine onset occurred at a mean age of 22.7, 33% having family history, and with migraine with and without aura having near equal frequencies. The prevalence of migraine in women of reproductive ages in Istanbul as found in our study is lower than that reported in United States and Europe countries, but higher than that in Middle and Far Eastern countries. ——— migraine; women of reproductive ages; prevalence; Turkey

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Headache is one of the most common complaints of patients presented to physicians and migraine is a commonly seen headache form in general practice. To date, in order to determine the prevalence of migraine headache, many population-based studies have been performed using different data collection methods. There are a large variety of the prevalence rates among

community-based migraine prevalence studies. According to previous prevalence studies for migraine headache, estimates ranged from 1.5% to 33%, variations possibly originating from definitions and study design (Wong et al. 1995; Launer et al. 1999; Rasmussen 2001). These variations can be explained by differences in case definition, sociodemographic profiles of subjects,

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selected diagnostic criteria and method of prevalence study (Stewart et al. 1995; Rasmussen 2001; Zivadinov et al. 2001). After the introduction of International Headache Society (IHS) diagnostic criteria, standardization of headache became possible (Headache Classification Committee of the International Headache Society 1988). A face-to-face clinical interview remains the reference standard for diagnosing migraine in the absence of any neuroradiological or biological markers. In a population based survey, the major issue is to perform a direct inter-view with the participants in order to clarify signs and symptoms of migraine. Although, several population-based prevalence surveys have employed the IHS criteria for migraine, most of them were performed on the basis of telephone or mail survey questionnaires. Face-to-face in-door prevalence studies are rare because of high economic costs. All studies show that migraine is more common in females, with a male to female ratio of 1/2 - 1/5 (Stang and Osterhaus 1993; Takeshima et al. 2004). Onset of migraine is most commonly seen in the second and third decades of life and is infrequent after middle age. The prevalence of migraine increases until the fourth decade and then decreases with increasing age (Chen et al. 1987; Henry et al. 1992; Launer et al. 1999; Rasmussen 2001). In other words migraine is more common in reproductive aged groups.

The purpose of the present study was to determine the prevalence of migraine and its subtypes in a population-based survey among Turkish reproductive aged females, in order to analyze the possible variations by age and to compare the findings with those obtained in from other populations. We performed a “face-to-face in-door” epidemiological survey of migraine and its subtypes, diagnosed with the IHS criteria, in Turkish women.

MATERIALS AND METHODS

Study design and setting

The study was conducted in Maltepe, Istanbul, a big and a well-known seaside city of Turkey. Maltepe town is a region that represents the population with lower

socioeconomic status in Istanbul in comparison to the general population of different regions in the city. The study population consisted of all women aged between 15 and 45 years in Maltepe by December 31, 2002. The town of Maltepe has a total population of 355,384 people with 176,566 women (96,000 aged between 15 and 45 years). The prevalence rate of European countries which we share the same geographic regions and hemisphere was supposed to be the lowest (11%) among the women of this age range, and it was estimated that 1,825 subjects were required (95% confidence interval with variation from -2 to +2) to reach a statistical power of 80 percent. Based on this assumption, a total of 1,835 women participated in the study. There was no significant difference among participants and nonparticipants regarding age. Therefore, the participants have been considered representative of the total population sample surveyed. Our hospital ethics committee has approved this study with human subjects.

The town of Maltepe consists of 16 districts and thus the numbers of the participants from each district were calculated in consideration to the ratio of their population to that of the town as a whole (stratified systematic sampling method). Twenty-nine women refused to participate in the study. We did not try to reach the people who were not at home on more than one occasion. The survey team waited for one minute after knocking the door and the next door was tried in the cases of not having the door opened or being refused.

Since the numbers of women from each district were determined at the beginning of the study according to entire 15 - 45 year old female population, teams stopped going to houses when the sample size was reached. In order to avoid bias, teams worked from very early in the morning (7 a.m.) until very late in the evening (11 p.m.) and continued working during weekends. A “face-to-face in-door” structured interview was developed by neurologists who were eight people and worked at the Neurology Clinics of Dr. Lutfi Kirdar Teaching Hospital in Istanbul, Turkey. They had had a course in standardization of headache diagnosis. A form concerning the prevalence of headache which comprised the sociodemographic data (age, level of education, economic status, marital status, medical history) was designed in a blinded format with each question having “yes or no” options and the forms were applied to the female family members aged 15 - 45 who were willing to participate in this investigation. Before each interview, the objective of the study was described and verbal

informed consent was obtained. Since the evaluation in the questionnaires was based on the responses given to questions with two options, any possibility of discrepancies among observers was eliminated. The subjects were questioned for headache history. If any important, attention calling (discomforting) headache in the last year period was reported by subjects, they were asked questions about the characteristics of their headaches. On the basis of defined as those who had ever had a headache (hangover or sinus infection were excluded) or had a severe headache with at least four times during life, the subjects were included in the second part of questions. The second set of questions was applied only to positive responders of the first group of questions and contained a more detailed interview which focused on signs and symptoms of migraine and aura as outlined in the IHS criteria. The interview was performed and the questionnaire was filled out by 8 neurologists after being trained about migraine, study design and criteria. Each participant woman was asked to describe the characteristics of their headaches: age at onset, frequency, duration, character of pain, location, severity, aggravating factors, and associated symptoms. Headache was classified as mild (intensity did not affected daily activities), moderate (intensity affected daily life), and severe (intensity prohibited daily activities). Final diagnosis of migraine - migraine with aura (MWA) or migraine without aura (MWOA) - was made by the neurologists according to IHS criteria. The study validation was controlled every week by the Chief of Neurology Department at Dr Lutfi Kirdar Teaching Hospital and Director of Public Health Department at University of Marmara during six month study. Lifetime migraine prevalence was estimated on the basis of the IHS criteria; who had at least two different attacks of MWA or at least five attacks of MWOA previously.

Statistical analysis

Statistical analysis was performed by using the Statistical Package for the Social Sciences (SPSS), Version 11.5. The evaluation of the relationship between the prevalence of migraine and the properties of headache patients, such as age, educational and economic level, professional status, marital status and the comparison of clinical characteristics between migraines subtypes were achieved by chi-square (χ^2) tests. The relationship between clinical characteristics and headache severity were assessed by using Spearman rank correlation analysis. Ninety-five percent confidence intervals

(95% CI) were calculated using a binomial approximation of the Poisson distribution.

RESULTS

The sociodemographic properties of migraine patients: age, educational and economic level, marital and professional status of the patients are presented in Table 1. One thousand, eight hundred and thirty-five women in reproductive age were interviewed for lifetime headache prevalence. Lifetime overall headache prevalence in women of reproductive age was found to be 70.9% (1,301 subjects) and migraine prevalence was 15.8% (290 participants). Age mean related to the onset of the migraine headache was identified to be 22.7 (s.d.: 7.1) year (R: 7 - 41). Positive family history for migraine headache was reported by 96 (33.1%) subjects. In respect of aura, no significant difference was found between subtypes of migraine, and the observed difference in the proportions of age distribution was not statistically significant ($p = 0.196$), either.

The prevalence of migraine did not vary significantly according to economic status. Migraine sufferers in the middle economic status group had more frequent headache attacks compared to lower and higher economic status groups, with no statistically significant difference between the groups (Chi-Square Value = 2.77; $p = 0.24$). Also there was no association between migraine prevalence and level of education attained.

Migraine headache was reported to be pulsatile by 86.2% of the migraine population ($n = 250$). The location of migraine was reported to be primarily unilateral by 67.2% of the migraine population. Sixty-five percent of the individuals with unilateral headache reported that their headaches consistently occurred on one side rather than alternating sides. The frequency of migraine attacks was reported to be more than 1 times weekly by 36.2%, once every 2 weeks by 17.2%, once a month by 27.9%, and less often by 18.6% of the sampled migraine patients. Typical severity of headache was reported to be mild by 4 (1.4%), moderate by 42 (14.5%), and severe by the remaining 244 (84.1%) subjects. Routine daily activities were affected in 84.1% of patients because

TABLE 1. Sociodemographic characteristics of the participants

Features	All participants <i>n</i> (%)	Participants with migraine <i>n</i> (%)	Chi-square value	<i>p</i> value
<i>Age</i>				
15-19	39 (2.2)	5 (1.7)	0.05	0.82
20-24	284 (15.6)	40 (13.8)	0.42	0.51
25-29	317 (17.4)	56 (19.3)	0.58	0.44
30-34	487 (26.7)	70 (24.1)	0.62	0.42
35-39	381 (20.8)	61 (21.0)	0.0007	0.97
40-45	327 (17.9)	58 (20.0)	0.66	0.41
<i>Education</i>				
Uneducated	114 (6.2)	19 (6.6)	0.008	0.92
Primary	1,169 (63.7)	192 (66.2)	0.57	0.44
Secondary	301 (16.4)	42 (14.5)	0.54	0.45
High	163 (8.9)	19 (6.6)	1.45	0.22
University	88 (4.8)	18 (6.2)	0.77	0.37
<i>Economical status</i>				
Low	543 (29.6)	94 (32.4)	0.82	0.36
Middle	1,242 (67.7)	183 (63.1)	2.17	0.14
High	50 (2.7)	13 (4.5)	2.11	0.14
<i>Professional status</i>				
Housewife	1,644 (89.6)	266 (91.7)	1.02	0.31
Working	191 (10.4)	24 (8.3)	1.43	0.23
<i>Marital status</i>				
Married	1,694 (92.3)	266 (91.7)	0.05	0.81
Single	121 (6.6)	23 (7.9)	0.51	0.47
Divorced	20 (1.1)	1 (0.4)	0.76	0.38

of the severity of headache. With respect to this factor, no significant difference was found between migraine with and without aura. In the patients, pulsatile nature ($p < 0.05$), aggravation on physical activities ($p < 0.001$), the concomitant symptoms of nausea ($p < 0.05$), and phonophobia ($p < 0.01$) were found to be related with the headache impact on daily activities on Spearman rank correlation analysis. In the population with migraine, 153 subjects (52.8%) had visited a physician for medical help and 48.4 % of this group (74 subjects) had been diagnosed as migraine. Most of the subjects frequently suffer more than one kind of migraine symptoms.

The frequency of migraine with aura (MWA) was 53.1% and the frequency of migraine without

aura (MWOA) was 46.9% in the migraine population of the present study. Phonophobia (91.3%) and nausea (74.8%) among migraine associated symptoms were seen more frequently than others in the subjects. Migraine-associated symptoms and their relative frequencies are listed in Table 2. With respect to these findings, there was no statis-

TABLE 2. Migraine associated symptoms

Symptom	Number (%) of subjects
Phonophobia	265 (91.3)
Nausea	217 (74.8)
Photophobia	195 (67.3)
Osmophobia	186 (64.1)
Vomiting	110 (37.9)

tical difference between migraine with and without aura. Migraine headaches can be started by some triggering factors and 280 migraine patients (96.6%) reported some trigger factors (Table 4). In addition, ninety-six migraine patients (33.1%) reported relation between their headaches and menstruation period. Seventy-six percentages of these women had headaches in premenstrual period.

DISCUSSION

Migraine is more common in women than in men and the female-to-male ratio varies considerably by age. The prevalence of migraine increases from adolescence to about aged 40 years of ages and then declines (Launer et al. 1999; Rasmussen 2001; Molgaard et al. 2002). The prevalence of migraine was highest in both men and women between ages of 35 to 45 years. During reproductive years, there are marked gender differences in the prevalence and type of migraine, with migraine without aura affecting more women (Linet et al. 1989; Launer et al. 1999; Lipton et al. 2001; Zivadnov et al. 2001). On the other hand males mostly worked and were not active household members during times selected for interview. To estimate certain prevalence rate and age relationship, we included only women for this study. Migraine prevalence varies with age.

In a study of headache among young adults who were 12 to 29 years old, migraine prevalence was 7.4% in females and much more (8.8%) in females' aged 24-29 years (Linet et al. 1989). This study was based on a four-week (prior to interview) assessment, so cannot be compared with lifetime studies. Epidemiological studies on migraine in American population indicated that migraine was most prevalent in those aged 25 to 44 years and was about 2.5 times more frequent in females than males (Stang and Osterhaus 1993). Another study of prevalence of migraine in United States showed that the migraine prevalence was 18.2% among females and increased from aged 12 years to about aged 40 years and then declined (Lipton et al. 2001). Especially after ages of 25, percentages of

migraine increased (Chen et al. 1987) and the lifetime prevalence of migraine was high, particularly among women of ages 30 to 45 (Lipton and Steward 1993; Russell et al. 1995; Launer et al. 1999; Lipton et al. 2002; Takeshima et al. 2004). As it is seen on Table 3, migraine has been estimated to affect 11.2-33% of the women in European and American populations. It was not possible to compare those with our study due to differences in case definition and age ranges. Considering reproductive aged women and comparing age categories demonstrated on Table 3, it could be seen that lifetime prevalence rate of migraine in Turkish population still differed from reports of those countries and that migraine prevalence in our study was lower than those recorded in previous studies (Lipton et al. 1993; Russell et al. 1995). Henry et al. (2002) reported lower prevalence rate than the present study. Köseoglu et al. (2003) reported that migraine prevalence was the highest in 35-44 years age groups. Similarly, migraine prevalence in our Turkish population was the highest between ages of 30 and 39, and percentages of migraine increased after the age of 25. Our rates were similar to some reports (Lipton et al. 1993; Lipton and Steward 1994), although other reports showed that the prevalence of migraine was the highest at the age group of 40-45 years (Russell et al. 1995; Lipton et al. 2001, 2002).

Bank and Marton (2000) suggested that migraine was associated with high intelligence and social class. In some previous reports and in a recent report it was found to be more common in patients with the lowest education and economical level (Koehler et al. 1992; Stewart et al. 1992; Stang and Osterhaus 1993; Silberstein and Lipton 1996; Molgaard et al. 2002). Migraine was most common in people with low household income, and it increased as the level of education increased in females in USA (Stang and Osterhaus 1993). In contrast, some studies reported conflicting results with a lower frequency of headache in higher-income groups and in females living in larger metropolitan areas (Lavados and Tenhamm 1997). The prevalence of migraine did not vary significantly according to economic

TABLE 3. *The frequency of migraine occurrence in reproductive aged women of different countries.*

Name of study	Age groups	The results (%)	Our results	
			<i>n</i>	%
Zivadcinov et al. (2001) Coritaria 15-65 year aged women	15 - 19	28	5	4.7
	20 - 29	12.5	96	13.7
	30 - 39	27.1	131	19.6
	40 - 45	38.1	58	16
Overall value		22.9		
Henry et al. (2002) France 15-49 year aged women	< 25	16	53	10.7
	25 - 34	9	118	17.1
	35 - 49	9	119	18.4
	Overall value	11.2		
Lipton et al. (2001) United States 12-49 year aged women	15 - 17	7.1	1	2.4
	18 - 29	21.5	100	13.1
	30 - 39	27.3	131	19.6
	40 - 45	26.0	58	16
Overall value		18.2		
Lipton et al. (2002) United States 18-49 year aged women	18 - 29	17.7	100	13.1
	30 - 39	19.8	131	19.6
	40 - 45	22.7	58	16.0
	Overall value	17.2		
Laurer et al. (1999) Netherlands 20-65 year aged women	20 - 24	17.9	40	12.3
	25 - 29	24.9	56	15.1
	30 - 34	27.9	70	18.2
	35 - 39	31.6	61	21.4
	40 - 44	25.5	51	16.6
Overall value		33		
Russell et al. (1995) Denmark 40 year aged women	40	24	9	17.6

TABLE 4. *Triggering factors of migraine in present study*

Factor	Number (%) of subjects
Stress	235 (81%)
Noise	158 (54.5%)
Sleeplessness	119 (41%)
Hunger	108 (37.2%)
Light	80 (27.6%)
Fatigue	29 (10%)
Foods	17 (5.9%)

status or education level in the present study as in other studies (Rasmussen et al. 1992; Göbel et al. 1994).

Migraine is commonly unilateral, pulsating, moderate to severe in intensity, and is associated with nausea, photophobia and phonophobia (Lipton et al. 2003). In a newly reported study performed in Turkish females, 96.6% of subjects had pulsatile pain, 49.2% had unilateral pain (Köseoğlu et al. 2003). Our results (throbbing 86.2%, unilateral 67.2%) are different from the results of this study probably because of different age groups and study population. Previous epidemiological studies, reported the prevalence of MWA to be approximately 5% in females of the general population (Nikiforow 1981; Rasmussen and Olesen 1992; Rasmussen et al. 1992). The prevalence of MWA was 8.39% in our study group and it was higher in compare. This can be due to somatization of our patient group or because of asking in a blinded format e.g. we asked that he / she had have visual complaints / somatosensorial complaints / weakness of extremities or not. The aura symptoms and differences will be discussed in another article. In the migraine population, the proportions of MWA and MWOA in females were similar. In our MWA group, the most common aura symptoms reported were visual and our results were similar to those in previous epidemiologic studies (Lee and Olness 1997; Queiroz et al. 1997; Roh et al. 1998; Lipton et al. 2001). Our subjects reported similar incidences of associated symptoms (phonophobia, nausea, and photophobia) reported

from previous studies (Rasmussen 1993; Queiroz et al. 1997; Lipton et al. 2001; Mattson 2003). The clinical characteristics of migraine was found to be different than the study conducted by Köseoğlu et al. (2003); a higher ratio of phonophobia and a lower ratio of nausea were found in our study.

Trigger factors are common in migraine and the same trigger factors can result in different types of migraine depending on the individual. Additionally there are ethnological and geographical differences in trigger factors (Stang and Osterhaus 1993; Mattson 2003). In our study, stress emerged as the most important trigger factors of migraine and occurred with the highest frequency in the sample. Sleep deprivation and hunger accounted for nearly forty percentages of our responders. Ninety-six migraine patients (33.1%) reported a relation between their headaches and menstruation periods. Köseoğlu et al. (2003) reported a similar ratio (35.6%) from Turkey. This ratio was higher than study reported by Mattson (2003) and much higher (10%) in a study conducted Deleu et al. (2001). Since that data covered only university population in Oman's study, it cannot be compared with that from our study. In Mattson's study (2003), the population group was older aged between 40 and 74, so it cannot be compared with that from present study, either.

COMMENTS

This is the first population based epidemiological study of headache in reproductive aged females, in Turkey using the operational diagnostic IHS criteria. We tried to evaluate sociodemographic and clinical characteristics of migraine type headache. Several aspects of our methodological procedure should be considered. The epidemiological studies in which "face-to-face, in-door" interview survey method has been employed are very rare. This method of data collection is probably more sensitive for migraine case definition than telephone interviews or self-administered questionnaires. That our data were collected and responders were interviewed by neurology doctors directly is also important.

Therefore, we believe that our case definition ascertainment is accurate and sensitive. The prevalence of migraine differ according to geography, genetic factors, the ethnic and cultural variations, and socio-cultural structure of the population. Previous population-based studies in female age groups have indicated that the lifetime prevalence of migraine in the European and American populations was higher than those that have been reported from Middle East and Far East countries (Wong et al. 1995; Abdul-Jabbar et al. 1996; Sakai and Igarashi 1997; Cheung 2000; Takeshima et al. 2004) (Table 3). Our country is geographically located between Europe and Asia. We have close relationships with Middle East and Asian countries ethnically and culturally. The prevalence of migraine in Turkey is lower than that in previous reports with European and American populations, but higher than those in Middle Eastern, Asian or Far Eastern countries.

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