

The prevalence of pediculosis capitis and its associated risk factors in primary school students in Jahrom, 2016

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Abstract:

Introduction:

Pediculosis is one of the most common parasite infections in the world. This infection is common in many countries including Iran. Pediculosis infection causes serious health problems especially in school children. This study aimed to determine the prevalence of pediculosis infection and some associated factors in primary school students in Jahrom, 2016-2017.

Material and Methods:

This descriptive analytical study recruited 717 primary school students of Jahrom selected by multi-stage random sampling. Data were collected by using a questionnaire and complete examination of hair for pediculosis infection and were analyzed with Chi-square test and descriptive test.

Results:

Among 717 examined students, 49 were infected by pediculosis. Infection prevalence was 2.4% among boys and 9% among girls. All infected cases were living in the city. Most infected cases were in third grade. Infection prevalence was significantly higher among Afghans ($P < 0.05$). There was a significant relationship between factors like a previous infection with pediculosis, hair quality and access to health care center and pediculosis infection.

Conclusion:

The prevalence of this infection among Jahrom students was 6.8%, which was associated with factors such as low access to health care centers and poor personal hygiene. Personal hygiene, information about transmission and prevention ways and availability of health facilities can play an important role in decreasing the infection and its complications.

Keywords: Pediculosis, Epidemiology, Students, Jahrom

Introduction

Lice are arthropod parasites in animals and humans with three species that live parasitically in the human body: head lice

(*Pediculus capitis*), body lice (*Pediculus humanus*) and pubic lice (*Phthirus pubis*).

The most important ways of pediculosis transmission are by direct contact with

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infected people, or indirectly by contact with clothing, personal belongings, beds, or furniture lining contaminated with lice nits (eggs) or the louse itself (2).

Pediculosis has a worldwide spread and is often found in temperate regions (3). The incidence of infestation in girls has been reported more than in boys (4).

Despite the advancement of health and the progress of medical sciences, the disease remains a public health problem with a high potential to spread (5). This parasitic infection affects between 6 and 12 million people annually (6).

One of the places that can be the starting point for lice epidemic in today's societies is school, especially primary school (3). Due to the students' failure to observe personal hygiene and their presence in populated areas such as school, pediculosis is one of the most common health problems of primary school children. Studies on the prevalence of this parasite around the world show that the incidence of pediculosis varies from less than 10 to more than 40 percent among primary school children (7). In pediculosis, due to the fact that the louse sucks blood several times a day and its saliva is repeatedly injected into the body, hence its toxic effects in the infected people might cause fatigue, irritation, pessimism, and laziness. Occasionally, acute allergy, such as intense itching, is caused by repeated injection of saliva from the lice. Due to the scratching of the bite site, bacterial and fungal agents may cause secondary contamination and inflammation. Its psychological effects cause feelings of embarrassment, mockery, anger and consequently an academic failure in the person and a lot of psychological burden in the family (8).

Pediculosis is common in all parts of the world, including Iran, especially in highly populated places with poverty and poor personal hygiene. Unfortunately,

pediculosis along with other contagious diseases is emerging as a health problem in some areas in Iran due to uncontrolled growth of population, the migration of villagers to the cities, slum dwelling, and establishment of satellite towns with minimum health and welfare facilities (9). The incidence of pediculosis has been reported from 6 to 30 percent in different regions of Iran (10).

According to the available reports of growing pediculosis in Iran, including schools in Jahrom, this study was conducted to determine the prevalence of pediculosis and its related factors among elementary school students in Jahrom, Iran.

Materials and Methods

This cross-sectional study was conducted to determine the prevalence and factors affecting pediculosis in primary school students of Jahrom in 2016. Based on the prevalence of pediculosis in previous studies $P = 0.3$, $\alpha = 0.05$ and $SD = 0.0$; hence 717 students from urban and rural areas were selected as the sample size by multistage random sampling method. Data were collected through a questionnaire and a hair examination for pediculosis. A researcher-made questionnaire was designed for data collection and its face and content validity were evaluated and approved by experts and professors working in this field. The reliability of the questionnaire was evaluated by the test-retest method. The correlation was satisfactory ($r = 0.78$). The questionnaire for evaluating effective factors included eighteen items of individual and family behaviors such as a history of infection, number of taking a bath, hair length, access to health services such as shampoos and detergents, as well as access to health care. It also collected demographic information (gender, age, grade, father's education level, mother's education level, father's

occupation, mother's occupation). Hair examination was used to determine the prevalence of infection. Upon obtaining the permission of the Ethics Committee under the number IR.JUMS.REC.1395.133 and in coordination with schools' health units, health centers, and the general directorate of education of Jahrom, examinations and direct and individual interviews with the students were conducted to determine the prevalence of the infection. The interviewers obtained some information from the health records of students in the school office or through direct observation. Based on the existing standards (Prevention and Control of Head Lice Infestation in Schools manual issued by the Health Department of the Ministry of Health and Medical Education), detection of living, nymph or adult eggs was considered as infection. The hair was examined, especially in the back of the ear and above the neck, in the presence of sufficient light for about four minutes. Chi-square test and descriptive statistics were used to analyze the data. The statistical significance level was considered as $P < 0.05$. Data were analyzed using the SPSS V.22 software.

Results

In this study, the prevalence of pediculosis was 6.8% among girls and boys in urban and rural primary schools in Jahrom. The mean age of healthy and infected students was 9.5 ± 1.8 and 8.8 ± 1.3 years, respectively. In the initial analysis, pediculosis was investigated according to individual, social and behavioral variables. The prevalence of infection in the first to sixth grades was 10 (8.1%), 7 (5.5%), 13 (10.5%), 7 (6.4%), 11 (9.8%), and 1 person (0.9%), respectively.

There was a significant relationship between the prevalence of infection and students' place of residence ($P < 0.05$), and all infected cases were residing in the urban

area. The relationship between the prevalence of infection and gender showed that most of the infected cases were girls (9% prevalence among girls and 4.2% among boys) and the difference was statistically significant ($P < 0.001$).

There was a significant relationship between infection prevalence and nationality, pediculosis and previous history of infection, pediculosis and dandruff, pediculosis and access to health services, pediculosis and hair type, and pediculosis and itching ($P < 0.05$).

There was no significant relationship between pediculosis and school education, parents' education, and hair length ($P = 0.7$) (Table 1). The relationship between pediculosis and the economic status of students was such that the prevalence of infection was 7% among households with an income below 10 million Rials, 4.11% among households with an income between 10 to 20 million Rials, 10.57% among households with an income more than 20 million Rials. There was no statistically significant relationship between economic status and pediculosis ($P = 0.12$).

There was no statistically significant relationship between the prevalence of infection and the educational level based on chi square test ($P = 0.06$). The highest number of infection cases (13) were found among the third-grade students and the lowest (1) in the sixth grade.

The results of this study showed that the fathers of the 49 infected people were self-employed (26 cases), laborer (15 cases), farmer (5 cases) and employees (3 cases). There was no significant relationship between father's occupation and infection ($P = 0.14$). The mothers of 48 infected students were housewives and only one mother was employed. There was no significant relationship between mother's occupation and infection ($P = 0.56$).

Among the infected people, 83.6% of their fathers and 75.5% of their mothers were illiterate or had an education level under

high school diploma. There was no significant relationship between parents' education and pediculosis ($P = 0.72$).

Table 1: Frequency distribution of studied variables in terms of pediculosis in Jahrom in 2016

Demographic variables / Frequency	Infected (percent)	Not infected (percent)	Total (percent)	P-value
Place of residence				
Rural	0 (0%)	215 (100%)	215 (100%)	*
Urban	49 (9.7%)	453 (90.3%)	502 (100%)	0.001
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Gender				
Female	35 (9.04%)	352 (90.96%)	387 (100%)	*
Male	14 (4.24%)	316 (95.76%)	330 (100%)	0.01
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Nationality				
Iranian	44 (6.41%)	642 (93.59%)	686 (100%)	*
Afghan	5 (16.11%)	26 (83.89%)	31 (100%)	03/0
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
History of infection				
Yes	31 (63.26%)	18 (36.74%)	49 (100%)	*
No	18 (2.7%)	650 (97.3%)	668 (100%)	0.0001
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Education				
Yes	38 (7.14%)	494 (92.86%)	532 (100%)	
No	11 (5.95%)	174 (94.05%)	185 (100%)	0.57
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Having a bathroom				
Yes	46 (7.12%)	600 (92.88%)	646 (100%)	
No	3 (4.22%)	68 (95.78%)	71 (100%)	0.35
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Access to health care services				
Yes	46 (6.52%)	659 (93.48%)	705 (100%)	*
No	3 (25%)	9 (75%)	12 (100%)	0.01
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Combing the hair				
Once a day	21 (7.36%)	264 (92.64%)	285 (100%)	
Twice a day	16 (6.45%)	232 (93.55%)	248 (100%)	0.89
Three times a day or more	12 (6.52%)	172 (93.48%)	184 (100%)	
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Hair length				
short	22 (7.16%)	285 (92.84%)	307 (100%)	
Medium	20 (7.09%)	262 (92.91%)	282 (100%)	0.79
Long	7 (5.46%)	121 (94.54%)	128 (100%)	
Total	49 (6.8%)	668 (93.2%)	717 (100%)	

Demographic variables / Frequency	Infected (percent)	Not infected (percent)	Total (percent)	P-value
Shared accessories				
Yes	19 (8.11%)	215 (91.88%)	234 (100%)	0.34
No	30 (6.21%)	453 (93.79%)	483 (100%)	
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Dandruff				
Yes	14 (12.17%)	101 (87.83%)	115 (100%)	*
No	35 (5.81%)	567 (94.9%)	602 (100%)	0.01
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Type of hair				
Straight	38 (5.85%)	611 (94.15%)	649 (100%)	*
Curly	11 (16.17%)	57 (93.83%)	68 (100%)	0.001
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Number of bedrooms in a house				
One	7 (9.72%)	65 (90.08%)	72 (100%)	0.28
Two	28 (7.95%)	324 (92.5%)	352 (100%)	
Three	11 (5.16%)	202 (94.84%)	213 (100%)	
Four or more	3 (3.75%)	77 (96.25%)	80 (100%)	
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Shared bedroom				
Yes	30 (6.55%)	428 (93.45%)	458 (100%)	0.68
No	19 (7.33%)	240 (92.67%)	259 (100%)	
Total	49 (6.8%)	668 (93.2%)	717 (100%)	
Itching				
Yes	27 (29.03%)	66 (70.97%)	93 (100%)	*
No	22 (3.52%)	602 (96.48%)	624 (100%)	0.001
Total	49 (6.8%)	668 (93.2%)	717 (100%)	

Discussion

In the present study, the prevalence of pediculosis was 6.83%. Saghafipour et al. reported a 13.3% prevalence of pediculosis in elementary school students in Qom (11), and Aivazi et al. reported a 24.8% prevalence of pediculosis in girl's elementary school students in Gilan-e-Garb (12). Arjmandzadeh et al. reported a 22% prevalence of pediculosis among girls in primary schools in Bushehr (13).

Farzinnia et al. reported a 4.5% prevalence of pediculosis among girls in Qom. This amount was 1.9, 4.5, 3.3, 4.7, and 4.9 percent for the students in the first to fifth grade, respectively (14). Also, in studies in Ahwaz, Zabul, and Hamedan, the pediculosis prevalence was 11%, 29.4%, and 1.3%, respectively (10, 15, 16).

The prevalence of infection in this study in the first to sixth grades was 10 (8.1%), 7

(5.5%), 13 (10.5%), 7 (6.4%), 11 (9.8%), and 1 person (0.9%), respectively.

The incidence of pediculosis was somewhat higher in the third and first grade students, but there was no significant difference between the grades. This is consistent with the results of Saghafipour et al. (11).

Although it appears that infection rate is inversely correlated with parents' level of education, and increasing the level of awareness of parents will be effective in the prevention and rapid treatment of infection (17 and 18), this study found no significant relationship between the infection rate and the level of education and occupation of the parents. That is possibly due to the fact that parents with high education may also be at the level of other parents for reasons such as being busy or having education unrelated to medical and health knowledge in the

prevention and control of their children's illness.

There was no significant relationship between prevalence of infection and frequency of combing hair ($P = 0.89$). Regular and daily combing may appear to separate the lice nits and reduce contamination, however, the head lice stick to the hair and secrete allergenic substances, hence this infection is associated with itching, and it is expected that people who do not comb their hair be at a higher risk because of the overlapping of hair and the possibility of parasite placement. This is consistent with the results of Saghafipour in Qom (11).

There was a significant relationship between history of infection and present infection. This could be because some lice nits might already be present in hair or the source of transmission of the disease in the relatives or family is not removed yet. Also, a specific non-healthy behavior that has caused the previous infection might still exist in the individual and his or her relatives and cause re-infection. This is consistent with the results of Saghafipour et al. in Qom (11).

The results showed that the rate of infection in girls (9%) was significantly higher than that of boys (4.2%), which can be due to their behavioral differences such as having longer hair, covering the hair with scarves, more close-up contacts, more hair mass in girls, and harsh games and very short contacts in boys. Studies of Aivazi (12), Farzinnia et al. (14), and Motevalli hagh et al. (19) also refer to similar results of Noori in Kalaleh (20) and Moradi in Hamadan (21).

All infected students were living in urban areas and there was a significant relationship between place of residence and infection. Moradi et al. reported that contrary to other studies in Iran, pediculosis is more prevalent among students in urban areas in Bahar (22). One of the possible reasons for the difference in this epidemic and the study by Moradi in Bahar can be due to the continuous provision of health

education in rural areas by health care providers which is very effective in raising the awareness of students and their families; as well as seasonal control and visitation of health status of the students by the health workers in the rural areas. In urban schools, health educators in schools or health care providers in urban health centers are responsible for those examinations, which due to their unrelated field of study and lack of personnel, the visits and examinations are performed annually, which is consistent with the present study.

There was a significant relationship between access to health care services and pediculosis in the students, which is consistent with the results of Saghafipour et al. in Qom (11). Clearly, the greater the access and use of health care services, the greater the physical and mental health (23). In this study, there was no relationship between hair length and pediculosis in students, which is not consistent with the study of Noori in Kalaleh (20).

There was a direct relationship between hairstyle and infection prevalence such that the risk of infection in students with curly hair (16.1%) was higher than those with straight hair (5.8%), which is consistent with the result of Rafinejad et al. in Amlash. There was a direct relationship between itching and the prevalence of infection. In other words, the risk of infection in those with itching is 11.1 times that of those who do not have itching, which is consistent with the study of Rafinejad (18).

Also, there was no relationship between student training and infection prevalence, that is 39 of the 49 infected students were trained and 10 were not, which indicates no difference. This can be a ground for revising the instructions provided at school.

Conclusions

The prevalence of this disease among Jahrom's students was 6.8%. Factors such as access to health services and previous history of infections were effective in the high prevalence rate of the diseases in

primary schools in Jahrom. Therefore, controlling this problem requires macro health plans such as hiring a health trainer in all schools, increasing public access to health services, along with personal hygiene measures and health education.

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Conflict of interest

There is no conflict of interest.

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