

Head Lice Infestation (Pediculosis) and Associated Factors among Primary School Girls in Sirik County, Southern Iran

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Abstract

Background

Head lice infestation (pediculosis) is a serious health problem that can cause a high level of anxiety and psychological frustration, especially in developing countries. Socio-demographic factors are important determinants of the occurrence of head lice infestation. This study aimed to determine the head lice infestations and the factors affecting the rate of infestation in primary school girls.

Materials and Methods

In this cross-sectional study, a total of 358 school girls from two urban and three rural primary school girls in Sirik County, Southern Iran, were randomly selected. For the diagnosis of head lice infestation, students were examined carefully by visual inspection of the scalp and hair for the presence of lice. Self-administered questionnaire was used to collect data on socio-demographic and associated factors of head lice infestation. SPSS version 21.0 was used to analyze the data.

Results

The prevalence of head lice infestation among primary school girls was 56.15%. There were significant associations between head lice infestation and age ($p < 0.05$), school grade ($p = 0.045$), family size ($p = 0.048$), parents' literacy ($p = 0.001$), father's job ($p < 0.05$), residential environments ($p = 0.014$), and history of lice infestation in one family member ($p = 0.001$).

Conclusion

The head lice infestation is one of the major public health problems in primary school girls of Sirik County. It seems that improvement of socio-economic conditions and also health education programs about head lice infestation for primary school girls and their parents could significantly reduce the prevalence of head lice infestation in this area.

Key Words: Head lice infestation, Iran, Pediculosis, Primary school, Students.

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1- INTRODUCTION

The human head louse, *Pediculus humanus capitis* (*P. h. capitis*) is one of the important lice species which only infects the human scalp (1). *P. h. capitis* is a holometabolous insect, completing its entire cycle on head hair from eggs to adults through three nymphal instars in about 45 days (1). Head lice infestation (pediculosis) is a common health problem in Iran and other developing countries especially among primary school children worldwide and a survey conducted in the South of Iran reported the prevalence in children aged between 3 to 11 years (2-4). After landing on scalp skin, head louse takes a blood meal and injects its saliva through the scalp skin to prevent clotting of blood. Although head lice are not known to transmit human diseases, head lice infestation may lead to intense scalp itching, dermatitis, bite reactions, and secondary bacterial infections (1). It also can cause a high level of anxiety and psychological frustration among the infected people (5).

Head louse are extremely transmissible, by through direct head-to-head contact especially in overcrowded dwellings or indirect contact by using common objects such as combs, hairbrushes, hats, helmets, clothing, and towels (6). In addition to lice resistance, some demographic and socio-economic factors including age, gender, family size, bathing facilities, frequency of hair washing, shared use of personal hygiene items, medical treatment availability, and family income are necessary to be considered in prevention and control of head louse infestation (7, 8). Primary school children generally show the highest prevalence of head lice infestation, and girls are more frequently affected than boys because they usually have longer hair and despite boys who prefer playing outside during sports or rough activities, prefer playing inside with more frequent head-to-head contacts (9,

10). Therefore, it is particularly important to recognize the factors associated with the prevalence of head lice infestation in schoolchildren to provide a basis for intervention towards control and prevention of infestation. This study was conducted due to high prevalence rate and lack of recent local data regarding head lice infection. Identifying the factors that influence the infestation by head lice may help in the planning of intervention health programs at primary schools.

The main purpose of this study was to determine the prevalence and risk factors associated with head lice infestation in primary school girls of Sirik County, Hormozgan province, one of the low socio-economic areas in South of Iran and North of Persian Gulf.

2- MATERIALS AND METHODS

2-1. Study design and population

A descriptive cross-sectional study was conducted from November 2015 to February 2016 in Sirik County which is located in South of Iran and North of Persian Gulf (**Figure.1**). Sirik County has a warm, humid, and low rainfall climate. The mean annual temperature is 25.8 C° and the mean annual relative humidity is 63%. The average annual rainfall has been reported to be 9.75 mm in 2016 (**Figure.2**). It is a low socioeconomic area with majority of the population living in houses made of cement and blocks and shelters made of palm tree branches and has a population of about 45,723 persons in 2016 (10).

2-2. Methods

The sample size was determined according to the Morgan table. Since the total population of student in the primary schools in Sirik County was 5,426 students, the sample size was determined to be 358 students which were taken through cluster sampling method. On the

basis of available epidemiological data and unpublished data on the prevalence of head lice infestation in the Sirik health centre, five villages including two urban and three rural schools were selected randomly and considered as the clusters. All of the students in each cluster were examined for head lice infestation. For the diagnosis of *P. h. capitis*, the students' hair was examined carefully by a team including health workers of the study area and a medical entomologist with skills in the detection of head lice. The physical examination consisted of visual inspections of student's head for 5 min, paying special attention to the neck and behind the ears. The presence of nits, nymphs or adult lice in the hair were the criteria for diagnosis of head lice. After the examination, all of the participants were interviewed using a pre-tested structured questionnaire. The questionnaires were administered by trained field interviewers and supervised by the principal investigator. The questions included respondents' demographic characteristics, parent's educational level and job, family size, history of head lice infestation in family, type of house, bathroom availability in the home, Frequency of hair washing per week, dwelling houses construction materials, electricity, and water supply.

2-4. Ethical consideration

Schoolchildren of study and their family were informed about the objectives and procedures of the investigation. The parents signed a consent form and the students were informed that their participation was purely voluntary and they were free to withdraw from the study at any time. In this study identification numbers were used instead of participant names and collected data were kept confidential. Hormozgan University Medical Sciences Ethics Committee approved this study.

2-5. Inclusion and exclusion criteria

The inclusion criteria were consisted of being 1-6th grade students and being satisfied to participate in the study. The exclusion criteria were unwillingness to participate in the study or failure to complete the questionnaire.

2-6. Statistical analysis

SPSS version 21.0 software was used to analyze the data. Descriptive statistics were used to show percentages, averages, and relative frequencies of the variables. Chi-square test used to determine the statistical significance of differences of relative frequencies. The results were considered significant at 5% level ($p < 0.05$).

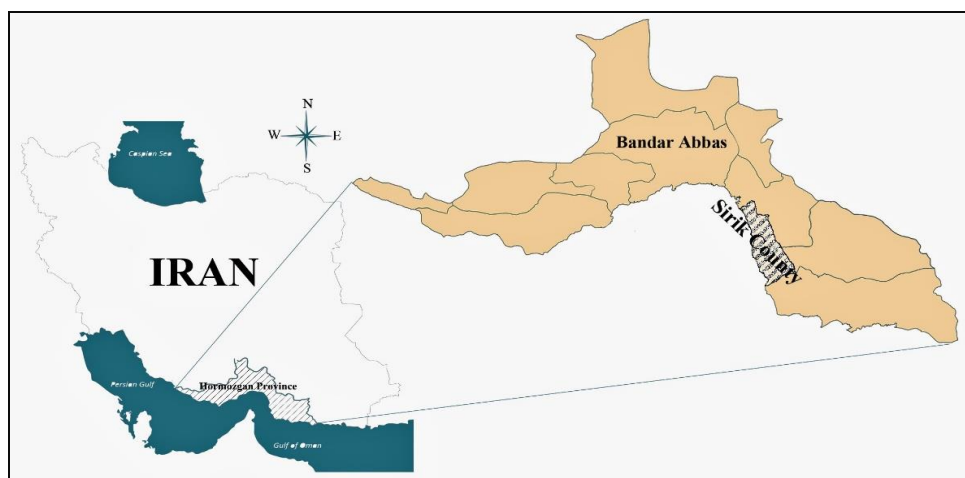


Fig.1: Map showing Iran, highlighting the location of Hormozgan province and Sirik County.

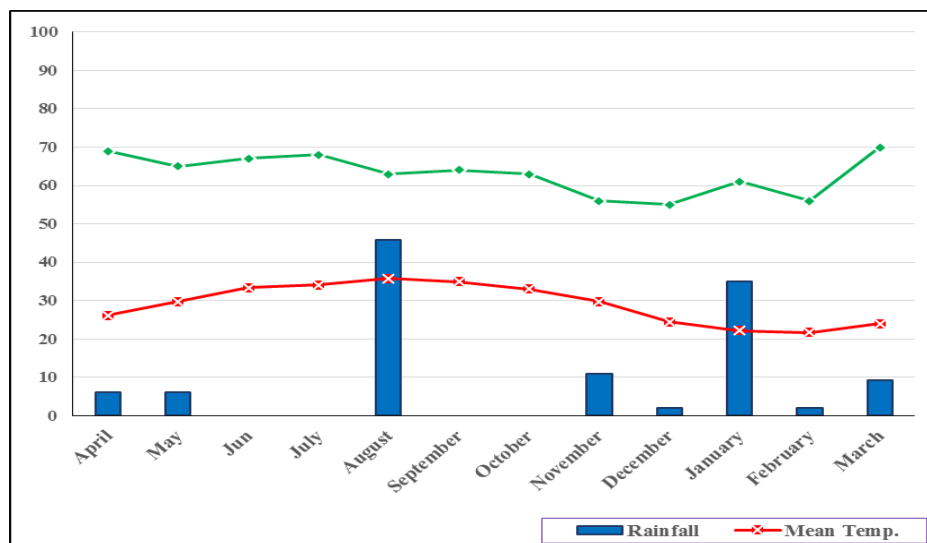


Fig.2: Average of meteorological parameters during 2015–2016 in Sirik County, Southern Iran.

3- RESULTS

According to results of this study, 201 out of 358 girl students had head lice infestation (56.15%). The prevalence of head lice infestation was significantly higher in the students who aged 11 years, and the lowest infestation rate was in 6 years ($p < 0.001$). In addition, we found that there was statistically a significant association between the prevalence of head lice and school grade (**Table.1**). The majority of students had a home constructed of cement blocks (95.8%). Most of the study students had access to clean piped water (97.8%), and all of them had electricity in their houses. Also, more than 98% of students lived in houses with bathrooms (**Table.2**).

The prevalence of head lice infestation according to the socio-demographic characteristics is shown in **Table.1**. The most infestation rate was in 7 years' age group (62.5%). The infestation rate was significantly higher among students who were living in rural areas (62.3%) than in urban areas (50.3%) ($p=0.014$) (**Table.1**). Also, the frequency of head lice infestation among students with no bathroom in their homes was significantly higher than students who had a bathroom in their

homes ($p < 0.05$). However, a negative correlation was observed between the numbers of hair washing per week and head lice infestation ($p=0.35$) (**Table.1**). As **Table.2** indicates, there was no statistical difference between the infestation rate of students who used shared articles such as combs and scarves compared and students who did not shared use of personal hygiene items ($p = 0.15$). According to the results students who had been infested in the past with head lice were more infested than those who had not been infested before ($p=0.001$). The same was true for students whose family members were previously infested with head lice (92.2%) than those coming from families who had never infested by lice (47.8%) ($p<0.001$) (**Table.2**).

The results showed that head lice infestation rate was significantly related to the parents' educational level ($p < 0.001$), and it was 78% and 73.7% in students with uneducated father and mother, respectively. Fathers' job was significantly associated with lice infestation ($p < 0.001$). The infestation rate was higher in students whose fathers were farmers (77.8%), and office worker's girls had the lowest infestation rate (31.7 %). Analysis of another factors influencing head lice

infestation showed infestation rate was significantly related to the family size of students ($p=0.048$), and it was 77% in

students with families with 8 or more children (**Table.2**).

Table-1: Head lice infestation in primary school girls according to the socio-demographic characteristics in Sirik County, South of Iran

Variables	Examinations, (number)	Infestations (percent)	P-value ^a
Age			
6	5	20	0.0001
7	49	33	
8	63	32	
9	59	31	
10	67	26	
11	55	39	
12	45	36	
School grade			
I	56	62.5	0.045
II	60	51.7	
III	58	50	
IV	72	45.8	
V	55	67.3	
VI	57	63.2	
Residential environments			
Urban	183	50.3	0.014
Rural	175	62.3	
Shared use of personal hygiene items^b			
Yes	81	24.6	0.015
No	277		
History of lice infestation in one of family member			
Yes	64	92.2	0.0001
No	289	47.8	
Father's education			
Illiterate	59	82.4	0.0001
Primary	128	58.7	
Secondary	75	35.3	
High school	46	6.7	
University	50		
Mother's education			
Illiterate	57	73.7	0.0001
Primary	171	64.9	
Secondary	49	36.7	
High school	50	44	
University	31	25.8	
Father's Job			
Employee	60	31.7	0.0001
Self-employment	279	60.2	
Farmer	18	77.8	
Family size			
2-3	25	56	0.048
4-5	176	50	
6-7	91	57.1	
≥ 8	66	71.2	

^a Chi-square test, ^b combs, and scarves.

Table-2: Characteristics of the houses of students in Sirik County, South of Iran

Variables	Number	Percent
Type of house		
Cement block house	343	95.8
Muddy	13	3.6
Shed	2	0.6
Situation of house		
Water supply	350	97.8
Electricity	358	100
Bathroom availability in the home	352	98.3

4- DISCUSSION

In the current study, the prevalence of head lice infestation was 56.15 % among female primary school students that is higher than the infestation rate which has been reported in different parts of Iran. Infestation with head lice is now widespread worldwide, mainly affecting children aged 3-11 years old children attending kindergarten and primary school, especially in developing countries including Iran (9, 12). Different rates of prevalence of head lice infection among primary school girls in different province of Iran have been reported. For example, the prevalence rate of head lice prevalence was estimated as 0.7%, Isfahan 2.2% (Hamadan), 3.6% (Semnan), 3.6% (Golestan), 4.7% (Kurdistan), 5.5% (West Azarbaijan), 6.7 (East Azerbaijan), 6.8% (Kerman), 8.4 (Khoozestan), 15.8% (Kermanshah), 27% (Sistan and Baluchestan), and 35.3% (Hormozgan) (12). It seems the reasons for the different outcomes obtained from these studies were the socioeconomic status, age group studied, children's gender, school grade and different examination and diagnostic modalities (11, 12). According to the national pediculosis association of USA, which defines an epidemic when infestation rate of head lice is more than 5% (12), the status of head lice infestation in primary school girls in Sirik County is in epidemic stage. Our study showed that

the prevalence rate of head lice infestation was significantly lower in urban areas as compared with rural areas (14-17). It can be explained by better social, economic, and educational status of urbanites. It has also been observed that there are better personal care and hygiene among urban dwellers than among their rural counterparts. In this study, frequency of hair washing had no influence on infestation prevalence. This finding is in agreement with the results obtained previous studies which reported that the frequency of hair washing is not associated with the rate of infestation (17-20).

Our results showed that shared use of personal hygiene items such as combs, hairbrushes, and scarves does not increase the prevalence of head lice. This is in contrast with other published reports (7, 20-22). According to the results, it seems that the infestation rate rises with the number of children in the family. This finding is in line with previous studies (7, 17, 20, 21, 23-26). It seems that children in large families have a higher risk of being infested by their siblings (or parents) and large families may pay less attention to hair care. The results of this study also showed that the infestation rate was inversely proportional to the parent's education level, increasing with higher education. This finding is in agreement with results of previous studies which carried out in Iran and some other

countries (7, 12, 20, 24, 27,28). The reason is that educated parents have more information about head lice infestation and provide better prevention for their children than would those with less education. The educational intervention has been reported to be effective in improving community involvement and reduction of prevalent insect-borne diseases in low socioeconomic areas (29- 31).

The present study confirms the results from previous studies showing that if one member of a family is infested, other family members have a greater risk of infestation (32, 33).

5- CONCLUSION

In current study, Head lice infestation (Pediculosis) was prevalent in more than 50% of schoolchildren in the population studied; a prevalence higher than in most previously reported studies. Factors that may explain the high prevalence of head lice infestation in the studied girls may be attributed to poor health facilities, low parents' educational level, large family size, residential environments, and low socioeconomic status. It seems that improvement of socio-economic conditions and also health education programs for primary school girls and their parents that puts emphasis on the provision of information regarding the mode of transmission, treatment, and prevention of head lice infestation could significantly reduce the prevalence of pediculosis in low socioeconomic areas such as Sirik County, South of Iran.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

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