School Start and Occurrence of Headache

Pirjo Anttila, MD; Liisa Metsähonkala, MD, PhD; and Matti Sillanpää, MD, PhD

ABSTRACT. Objectives. The purpose of the study was to examine the occurrence of childhood headache at the start of school.

Study Design. An unselected population-based questionnaire study on the occurrence of headache was conducted in 1433 children between the ages of 6 and 7 years old (ranging from 6 years 8 months to 7 years 8 months) who started school in 1992. The first questionnaire was given within 3 months of school entry in 1992. Of 1433 children, 1290 responded satisfactorily to the second headache questionnaire at the end of the second school year. The children (n = 725) who had had headache in 1994 were sent a more detailed questionnaire concerning risk factors of headache.

Results. A significant increase in the incidence density of overall headache in children was found during the first 12 school months compared with the 6 months immediately before school started or with the subsequent 6 school months (13th–18th month). The increase was attributable to occasional headache. During the first school months, the frequency of headache increased in 20% of children who had had headache before the 6 months preceding the start of school. The mothers and fathers of 129 children who started to have headache after school entry had a higher socioeconomic status than the mothers and fathers of children who had headache before the start of school. No significant difference in family history of headache or school-related factors was found among children. Predictably, the incidence density of recurrent headache after school start was higher than before school start. However, occasional headache showed a distinct peak at school start but regained its initial level at the end of the second school year.

Conclusion. School start appears to increase the incidence of overall headache (occasional headache in particular) in children, independent of other factors. Pediatrics 1999;103(6). URL: http://www.pediatrics.org/cgi/content/full/103/6/e80; headache, child, school, school start.s


The prevalence of headache increases with age in children. Recurrent headache occurs in 3% to 5.9% of 3- to 4-year-old children.1–3 According to Sillanpää et al., the lifetime prevalence of overall headache in 5-year-old children was 19.5%. The lifetime prevalence of headache increased from 47.2% in 7- to 9-year-old children to 69.5% in 13- to 15-year-old children in the study by Bille.5 In the study by Sillanpää,6 the prevalence of headache in 7-year-old children at school start was 37.7%, whereas the prevalence of 1-year headache in 13-year-old children was 82%.7

Starting school represents a remarkable life event for children. According to Metsähonkala et al., bullying in school, problems in interaction with other children, and stress in school were associated with headache in 8- to 9-year-old children. Socially unstable schools9 and lower social status are associated with increased occurrence of headache in children.4,10

The effect of school start on the incidence of headache has not been examined previously. We hypothesized that school start presents a stressing change in the lives of children and gives rise to headache or increases the frequency of episodes of existing headache during the first years of school. Our hypothesis proved to be true.

STUDY POPULATION AND METHODS

The target population consisted of all 6- to 7-year-old children (ranging from 6 years 8 months to 7 years 8 months) starting school in 1992 in the city of Turku, Finland. Turku has a total population of 165 000 and a subpopulation of 0- to 15-year-old children of ~30 000.

This study was conducted in three phases. During the first phase (in 1992), a structured questionnaire about the occurrence and frequency of present headache (preceding 6 months, headaches during 1992 [HA92]) and past (before present headache, pre-HA92) headache was given to the parent(s) who completed it with their child at a routine medical examination, which was conducted for the children by the school physician at school entry. A total of 1433 (93.5%) of the 1533 children who started school could be included in the study. A total of 45 pupils were excluded for the following nonheadache reasons: 30 children had mental retardation or severe hearing loss and could not cooperate, 3 pupils were abroad, the school attendance of 10 children had been interrupted, 1 child had relocated, and 1 child had a native language other than English (Chinese). A total of 24 children were absent from school for nonheadache reasons or were occasionally untraceable for other reasons during the study. Furthermore, 5 pupils returned the questionnaire uncompleted and no data were available on an additional 26 children. The details of this study have been reported previously.11

The second phase of the study took place at the end of the second school year in May 1994. A structured questionnaire with questions about the occurrence and frequency of present (preceding 6 months, HA94) and previous (before present headache, but after school start, HA93) headache was given to the child by his/her named school nurse and completed at home by the parent(s) with their child. Fig 1 displays the temporal sequence of the questionnaire administration in relationship to the school year. The same schools were used as in 1992. A total of 1395 pupils, 92.8% of all children, returned the questionnaire. A total of 1290 (90%) children participated in both the 1992 and the 1994 studies. Of these children, 2 did not answer the question concerning present headache in 1994. Of the pupils, 143 (10%) participated only in the first phase of the study. There were no significant
differences in the occurrence and frequency of present and past headache in 1992 between those who participated and those who did not participate in the 1994 study.

In the third phase of the study, the children who had had present headache (HA94) in 1994 (n = 725) were sent a more detailed questionnaire on background factors of headache 1 year later. The questionnaire included questions about the occurrence of headache in family members and sociodemographic and school-related factors. A total of 622 (85.8%) of all eligible children returned the questionnaire completed in an acceptable form.

Sociodemographic factors included the basic education, vocational education, and socioeconomic status of the parents according to the Central Statistical Office of Finland. School-related factors included school phobias, fear of teacher(s), fear of failure, bullying at school, loneliness at school, behavior problems, and learning difficulties.

We compared the incidence density per 1000 pupil years of overall headache and recurrent (≥1/month) headache among three periods: 6 months at school start (HA92), the first 12 months of school (HA93), and the subsequent 6 months at school (13th–18th month, HA94).

Pearson’s χ² test and Fisher’s exact two-tailed test with Yates’s correction when appropriate were used to compare the occurrence of headache in family members and school-related and sociodemographic factors in children who began having headache after school entry and in children who had headache before school start. The statistical significances of differences in incidence densities were tested using the Poisson regression model. The 95% CIs for incidence densities were calculated based on the profile maximized likelihood function of the Poisson regression model. Statistical analysis was performed with SAS System for Windows, Release 6.12/1997. A P value of <.05 was used as the cut-off point of significance.

The study design was approved by the Joint Ethics Committee of the University of Turku Medical School and the Turku University Hospital.

RESULTS

Incidence of Overall Headache

The incidence density of overall headache in children was significantly higher during the period of HA93 than during the period of HA92 or during the period of HA94 (Table 1). A total of 129 headache-free children began having headache after school start. Of these children, 2.3% had headache once a week or more by the end of the second school year.

Incidence of Recurrent Headache

The incidence density of recurrent headache was higher during the period of HA94 than during the period of HA92 or HA93 (Fig 2), but this difference was not statistically significant.

Change in Frequency of Overall Headache

Of the 660 children with headache preceding the 6 months before school start and at school start, one fourth of these children became headache-free toward the end of the second school year (Table 2). However, 30% of these children had frequent (≥1/month) headache compared with 22% before school start (P = .001). The frequency had increased in 130 (20%) of 660 pupils during the two school years. Of these pupils, 43 (33%) reported an increase of headache during the preceding 6 months. A total of 71 (11%) children experienced a decrease in the frequency of headache, and 166 (25%) children were completely headache-free.

Risk Factors for Onset of Headache After School Start Versus Before School Start

Both mothers (P = .001) and fathers (P = .025) of children who began having headache after school entry had a higher socioeconomic status than the parents of children who had headache well before school start. Mothers (P = .002) and fathers (P = .034) of children who started to have headache after school entry were independent entrepreneurs and employers and upper white-collar workers in a significantly higher number of cases than the parents of children who had headache before school start. There was no significant difference in family history of headache, parental basic or vocational education, or school-related factors between children who had headache before school entry compared with those children who began having headache during the first years of school.

### Table 1. Incidence Density of Overall Headache in Children During the First Year After School Entry (HA93) in Comparison With 6 Months Before School Start (HA92) and During the Last 6 Months of the Second School Year (HA94)

<table>
<thead>
<tr>
<th>Period</th>
<th>Incidence Density/1000 Person Years</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA92</td>
<td>165</td>
<td>116–227</td>
<td></td>
</tr>
<tr>
<td>HA93</td>
<td>292</td>
<td>241–350</td>
<td>.97</td>
</tr>
<tr>
<td>HA94</td>
<td>167</td>
<td>103–254</td>
<td>.017</td>
</tr>
</tbody>
</table>

![Fig 1](image1.png) The temporal sequence of questionnaire administration (Q1 = the first questionnaire, Q2 = the second questionnaire) in relationship to the school year in children during the first year after school entry (HA93), 6 months before school start (HA92), and during the last 6 months of the second school year (HA94).

![Fig 2](image2.png) The incidence density of overall and recurrent headache (HA) in children during the first year after school entry (HA93) in comparison to 6 months before school start (HA92) and during the last 6 months of the second school year (HA94).
TABLE 2. The Changes in Frequency of Overall Headache in Children With Headache Prior to the 6 Months Before School Start and Still at School Start (P = .001)

<table>
<thead>
<tr>
<th>Year 1992 At School Entry Frequency of Overall Headache</th>
<th>Year 1994 At the End of the Second School Year Number of Children (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1/mo</td>
<td>None</td>
</tr>
<tr>
<td>1–3/mo</td>
<td>&lt;1/Mo</td>
</tr>
<tr>
<td>≥1/wk</td>
<td>1–3/Mo</td>
</tr>
<tr>
<td></td>
<td>≥1/Wk</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>&lt;1/mo</td>
<td>146(28.5)</td>
</tr>
<tr>
<td>1–3/mo</td>
<td>253(49.4)</td>
</tr>
<tr>
<td>≥1/wk</td>
<td>97(19.0)</td>
</tr>
<tr>
<td></td>
<td>16(3.1)</td>
</tr>
<tr>
<td></td>
<td>512(100.0)</td>
</tr>
<tr>
<td>&lt;1/mo</td>
<td>15 (13.3)</td>
</tr>
<tr>
<td>1–3/mo</td>
<td>35 (31.0)</td>
</tr>
<tr>
<td>≥1/wk</td>
<td>46 (40.7)</td>
</tr>
<tr>
<td></td>
<td>17 (15.0)</td>
</tr>
<tr>
<td></td>
<td>113(100.0)</td>
</tr>
<tr>
<td>&lt;1/mo</td>
<td>5 (14.3)</td>
</tr>
<tr>
<td>1–3/mo</td>
<td>6 (17.1)</td>
</tr>
<tr>
<td>≥1/wk</td>
<td>10 (28.6)</td>
</tr>
<tr>
<td></td>
<td>14 (40.0)</td>
</tr>
<tr>
<td></td>
<td>35 (100.0)</td>
</tr>
</tbody>
</table>

DISCUSSION

It is well-known that the prevalence of headache increases with age in children. Whether the increase is more distinct at the age of school entry has not been clarified previously, and the reasons for the increase have not been individualized.

As expected, a significant increase in the incidence density of overall headache in children was found during the first year after school entry compared with the 6 months immediately before school start or with the 6 final months of the second school year. However, there was no significant difference between the incidence density of overall headache before school entry and the incidence density at the end of the second school year. This finding can be interpreted in such a way that the event of school start has a real and independent effect on the occurrence of headache.

Our results also showed that children who had headache before the 6 months preceding school entry had an increasing frequency of headache episodes after school start. Furthermore, a total of 40% of children who had headache at least once a week before school entry had headache episodes equally often after the first 2 years of school.

In this study, we compared three periods based on two questionnaires. The first questionnaire was completed by the parent(s) with their child at the office of the school physician, whereas the second questionnaire was completed by the parent(s) and their child at home. So, the only difference in the completion of the questionnaires was the place in which it was completed, and it had hardly any significance.

In previous studies, the low socioeconomic status of parents has been associated with headache in children. In contrast, in the Finnish adult study by Aromaa et al., the occurrence of headache was increased in women of higher socioeconomic status. In our study, the mothers and fathers of children who started to have headache after school entry had a higher socioeconomic status than the mothers and fathers of children who had headache before school start. The present study design does not imply causality between the high socioeconomic status of parents and the start of headache after school entry. The parents with higher socioeconomic status may expect good results from their child in school. These high expectations could cause stress and provoke the occurrence of headache in the child.

There was no significant difference in the occurrence of familial headache between those children who started to have headache after school start and those who had headache before school start. We might have obtained more information about the influence of parental headache on headache start in children if we had asked about the frequency of headache in the parents.

CONCLUSIONS

School start appears to increase significantly the incidence density of overall headache. The increase is almost exclusively attributable to occasional headache. Subsequently, it is important to develop preventive intervention methods and to prepare children to cope with the life changes that are caused by school start.

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