

Prevalence of head louse infestations and factors affecting the rate of infestation among primary schoolchildren in Paveh City, Kermanshah Province, Iran in the years 2009 to 2010.

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Abstract: *Pediculus humanus capitis* is a worldwide public health concern that affects mostly *primary school age children*. The objective of present study was to determine the prevalence of pediculosis infestation in primary schoolchildren, in relation to socioeconomic status of the family and hygienic practices in the home. The sample size of the study was 750 pupils in 25 primary schools in Paveh city who were selected by multistage, systematic random sampling. A total of 60 (8%) students of 5 grades were infested with different rates of infestation. A standard questionnaire recorded information of students about demographic features that were filled by the students. Children aged 8-9 years showed the highest prevalence rates (41.7%) and pupils aged ≥ 12 years had the lowest rate of infestation (3.3%). There were significant relationship between head louse infestation and parents' education, pupils' age and father's job ($p < 0.05$). The prevalence of head lice was higher than those observed in many studies in Iran. Pediculosis was found to be more prevalent in children of parents with lower level of education and socioeconomic status. There is a need for increasing awareness and education of teachers and parents in health education to prevent pediculosis.

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Key words: *Pediculus humanus capitis*, louse, pediculosis, school children.

Introduction

Pediculosis capitis, also known as head lice infestation, caused by *Pediculus humanus capitis* De Geer, 1778, is a regular community health concern which affects millions of children around the world. The peak incidence is between 5 and 13 years of age (Motovali-Emami *et al.*, 2008; Hodjati *et al.* 2008). In spite of the fact that this insect is not known to be vector of human disease, pediculosis causes scalp pruritus. This symptom is in response to sensitization to both saliva of the louse and fecal antigens and may be so intense that lead to excoriations, secondary bacterial infection (Malcolm & Bergman, 2007), sleep loss, disturbances and scratching. Although, *pediculosis capitis* infestation is found on the head, it hybridizes easily with other strains such as *pediculosis corporis*, which is found on the body (Downs *et al.*, 1999; Burgess, 2004).

Head lice transmit from person to person directly during children's play or indirect through contact with lice carrying such as brushes, combs, clothing and towels (AL-Shawa, 2008). Many factors such as; poor hygiene, socioeconomic status, lack of medical treatment and resistance to the treatment leads to

increase the prevalence of head lice (Koch *et al.*, 2001 & AL-Shawa, 2008). Researchers have found that *Pediculus* species are transmitters of etiological agents of typhus and relapsing fever (Ogunrinade & Oyejide, 1984). The present study was carried out to investigate the prevalence rate of *Pediculosis capitis* and some of the factors affecting infestation among pupils in primary girl schools in Paveh city to appropriate training programs in order to improve the health promotion of the students and their families in this region.

Material and Methods

The present study was a descriptive, cross-sectional, analytical study. The study samples were selected from the students of 25 primary schools in Paveh city. The sample size was 750 students, using the formula $N = z^2pq/d^2$, where $p = 0.2$ (from previous Iranian studies), $q = 0.8 (1 - p)$ and $d = 0.03$. For 95% confidence ($\alpha = 0.05$) N is 683, by 10% attrition N was calculated at 750. In this study 25 primary schools were selected by classification cluster random sampling. In each school 2 classes with 15 students in each class was selected and investigated for head lice

infestation by survey of the entire head carefully after parting the hair, special attention to the nape of the neck and behind the ears.

A child was considered infested if living lice, eggs, either live or dead or nits were detected. We used a questionnaire that included questions relating to the following: age, school grade, socio-economic status, parent's job, level of parents' education and family income. Public health questionnaire focusing on demographic information and head lice manifestation were completed during the interview. Collected data were analyzed by computer using Statistical Package for Social Science ver. 11.5 (Spss,11.5).

Results

During the study, a total of 750 primary school children were examined. 60 pupils (8%) were infested with a single species of louse (Tables 1-3). The mean age of samples was 9.23 ± 1.47 year. This study showed that social status and living standard of human being significantly ($\alpha=0.05$) affected the prevalence of pediculosis. Results of this study showed that there are relation between head louse infestation and age ($p=0.04$), level of education ($p=0.04$), father's job ($p=0.01$), father's education ($p=0.003$), mother's education ($p=0.001$) and using common comb ($p=0.01$). There is no significant relationship between head louse infestation and other variables ($p>0.05$). Students in grade 1 and 4 had the most infestation rate (23.3%) and pupils in grade 5 had the lowest infestation rate (13.3%). Children 8-9 years had the most head louse infestation (41.7%) and children ≥ 12 years had the lowest head louse infestation (3.3%). Sharing of bed and combs and taking bath in a common place are dissemination factors of head louse infestation among children. There was a negative correlation between frequency of hair washing and head louse infestation; students that wash hair three times or more a week had the least head louse infestation compared with the children who wash hairs one or twice a week (table 3).

Discussion

Similar to other studies in different parts of the world, Africa and the Middle East, infestation with human louse *Pediculus humanus capitis* was observed to be a common condition among primary school children (Jinadu, 1985; Maunder, 1982). Furthermore, the rates among school children in some Middle Eastern and other worldwide countries have shown a wide range of variation of lice infestation of nearly (5-78%) (Bahamdan et al., 1996; Ilhan et al., 1997; Al-Shawa, 2006) since 1965. The prevalence rate of head louse infestation in this study was 8%. Children aged 8-9 years had the most infestation, which could be

explained because of their age and their head to head contact (Downs et al., 1999; AL-Shawa, 2008).

Table 1. Correlation between head lice infestation with different variables

Variable	Df	χ^2	p-value
Age	1	3.98	0.04
Level of education	1	4.27	0.04
Father's job	1	6.20	0.01
Father's education	1	8.77	0.003
Mother's job	1	0.28	0.4
Mother's education	1	10.83	0.001
Frequency of hair washing	1	3.2	0.07
Length of hair	2	2.71	0.3
Having hygiene teacher	1	0.22	0.4
Using common comb	1	5.81	0.01

$\alpha=5\%$

Table 2. Prevalence of head lice infestation in relation to sociodemographic status of parents and age of the children

Variable	Infestation/Number of infestation/Total %	
Age		
6-7	13/116	21.7
8-9	25/301	41.7
10-11	20/309	33.3
≥ 12	2/24	3.3
Total	60/750	100
Children's grade school		
I	14/125	23.3
II	13/117	21.7
III	11/188	18.4
IV	14/144	23.3
V	8/176	13.3
Total	60/750	100
Father's job		
Government	13/187	21.7
Private	30/400	50
Labour	17/163	28.3
Total	60/750	100
Father's education		
Illiterate	16/97	26.7
Initial education	28/366	46.6
University education	16/287	26.7
Total	60/750	100
Mother's job		
Employed	6/61	10
Housewife	54/689	90
Total	60/750	100
Mother's education		
Uneducated	23/167	38.3
Initial education	31/417	51.7
University	6/166	10
Total	60/750	100

Table 3. Prevalence of head lice infestations in relation to personal hygiene

Variables	Number of infestation	
	Total %	
Number of hair washing		
Once a week	27/254	45
Twice a week	24/345	40
Three times a week or more	9/151	15
Total	60/750	100
Length of hair		
Short*	20/273	33.3
Medium	29/292	48.3
Long	11/185	18.4
Total	60/750	100
Having hygiene teacher		
Yes	56/661	90
No	6/89	10
Total	60/750	100
Sharing common comb		
Yes	29/254	48.3
No	31/496	51.7
Total	60/750	100

* The length of the hair

Study in Fars province, Southern Iran in primary school children shows that the total prevalence of head louse infestation was 0.49%, 0.37% and 0.20% in autumn, winter and spring, respectively. In Hamadan, Western Iran, survey of 847 schoolchildren aged 6-12 years showed that prevalence of head louse infestation was 6.85% that similar to our results in this study. In Taiwan, the prevalence has been reported 40% (Fan et al., 1991), 61.4% in Argentina (Catala et al., 2005), 35.5% in Malaysia (Bachok et al., 2006), 5.5% in Egypt (El-Basheir and Fouad, 2002), 5.1% in Turkey (Atambay et al., 2007), 14.1% in Palestine (Al-Shawa, 2006) and 5.2% in Saudi Arabia (Al-Saeed et al., 2006). The low prevalence rate of head louse infestation in our study related to nationwide strict screening programs in pupils and educational programs for families about prevention and early detection of this infestation.

The prevalence rate of head louse infestation in the present study is similar to prevalence rate of head lice infestation in Egypt (El-Basheir and Fouad, 2002), Turkey (Atambay et al., 2007) and Saudi Arabia (Al-Saeed et al., 2006) and very different and lower than results of studies in Taiwan (Fan et al., 1991), Argentina (Catala et al., 2005), Malaysia (Bachok et al., 2006), Cheli (Sagua, 1997) and Belgium (De Maeseneer et al., 2000). The prevalence rate of head lice infestation in Bahar, Hamadan province, west of Iran was 2.2%. Previous studies in different parts of Iran showed infestation rates of 5.1, 4.5, 2.2, 5.3, 28.5 and 12 percent, mostly in the

primary school children, in Rasht, Gilan province, Babol, Tabriz, Ardabil and Boushehr, respectively (Arjomanzadeh et al., 2001; Golchai & Ahmadi-Ghajar, 2002; Pourbaba et al., 2004; Zabihi et al., 2005; Edalatkhah et al., 2005 and Hodjati et al., 2008). The low prevalence rate of head lice infestation in the present study and other Islamic countries related to importance of health and individual hygiene in Islam. In two other studies in Iran that were carried out in Kerman and Hamadan provinces, the overall infestation rates were 3.8 and 6.85%, respectively (Kamiabi & Nakhaei, 2005; Nazari et al., 2006). Demographical results showed that there was a significant decrease in children's infestation who had employed mothers and in children with increasing mother's education. This is because educated mothers have more information about head lice due to their social communication (Tolozza et al., 2009; Moradi et al., 2009; Bibi et al., 2011). The impact of socioeconomic status upon the infestation rate detected in present study agreed with other studies and low socioeconomic status significantly increased the rate of head louse infestation (Kamiabi & Nakhaei 2005; Nazari et al., 2006; AL-Shawa 2008; Tolozza et al., 2009; Bibi et al., 2011). The prevalence of present study is different with prevalence of head louse infestation in Khorasan-e-Razavi province (Ramezani et al., 2012). The prevalence rate of infestation in Khajeh city, East Azerbaijan Province was 4.8% (Shayeghi et al., 2010) and in sanandaj city was 4.7% (Vahabi et al., 2012). Our study showed that Frequently shampooing, brushing of hair and examination of hairs for lice are important factors in the prevention of head lice infestation. Physical contacts, especially head to head contact are the most important factors in transmission of head lice infestation (Tolozza et al., 2009) that were found in the present study. Results of present study indicate that screening and treatment for head lice among children should be done continuously in order to decrease infestation rates that similar to Malaysian study (Muhammad Zayyid et al., 2010).

Conclusion

Reducing head louse infection in pupils by health education programs about ways of transmission, methods of prevention, personal hygiene, and providing suitable healthy living place for them is important. These programs will help them to discover the infestation and design simple and effective preventive and control programs. Also, apply an effective educational strategy such as Persuading students, mothers, and teachers in health education program to engage with simple and suitable materials and methods in order to effect on knowledge, attitude,

and practice concerning head lice infestation is constructive.

Acknowledgment

Hereby we thank students, teachers, and staff members of health centers, who willingly helped us to do this survey.

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11/14/2023