

Research Submission

Migraine Disability Awareness Campaign in Asia: Migraine Assessment for Prophylaxis

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Objectives.—This study aimed to survey the headache diagnoses and consequences among outpatients attending neurological services in 8 Asian countries.

Methods.—This survey recruited patients who consulted neurologists for the first time with the chief complaint of headache. Patients suffering from headaches for 15 or more days per month were excluded. Patients answered a self-administered questionnaire, and their physicians independently completed a separate questionnaire. In this study, the migraine diagnosis given by the neurologists was used for analysis. The headache symptoms collected in the physician questionnaire were based on the diagnostic criteria of migraine proposed by the International Classification of Headache Disorders, second edition (ICHD-2).

Results.—A total of 2782 patients (72% females; mean age 38.1 ± 15.1 years) finished the study. Of them, 66.6% of patients were diagnosed by the neurologists to have migraine, ranging from 50.9% to 85.8% across different countries. Taken as a group, 41.4% of those patients diagnosed with migraine had not been previously diagnosed to have migraine prior to this consultation. On average, patients with migraine had 4.9 severe headaches per month with 65% of patients missing school, work, or household chores. Most (87.5%) patients with migraine took medications for acute treatment. Thirty-six percent of the patients had at least one emergency room consultation within one year. Only 29.2% were on prophylactic medications. Neurologists recommended pharmacological prophylaxis in 68.2% of patients not on preventive treatment. In comparison, migraine prevalence was the highest with ICHD-2 “any migraine” (ie, migraine with or without aura and probable migraine) (73.3%) followed by neurologist-diagnosed migraine (66.6%) and ICHD-2 “strict migraine” (ie, migraine with or without aura only) (51.3%). About 88.6% patients with neurologist-diagnosed migraine fulfilled ICHD-2 any migraine but only 67.1% fulfilled the criteria of ICHD-2 strict migraine.

Conclusions.—Migraine is the most common headache diagnosis in neurological services in Asia. The prevalence of migraine was higher in countries with higher referral rates of patients to neurological services. Migraine remains underdiagnosed and under-treated in this region even though a high disability was found in patients with migraine. Probable migraine was adopted into the migraine diagnostic spectrum by neurologists in this study.

Key words: migraine, neurological clinic, prevalence, prophylaxis, disability

Abbreviations: IHS International Headache Society, HIT headache impact test, VAS visual analog scale

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Using the International Headache Society (IHS) diagnostic criteria, the estimated prevalence of migraine is 14% (range 2% to 25%) in females and 6% (range 1% to 20%) in males across different populations.¹ The World Health study provides a quantitative assessment of its burden using disability-adjusted life years.² This 2001 report put migraine as the 19th leading cause of disability for adults of both sexes and 12th for females worldwide and led to the recognition of migraine as a significant disorder affecting populations. The effects of the disease are widespread as it affects not only the patients but also the people around them, their family, coworkers, employers, and society in general.¹ It is a costly disease with higher indirect costs that include the economic effects of migraine on lost work productivity, absentee days.^{3,4}

In the Asian region, a review of recent epidemiologic studies of headache reported an overall prevalence ranging from 8.4% to 12.7% with a sex-specific migraine prevalence of 11.3% to 14.4% in women and 3.6% to 6.7% in men.⁵ These figures were considered close but in the low range of the prevalence of migraine in Western countries.^{1,5} To date, however, there are still limited studies conducted on how migraine affects the Asian population in general. The data of disability, diagnosis, and treatment in patients who seek medical help for their headache are lacking in this region.

We conducted this multinational study to determine the frequency and disability of migraine among patients with the chief complaint of headache seen by neurologists in 8 Asian countries.

PATIENTS AND METHODS

Study Design and Setting.—This is a multinational cross-sectional study conducted in selected neurology clinics in 8 Asian nations. The present study was designed to be conducted in the neurologists' clinics. This can improve data gathering and diagnosis of migraine by neurologists. However, due to diverse healthcare systems in Asia, neurologists among different countries practice differently. In a low referral rate system, such as Taiwan (4%), many neurologists practice as primary care physicians. In contrast, in Hong Kong, all patients visiting neurologists are through

referral system. The study involved 2 groups of respondents, the neurologists, and their patients consulting them for headache for the first time. Both groups of respondents filled in structured questionnaires.

Subject Selection.—Eight Asian countries joined the study: Taiwan, South Korea, Malaysia, Thailand, India, Philippines, Singapore, and Hong Kong. The study recruited as many neurologists as possible from these countries. This study was first approved by the headache society in each country, and then the representatives of the sponsoring pharmaceutical company helped contact potential practicing neurologists to join this study. The neurologists who were interested in treating headache patients were potential candidates. From the period of April to August 2005, the neurologists enrolled patients who consulted them for headache for the first time; however, it was not taken into consideration whether the patient had any prior consultation with any other physician for headache. Patients who suffered headaches for more than 15 days per month were not included in order to exclude cases of chronic daily headache. In our original design, each participating neurologist was allowed to recruit no more than 10 patients during the study period in order to decrease the possibility of selection bias from headache clinics. However, this restriction was later cancelled because the recruitment of neurologists was not as successful as expected in some countries. Nevertheless, since Taiwan finished the study the earliest, the limiting restriction of a "maximum 10 patients" was only applied in Taiwan.

Data Collection and Variables.—The data comprised 2 components. In the first component, the patients were asked to answer a self-administered, standardized Patient Characteristic Questionnaire. This consisted of information on patient demographics, headache history, headache intensity, and level of disability. Headache characteristics included duration of illness, average number of severe attacks per month, duration of headache attacks, number of days per month, and other concurrent symptoms during headache episodes. Headache intensity was self-rated using the anchored horizontal 10-cm visual analog scale (VAS) for pain, where respondents were asked to rate from a scale of 0 to 10, how painful their worst headache was in the previous year. On this scale,

0 indicated No Pain, and 10 represented Worst Pain Ever, 1, 2, 3 was set as Mild Pain, 4, 5, 6 as Moderate Pain, and 7, 8, 9 as Severe Pain. The following questions were asked to assess headache disability: (1) Does the headache prevent you from being employed? (2) Did you miss family, social, or leisure activities because of headache? (3) Did you miss school, work, or household chores because of headache? (4) Have you felt moody or irritable because of headache? and (5) Did you receive emergency treatment such as injections from your physician in the past year? We did not use popular questionnaires such as Migraine Disability Assessment⁶ and headache impact test (HIT)⁷ because cross-language validation of these questionnaires in this region would take some time.

The second component involved the neurologist's description of the patient's headache profile, diagnosis, treatment, and recommendations for prophylaxis. A standardized self-administered Physician Core Screening Questionnaire was used to collect data. Physicians were asked to categorize patients as migraine or "not" migraine based on their own clinical judgment. This neurologist-diagnosed migraine was the basis of data analysis for this study. Of note, the headache symptoms collected in the physician questionnaire were based on the diagnostic criteria of migraine proposed by the International Classification of Headache Disorders, 2nd edition (ICHD-2).⁸ Similar questions to assess disability in terms of missing school, work, or household chores and need for emergency treatment were also asked of the neurologists.

Statistical Analysis.—Demographic and headache characteristics of patients were summarized using frequency tables and descriptive statistics for quantitative measurements. The characteristics were compared between patients with migraine and the nonmigraine patients. The test performed to detect statistically significant differences in the distribution of categorical characteristics between the 2 patient groups was the chi-square of homogeneity. The Mann-Whitney *U* was used to test for differences in the distribution of number of severe headaches and headache intensity (VAS) due to data skewness. The adequacy of the *kappa* coefficient was evaluated

using the following descriptive ranges: a kappa of 0.40 to 0.59 is considered to be moderate, a kappa of 0.60 to 0.79 is considered to be substantial, and a kappa ≥ 0.80 is considered to be excellent agreement.⁹

Ethical Clearance.—The study protocol was reviewed and approved by the ethics committee in each participating hospital or clinic in each country. Each patient signed an informed consent form before participating in the study.

RESULTS

Participating Hospitals and Physicians.—The study was conducted in 144 participating hospitals or clinics. A total of 222 neurologists were recruited in the study. Table 1 shows a summary of the participating physicians in each country. The recruitment of neurologists was rather uneven among different countries, with recruitment rates ranging from 2.6% in South Korea to 22.6% in Malaysia and the number of participating neurologists ranging from 2 (Singapore) to 102 (Taiwan). Since the health systems differed, the referral rates of patients to the neurological services were also different among these countries, ranging from 4% in Taiwan to 100% in Hong Kong.

Patient Demographic Characteristics.—A total of 3177 patients participated in the study; however, 395 questionnaires were excluded due to: (1) missing gender data ($n = 6$); (2) missing data pertaining to headache frequencies per month ($n = 213$); and (3) more than 15 headache days per month ($n = 176$). In total, 2782 patients from 8 Asian countries comprised the final sample for analysis (Table 2). The mean age was 38.1 ± 15.1 (range 4 to 90) years. Nearly 70% of patients were between 20 and 49 years. The majority of the patients were female (71.6%). The highest proportion of patients had reached at least college (44.4%), although substantial proportions attended elementary (17.9%) and junior high school (26.6%). Half (50.7%) of the patients were employed while 27.4% of them were homemakers. The biggest percentage of patients in this study were recruited from Taiwan (27.1%), followed by South Korea (21.7%) and Thailand (18.3%).

Clinical Features in Patients With Migraine.—Of the 2782 patients, 1854 (66.6%) were diagnosed to have migraine, 914 (38.2%) no migraine, and 14

Table 1.—Summary of Participating Neurologists

Country	No. of participating clinics	No. of participating neurologists recruiting ≥ 1 patient	Total no. of practicing neurologists in each country†	Percentage (%) of recruitment of neurologists	Percentage (%) of patient referral to neurological practices	No. of physicians recruiting >10 patients
Singapore	2	2	27	7.4	95	1
Thailand	26	32	256	12.5	30	22
Philippines	6	15	357	4.2	90	5
South Korea	14	20	764	2.6	20	20
Malaysia	10	13	55	23.6	20	7
Taiwan	47	102	565	18.1	4	0
India	33	33	700	4.7	60	11
Hong Kong	5	5	55	9.1	100	0

†Estimated by the neurology or headache societies in the participating countries.

Table 2.—Demographics of Study Patients (n = 2782)

Patient characteristic	Number	Percent
Age (years)		
<20	262	9.4
20-29	611	22.0
30-39	661	23.8
40-49	642	23.1
50-59	343	12.3
60-69	156	5.6
70-90	94	3.4
Unknown	13	0.5
Total	2782	100.0
Gender		
Male	789	28.4
Female	1993	71.6
Total	2782	100.0
Educational attainment†		
Uneducated	31	1.3
Elementary	419	17.5
Junior high school	611	25.5
Senior high school	208	8.7
College	945	39.4
Postgraduate	140	5.8
Unknown	44	1.8
Total	2398	100.0
Occupation		
Unemployed	215	7.7
Employed	1411	50.7
Homemaker	762	27.4
Student	350	12.6
Retired	10	0.4
Unknown	34	1.2
Total	2782	100.0
Country		
Taiwan	755	27.1
Korea	603	21.7
Thailand	510	18.3
India	437	15.7
Philippines	187	6.7
Malaysia	163	5.9
Singapore	105	3.8
Hong Kong	22	0.8
Total	2782	100.0

†Students were excluded.

(0.5%) had “no answer” based on the neurologists’ assessment. However, 1344 (48.9%) patients were not diagnosed to have migraine prior to this consultation, but of the total responses, 185 (6.7%) of the patients were unsure if they were told by their doctor whether they had migraine or not. The proportion of patients with migraine varied by age, sex, educational attainment, occupation, and across countries

Table 3.—Migraine Prevalence in Neurology Service in Different Countries

	Migraine		Nonmigraine		Chi-square <i>P</i> value
	Number	Percent	Number	Percent	
Taiwan	451	59.8	303	40.2	<.001
Korea	413	69.2	184	30.8	
Thailand	259	50.9	250	49.1	
India	375	85.8	62	14.2	
Philippines	150	81.1	35	18.9	
Malaysia	110	69.2	49	30.8	
Singapore	82	78.1	23	21.9	
Hong Kong	14	63.6	8	36.4	
Total	1854	67.0	914	33.0	

($P < .001$). Patients with neurologist-diagnosed migraine were younger (36.2 ± 13.8 vs 42.0 ± 17.0 , $P < .001$) and had a higher female ratio (76.2% vs 62.1%, $P < .001$) than those without migraine. Of note, we found patients with migraine had higher frequencies of \geq college education than those without migraine (49.2% vs 39.9%, $P < .001$). Across countries, the majority of migraineurs consisted of headache patients consulting for the first time. However, the percentage among these patients who were diagnosed with migraine varied considerably from 50.9% in Thailand to 85.8% in India (Table 3).

Patients with neurologist-diagnosed migraine showed a different clinical profile from those without (Table 4). Except for the presence of dizziness and the number of severe headache attacks in the past year, all features of headache were different between migraine and nonmigraine patients. Thirty-nine percent of migraine patients reported suffering from headaches for 6 years or more and another 20% for 4 to 6 years. On average, patients with migraine had 4.9 severe headaches per month with 65% of patients missing school, work, or household chores. Pain intensity was likewise greater in the migraine group with a mean VAS score of 7.1, compared to 5.9 in the nonmigraine group ($P < .001$).

Patients with headaches, especially patients with migraine, had very frequent concurrent symptoms (Table 4). Except for dizziness and neck pain, most symptoms were more frequently reported by migraine patients than nonmigraine patients. Except

for “exacerbation by physical activity” (kappa = 0.462, $P < .001$), patients and neurologists had a substantial agreement on reporting of the same symptoms, such as nausea/vomiting (kappa = 0.676, $P < .001$), aura (kappa = 0.592, $P < .001$), photophobia (0.664, $P < .001$), and phonophobia (0.633, $P < .001$).

Except for headache, the most bothersome symptoms for migraine patients were pain aggravation by physical activity (20.7%), nausea/vomiting (19.9%), dizziness (17.9%), and eyeball pain (14.2%). Dizziness (27.4%) was listed as the most bothersome symptom in the nonmigraine patients followed by neck pain (18.7%) and pain aggravation by physical activity (15.5%).

Burden and Treatment of Migraine and Nonmigraine Headaches.—For questions on the level of disability and treatment requirement associated with headache, the results show that higher percentages of patients with migraine missed social/leisure activities (60.4%) and work/school days (64.7%) (Fig.). A high proportion of patients with migraine felt moody or irritable because of headaches (82.3%). More than one-third (36.0%) of patients with migraine had emergency room visits and treatment in the past year. Around 84% of migraineurs were already taking acute medications at the time of consultation, compared to 61.7% of nonmigraine patients. After excluding the students and those aged 20 years or younger, a substantial proportion in both groups of patients were prevented by headaches from gainful

Table 4.—Clinical Characteristics of Patients, by Migraine Diagnosis

	Migraine		Nonmigraine		Chi-square <i>P</i> value
	Number	Percent	Number	Percent	
Duration of headache	n = 1831		n = 887		
<1 year	264	14.4	372	41.9	<.001
1 to 3 years	485	26.5	233	26.3	
4 to 6 years	366	20.0	98	11.1	
More than 6 years	716	39.1	184	20.7	
No. of severe headache attacks per month in past year	n = 1764		n = 794		
Mean ± SD	4.9 ± 9.3		4.6 ± 6.7		.320†
Duration of each headache attack	n = 1831		n = 887		
<4 hours	264	14.4	372	41.9	<.001
4 to 24 hours	485	26.5	233	26.3	
>1 day to 3 days	366	20.0	98	11.1	
>4 days	716	39.1	184	20.7	
Rating of worst pain intensity (0-10 VAS)	n = 1811		n = 904		<.001†
Mean ± SD	7.1 ± 1.8		5.9 ± 2.3		
Headache profile					
Patient response	n = 1853		n = 912		
Aura	532	28.7	62	6.8	<.001
Eyeball pain	800	43.2	276	30.3	<.001
Dizziness	1024	55.3	489	53.6	.426
Aggravation of head pain by physical activity	976	52.7	341	37.4	<.001
Nausea/vomiting	1225	66.1	283	30.9	<.001
Sensitivity to light	788	42.5	196	21.5	<.001
Sensitivity to sound	744	40.2	263	28.8	<.001
Neck pain	780	42.2	441	48.3	.003
Neurologist's assessment	n = 1841		n = 908		
Aura	448	24.3	60	6.6	<.001
Pulsatile pain	1236	67.2	313	34.5	<.001
Unilateral pain	1287	69.9	344	37.9	<.001
Moderate or severe pain	1260	68.4	509	56.1	<.001
Aggravation of head pain by physical activity	1045	56.8	337	37.1	<.001
Nausea	1245	67.6	272	30.0	<.001
Vomiting	886	48.2	164	18.1	<.001
Photophobia	842	45.7	172	19.0	<.001
Phonophobia	791	43.0	221	24.3	<.001
Most bothersome symptom except for headache					
Aura	83	5.0	15	1.8	<.001
Eyeball pain	237	14.2	108	13.1	
Dizziness	298	17.9	226	27.4	
Aggravation of head pain by physical activity	344	20.7	128	15.5	
Nausea/vomiting	331	19.9	61	7.4	
Sensitivity to light	82	4.9	16	1.9	
Sensitivity to sound	88	5.3	39	4.7	
Neck pain	113	6.8	154	18.7	
Other symptoms	89	5.3	77	9.3	

†Mann-Whitney *U*-test.

VAS = visual analog scale.

employment, 20.2% in migraine and 15.9% in nonmigraine patients.

As reported by neurologists, relief within 2 hours of taking medication did not come in a slightly higher

proportion of migraine patients (40.4%) than in patients with other headaches (35.3%) (Table 5). A majority of patients with migraine (70.8%) were not on any form of migraine prophylaxis. Among those

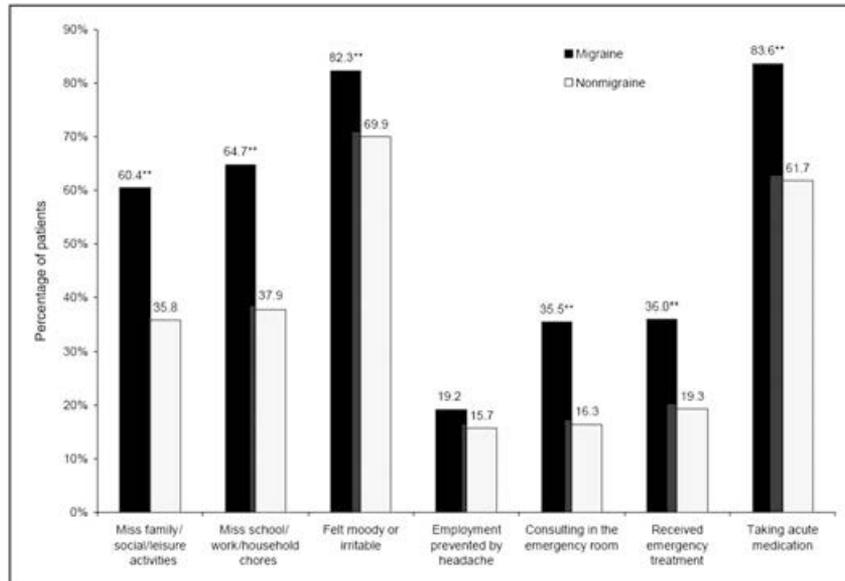


Figure.—Comparisons of the levels of disability and treatment needs of patients with migraine vs nonmigraine headache. * $P < .01$, ** $P < .001$.

who were, 28.9% still reported to their physicians that the decrease of their headache attacks was less than 50%. Neurologists also recommended that for those who were not on prophylaxis treatment for their headache, 68.2% should do so.

Comparison With Neurologist-Diagnosed Migraine and ICHD-2 Migraine.—We used a computer algorithm to diagnose ICHD-2 migraine based on the physician questionnaire and made comparisons

between the diagnoses of neurologist-diagnosed migraine and ICHD-2 migraine.⁸ ICHD-2 migraine was analyzed as 2 diagnoses: (1) strict migraine (migraine without aura or migraine with aura, ICHD-2 codes 1.1 + 1.2); and (2) any migraine (strict migraine or probable migraine, ie, ICHD-2 codes 1.1 + 1.2 + 1.6). We found migraine prevalence was the highest with ICHD-2 any migraine (73.3%) followed by neurologist-diagnosed migraine (66.6%)

Table 5.—Treatment Characteristics of Patients, by Migraine Diagnosis

	Migraine		Nonmigraine		Chi-square <i>P</i> value
	Number	Percent	Number	Percent	
Is satisfactory relief obtained within 2 hours after taking acute pain medication?					
Yes	968	59.6	430	64.7	.026
No	655	40.4	236	35.3	
Is your patient taking medication to prevent headache or migraine?					
Yes	534	29.2	92	10.1	<.001
No	1296	70.8	815	89.9	
If yes, has the patient’s headache attacks decreased by more than 50%?					
Yes	367	71.1	67	80.7	<.001
No	149	28.9	16	19.3	
If not, do you think the patient needs prophylaxis for treatment?					
Yes	865	68.2	234	29.1	<.001
No	404	31.8	569	70.9	

and ICHD-2 strict migraine (51.3%). About 88.6% patients with neurologist-diagnosed migraine fulfilled ICHD-2 any migraine criteria but only 67.1% fulfilled the ICHD-2 strict migraine criteria.

COMMENTS

This study marks the first large-scale cooperative attempt to determine the impact of migraine among Asian countries. It provides the frequency and impact of migraine among patients with headache diagnosis in neurological services in Asia. From this study, migraineurs comprised the majority of patients who consulted their neurologists with headache complaints, the proportion ranging from 50.9% to 85.8% across different countries. This finding is important because many neurologists in this region consider tension-type headaches as more common than migraine in their clinics.¹⁰ This variation could indicate differences in healthcare utilization among patients, which can be attributed to variation in health-seeking behaviors and the referral system of health care among the countries. Though not always compatible, the migraine diagnosis was higher in the countries where the percentages of referred patients were high. After excluding Hong Kong participants due to a very small sample size ($n = 22$), there is a trend of significance of positive correlation between migraine prevalence and referral rates ($r = 0.704$, $P = .078$).

The diagnosis of migraine in this study was based on the neurologist's assessment of migraine in the patient. The Landmark study¹¹ found that migraine diagnosis at baseline visit by a primary care physician had 98% positive predictive value, indicating a safe migraine declaration when compared with the longitudinal diary data assessment using IHS criteria as gold standard; however, the same study revealed that most patients with a non-migraine diagnosis were later found to have migraine.¹¹ Our study showed that the prevalence of migraine was still underestimated if ICHD-2 criteria migraine and probable migraine were used (66.6% vs 73.3%). Probable migraine was diagnosed if the headache profile fulfilled all but one criterion for migraine with or without aura according to the ICHD-2.⁸ A recent study conducted in the US showed the epidemiological profile of probable

migraine was similar to migraine and many patients with probable migraine did not receive the diagnosis nor adequate treatment.¹² Our study showed that the agreement between neurologist-diagnosed migraine and ICHD-2 any migraine was high (88.6%). This suggests that probable migraine has been adopted into migraine diagnostic spectrum by the neurologist in this study.

It has been shown in several studies that migraineurs suffer from a significant amount of disability as compared to other forms of headaches.^{3,4,13-16} This study corroborated with these earlier findings; however, few direct comparisons can be performed because of differences in definitions of indicators of disability used. The observed burden of migraine patients in this study being clinic-based was higher: the proportions that received emergency treatment in the past year (36%) and were taking medications were much higher compared to population-based studies in Taiwan¹⁵ and Sweden.¹⁶ Summing together the burden among diagnosed patients and that of the undiagnosed ones, one can conclude that the impact of migraine among Asian populations is very high in terms of loss work, productivity, and use of health care. However, our study suggests a low awareness of migraine in Asians. Among the patients in neurology specialty clinics as in our study, only 58.6% of migraine patients had had a prior diagnosis of migraine before this consultation, which is even lower than that (69.9%) reported by the Landmark study performed in the European and US primary care settings. Therefore, the awareness of migraine in Asia is unsatisfactory and needs to be promoted in the future.

The profile of the migraine patients' treatment history reflects that Asian patients' healthcare utilization for migraine stood far from the ideal situation. Forty percent of migraine patients did not obtain relief within 2 hours of medication. In a study on the impact of migraine using the HIT, it was shown that most migraineurs had scores reflective of a "severe impact" range.¹⁷ This could be one of the reasons why migraineurs had less relief, greater tendency to overuse pain medications, and had more frequent emergency room consults and treatments as compared to others with other forms of headaches.

Evidently, many of these patients did not benefit from their current migraine treatment. A trend in today's management of migraine involves the use of prophylaxis. The guidelines provided by the American Academy of Neurology recommend the use of prophylaxis in patients whose headache attacks were frequent, or did not respond to acute care, or where reliance to acute care increases likelihood of drug-induced headache.¹⁸ In a recent population-based study performed in the US,¹⁹ it was estimated that only 13% of participants with migraine were currently on migraine prevention and 25.7% of participants with migraine met expert's criteria to "offer prevention." In our study performed in the neurologists' clinics, less than 30% of our migraine participants were currently taking medications for migraine prevention. More importantly, our neurologists recommended that around 70% further patients with migraine should be on migraine prophylaxis. Therefore, migraine treatment still has room for improvement in this region.

CONCLUSIONS

This study provides a picture of the prevalence of migraine and its impact on patients in Asian populations. A majority of the patients who consulted a neurologist for the first time for headache were diagnosed to have migraine. Also, migraine imposed a great burden on these patients due to loss of productivity and need for treatment. Many migraineurs were not on, but needed to be on, migraine prophylaxis as a treatment strategy. Thus, migraine education campaigns for neurologists and patients must be conducted in the Asian region.

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