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Pediculosis Capitis and Relevant Factors in Secondary School Students of Hamadan, West of Iran

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ABSTRACT

Background: Pediculosis capitis is a problem in children and has worldwide distribution. The aim of the present study was to determine the prevalence of pediculosis degree and its relevant factors in the secondary schools in Hamadan west of Iran.

Methods: The study was carried out in two phases. A cross-sectional procedure was used to determine the prevalence of pediculosis, and the case study was done to identify the relevant factors to the infestation. Totally, 10841 secondary students were chosen and classified in accordance with the clustering sample.

Results: The prevalence of pediculosis was 1.05%. It was 1.27% among the urban student; whereas 0.05% among the rural students. About 2.3% belonged to female students, and 0.11% was pertained to the male students. The greatest amount of infestation prevalence was reported from the schools of urban areas particularly in the public schools of suburbia. Furthermore, the prevalence of infestation was more where some individuals had pediculosis previous history and suffered from head inching. It turned out to be a significant relationship between pediculosis, head itching (P<0.001) and previous history of pediculosis (P<0.001).

Conclusions: The prevalence of pediculosis in Hamadan is low, but is more in the areas which are deprived of the access to health facilities. Therefore, there is a need for educational campaigns about danger of infection and regular mass screening at school.

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Introduction

The public health is significance issues in every society and infestation with insects is a common public health problem[1].Pediculosis capitis is a blood sucking insect and an external human parasite that has worldwide distribution. Infection by this parasite has been observed in all age groups, but it is more prevalent among schoolchildren. It causes serious health problems as well as social problems and stigma[2]. The first symptom of pediculosis is the severe head itching caused by blood sucking of the parasite from the host. One of the complications resulted from pediculosis is pyoderma streptococci or impetigo[3]. The louse saliva contains anticoagulant substances which prevent the blood from clotting. The anticoagulant substances may also cause the anemia, allergies and impetigo. The infectious skin disease is developed by the severe itching leading to skin impairments[4]. Pediculosis occurs by a direct contact with the patient, personal equipments such as his/her comb, hat, scarf, underwear, towel and the sponge of headphones in electrical devices. A head to head contact with the patients is the most prevalent way of transferring the pediculosis[3].

Pediculosis can be found throughout the world[5]. In fact, it does not simply belong to the poor and the developing countries, but involves the developed countries. According to some reports, the prevalence of pediculosis among American students is more than that of other

communicable diseases[3].The rate of pediculosis differs in various countries through the world for examples, the Netherlands with 4.8%[6], Brazil with 35%[6], Turkey with 1.2%[7], Venezuela with 28.8%[8] and Argentina with 29.7%[9]. Previous studies in different parts of Iran showed infestation rates were 5.1, 4.5, 2.2, 28.5 and 12%, mostly in the primary school children, in Rasht, Tabriz, Babol, Ardabil and Boushehr, respectively. In three other studies carried out in Hamadan Provinces, the overall infestation rates were 7.5, 6.85% and 1.3% respectively[10].

The risk of pediculosis is related with different host factors. Pediculosis is increased in areas with poor socio-economic conditions, high population concentration, lack of personal hygiene, minimum sanitary facilities, and lack of nurse school. Infestation occurring when hair is not washed or clothes are not changed or washed regularly[5].In addition it is related with the parental education and occupation, beliefs and attitudes of mother to health standards[11].

The lack of health care workers and school nurses in secondary schools and the increasing prevalence of pediculosis among school age children prompted us as community health nurses to conduct a survey on the prevalence of pediculosis and its relevant factors among preschool children. Although there have been numerous studies on the prevalence of pediculosis and its control in primary schools, little work has been performed in secondary schools.

Therefore, the aim of the present study was to determine the prevalence of pediculosis and its relevant factors in secondary schools in Hamadan west of Iran.

Methods

This study has been carried out in two phases between October and December 2010. In the first research phase, to determine the prevalence of pediculosis in secondary students of Hamadan, a cross-sectional study procedure was conducted and in the second phase to identify the relevant factors, a case-control study was used. The control subjects were selected among the classmates so that two healthy students could serve as control randomly in return for each pediculosis infested student. The case and control subjects filled in a questionnaire which contained demographic data and personal and familial information about hygiene.

The statistical population of the research includes all secondary schools of rural and urban areas, public and private sectors and girls' and boys' schools. To calculate the number of subjects in the sample group, it is assumed that *P* equals 8.6%, the relative error turns to be r=0.1 and the confidence rate approximates 95%.

As there is a correlation among the school students due to the use of the cluster sampling, the sampled subjects were estimated as 6615 because the cluster sampling coefficient has been multiplied by the number of sampled subjects. So, the researcher felt constrained to examine some 10841 students in order to obtain more precision. To carry out the sampling enterprise in the city, the researcher selected the schools randomly in five districts of northern, southern, eastern, west of and central parts of the city.

The male and female groups were determined in proportion to the total number of students in both state and privately-owned schools of every district. All students living in the villages of Hamadan were also included in the sampling process.

For the diagnosis of pediculosis, the students' hair was examined carefully by the trained health workers then pediculosis infested subject was confirmed by physician of the health centers. The presences of nits, nymphs or adult lice in the hair were the criteria for diagnosis of pediculosis.

The SPSS software package and chi square and McNemar tests were used to analyze the data and to tabulate the absolute and relative frequencies. Female students were examined by female experts and male subjects were checked by the male examiners. Subjects were treated and interviewed individually to avoid disgracing their honors and to prevent the students' psychoses. The results of examination were only accessible to the authorities of the health centers, school masters and subjects.

Results

The prevalence of pediculosis was 1.052% among 10841 secondary students of Hamadan and its subordinate villages. In fact, the prevalence was 1.279% among the urban students while the students of rural schools assumed 0.05% of the prevalence. A significant relationship was seen between rate of pediculosis and students' residency ($P<0.001$). In the case of gender; rate of pediculosis was 2.383% among the girl students; whereas the boy group was infested by 0.11% of pediculosis ($P<0.001$). The prevalence of pediculosis was 2.889% for girls and 0.135% for boys in urban schools and 0.122% for girls and 0.0% for boys in rural schools. A significant relationship was found between pediculosis rate and the gender of the students ($P=0.001$) (Table 1).

Table 1: Prevalence of pediculosis capitis by sex and region

Subjects	Total	Number	Prevalence	95% CI
Female	4491	107	2.38	1.93, 2.82
Male	6350	7	0.11	0.02, 0.19
Urban	8836	113	1.27	1.00, 1.51
Rural	2005	1	0.05	0.05, 0.14
Total	10841	114	1.05	0.86, 1.24

The prevalence of pediculosis was 1.3% for the first graders. The first grade students were more infested than other graders; however, there was no significant relationship between the educational gradation and pediculosis statistically ($P=0.111$). The greatest rate of preva-

lence belonged to the public schools (1.2%) and the least rate of pediculosis was attributed to the private schools (0.3%).The results showed a significant relationship between the school type and the prevalence rate (P=0.003).

The highest percentage of pediculosis was found among to the students whose fathers had the profession of laborers (83.3%). The highest rate of pediculosis pertained to the students whose parents were illiterate or had the fifth grade of elementary school. There was no significant relationship between rate of pediculosis and the degree of parents education (P=0.151 and P=0.166).

The highest rate of pediculosis was reported among the students (33.3%) who had families of four members. There was no significant relationship between pediculosis and the family size (P=0.484).

The highest rate of infestation (50.9%) was related to the individuals who took shower twice a week, whereas, the lowest of pediculosis (4.4%) was associated with the subjects who bathed three times a week. No significant relationship was identified between the number of the bathing times and PI. (P=0.412).

The majority of the subjects (31.6%) combed their hair once a day; therefore, the highest rate of pediculosis (56.1%) was experienced by the students who shared their comb. Only did 22.8% of the female subjects were forced to share their veil. The statistical tests revealed no significant relationship between rate of pediculosis and the number of combings (P=0.111) and the use of shared comb (P=0.089) or veil (P=0.303).

The prevalence of pediculosis was greater in the subjects who suffered from head itching than those who did not itch their heads (61.4%). The χ^2 test demonstrated a significant relationship between the head itching and pediculosis rate (P<0.001) (Table 2).

Table 2: Prevalence of pediculosis capitis by head itching (χ^2 test=11.046; P<0.001)

	Infested Subjects		Non infested Subjects	
Head itching	**Number**	**Present**	**Number**	**Present**
Yes	70	61.4	92	40.3
No	44	38.6	126	55.3
Unidentified	-	-	10	4.4
Total	114	100.0	228	100.0

The highest percentage of pediculosis infested subjects (92.1%) had pediculosis previous history; so McNemar test displayed a significant relationship between pediculosis and the subjects' pediculosis previous history (P<0.001) (Table 3).

Table 3: Prevalence of pediculosis capitis by having previous history using McNemar test (P<0.001)

Havingprevious history	Infested Subjects		Non infested Subjects	
	Number	**Present**	**Number**	**Present**
No	9	7.9	12	5.3
Yes	105	92.1	206	90.3
Unidentified	0	0.0	10	4.4
Total	114	100.0	228	100.0

Discussion

In this study, the prevalence of pediculosis in the secondary students of Hamadan and its suburban villages was low. This is because of seasonal medical checkups and the frequent education of the staff in the health care centers. It has increased students' health knowledge which encourages them to consider health matters. The prevalence of pediculosis varies in schools throughout the word. Studies done in recent years demonstrate that the prevalence has been 0.7% in Germany, 4.1% in South Korea and 29.7% in Argentina[12,1,9].

The percentage of pediculosis was 21 times higher for girls than for boys. The rise in the prevalence of pediculosis for girls is because of the behavioral differences between girls and boys. Girls' longer hair and their use of veil for the coverage of the hair cause them not to realize the prevalence of pediculosis on time. A study carried out in Guilan, north of Iran revealed that the rate of pediculosis was twice more for girls than for boys[13]. The prevalence of pediculosis has been 3.6 times higher for girls than for boys in Babol, north of Iran [14]; while it has become 3.23 times higher for girls in Amlash north of Iran. This kind of variation has been reported to be statistically significant[15]. Studies under taken in other countries such as Korea, Argentina and Brazil confirm the above-mentioned point[1,6,9].

This study explores that pediculosis has been higher in the schools of the city outskirts which suffer from poor socio-economic states. Differences of pediculosis in various socio-economic setting of Brazil confirm the above stated point[11]; moreover, a study done in Italy displays that knowledge and appropriate response to the infestation pertain to it was estimated[16].Geographical location of the school, student population of the class, weak situation on economy and social problems had a relationship with rate of pediculosis[17].

The increases of pediculosis among public schools in comparison to private schools are indicative of the effects of economic conditions on rate of pediculosis. The socio-economic state is one of the important factors in the outbreak of pediculosis, which afflicts most of school students and homeless individuals[18]. The present study showed that the highest rate of pediculosis belonged to the first grade secondary students. The comparison of this study with the surveys conducted in primary schools indicates when the education increases, pediculosis decreases. The higher prevalence of pediculosis at the lower grades may as well be due to pupils' poor knowledge and their inability to abide by the rules of personal hygiene. A study conducted in Guilan revealed that the first grade students became more infested with pediculosis[13].

The highest infestation was pertained to the student whose fathers were laborers and whose mothers were housewives. In addition, their schooling level was limited to the fifth primary education or they were illiterate. It can be stated that when parents' educational degrees im-

prove, they will highly follow the rules of hygiene, prevention and treatment. An investigation in Germany discovers that there is a positive correlation between parents' educational level and their cognition of the infestation to pediculosis; namely, the students whose mothers were of low leveled education became more easily infested by pediculosis[12].

Itching is the most important clinical symptom of the patients suffering pediculosis. This study made it clear that 61.4% of the patients got involved in head itching. In fact, the statistical test confirmed that there existed a relationship between pediculosis and head itching. The results of this study corresponds to the findings of the other researchers conducted[13,14]. The survey performed in Brazil made it clear that head itching and sleepiness were the main symptoms of pediculosis in the patients. In a way, 65% of the patients suffered from head itching[19].

This study showed that 92.1% of the patients had pediculosis previous history. Pediculosis previous history made students susceptible to the disease again. The findings of other investigations approved it[17]. The results of the present study do not show any significant relationship between the bathing times with the prevalence of pediculosis; accordingly, studies with similar subject matter could not reveal any relationship between the prevalence of pediculosis and the bathing times per week[14]. Furthermore, in this study no significant relationship has been seen between the shared use of veil, cap, comb, bed and the rate of pediculosis. Transference of pediculosis takes place through the direct touch between individuals or the indirect contact with the objects. The results of a study clarify that higher rate of pediculosis is transferred the head to head contact rather than through the devices and items[10].

Generally speaking, a comparison of the results in this study made it obvious that the prevalence of pediculosis tended to be less for secondary students than for the primary school goers in Hamadan west of Iran [10]. There was a limitation in this study, since this study was carried out in autumn, and season factor has an impact on the prevalence of pediculosis, if this is done in the winter which students wear more clothing, the prevalence of pediculosis might be increased.

Conclusion

The prevalence of pediculosis in Hamadan is low, but is more in the areas which are deprived of the access to health facilities. Therefore, there is a need for educational campaigns about danger of infection and regular mass screening at school. Moreover existence of school nurses for hygienic controls of students in secondary schools are important measures in the elimination of pediculosis.

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Conflict of interest statement

The authors have no conflicts of interest to declare for this study.

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