Prevalence of Head Lice in Two Socio-economically Different Schools in the Center of Izmir City, Turkey

İzmir'de Sosyo-ekonomik Olarak Farklı İki Okulda Baş Biti Yaygınlığının Araştırılması

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ABSTRACT

Objective: The well-known and common infestation caused by *Pediculus humanus capitis* is an important public health and a social issue in many communities in the world. The aim of this study was to compare the head louse infestation rate in two schools having pupils from different socio-economic levels in the city center of Izmir.
Methods: The pupils aged between 6 and 11 years, were screened for the presence of eggs and nymph/adult lice using a fine-tooth head louse comb.
Results: A total of 88 and 126 pupils from the schools with low and medium socio-economic level were screened and 24 (27.2%) and 5 (3.96%) of them were found to be positive for head lice, respectively. Overall, the infestation rate among girls was 3.14 times higher than in boys.
Conclusion: Head louse infestation is a significant public health problem among primary schools. Increasing the knowledge about pediculosis and self-hygiene would be helpful in successfully reducing head louse infestation in the school setting. School authorities must encourage the parents to look for head lice routinely and a "school nurse" system is needed for effective head louse control in the schools.
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Key Words: *Pediculus capitis*, socioeconomic level, Turkey

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ÖZET

Amaç: *Pediculus humanus capitis* kaynaklı enfestasyonlar dünya çapında yaygın olan ciddi bir halk sağlığı sorundur. Bu çalışmanın amacı İzmir de farklı sosyo-ekonomik düzeyde olan iki okulda, öğrencilerin baş biti enfestasyon oranlarını belirlemektir.
Yöntemler: 6 ve 11 yaş arası öğrenciler ince dişli bit tarakları kullanılarak baş bitinin (yumurta ve nimf/ergin) bulunması açısından incelenmiştir.
Bulgular: Sosyo-ekonomik durumu düşük ve orta düzeyde olan okullardan toplamda 88 ve 127 öğrenci taranmıştır. Düşük seviyedeki okulda baş biti enfestasyon oranı 24 (%27,2) ve orta düzeydeki okulda 5 (%3,96) olduğu gözlenmiştir. Genel olarak kızlar arasındaki enfestasyon oranının, erkeklere oranla 3,14 kat daha fazla olduğu saptanmıştır.
Sonuç: Baş biti enfestasyonu ilköğretim okulları arasında gözlenen cidi bir halk sağlığı sorunudur. Pedikulosis ve kişisel hijyen konusunda bilincin artması okullarda bit enfestasyonunun azaltılmasında etkili olacaktır. Okul yönetiminin aileleri öğrencilerin saçlarını düzenli olarak kontrol etmesi konusunda teşvik etmesi ve okullara "Okul Hemşiresi" sisteminin getirilmesi baş biti kontrolünde etkili olacaktır.
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Anahtar Sözcükler: *Pediculus capitis*, sosyo-ekonomik düzey, Türkiye

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INTRODUCTION

Pediculosis, also known as head louse infestation, is caused by *Pediculus humanus capitis* (De Geer, 1778), (Anoplura: Pediculidae), an obligate ectoparasite of man found on the hair and scalp (1). Head lice lay eggs on the hair shaft, close to the scalp, where the temperature is optimal for the development of the embryo (2). Because, *P. h. capitis* belongs to the hemimetabolous group of insects, there are little differences between adult and nymphal stages, however all of them are hematophagous. Usually it takes approximately seven days for the development of nymphs to adults (1, 3-5). Pediculosis is often causes a socially undesirable condition accompanied by social stigma (6).

Many studies have conducted in Turkey comparing the social status and rate of pediculosis in different cities. These studies showed that the average, minimum and maximum infestation rates are 10.16%, 0.54% and 29.4%, respectively (Table 1) (7-37). In this study, we aimed to compare the head louse infestation rates in two socio-economically different schools located in the city center of Izmir.

METHODS

Two primary schools located in the center of Izmir have been selected as representatives of low and medium socio-economic status. Permission was obtained from the Izmir Branch of the Ministry of Education for screening the pupils for head lice in these two schools.

Totally, 214 pupils (88 and 126 from the first and second school, respectively) at ages between 6 and 11 years were screened for the presence of eggs/nits and nymph/adult lice using a special

Table 1. Previous researches conducted in different regions of Turkey

Author(s)	Year	City	Girl (%)	Boy (%)	Total (%)
Saygı et al. (7)	1990	Sivas	13.3	1.3	7.3
Kişioğlu et al. (8)	1991	Kayseri	20.4	2	3.5
Öztürkcan et al. (9)	1991	Sivas	9.8	0	3.6
Yücel et al. (10)	1994	İstanbul	30.39	6.9	18.05
İlhan et al. (11)	1994	İzmir/Karşıyaka	9.3	2.3	5.6
Payzın F. (12)	1995	Sakarya	54	17.2	34.1
Özcan et al. (13)	1996	Malatya	1.3	0	1.3
Üner et al. (14)	1997	İzmir/Karşıyaka	*	*	8.57
Karaman et al. (15)	1997	Aydın	32.11	9.44	20.08
Yazar et al. (16)	1997	İzmir/Kemalpaşa	29.9	4.9	16.4
Polat et al. (17)	1999	İstanbul/Silivri	27.6	3.12	14.2
Orhan et al. (18)	1999	İzmir/Narlıdere	36.7	9.8	23.3
İnceboz et al. (19)	2000	İzmir/Bornova	12.34	1.45	6.71
Güleç et al. (20)	2000	Ankara	9.1	1.8	5.2
Akısü et al. (21)	2002	İzmir/Narlıdere	50.8	3.4	27.4
Kokturk et al. (22)	2003	Mersin	13.3	1.1	6.8
Karataş et al. (23)	2004	Aydın	19.6	2.2	10.6
Daldal et al. (24)	2004	Malatya	2.12	0	1.25
Polat et al. (25)	2004	Sivas	1.1	0	0.54
Oktun et al. (26)	2005	Edirne	10.3	0.9	5.4
Akısü et al. (27)	2005	İzmir	31.2	2.5	16.6
Oflaz, M. (28)	2006	Konya	6.45	0.78	3.65
Çiftçi et al. (29)	2006	Afyon	1.5	0.9	1.2
Noyan et al. (30)	2006	İzmir/Konak	55	0	29.4
Oğuzkaya et al. (31)	2006	Kayseri	16.4	2.1	9.2
Özçelik et al. (32)	2006	Sivas	20.27	1.92	9.49
Dursun et al. (33)	2009	Van/Erciş	23	3.3	9.5
Çetinkaya et al. (34)	2010	Kayseri/Hacılar	21.5	1.4	10.9
Akkaş et al. (35)	2011	Iğdır	22.9	3.2	13.1
Değerli et al. (36)	2012	Sivas	12.9	0.2	6
Değerli et al. (37)	2013	Sivas	13.7	1.1	10.2

head louse comb. Combs were metal pin comb with an angled nylon grip and stainless steel pins are 31 mm long. Before combing, the pupils were informed about louse infestation and self-hygiene by a power point presentation. Each pupil has been examined alone in a separate room. Collected lice were examined under a stereo-microscope for determining the developmental stage of the head lice.

RESULTS

A total of 88 pupils from the first school with the low socio-economic level were screened and 24 (27.2%) of them were found to be positive for head lice. Seventeen out of 31 girls (54.83%) and 7 out of 57 boys (17.2%) were positive for head lice (Table 2). Overall, 157 head lice were collected from 24 students; 47% of them were nymphs while 53% were adult lice.

A total of 126 pupils from the second school, with a low socio-economic level, were screened and 5 (3.96%) of them were positive for head lice. Sixty-eight girls and 58 boys were combed and only 5 girls (7.35%) were infested with head lice, while none of the boys was infested with lice. The overall prevalence in the second school was 3.96% (5/126) (Table 2). In this school, 8 head lice were collected from 5 pupils and 6 of them were nymphs and 2 adults. No statistical differences were found regarding the age group of the 6-11-years old children, examined in the present study.

DISCUSSION

Head louse infestation is a public health problem even in well-developed countries. There are differences in the prevalence of head louse infestation between populations with different socio-economic levels, and many studies have stressed this point. The present study too was conducted to detect head louse infestation rates among pupils from two schools with different socio-economic levels.

Previous studies on head louse infestation, which were mostly performed among school children in Turkey, showed an average infestation rate of 10.16%, where the minimum infestation rate reported was 0.54% and the maximum 29.4%. In all 31 studies, girls showed a higher infestation rate than boys, i.e., 19.23% and 2.9%, respectively. Accordingly, girls were in average 6.63 times more infested than boys (Table 1).

Earlier studies conducted in Turkey showed that the socio-economic differences have an effect on the rate of pediculosis capitis (33). Çetinkaya et al. showed a correlation between family income and infestation rate. In another study, economically underdeveloped areas had a higher infestation rate than economically developed areas (38). In a study comparing the head louse infestation rates among four socio-economically different schools, the researchers found statistically significant differences between low (6.34%) and high (0.6%) socio-economic level schools (28). Aktas et al. separated the schools into three groups according to their socio-economic level. The first one had a high socio-economic level and 3.9% of the pupils were infested with head lice. The second school had a medium socio-economic level and 15.4% of the children were infested, while in the third group with a low socio-economic status the infestation rate was 22% (35). Previous studies also showed that the prevalence increased with decreasing total income levels in the family (16, 21, 34). In this study, we also found a positive relationship between socio-economic status and head louse infestation. The prevalence of *P. h. capitis* was significantly lower ($p<0.0001$) in the first school with a low socio-economic status.

Table 2. Infestation rate of the students in both schools

	1st Primary School (low socioeconomic level)		2nd Primary School (intermadiate socioeconomic level)	
	Students			
	Screened n	Infested n (%)	Screened n	Infested n (%)
Boy	57	7 (12.28)	68	0
Girl	31	17 (54.83)	58	5 (8.62)
Total	88	24 (27.27)	126	5 (3.96)

Personal hygiene is also an important factor for head louse infestations and this is usually related to the educational level of the family and this was shown to be the case in previous studies done in Turkey. High infestation rates were found in children belonging to low educated families (20, 23, 26, 28, 33, 39-43). In Turkey too, mostly mothers take care of their children, and therefore their educational level and economic status has proven to be a significant factor on prevalence of head louse infestation (33). Though we did not used a questionnaire to interview the pupils in the present study, a general information about the socio-economic status of the children was obtained from the head-master of the schools.

Almost in all previous studies, the percentage of girls with pediculosis capitis was significantly higher than boys (6.63 times higher in average) (7-37). In the present study, we found that girls has 3.14 (7/22) times higher infestation rate than boys, which could be explained with the fact that in general girls have longer hair and they can more easily infest each other.

CONCLUSION

In conclusion, head louse infestations may be regarded as a significant public health problem among primary schools and dormitories. Thus, the necessary education on hygiene should be given also to these school-age children. Increasing our knowledge of pediculosis may be helpful in successfully reducing head louse infestation in a school setting. School authorities must encourage the parents to look for lice routinely and a "school nurse" system is needed for an effective head louse control in the schools.

Ethics Committee Approval: The necessary permit from Izmir Branch of Ministry of Education was taken by Alsancak Protection and Adornment Association.

Informed Consent: The informed consent forms were taken from their teachers with the permission of student's family.

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