

Original article

# Characteristics of headaches in Japanese elementary and junior high school students: A school-based questionnaire survey

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Received 11 November 2016; received in revised form 9 May 2017; accepted 16 May 2017

## Abstract

**Purpose:** Few studies have investigated pediatric headaches in Japan. Thus, we examined the lifetime prevalence and characteristics of headaches among elementary and junior high school students in Japan.

**Methods:** In this school-based study, children aged 6–15 years completed a questionnaire based on the diagnostic criteria of the International Classification of Headache Disorders-3 $\beta$  to assess headache characteristics and related disability.

**Results:** Of the 3285 respondents, 1623 (49.4%) experienced headaches. Migraine and tension-type headaches (TTH) were reported by 3.5% and 5.4% of elementary school students, respectively, and by 5.0% and 11.2% of junior high school students. Primary headaches increased with age. Compared with TTH sufferers, the dominant triggers in migraine sufferers were hunger (odds ratio = 4.7), sunny weather (3.3), and katakori (neck and shoulder pain) (2.5). Compared with TTH, migraine caused higher headache-related frustration ( $P = 0.010$ ) as well as difficulty concentrating ( $P = 0.017$ ). Migraine-related disability was greater among junior high school students (feeling fed up or irritated,  $P = 0.028$ ; difficulty concentrating,  $P = 0.016$ ). TTH-related disability was also greater among junior high school students (feeling fed up or irritated,  $P = 0.035$ ). Approximately half of the students who complained of headache-related disability were not receiving medical treatment.

**Conclusion:** This is the first detailed study of headaches in Japanese children to include elementary school students. Nearly 50% of the school children reported headaches and the disruption of daily activities caused by migraine was higher among junior high students than elementary school students.

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**Keywords:** Children; Disability; Migraine; Pediatric headache; Tension-type headache; Trigger

## 1. Introduction

Headaches are symptoms associated with many diseases, such as infections, and they are often acute and

transient. However, many people suffer chronically from severe and frequent headaches, which may interfere with daily life. Various headache types were described in the International Classification of Headache Disorders 2nd edition (ICHD-II) [1] published in 2004, and in the 3rd edition (ICHD-3 beta) [2] published in 2013. Many headaches that are sufficiently severe to interfere with normal activities and require treatment are classified as migraine or tension-type headaches (TTH), both of

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which are referred to as primary headaches. They may be associated with a wide variety of symptoms that affect physical, psychological, and social health in children [3,4]. In particular, migraines frequently cause significant disruption of normal routines.

According to recent school-based studies, the prevalence of primary headaches among children ranges from 1.7% to 11.0% for migraine [5–12], and from 1.3% to 24.7% for TTH [5–9,12] (Table 1). In Japan, the prevalence of migraine and TTH among adults range from 6.0% to 8.4% and from 21.7% to 22.4%, respectively [13,14], but few studies have focused on pediatric headaches. One study found that the prevalence of migraine among junior high school students was 4.8% [10]; however, a detailed investigation of elementary school students has not been performed. A previous Japanese study found that the prevalences of migraine and TTH among elementary school students were 7.5–7.9% and 3.7–3.8%, respectively [15]. Young children often have difficulty describing their symptoms, so headaches are often under-recognized by their parents and teachers, and they are treated medically less frequently. Thus, the true prevalence of headaches in the pediatric population is unknown in Japan. We designed this study to assess the prevalence and causes of headaches in elementary and junior high school students in Japan, including both primary and secondary headaches. Due to the potential for chronic primary headaches, we carefully assessed the triggers of these disorders and their effects on normal daily activities.

## 2. Methods

### 2.1. Survey procedure

The subjects comprised 3404 Japanese children living in Hitachiomiya City (population approximately 45,000), Ibaraki Prefecture, Japan. All were students at 13 public elementary schools and seven public junior high schools in the city. The study was conducted among all children in the city from November 12 to December 20, 2012. Computer-scored answer sheets were given after school to the students at each of the schools. Instructions for completing the questionnaire were provided by the teachers in charge of the students. If young students and students in handicapped classes could not complete the questionnaire themselves, they were instructed to complete it at home with the assistance of their parents. The completed answer sheets were collected by the teachers. If students were absent on the day the questionnaires were distributed, they were provided with forms later.

This study was approved by the ethics committee of Hitachiomiya Saiseikai Hospital. Informed consent was obtained from the schools after verbal and written explanations had been provided by the research repre-

sentative. The teachers in charge of the students delivered a written notice to the parents explaining the study purpose, contents, and ethical considerations. The questionnaire was anonymous. We assumed that informed consent was granted by the children and their parents when they returned the answer sheets.

### 2.2. Questionnaire design

We created a computer-scored questionnaire with simple, multiple choice answers. The questionnaire was based on the diagnostic criteria of the ICHD-II [1] and it comprised 26 items including characteristics related to the headaches, family history, triggers, interference with normal activities (referred to as disability), history of medical treatment for headaches, and drugs that had been used (Supplementary material 1). The answer choices for secondary headache were based on ICHD-II or previous reports, and they covered the main causes of pediatric secondary headache. The computer-scored questionnaire and data calculations were provided by G's STAFF Ltd (Tokyo, Japan). We received the collected data as from the company spreadsheet files and we analyzed the data after excluding questionnaires with incomplete responses.

### 2.3. Evaluation

Headaches were classified according to the diagnostic criteria of the ICHD-3 beta [2]. The questionnaire started with questions about demographic information, including sex and age. If a student responded that he or she had not experienced headaches, the respondent was instructed not to continue with the subsequent questions. If the students reported secondary headaches, they were instructed not to proceed to the questions regarding primary headaches because we assumed that primary and secondary headaches did not occur concurrently. Given that migraines in children tend to last for a shorter period than adults and are likely to be bilateral or midline, bilateral headaches involving the frontal and temporal areas and lasting 2–72 h are also diagnosed as migraine by ICHD-3 beta [2]. In migraine with aura, unilateral aura was omitted from the diagnostic criteria because there was no answer choice regarding unilateral aura. TTH was defined as having 10 or more headache episodes irrespective of the total frequency (Supplementary material 2).

### 2.4. Statistical analysis

All of the analyses were performed using SPSS Statistics Version 23 (IBM, Inc., Armonk, NY, USA). Descriptive statistics were expressed as the mean  $\pm$  standard deviation. Comparisons of two groups were performed using the Mann–Whitney *U* test. Associations

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