Prevalence and Precipitating Factors of Migraine in Secondary School Students in Thailand

Vitchayaporn Emarach Saengow[1] Sirikarn Tangcheewinsirikul[1]

[1] Department of Pediatrics, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima, Thailand

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Address for correspondence Vitchayaporn Emarach Saengow, MD, Department of Pediatrics, Maharat Nakhon Ratchasima Hospital, Chang Peuk Road, Muang, Nakhon Ratchasima 30000, Thailand (e-mail: vitchayaporn.sa@cpird.in.th).

Abstract

Introduction Migraine is the most common primary headache in children which leads to disturbance of school performance and impaired quality of life. The prevalence of migraine is different between countries and ethnicities; this study determines the prevalence and precipitating factors of migraine in Thailand.

Method This cross-sectional school-based study was conducted in Nakhon Ratchasima. The children aged between 12 and 18 years from four secondary schools were selected by stratified randomization method. The screening questionnaire and directed interview with physical examination were done and migraine was diagnosed based on the criteria of International Classification of Headache Disorders III. The prevalence of migraine was identified and baseline characteristic of disease with precipitating factors was evaluated.

Results A total of 2,744 students aged between 12 and 18 years (900 males, 1,844 females) were recruited; mean age was 14.3 ± 1.75 years. Fifty-five students were diagnosed with migraine (20 males [36.36%], 35 females [63.64%], mean age: 15.1 ± 1.6 years). The prevalence of migraine was 1.98%. Migraine prevalence was predominant in female adolescents with a common feature being migraine without aura. The important precipitating factor in this study was stress from academic achievement.

Conclusion Migraine is a common disease in children and under-recognized in school students, and stress is the major precipitating factor.

Keywords
- migraine
- prevalence
- pediatric
- students
- severity
- precipitating factors

Introduction

Headache, a common health problem, affects almost 75% of children in their childhood.[1]

Migraine is the most common primary headache which has chronic effects on children's daily activities as well as their quality of life; however, migraine is usually under-recognized by parents, teachers, and physicians. Previous studies revealed that the prevalence of migraine in children is increasing by age: 1.7% in 7-year-old children to 5.3% in 15-year-old children and it also differs in various ethnicities: the prevalence is 2.7 to 22% in the Western countries and 0.5 to 13.8% in Asian countries.[1–3] The precipitating factors of migraine are different in each study such as emotional stress, menstruation, social expectation, socioeconomic status, and lack of sleep and diet.[1–11]

Previously in Thailand, two studies had looked over the prevalence of migraine in Bangkok, the capital city of Thailand[2,3] however, there is no survey on prevalence of migraine in other regions with different cultures and environment in Thailand. Therefore, in this study, the prevalence of migraine assessed in children in Northeastern Thailand and the characteristics of migraine and precipitating factors of migraine have been further determined.

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Method

This cross-sectional school-based study was conducted in Nakhon Ratchasima Province, a town in northeastern Thailand with a total population of 210,941 and 11,175 students aged 12 to 18 years. Following the approval of Institutional Review Board of Maharat Nakhon Ratchasima Hospital, the study was conducted between July 1, 2016 and September 30, 2016. Four schools in Mueang Nakhon Ratchasima District with students of grade 7 to 12 were recruited; the children aged between 12 and 18 years were selected by stratified randomization method. The self-administration screening questionnaire was sent to the selected students and 2 weeks apart the screening questionnaires were collected for further evaluations in regard to headache symptoms. Individuals with the most compatible symptoms to migraine were further selected to be examined and interviewed by pediatric neurologists. The diagnosis of migraine and other primary headaches was made based on the diagnostic criteria of International Classification of Headache Disorders III (ICHD-III) as shown in ►**Table 1**.[12] The baseline characteristic features of migraine (we recruited only cephalic manifestation of migraine), such as frequency, duration, location, quality, intensity of pain, influence of physical activity, nausea, vomiting, photophobia, and phonophobia, the type of migraine, associated signs and symptoms, precipitating factors (diet, stress [evaluated by direct interview], total sleep times, menstruation, social expectation, grade point average [GPA]), and family history, were recorded to determine the prevalence of migraine and precipitating factors. Stata 10 program was used for data analysis. In descriptive analysis, mean $\pm$ standard deviation and percentage were used, while univariate and multivariable analyses were employed to evaluate the associated precipitating factors of migraine by comparing with children without migraine; results are reported as significance levels of $p < 0.05$.

Table 1 Diagnosis criteria for migraine without aura (ICHD-III)

A. At least five attacks fulfilling criteria B–D
B. Headache attacks lasting 2–72 hours (untreated or unsuccessfully treated)
C. Headache has at least two of the following four characteristics:
1. Unilateral location
2. Pulsating quality
3. Moderate or severe pain intensity
4. Aggravation or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D. During headache at least one of the following:
1. Nausea and/or vomiting
2. Photophobia and phonophobia
E. Not better accounted for by another ICHD-III diagnosis.

Abbreviation: ICHD-III, International Classification of Headache Disorders III.

Table 2 Characteristic of migraine

	Number of students (%) $N = 55$
Age	
12–17 year	
Mean age 15.1 $\pm$ 1.6 year	
Sex	
Male	20 (36.36)
Female	35 (63.64)
Classification of migraine	
Migraine without aura	41 (74.54)
Migraine with typical aura	12 (21.81)
Hemiplegic migraine	1 (1.81)
Migraine with brain stem aura	1 (1.81)
Characteristic of pain	
Throbbing	33 (60.01)
Tense	3 (5.45)
Burning	3 (5.45)
Others	16 (29.09)
Duration of headache	
2–4 hours	38 (69.09)
4–8 hours	13 (23.63)
$>$ 8 hours	4 (7.27)
Site of headache	
Unilateral	
Frontal	1 (1.81)
Temporal	16 (29.09)
Parietal	2 (3.63)
Bilateral	
Frontal	7 (12.7)
Temporal	15 (27.27)
Others	14 (25.45)
Nausea and vomiting	
Yes	55 (100.00)
No	0 (0.00)
Photophobia or phonophobia	
Yes	53 (96.36%)
No	2 (3.64)
Frequency of headache	
1–2 times/month	22 (40.00)
3–4 times/month	13 (23.63)
$>$ 4 times/month	9 (16.36)
Yearly	11 (20.00)
Severity of migraine	
Mild	32 (58.18)
Moderate	21 (38.18)
Severe	2 (3.63)

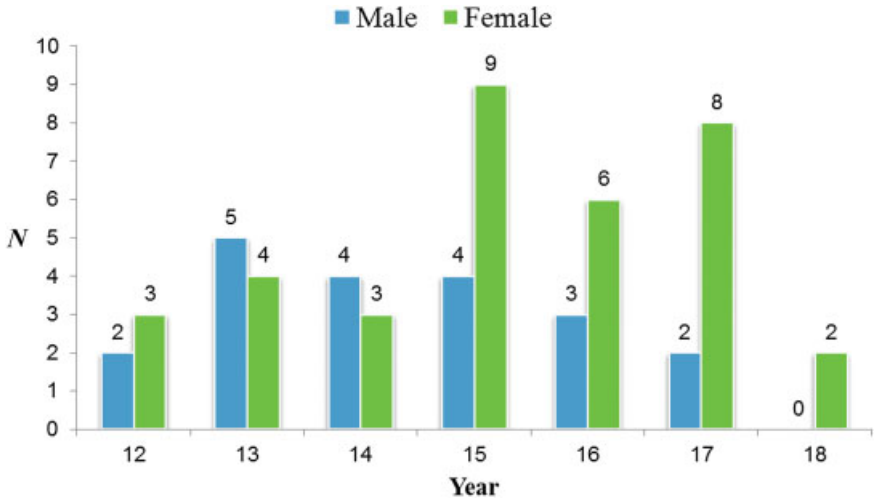

Fig. 1 Age and sex distribution in students with migraine.

Results

A total of 2,744 students (900 males and 1,844 females) were recruited for this survey; 248 students (91 males [36.69%], 157 females [63.31%]), aged between 12 and 18 years (mean age: 14.3 ± 1.75 years) were selected using the screening questionnaire. The selected individuals were included into a directed interview and a complete physical examination by a pediatric neurologist. Fifty-five students were diagnosed with migraine in our data (20 males [36.36%], 35 females [63.64%], and mean age 15.1 ± 1.6 years). The prevalence of migraine was evaluated to be 1.98%. Regarding the characteristic of migraine as shown in ►**Table 2**, commonly found type was migraine without aura (74.54%); there were two students diagnosed with hemiplegic migraine and migraine with brain stem aura subsequently. Out of all students, 60.61% had pain characteristics of throbbing or pulsatile, 69.09% had symptom duration for approximately 2 to 4 hours. The most common site of pain was unilateral temporal region, and the severity of pain was moderate to severe in 98.18% of students, and 80% of students had frequent headaches with one to four migraine attacks per month that affected their quality of life with high impact on their school scores. The mostly affected age group with migraine consisted of students in grade 10 (aged 15 years); in older age, the increase in prevalence happened to be correlated with female sex (as shown in ►**Fig. 1**). The common onset of headache was at the age of 10 years (as shown in ►**Fig. 2**). The family history of migraine was positive in 87.27% of students, and 7.28% had comorbidity of obesity and allergic rhinitis. Regarding the lifestyle of students with migraine, 27.27% of students with migraine enjoyed reading comic books, 25.45% meditated, and 64.46% were users of social media and tablets (2–5 hours per day). About 45.45% possessed high socioeconomic status (based on family incomes) status and 96.37% had high value and expectations from family and society. The common range of GPA was 3.00 to 3.5 (34.55%), and 49.09% of students diagnosed with migraine did not have any chocolate, green tea, or tea in their daily diet.

Univariate analysis showed that associated precipitating factors of migraine were lack of sleep (< 6 hours/day),

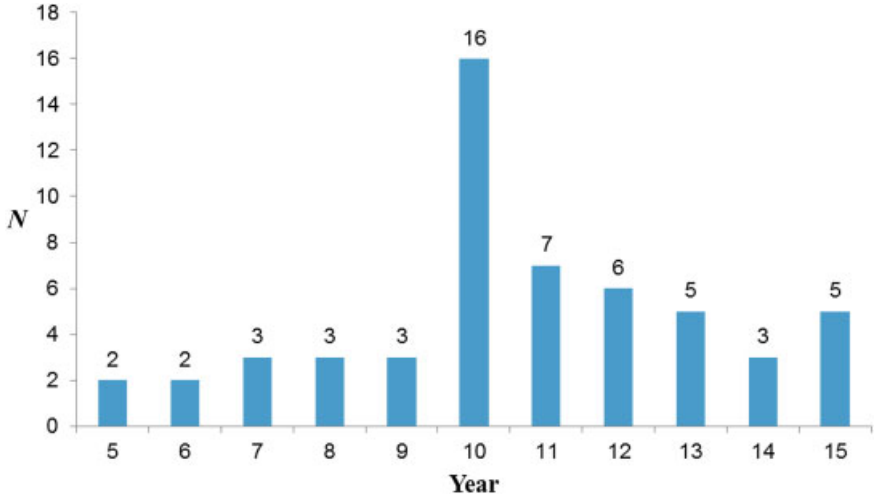

Fig. 2 Age of onset of headache in student with migraine.

Table 3 Precipitating factors of migraine in univariate analysis

Factors	Migraine No. (%)	Not Migraine No. (%)	*p*-Value
Sleep times			0.03
< 4 hours	11 (20.0)	26 (13.5)	
4–6 hours	22 (40.0)	40 (20.7)	
6–8 hours	9 (16.4)	75 (38.9)	
> 8 hours	1 (1.8)	6 (3.1)	
N/A	12 (21.8)	46 (23.8)	
Stress			<0.001
Family condition	8 (14.5)	28 (14.5)	
Academic achievement	27 (49.1)	60 (31.1)	
Peer relations	3 (5.5)	7 (3.6)	
Mixed	13 (23.6)	19 (9.9)	
No stress	4 (7.3)	79 (40.9)	
Precipitated during menstruation period (Female)			0.04
Yes	13 (37.1)	17 (13.9)	
No	22 (62.9)	105 (86.1)	

Abbreviation: N/A, not applicable.

academic achievements stress (subject of study, study environment), and menstruation. However, the multivariate analysis showed that associated factor was only the stress from school, while sleeping time and menstruation were considered not significant (►**Tables 3** and **4**).

Discussion

A previous study in Asian countries showed the migraine prevalence to be approximately 0.5 to 13.8%[1]; our study reported 1.98% prevalence of migraine among 2,744 students in Nakhon Ratchasima Province, Thailand, which is lower than the study of Visudtibhan et al in Thailand with the prevalence of 13.8% among 1,789 students aged between 12 and 15 years living in Bangkok.[2,3] The noticeable difference between these studies can be explained by the divergent culture and social expectations in urban and rural areas of Thailand, which is in agreement with previous study in Taiwan indicating the role of culture in prevalence of migraine.[5]

Table 4 Precipitating factors of migraine in multivariate analysis

Factors	Migraine No. (%)	Not Migraine No. (%)	*p*-Value
Stress			<0.001
Family condition	8 (14.5)	28 (14.5)	
Academic achievement	27 (49.1)	60 (31.1)	
Peer relations	3 (5.5)	7 (3.6)	
Mixed	13 (23.6)	19 (9.9)	
No stress	4 (7.3)	79 (40.9)	

Studies in Western countries showed that the migraine prevalence ranges from 3 to10.6% (e.g., in UK [10.6%], in Italy [3.0%], in Norway [7%], and in Turkey [8.8%]). All previous studies in Western countries showed a higher prevalence of migraine than the prevalence reported in our study which correlates with previous reports indicating lower prevalence of migraine in Asia than Western countries due to the different ethnicity and genetics.[1,6–11]

Even though all studies used different diagnostic criteria for migraine such as International Headache Society, ICHD-II, and ICHD-III classifications, which make a different cut point duration of migraine between 1 and 2 hours, large number of studies had mentioned that the different duration of headache may not have a significant impact on the prevalence of migraine. Similarly, when we compared the ICHD-II (prevalence 2.2%) and ICHD-III (prevalence 1.98%), the prevalence analysis did not show a significant difference. However, a study in Japan mentioned the underdiagnoses of migraine if using longer time cutoff.[13] Further study is required to identify the prevalence of migraine using ICHD-III for a more precise conclusion.

The characteristic of headache such as age and sex distribution of migraine in our survey correlated with other previous studies; female group predominates, especially in older age, with significant higher prevalence.[1,5,14–16] This study is also in general agreement with previous studies in identifying the strong impact of positive family history associated with migraine as the identification of abnormal genetic in specific type of migraine such as familial hemiplegic migraine.[1] The migraine pain in this study considered a moderate-to-severe throbbing pain on unilateral site along with nausea and vomiting symptoms as already explained in previous studies.[1–3]

The precipitating factor of migraine in this study was stress from academic achievement which is similar to the previous study in Thailand,[2,3] while the social expectation was not a significant precipitating factor in this study which illustrates the lower life expectation in rural area than the urban area in Thailand. Similar to other previous studies in Hong Kong and Japan,[13,17] our data showed stress to be the important precipitating factor in migraine. The sleep deprivation was a significant precipitating factor in Hong Kong and Japan and menstruation was the significant factor in the study of Japan. However, in this study, using the multivariate analysis, the sleep deprivation and menstruation period were not significant. This may be explained by the smaller sample size. Unlike the studies in Western countries, diet was not a precipitating factor of migraine similar to other studies in Thailand and Asia with low impact of food regime on headaches.[1]

Conclusion

The prevalence of migraine differs between culture and ethnics, with a lower prevalence in Asian and rural areas. Stress is one of the important precipitating factors in Thai and Asian population.

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