

Prevalence of head lice infestation among 3-6 years old nursery children in Kashan (2009)

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Abstract

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Background: Head lice infestation is one of the most common parasitic infections with a long history in the world. The purpose of this study was to determine the prevalence of head lice infestation among 3-6 years old children going to nursery schools in Kashan, Iran in 2009.

Materials and Methods: This cross-sectional study was performed on 1200 children having the age range of 3-6 years old in February 2009. The infestation was confirmed by the presence of nit, nymph and adult species in the children's hair. The causing agent, *Pediculus Capitis*, was isolated by combing for 3-5 minutes or using manual lens. Then a questionnaire was completed and the data were categorized and compared using Fisher's exact test.

Results: The results demonstrated that 8 children, (0.7%, out of 1200) were infected with the parasite. The prevalence rates of infestation among girls and boys were 1.14% and 0.17%, respectively. Infestation prevalence rates were 8.3% and 0.43% among children having unemployed and employed fathers; respectively (P<0.001). About 2% of children who were living in family with five or more members were infected which was significantly higher than its proportion (0.4%) among children living in families with 3-4 member (P<0.031).

Conclusions: The prevalence rate of head lice infestation was higher among children living in big families and also among children who had unemployed fathers. Appropriate parental education, weekly inspection of the nurseries in order to find the infected children and referring them to health centers, can decrease the incidence rate of head lice infestation.

Keywords: *Pediculus*, nursery, prevalence

Introduction

Pediculus capitis is species of Sucking lice of the order Anoplura. It is an external obligatory and human blood sucking parasite. It has a specific host and lives upon human body throughout its whole life cycle [1]. It also causes health problems. Overall, head lice has consequences both in the developing and developed countries [2, 3]. Head lice

infestation is one of the most prevalent parasite infestations among children. The prevalence rate in industrialized countries in addition to developed ones has been reported as 1-3% and the incidence rate has been quoted 800-2400 *cases among 10000

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children each year [4, 5]. The infestation spreads via direct contact or through exposure to infected objects such as towels, combs, hair brushes, hats, head covers, pillows and nighties [6, 7]. The relevant symptoms include itching, inflammation and head scalp irritation. *Pediculus capitis* is a blood sucking parasite which makes scalp irritation and itching ultimately causing abrasion and secondary infection [8, 9]. Although *Pediculus capitis* does not cause a significant disease in man, it may cause discomfort and anxiety in children, families and teachers. Also the infected children may feel depression and are obliged to have unwarranted absence from schools or nurseries [4, 10]. It may also cause insomnia in children [11]. Epidemiologic studies conducted in various schools and nurseries in different countries have demonstrated various results. For example, the prevalence rate of infestation in Turkey was 6.8%, in Belgium 8.9% among 2.5-12 years old children, in Brazil 35% among 0-15 years old counterparts settled in urban and rural regions [12-14]. The investigation carried out in South Korea in 2000-2003 in school and nursery children showed that the prevalence rate of infestation was 5.8% and 12.8%, respectively, while it was 13.4% in nurseries in Jordan [15-17]. Retrospective investigations in various parts of Iran have revealed various results; for example a study fulfilled in Rasht on 3-7 years-old children going to nurseries demonstrated that the infestation prevalence rate was 5.1% [18]. Another study performed on 5-9 years old children in Tabriz showed that it was 5.7% [19]. The investigation carried out by Zabihi et al, on primary schools in Babul in 2004 demonstrated that the prevalence of infection was 2.2%, while it was 6.85% in Hamadan province [20, 21]. The study fulfilled by Mozafari et al, on students in 21 Iranian

provinces in 2008 showed a prevalence rate of 5.7% of which 11.1% belonged to Sistan and Balochestan province where the infestation is the most prevalent among the whole population of the country [22]. The investigation performed by Dehghani and his colleague showed that the prevalence rate among the boys and girls going to primary schools of Kashan was 0.9% and 5.24% ; respectively [3, 23]. Various host factors contribute to the prevalence rate of *Pediculus capitis* including age, gender, race, socio-economical status, and hair characteristics. Moreover, living in high populated places and lice resistance to common pesticides may contribute to increase infestation rate nowadays [21]. The preventive schemes burden high expenses on governments. Third world countries have paid less attention to the infestation, while developed countries focused on the preventive schemes; for example, USA spends 100 million dollars for treating the infestation [24]. Head lice is more prevalent in 3-12 years old children than in other counterparts, and there are various reports in this regard in Kashan [3, 23]. Furthermore, regarding the lack of definite investigation and concerning the infestation status in Kashan nurseries, the current study was conducted to determine the prevalence rate of head lice infestation among children going to nursery school in Kashan in 2009.

Materials and Methods

This is a cross-sectional study conducted in 18 nurseries in Kashan. Sixteen of these nurseries were under the supervision of welfare organization (*Sazmane behzisti*) and the remaining were under the control of the education ministry. Study data were collected from 1200 children in the age range of 3-6

years old. Respondents were all children going to nurseries in kashan in 2008. Data collected in this study includes information about age, gender, parent's job, parent's educational status and the size of their families. The questionnaire was completed by the trained experts and also by obtaining the information recorded in children's health files. Some information were obtained by interviewing the teachers and parents. The ethics approval for this research was issued by Kashan university of medical sciences. The infestation was confirmed by the presence of nit, nymph and adult louse. The children's hair were examined thoroughly for 3-5 minutes with manual hand lens or by combing. The children with adult louse, nymph, and nits in their hair were identified as positive samples. Finally the specimens were mounted on the microscope slide and were examined by microscope. Canada balsam gum was used as the clearing paste. Collected data were analyzed using SPSS version 11.5 and

Fisher's exact test was used for comparing groups.

Results

The results demonstrated that out of 1200 children, 8 children (0.7%) suffered from head lice. The infestation rates among girls and boys were 1.14% (7 girls) and 0.17% (1 boy), respectively. This was 0.79% among children with the age range of 4-6 years, while this rate was 0.33% among 3-4 years old children. Infestation rate was 8.3% among children having unemployed father and was 0.43% among those having employed father. Infestation rate was 0.57% among children having mothers who were working outside the home, while it was 0.7% among those having housewife mothers. About 0.8% and 0.5% of children whose father had educational status less than diploma and children whose father had educational degree higher than diploma, respectively.

Table1: Prevalence rates of head lice infestation among children going to Kashan nurseries regarding age, gender, parental education level, parent's job and the family size

variable	total	Infestation rate		p.value	OR	95% CI
		number	percent			
gender						
- girl	615	7	1.14	0.07	6.72	0.825-4.8
- boy	585	1	0.17			
Father's education status						
- high school	602	5	0.83	0.7	1.6	0.39-6.98
- high school or higher	598	3	0.5			
Mother's education status						
- high school	502	5	0.99	0.29	2.3	0.5-9.7
- high school level or upper	698	3	0.43			
Mother's job						
- House keeper	848	6	0.7	1	1.24	6.179
- Employed in out of house	352	2	0.57			
Father's job						
- unemployed	36	3	8.3	0.001	21.07	4.8-91.8
- employed	1164	5	0.43			
family size						
- 3-4 members	998	4	0.4	0.031	5.02	1.24-20.2
- ≥5 members	202	4	1.98			
age						
- 3-4 years	312	1	0.32	0.68	2.47	0.3-20.2
- 4-6 years	888	7	0.79			

There was a significant association between the rate of infestation and the children fathers' job ($P < 0.001$). The chance of head lice infestation in children having unemployed fathers was more than that in children with employed father (odds ratios = 21.1). The infestation rate among larger families (≥ 5 members) was 1.98%, while it was 0.4% among families having 3-4 members. There was a correlation between the infestation rate and the family size ($P < 0.031$). The likelihood of infestation among children with five or more family members was 5.02 times more than that among those having 3-4 family members (Table 1).

Discussion

Our results showed that the prevalence rate of head lice infestation in Kashan nurseries was 0.7%. It was more prevalent in girls than in boys. There was an association between the infestation and the factors of age, parent's educational status, parent's job and the family size. There was a significant correlation between father's job and the family size ($P \leq 0.05$). Similar to our results, the studies conducted by Kokturk et al (2003) in Mersine nursery in turkey demonstrated that the prevalence rate of head lice infestations in girls was more than that in boys. Some factors like age and parent's educational status have a significant role in this regard [12]. The research fulfilled by Golchai et al (1999) on 3-7 years old children going to Rasht nurseries showed that the highest rate of infestation occurred among 6 year old children and the least rate was reported among 3 year old counterparts [18].

In the research conducted by Shayeghi et al (2010) on primary school students in Khaje city in West Azarbajejan province, the prevalence infestation rate was 4.8% and it

was more prevalent in girls than that in boys. Some factors like family size and the status of parent's education have an important role in this regard [25]. Another study accomplished by Hujatti et al (2006) on students going to primary school to high school in Tabriz showed that the prevalence infestation rate was more common in girls than this rate in boys and some parameters were effective in this regard such as age and regular combing [19]. The investigation conducted by Davarpanah et al (2009) on 6-11 years old children in Fars province demonstrated that the prevalence rate of infestation was more in girls than that in boys and among rural people than that in urban inhabitants [26]. In almost all of these studies in Iran and other parts of the world, the prevalence of head lice infestation in females was more than the infestation in males. Difference in behavior patterns between boys and girls (For example, the long hair of girls) might have affected transmission rates as well as their susceptibility to head lice infestation [24].

The obtained results from our study were compatible with aforesaid results. It is likely that frequent hair cutting in boys causes the high prevalence infestation rate. The prevalence infestation rate among families with low socio-economical status, more children and low educated was higher than those with high socio-economical status, less children and high educated families, significantly. Hence, we can conclude that increasing parental awareness and improving socio-economical status can prevent the infestation. The highest level of infestation, also, occurred in families with five or more members and in children with unemployed fathers. Therefore, increased personal contacts and using common stuff like hats, scarves, head corers, etc can increase infestation probability. Taking into account

the high level of infestation in the world, proper methods should be applied to prevent and to treat this infection. There are two methods of treatment. First, the most common way includes using chemical shampoos such as Permethrin 1% and Lindane 1% used in the USA and other countries. The pitfall is increase resistance of the organism to these chemicals. Second, there are special combs defending against the organism. They cannot treat the infestation completely [10, 27]. It has been proved that taking hot bath for 30 minutes can treat the infestation completely [16]. Therefore, hot bathing is an effective and safe method because it cannot produce any resistance. However, after the end of this study, the infected individuals were introduced to health care centers for treatment.

Conclusion

Since the infestation rate was more prevalent among children in families with five or more members and also among those with unemployed fathers, providing appropriate information for parents, weekly visiting of nurseries by health care providers in order to find infected children and referring them to health care centers can decrease the prevalence rate of head lice infestation. Also allocating proper funding for low income families to provide health care facilities for them can decrease the infestation rate.

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Conflict of interest: Non declared

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