



# Head Lice Prevalence and Associated Factors in Two Boarding Schools in Sivas

Sivas'ta İki Yatılı Okulda Baş Biti Yaygınlığı ve Etkileyen Faktörlerin Belirlenmesi

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## ABSTRACT

**Objective:** The aim of the study was to determine the prevalence of head louse infestations and the factors affecting the rate of infestation in primary school children in Sivas.

**Methods:** A total of 342 children (249 girls and 93 boys) were examined with a louse comb for the presence of head lice. A questionnaire with 23 questions was distributed among the pupils and their parents.

**Results:** The overall infestation rate for head lice was 10.2% (n=35). The infestation rate was higher in girls (13.7%) than in boys (1.1%) (p<0.05). Children who had been infested in the past (27.1%) were more likely to be infested than those who had not been infested previously (7.2%) (p<0.05). The same was true for children whose family members were previously infested and those who were not (30% and 8.5%, respectively) (p<0.05). Head lice infestation was highest (20%) in children aged 6-11 and lowest (5.3%) in children aged 13-15 (p<0.05). The frequency of bathing and washing their hair, sharing combs, beds and towels, the hair color, hair thickness and quantity of dandruff, the number of family members and number of rooms per family member, were not significantly different between infested and non-infested children. A significant difference was found in the infestation of long haired (15.1%) compared with short haired pupils (4.5%) (p<0.05).

**Conclusion:** Girls were more often infested than boys and children who were previously infested with lice, or came from families where there had been previous infestation, had a greater chance of being re-infested. (*Turkiye Parazitol Derg* 2013; 37: 32-5)

**Key Words:** *Pediculus humanus capitis*, head louse, epidemiology, Sivas, Turkey

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## ÖZET

**Amaç:** Bu çalışmada ilköğretim çağındaki çocuklarda baş biti görülmesini etkileyen faktörlerin belirlenmesi amaçlanmıştır.

**Yöntemler:** Bu amaçla yatılı ilköğretim bölge okullarında (Merkez YİBO ve Pamukpınar YİBO) öğrenim gören, yaşları 6-15 arasında değişen 249'u kız ve 93'ü erkek olmak üzere toplam 342 çocuk baş biti açısından değerlendirilmiştir. 23 sorulu bir anket çocuklara dağıtılmıştır.

**Bulgular:** Öğrencilerin %10.2'inde (%10.2) bit infestasyonu tespit edilmiştir. Kız öğrenciler arasında (%13.7) baş biti görülme oranının erkeklerle (%1.1) göre daha fazla olduğu ve aradaki farkın istatistiksel olarak anlamlı olduğu saptanmıştır (p<0.05). Ankete göre, geçmişte bit infestasyonu geçiren öğrencilerin %27.1'inde tekrar baş biti saptanırken, daha önce bit infestasyonu geçirmeyen öğrencilerin %7.2'inde yeni bitlenme olduğu bulunmuştur (p<0.05). Ailesinde bitlenen başka birinin olduğunu bildiren çocuklarda baş biti yaygınlığı (%30) olmayanlara göre (%8.5) daha yüksek bulunmuştur (p<0.05). Bit infestasyonu 6-11 yaşındaki öğrencilerde (%20) diğerlerine oranla daha yüksektir (p<0.05). Uzun saçlı öğrencilerin %15.1'inde ve kısa saçlı öğrencilerin ise %4.5'inde bit tespit edilmiştir (p<0.05).

**Sonuç:** Kızlar, erkeklerle nazaran daha fazla infeste olmakta, daha önce bitlenen ve diğer aile üyelerinde bitlenme durumu olan çocukların, tekrar bitlerle infeste olma şanslarının daha yüksek olduğu görülmüştür. (*Turkiye Parazitol Derg* 2013; 37: 32-5)

**Anahtar Sözcükler:** *Pediculus humanus capitis*, baş biti, epidemiyoloji, Sivas, Turkey

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## INTRODUCTION

Head lice are an ongoing public health problem for children and their parents worldwide. The prevalence of the parasite can greatly vary from country to country and between regions of the same country, and it is usually higher among children aged 3 to 14 years (1-4). The socio-economic level of the examined population, the season in which they were examined, and the hygienic conditions under which children and their families lived, could be of importance (5). Head lice spread rapidly in overcrowded places such as nurseries, schools, prisons, and mental hospitals (4). The gold standard in the diagnosis of head lice is the detection of living adults, nymphs and/or eggs on the scalp. Although most of the studies are conducted by visual inspection of the hair, using a louse comb is approximately 5 times more effective in detecting lice than examination by hand (6, 7). Detection of living lice indicates an active infestation, while the presence of nits only indicates a past infestation (8).

The aim of the present study was to determine head lice prevalence in two boarding schools in Sivas, Turkey and to assess the risk factors related to infestation.

## METHODS

### Locality of the Schools and Period of Examination

The present study was conducted during the period of February to May 2011 in a boarding school in the center of the city of Sivas and in Yildizeli, one of the 17 districts of Sivas. Sivas is located in the eastern part of the central Anatolian region of Turkey and is the capital of the second largest province of Turkey.

At the beginning of the study, teachers and pupils were informed about head louse biology and control by a short power point presentation. Before the physical examination, the hair color (brown, black, blond), hair structure (straight, wavy, curly), hair length (short, medium, long), hair thickness (thin, thick) and presence and quantity of dandruff was noted for each child. A total of 249 girls and 93 boys were examined for the presence of head louse adults, nymphs and eggs/nits. The hair of each child examined for at least 2-3 minutes with the help of a louse comb (Sirma®, Istanbul). After examination, the comb was given as a present to the examined child. Collected lice and hair with nits/eggs, which were cut from the infested child's hair, were preserved in 70% ethyl alcohol and later brought to the laboratory for more detailed examination under a light microscope.

### Questionnaire

After the examinations, pupils were asked to complete a questionnaire with 23 closed-ended questions. Both parents and teachers were requested to help pupils to fill in the questionnaire and to return it to the examiners. The survey included questions related to the age of the child, the frequency of bathing and washing hair, number of family members, number of rooms per family member at home, and customs of sharing combs, bed and towels.

### Statistics Analyses

The collected data were evaluated using the SPSS for Windows 14 program. Results were considered to be of statistical significance if the relevant p-value was <0.05.

## RESULTS

The overall prevalence of head louse infestation in the two boarding schools was 10.2%. No statistical difference was observed between the two schools regarding louse infestation. Out of 35 infested children, 16 were infested with nits alone, 11 with all stages of the parasite, 5 with nymphs and 3 with adult lice only. Girls were significantly more infested (13.7%) than boys (1.1%) ( $p < 0.05$ ). Schoolchildren who had been infested in the past with lice were more infested (27.1%) than those who had not been infested before (7.2%) ( $p < 0.05$ ). The same was true for children whose family members were previously infested with lice than those coming from families who had never had lice (30% and 8.5%, respectively) ( $p < 0.05$ ) (Table 1). Head louse infestations were highest (20%) in children aged 6-11 and lowest in children aged 14-15 ( $p < 0.05$ ) (Table 2). The frequency of bathing and washing hair, number of family members, number of rooms per family member, habits of sharing combs, bed and towels, hair color, hair thickness and quantity of dandruff, were not significantly different between infested and non-infested children. A significant difference was found between longhaired (15.1%) and shorthaired pupils (4.5%) ( $p < 0.05$ ) (Table 3, 4). In the majority of cases (81.1%), the mothers were responsible for the diagnosis and treatment of head lice.

## DISCUSSION

A total of 342 schoolchildren were screened for the presence of head lice and, in 35 of them (10.2%), head lice were detected. In

**Table 1.** Prevalence of head lice infestation in relation to infestation in the past, infestation of another family member and level of knowledge in pupils regarding head lice

	Actually infested n (%)	Statistical analysis
Infestation with lice in the past		
Yes	13 (27.7)	$\chi^2=18.89$ $p < 0.05$
No	2 (7.2)	
Infestation with lice of other family members		
Yes	9 (30)	$\chi^2=13.61$ $p < 0.05$
No	26 (8.5)	
Knowledge of head lice		
Yes	14 (9.7)	$\chi^2=0.26$ $p > 0.05$
No	20 (10.3)	

**Table 2.** Prevalence of head lice by age in two primary boarding schools

Age of the examined child	Number examined	Positive for head lice n (%)	Statistical analysis
6-9	30	6 (20.0)	$\chi^2=6.59$ $p < 0.05$
10-12	198	23 (11.6)	
13-15	114	6 (5.3)	
Total/Average	342	35 (10.2)	

**Table 3.** Prevalence of head lice infestation in relation to hair color, hair structure, hair length, hair thickness and quantity of dandruff

	Number examined	Positive for head lice n (%)	Statistical analysis
Hair color			
Brown	156	21 (13.5)	$\chi^2=4.32$ $p>0.05$
Black	143	9 (6.3)	
Yellow	42	5 (11.9)	
Hair style			
Straight	229	21 (9.2)	$\chi^2=2.10$ $p>0.05$
Curly	27	2 (7.4)	
Wavy	83	12 (14.5)	
Hair length			
Short	132	6 (4.5)	$\chi^2=7.89$ $p<0.05$
Medium	123	16 (13)	
Long	86	13 (15.1)	
Hair thickness			
Thin	230	22 (9.6)	$\chi^2=0.48$ $p>0.05$
Thick	108	13 (12)	
Dandruff problem			
Yes	125	13 (10.4)	$\chi^2=0.0$ $p>0.05$
No	216	22 (10.2)	

**Table 4.** Prevalence of head lice infestation in relation to frequency of bathing, washing hair, and sharing personal items

	Number examined	Positive for head lice (%)	Statistical analysis
Bathing frequency			
Once a week	73	7 (9.6)	$\chi^2=0.62$ $p>0.05$
Twice a week	173	20 (11.6)	
Three times a week	93	8 (8.6)	
Hair washing frequency			
Once a week	70	8 (11.4)	$\chi^2=1.34$ $p>0.05$
Twice a week	143	17 (11.9)	
Three times a week	128	10 (7.8)	
Sharing combs, bed and/or towels			
Yes	154	13 (8.4)	$\chi^2=0.62$ $p>0.05$
No	153	17 (11.1)	

Turkey, several studies of head louse epidemiology were conducted and a wide range of infestation rates (0.7-59%) was observed (9). Some of the important reasons for the different outcomes obtained in these studies were the region's socio-economic position, age group studied, study period (year, month), children's gender, different examination modalities (visual inspection vs. examination with a louse comb) and whether nits were considered as a sign of infestation. In pupils coming from families with higher socio-economic status in Konya, the infesta-

tion rate was 0.6%, while in children from the provinces of this city with lower socio-economic levels, the infestation rates were 2.1-13.2% (10). Prevalence studies conducted in school children from Malatya in 2004 and 2007 demonstrated infestation rates of 1.1% and 5.1%, respectively (4, 11). Üner et al. (12) examined 2,906 children in Izmir and reported an infestation rate of 1.5%. Güleç et al., (13) who examined children from a low socio-economic level in the Ankara region, found an infestation rate of 5.2%. In Kayseri, 9.2% of 1,261 primary school children were positive for head lice, while in Sakarya, a prevalence of 34.1% was reported (3, 14). In epidemiological studies conducted in Sivas in the years 1990, 1993, 2002, 2006 and 2010 infestation rates of 7.3%, 3.6%, 1.1%, 9.5% and 5.9%, respectively, were found (15-19).

In the present study, girls were significantly more infested than boys. Payzin reported an infestation rate of 54% in girls and 17.2% in boys (14). Daldal et al. (11) found lice in 2% of the girls and in none of the boys examined. Artan et al. (3) reported a prevalence of 2.1% in boys and 16.4% in girls. This phenomenon could be explained by the fact that girls have longer hair, which facilitates the transmission of lice from head to head, and they are more sociable, frequently touching other girls' hair. In addition, in long hair, nits remain attached as the hair grows and accordingly, these signs of previous infestations, which had been treated successfully, remain for months, while a short hair-cut in boys, removes the nits.

In this study, no significant differences were found between different hair colour hair structure and hair density. Borges et al. (20) reported that girls with long, dark and wavy hair were more infested, while they found no differences between the different hair colors and structures.

In the present study, children 6-10 years-old were more frequently infested than other age groups. This is in agreement with Özcelik et al. (18) who found that first grade students (6-7 years old) were more infested than other age groups. Kamiabi et al. (21) also reported that 9-year-old children were the most infested age group.

Çiftçi et al. (22) stressed the importance of socio-economic status and parental education related to head louse infestation, emphasizing that children from lower socio-economic levels and those who had parents with lower education were more frequently infested. Heukelbach et al. (23) also reported that children under the age of 15, who lived in rural areas, were more often infested.

## CONCLUSION

Girls were more often infested with head lice than boys were, and children who were previously infested with lice, as well as children from families where there had been previous infestations, had a greater chance of being re-infested.

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## Conflict of Interest

No conflict of interest was declared by the authors.

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