

## Migraine Types and Triggering Factors in Children

How to Cite this Article: Nejad Biglari H, Karimzadeh P, Mohammadi Kord-kheyli M, Hashemi SM. Migraine Types and Triggering Factors in Children. Iran. J. Child. Neurol 2012;6(2):33-38.

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Received: 16-Apr-2012  
Last Revised: 9-May-2012  
Accepted: 10-May-2012

### Abstract

#### Objective

Migraine is a common problem in children and the mean prevalence of migraine in Europe among 170,000 adults was 14.7% (8% in men and 17.6% in women) and in children and youth (36,000 participants), the prevalences were (9.2% for all, 5.2% in boys and 9.1% in girls) and the lifetime prevalences were (16, 11 and 20%, respectively).

To determine the epidemiology of migraine and evaluate migraine triggering factors in children.

#### Materials & Methods

Two-hundred twenty-eight children with a maximum age of 12 years who fulfilled the ICHD-II criteria for pediatric migraine were enrolled into the study.

#### Results

This study shows that migraine is slightly more common in boys and its peak incidence is between ages 8 and 12 and most patients have three to five headache attacks per month. The pain has a tightening, stabbing or vague quality in about 70% of children with migraine and bilateral headache is slightly more common. The common triggering factors in children migraine were stress, noise, sleeplessness, hunger and light and the common relieving factors were sleep, analgesics, silence, darkness and eating.

#### Conclusion

Migraine is a common problem in children with an equal incidence in boys and girls before adolescence and more common in girls after adolescence.

**Keywords:** Migraine; Children headache; Triggering factor

### Introduction

Migraine is a common problem causing parent concern in children. Recurrent headaches frighten the child and the parents. They try to identify the cause of the headache, finding ways for relief and assurance that a horrible illness is not present (1, 2). This disabling illness causes absence from school and affects the quality of life. Migraine is an acute recurrent headache that is characterized by episodic, periodic, paroxysmal attacks of throbbing headache that may be unilateral or bilateral. Each episode is separated by pain free intervals. Prior to the attacks there may be pallor and behavioral changes and decreased appetite, nausea, vomiting, phonophobia and photophobia and the headache is usually relieved by sleep. Migraine presentations and treatment in children are different from adults as they are shorter and bilateral in location. Diagnosis of migraine in children due to limitations

on their ability to declare and describe the symptoms is challenging. Migraines in children are divided into three groups; namely, migraine with aura (classic migraine), migraine without aura (common migraine) and migraine equivalent syndrome. The epidemiology of migraine is different in various parts of the world and several studies have investigated it in Iran. The prevalence of migraine headache is 12.3% (95% CI: 10.2-14.4) and tension-type headache is 4.2% (95% CI: 2.9-5.6) among school children (aged 12-14 years) in Yazd (3). Prevalence rates of migraine and tension-type headache were 1.7% and 5.5%, respectively among children between 6 and 13 years old in Shiraz (4). The mean prevalence of migraine in Europe among 170,000 adults was 14.7% (8% in men and 17.6% in women) and in children and youth (36,000 participants), the prevalences were 9.2% for all, 5.2% in boys and 9.1% in girls and the lifetime prevalences were 16, 11 and 20%, respectively (5). A recent research about headaches in children and adolescents was initiated by Bille in 1962 (6). He revealed that by age 7, 1.4% of the children had migraine, 2.5% had non-migrain headaches and about 35% had infrequent headaches of other types. At age 15, 5.3% of the children and adolescents had migraine, 15.7% had frequent non-migrain headaches and 54% had infrequent non-migrain headaches. Bille concluded that the frequent non-migrain headaches are tension-type headaches (7, 8). The overall prevalence of headaches increases from preschool children through adolescence. Migraine is more common in boys before

7 years of age; however, boys are equally affected as girls between ages 7 to 11 years, and the incidence of migraine is greater in girls than the incidence in boys at adolescence (9). Migraine is a complex interaction of vasoconstriction and then vasodilatation in response to neurotransmitter release and subsequent effects on ion channels. The pathophysiology of migraine is not well known, but the most accepted theory claims that when a genetically susceptible person is exposed to environmental or physiological stimulus such as exposure to stress, diet or drugs, a migraine attack occurs (10). There are factors that alone or together may trigger a migraine attack so they are very important in the treatment of migraine because headache can be prevented by avoiding them (11). Researches about migraine triggering factors are limited in children. Triggers are varying in different patients and are even different in the same person in each attack. Common triggering factors are exercise, head trauma, stress and menstrual cycles (12). This study evaluates migraine-triggering factors in children.

### Materials & Methods

Cases who have been studied in this investigation were referred patients to the neurology clinic of Mofid Children's Hospital with the diagnosis of migraine according to the Second Edition of the International Headache Classification Criteria (Table 1).

**Table 1.** Proposed Revision to the International Headache Society Diagnostic Criteria for Pediatric Migraine Without Aura (13)

- A. At least five attacks fulfilling B through D
- B. Headache attack lasts 1 to 48 hours.
- C. Headache has at least two of the following:
  - a. Either bilateral or unilateral (frontal/temporal) location
  - b. Pulsating quality
  - c. Moderate to severe intensity
  - d. Aggravation by routine physical activity
- D. During headache, at least one of the following:
  - a. Nausea and/or vomiting
  - b. Photophobia and/or phonophobia

Eligible subjects were children under 12 years old who fulfilled the ICHD-II criteria for pediatric migraine and had complete outpatient records. The data collecting tool in this study was a questionnaire that included questions about triggering factors, epidemiologic data, familial history and imaging results. Exclusion criteria were the age above 12 and evidence of organic or structural abnormalities in the selected cases. General assessment and physical examination was performed for patients in the clinic. Based on the severity and frequency of headaches, each patient obtained a score of 1 to 3; 1, no impact on daily activities; 2, partial impairment in daily activities; and 3, impaired functioning. According to the formula;  $n = z^2p(1-p)/d^2$ ,  $\alpha = 5\%$ ,  $d = 6.5\%$  and  $p = 50\%$  sample size was 228. For increasing the internal and external validity these arrangements were made; evaluation and following of cases was performed only by a single physician, para clinical tests were used to increase the accuracy, the study was conducted under the supervision of pediatric neurology masters and selected cases were from different parts of the country. Consent to use patient information was obtained from their parents and they were free to leave the study whenever they wished. Statistical analysis was performed using SPSS statistical package and in all statistical tests, a significance level of 95% was intended. This study was conducted on 228 children with migraine referred to Mofid Children's Hospital from 2008 to 2011. All of the ethical aspects of this study has been approved in Ethics Committee of Shahid Beheshti University of Medical Sciences.

### Results

Children who were studied were aged between 2 to 14 years. Four (1.8%) of the cases were under 4 years old, 89 (39%) were between 4 and 8, 127 (55.7%) were between 8 and 12 and eight (3.5%) of them were above 12 years. 104 (45.6%) of the cases were female and 124 (54.4%) of them were male. The mean age at the first attack of migraine was  $6.8 \pm 2.5$  years. The frequency of headache in 129 (56.6%) patients was 3-5 per month, in 59 (25.9%) patients it was 5-10 per month and in 40 (17.5%) patients it was above 10 per month. The quality of pain in 40 (17.5%) cases was throbbing, in 71 (31.1%) cases it was tightening, in 18 (7.9%) cases stabbing,

in 44 (19.3%) cases vague and persistent and in 55 (24.1%) of them unexplainable. In 110 (48.2%) cases, the headache was unilateral and bilateral in 118 (51.8%). Pain location was occipital in 41 (18%) patients, retro orbital in 79 (34.6%) and without a specific location in 108 (47.4%) patients. The time of headache was in the morning in 47 (20.6%) of the children, all day in 24 (10.5%), at night in 53 (23.2%), at awakening in 23 (10.1%) and without a specific time in 81 (35.5%). The triggering factor was noise in 71 (31.1%) cases, stress in 113 (49.6%), hunger in 44 (19.3%), light in 42 (18.4%), sleeplessness in 67 (29.4%), food in eight (3.5%), minor head trauma in five (2.2%) and other factors in 21 (9.2%). The relieving factor was silence in 48 (21.1%) children, sleep in 127 (55.7%), eating in 18 (7.9%), and analgesic use in 124 (54.4%) and darkness in 35 (15.4%) of them. 165 (72.4%) of the cases had migraine without aura and 63 (27.9%) cases had migraine with aura. Visual and auditory aura frequency was 71.4% and 28.6%, respectively. The duration of headache was less than 1 hour in 98 (43%) children, 1 to 2 hours in 86 (37.7%) and more than 2 hours in 44 (19.3%). Migraine was the classic type in 53 (23.4%) cases, common type in 144 (63.2%), migraine variant in 19 (8.3%) and epileptic syndrome in 12 (5.3%). Familial history was positive in 163 (71.5%) of our patients. The associated signs and symptoms were nausea in 118 (51.8%) children, vomiting in 78 (34.2%) vertigo in 48 (21.1%), phonophobia in 18 (7.9%), photophobia in 41 (18%), abdominal pain in 17 (7.5%), sleep disorders in 74 (32.5%) and motion sickness in 81 (35.5%).

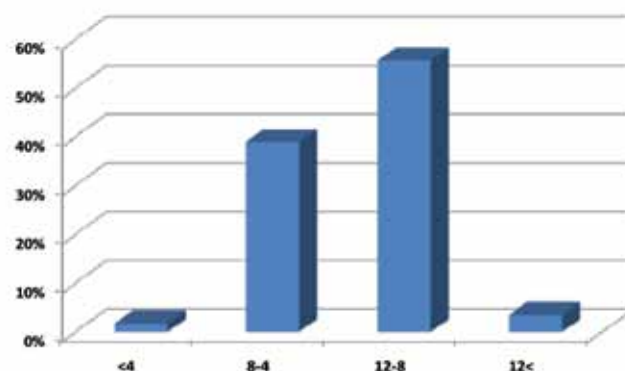


Fig 1. Frequency of different age groups

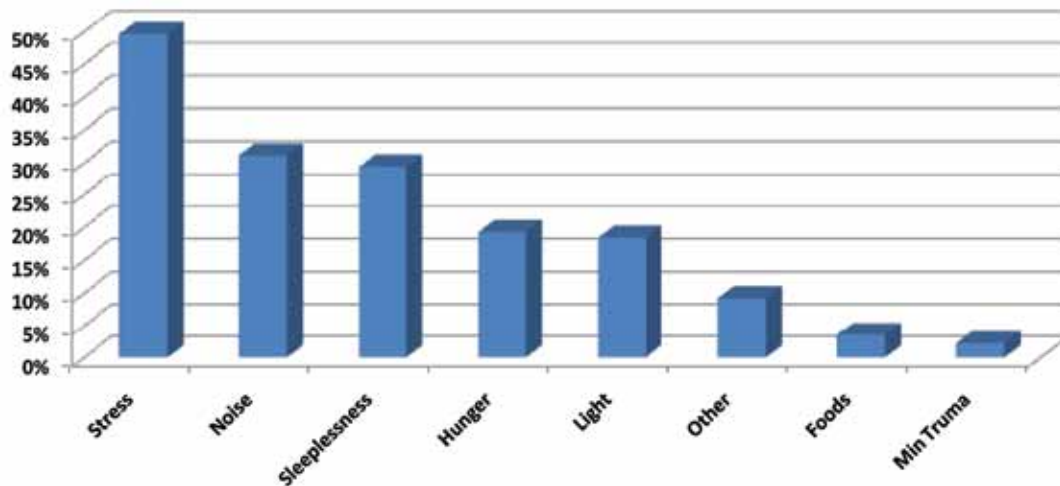


Fig 2. Frequency of different triggering factors

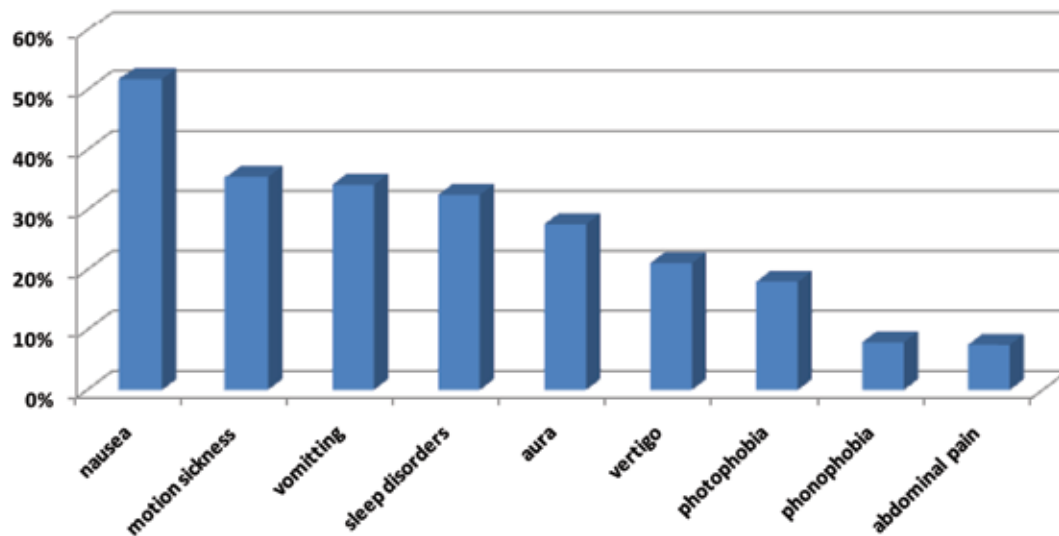


Fig 3. Frequency of different associated signs and symptoms

### Discussion

This study shows that migraine is slightly more common in boys and the peak incidence is between ages 8 and 12 and most of the patients had 3 to 5 headache attacks per month. The cause of greater frequency of migraine in boys that was detected in this study is the demographic composition of the enrolled patients. As mentioned earlier, migraine is more common in preadolescence. Pain quality was tightening, stabbing or vague in about 70% of the children with migraine and bilateral headache was slightly more common. The rarest time for starting a headache episode was at awakening time in the morning in children. The common triggering factors

in children's migraine were stress, noise, sleeplessness, hunger and light and the common relieving factors were sleep, analgesics, silence, darkness and eating. Migraine without aura is the most common type of migraine in children and in patients with aura the most common aura was visual aura. Only 20% of children with the diagnosis of migraine had more than 2 hours in each headache attack and a familial history of migraine was positive in about 70% of the patients. Nausea and vomiting were the most common associated problems in pediatric migraine that occur in approximately 85% of the cases. Diagnosis of migraine was based on the recurrences of attacks and their triggering by stress. The diagnostic

criteria of children migraine are summarized in Table 2. Some diagnostic criteria have been developed (14); an aura, generally visual, is seen in 10% to 50% of children (15); gastrointestinal symptoms, not only including

nausea and vomiting, but also anorexia and abdominal pain in 70% to 100%; a positive family history in 44% to 87%; unilateral headaches in 25% to 66%; and motion sickness in 45% to 65%.

**Table 2.** Headache Classification

<p><b>Primary Migraine</b></p> <p>With aura</p> <p>Without aura</p> <p><b>Periodic Syndromes</b></p> <p>Tension-type</p> <p>Episodic</p> <p>Chronic</p> <p>Cluster</p> <p><b>Secondary Migraine</b></p> <p>Trauma</p> <p>Vascular</p> <p>Intracranial disorders</p> <p>Substance abuse</p> <p>Infection</p> <p>Homeostasis</p> <p>Cranial structureNeuralgia</p>
<p>Modified from IHS(International Headache Society) criteria, 2004 (16)</p>

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