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Pediculus Capitis Infestation According to Sex and Social Factors in Hamedan-Iran

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Abstract: To determine the intensity of *Pediculus capitis* infestation (abundance) among school children, children's sex and social factors were analyzed as modifiers of the general prevalence of parasitism. The study included 847 school children (407 girls, 440 boys) between 6 and 12 years, from 12 in public rural primary schools of Hamedan, Province of Hamedan, Iran. Classic prevalence was obtained as the percentage of children with nits and/or lice. The general prevalence was 6.85% (girls: 13.5%; boys: 0.7%, $p < 0.001$), head lice were much more commonly detected in girls than in boys. The obtained results showed that there was significant variations between head lice infestation and the factors such as parents' literacy, type of hair, previous infestation, sharing of bed and comb and care centers, while there was no significant variation between school grade, parents' job, members of family and pediculosis in the studied areas ($p > 0.05$). Sex and social factor are important modifiers of *P. capitis* general prevalence and degree of infestation. The classification of children by intensity of infestation allowed a more precise delimitation of this condition, which is especially important for disease surveillance and application of control measures.

Key words: Head louse, *Pediculus capitis*, students, epidemiology, Iran

INTRODUCTION

Pediculosis capitis (Anoplura: Pediculidae) or head louse infestation has been known to be a world wide public health problem specially among school age children for a long time (Jinadu, 1985). The head louse is transmitted mainly through physical contact. Symptoms associated to the infestation are constant itching and scalp irritation. When the ectoparasite is associated with poor social conditions and inadequate diet, the infestation may even lead to anaemia (Linardi *et al.*, 1988).

The end of the sixties and beginning of the seventies an important increase of Pediculosis capitis observed prevalence in many countries and lice infestation throughout the world was estimated to run into hundreds of millions (Ewasechko, 1981; Kwaku-Kpikpi, 1982; Courtiade *et al.*, 1993) and may be found in people of all ages. However, school age children are more likely to be infested (Buxton, 1938; Lolió *et al.*, 1975; Donaldson, 1976; Gbakima, 1992). 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 (Sinniah *et al.*, 1981; Chung, 1986). Overcrowded living conditions and the arising of resistance to insecticides have contributed to the increase of head lice in the last few years (Linardi *et al.*, 1988; Pollack *et al.*, 1999; Lee *et al.*, 2000).

Findings by Ormeño (2004) indicate a need to obtain a more precise approach to pediculosis intensity so that children with different degrees of infestation should receive adequate care and vigilance. In the present study, the general prevalence of pediculosis was determined as well as the characterization of children according to the different degrees (or mean abundance) of parasitism. Moreover, sex and social factors, proposed as risk factors, were analyzed.

MATERIALS AND METHODS

Total of 847 schoolchildren including 407 girls and 440 boys between 6 and 12 years were selected in 12 public rural primary schools of Hamedan, Province of Hamedan, Iran. Each school was visited only once and children's names, sex, age and social factors were recorded in questionnaires.

Exams consisted of visual inspections of children's heads for 3 min, paying special attention to the neck and behind the ears with the help of hair manipulation. This time was set based on Mumcuoglu *et al.* (2001) who showed that the average time until detection of the first (mobile) louse by direct visual examination was 116 sec.

Children whose hair had at least one of the developing stages (nymphs and adults) of *P. capitis*, including only nit residues, were considered positive.

Based on the results obtained by Williams *et al.* (2001) special attention was put on the number and position of nits in relation to the scalp as indicators of parasitism intensity.

Statistical analysis of results was performed using the chi-square test by SPSS software version 10. Statistical significance was assumed at a p-value <0.05.

RESULTS

From 847 children examined, 58 of them showed at least one sign of pediculosis (nits, mobile lice). This indicates a general prevalence of 6.85%. Prevalence was significantly higher in girls (13.5%) than in boys (0.7%) (p<0.0001), 3 boys (out of 440) and 55 girls (out of 407) showed the presence of *P. capitis* (Table 1).

Table 1: Prevalence of head lice infestation by sex and social factors in Hamedan, Iran

	No. of examinations	No. of infestations	Prevalence (%)	χ^2 -test
Sex				
Male	440	3	0.7	52.58*
Female	407	55	13.5	
School grade				
I	56	11	19.6	6.75
II	5	8	10.7	
III	90	15	16.7	
IV	89	14	15.7	
V	97	7	7.2	
Type of hair				
Wavy	62	22	26.2	13.21*
Straight	290	33	10.2	
Parents' literacy				
Educated	203	18	8.1	10.90*
Uneducated	149	37	19.9	
Parents' job				
Government	6	1	16.7	0.58
Others	401	54	13.5	
Previous infestation				
Yes	44	28	38.9	45.59*
No	308	27	8.1	
Sharing of bed and comb				
Yes	243	46	15.9	4.24*
No	109	9	7.6	
Care centers				
Yes	189	16	7.8	4.36*
No	163	39	19.3	
Members of family				
≤4	22	2	8.3	0.021
>4	330	53	13.8	

All analysis were performed for female except in sex factor; *Significantly by χ^2 test at 5% level

The prevalence of head lice infestation by school grade was 19.6, 10.7, 16.7, 15.7 and 7.2% for first, second, third, fourth and fifth grades, respectively. No statistical difference was found between the five values ($\chi^2_{0.05} = 6.75$).

Children with wavy hairs presented greater prevalence rates than those with other hair types ($\chi^2_{0.05} = 13.21$). When head lice distribution was compared according to parents' literacy, an increase in the prevalence rates was observed in children with uneducated parents ($\chi^2_{0.05} = 10.9$). On the other hand, parents' job was not shown to be associated to the parasite distribution ($\chi^2_{0.05(2)} = 0.58$).

Both previous infestation and sharing of bed and comb also was shown as an important factor influencing the distribution of head lice ($\chi^2_{0.05} = 45.59$; $\chi^2_{0.05} = 4.24$). Head lice distribution compared by care centers showed significant differences ($\chi^2_{0.05} = 4.36$).

Results obtained from the χ^2 -test showed insignificant differences between head lice prevalence rate and in members of family ($\chi^2_{0.05} = 0.021$).

DISCUSSION

Studies on head lice in populations with different social-economical levels have encountered significant differences between prevalence rates in different populations and regions (Lolió *et al.*, 1975; Ewasechko, 1981; Kwaku-Kpikpi, 1982).

The analyses indicated that the prevalence rate of this ectoparasite in boys was lower than in girls (Table 1). This may be due to earlier and easier diagnosis and control of head lice in children with short hairs. The predominance of long hairs in females is factor associated to higher prevalence of pediculosis in this group (Simmiah *et al.*, 1981; Linardi *et al.*, 1989; Mumcuoglu *et al.*, 1990). Therefore, the higher prevalence rate of head lice found in girls with their hairs size.

The fact that the children with straight hair have presented lower prevalence rate than that with wavy type of hair seems at first sight, conflicting with results obtained with the factor hair shape. Girls generally have longer hair as compared to boys and longer hair require better grooming and combing. Sharing of bed and comb by children is strongly associated with pediculosis among them.

The prevalence of head louse infestation among children with educated parents was 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. Educational campaigns by community 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. Also care centers teams should be responsible for treatment and prevention of louse infestation besides carrying our other care centers service functions.

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