

## The Prevalence of *Pediculus capitis* in Primary School Students in Bahar, Hamadan Province, Iran

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(Received 7 Nov 2008; accepted 25 May 2009)

### Abstract

**Background:** Head lice infestation caused by *Pediculus humanus* var *capitis* (*Pediculus capitis*) is a worldwide public health concern that affects mostly school aged children. This descriptive, analytical study was carried out in 2008 to determine the prevalence of pediculosis capitis and some risk factors among primary-school pupils in Bahar, Hamadan Province, Iran.

**Methods:** We selected 900 pupils (50% girls and 50% boys) from 18 primary schools by multistage, systematic random sampling. Their hair was examined for head louse infestation. The results and demographic information recorded in the questionnaire and then were analyzed by SPSS software.

**Results:** Twelve students (1.3%) were infected with lice, 10 (2.2%) girls and 2 (0.44%) boys. The rate of infection was 0.66% in urban and 1.66% in rural areas. The results showed significant variations in head lice infestation, and factors such as sex, level of parent education and habitat ( $P < 0.05$ ), while there was no significant variation between school grade, members of family and the frequency of hair washing ( $P > 0.05$ ).

**Conclusions:** The prevalence of pediculosis was less than average percentages observed in other students inside and outside Iran. We recommend that the parents and teachers should receive training about the danger of infection and its distribution in family and school in order to prevent it.

**Keywords:** *Pediculosis, Students, Pediculus capitis, Iran*

### Introduction

Head lice infestation caused by *Pediculus capitis* (Anoplura: Pediculidae) is a world wide public health concern. Head lice generally affect primary school girls, aged 3-12 yr, in both the developed and the developing countries (1). The head louse is transmitted mainly through physical contact. Symptoms associated to the infestation are constant itching and scalp irritation. This ectoparasite feed by sucking blood and cause pruritus and subsequent skin excoriation may lead to secondary infection. In addition, chronic irritation and secondary infection may disrupt behavior, school performance and cause psychological distress (2, 3).

In the United States 6-12 million persons are infested every year with an estimated \$100 million being spent annually on treatment (4).

In certain epidemiologic school surveys conducted in different countries the prevalence of head lice has been found to be 6.8% in Turkey (5), 8.9% in Belgium (6), 13% in Australia (7), 35% in Brazil (8), 5.8% in Korea (9) and 52% in Ukraine (10).

Previous studies in different parts of Iran showed infestation rates of 5.1, 4.5, 2.2, 28.5 and 12%, mostly in the primary school children, in Rasht, Tabriz, Babol, Ardabil and Boushehr, respectively (11-15). In two other studies that were carried out in Hamadan Prov-

inces, the overall infestation rates were 7.5 and 6.85%, respectively (16, 17).

There are many factors related to the host that can be associated to head lice prevalence: Race, age group, sex, social-economical conditions and hair characteristics. Overcrowded living conditions and the arising of resistance to insecticides have contributed to the increase of head lice in the last few years (17). The present study was conducted to assess the head lice infestation rate and some risk factors in schoolchildren in Bahar, Province of Hamadan, Iran.

### Material and Methods

This descriptive, analytical study was conducted between February and June 2008 in Bahar, Province of Hamadan, Iran. A total of 900 children including 450 boys (50%) and 450 girls (50%) from 18 government primary schools were selected by multistage, systematic random sampling, then were examined for the presence of *P. capitis*.

The sample populations were 600 children of 12 schools in rural areas and 300 children from 6 schools in urban areas. Children were ranging in school grades from first to fifth that were diagnosed by health care employers. A team of health care workers skilled in the detection of head lice conducted the screening under the supervision of the co-investigator medical entomologist.

The diagnosis of head lice infestation was confirmed by clinical inspection of scalp and hair under the light of a reading lamp and by using a manual magnifier for the presence of adult lice, nymphal stage or eggs (nits).

Before examining the students, a detailed questionnaire including sex, school grade, family size, parent's education, parent's job, hair washing (per week) and social factors were recorded for each child.

Data were analyzed using SPSS software version 11.0. To compare qualitative variables, the chi-square test was used.  $P < 0.05$  were considered significant.

### Results

Of 900 children examined, the mean age of the children was  $8.5 \pm 1.9$  yr (range, 6-11 yr).

The overall prevalence of head lice infestation was 1.3% and this study showed that the prevalence of infestation was significantly higher in girls (2.2%) than in boys (0.44%) ( $P < 0.05$ ) and the infestation rate was greater among pupils who were living in rural areas (1.66%) than those in urban areas (0.66%) ( $P < 0.05$ ).

The prevalence of head lice infestation by school grade was 1.6, 1.1, 1.1, 2.2 and 0.55% for first, second, third, fourth and fifth grades, respectively. No statistical difference was found between the five values ( $P > 0.05$ ) (Table 1).

When head lice infestation rate was compared according to parents' literacy, an increase in the prevalence rates was observed in children with uneducated parents ( $P < 0.05$ ) (Table 2).

The analysis of other variables, such as family size and the frequency of hair washing in relation to infestation showed no significant differences between infested and noninfested subjects (Table 1).

**Table 1:** Prevalence of head louse infestation in primary School students by sex and social factors in Bahar, Iran

Characteristics	No. of examination	No. of infestations	Prevalence (%)
<b>Sex</b>			
Boy	450	2	0.44
Girls	450	10	2.2
<b>School grade</b>			
I	180	3	1.6
II	180	2	1.1
III	180	2	1.1
IV	180	4	2.2
V	180	1	0.55
<b>Habitat</b>			
Urban	300	2	0.66
Rural	600	10	1.66
<b>Frequency of hair washing</b>			
Once a week or less	543	7	1.28
Twice a week	357	5	1.4
<b>Family size</b>			
≤4	336	6	1.78
>4	564	6	1.06

**Table 2:** Prevalence of head louse infestation in primary School students according to parents' literacy in Bahar, Iran

Characteristics	No. of examination	No. of infestations	Prevalence (%)
<b>Father's education</b>			
Literate or primary	482	10	2.07
High school or diploma	282	2	0.7
University education	136	0	0
<b>Mother's education</b>			
Literate or primary	741	11	1.48
High school or diploma	146	1	0.68
University education	13	0	0
Twice a week	357	5	1.4

## Discussion

*P. humanus capitis* is an obligate ectoparasite that lives only on human hair and feeds on the blood from the skin.

Infestation rates among school children in some Middle Eastern and other regional countries have shown a range of infestation of 4.2 -78% (18-22).

The overall infestation rate in the present study was 1.3% that is one of the lowest rates among the reported results from the Middle Eastern and other regional countries. Results reported, mostly in primary school children, from different parts of Iran showed a rate between 2.2 to 28.5% (11-17,23) and the prevalence in the present study (1.3%) was lower than previous reported in Hamadan Province (7.5%,6.85%,5%),(16,17 ,24).

In comparison with some of the results that have been reported from different parts of Iran, the over-all infestation rate of 1.3% in the present study and the results reported from Babol and Kerman(1,13) are the lowest lice infestation rate that have been reported from Iran. There may be a number of likely explanations for this difference including: a bias due to the detection method or the sampling strategy used, deficient population groups, variation in the study design and consequently increase of government attention to health of schools.

In the present study and almost all previous studies in Iran and other parts of the world, the prevalence of head lice infestation in school boys was lower than the prevalence of the infestation in school girls. Difference in behavior patterns between boys and girls might have affected transmission rates and susceptibility to head lice infestation. Transmission of head lice most commonly occurs through close physical contact, especially head-to-head contact. Girls generally have longer hair as compared to boys and longer hair require better grooming and combing. Moreover girls in Iran use kerchief in the classroom situation and outside during daily activities. They occasionally replace their kerchief with each other that would in theory be an ideal situation for transmissions of head lice. In the present study, urban areas had lower prevalence of head lice infestation than rural areas, which is attributed to better hygiene, because more often urban school have health teacher or supervisor. Some researchers have claimed that head louse is found in all socioeconomic classes (1, 5, 7, 8), whereas others have reported that head louse is more frequent in poor peoples (9, 25). It has been proposed that in areas of high social disadvantage, larger families may pay less attention to hair care due to lack of support and financial limitations.

This study and studies conducted in Turkey (5), Babol (13) and Kerman (25) showed infestation rates among children with educated parents were lower than that among children with uneducated parents, which suggested that literacy was an important factor in the prevalence of infection. Teaching the community about personal hygiene and the availability of anti-pediculosis drugs could lead to the reduction in the prevalence of pediculosis capitis among children (17).

We found that there was not a relationship between the rate of infestation and factors such as school grade, members of family and the frequency of hair washing. This is in agreement with results of a number of previous studies (17, 20, 25).

Educational campaigns by community health care workers, nurses, public health doctors and teachers are expected to be helpful for head lice control. It is essential that school authorities and care centers cooperate to successfully control head louse infestation in primary schools. In addition, care centers teams should be responsible for treatment and prevention of louse infestation besides carrying out other care centers service functions.

### Acknowledgements

This research was supported by a grant from Deputy of Research of Hamadan University of Medical Sciences, Iran.

The authors gratefully acknowledge the staff of Health Centre of Bahar District, Hamadan University of Medical Sciences. The authors declare that there is no conflict of interests.

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