

Head Lice among Governmental Primary School Students in Southern Jordan: Prevalence and Risk Factors

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Abstract

Background: Head lice, a common social and health problem among all age groups, is especially widespread among school-aged children. **Aims:** This study aimed to assess the prevalence of pediculosis capitis among governmental primary school students in Southern Jordan and its related risk factors. **Settings and Design:** A sample of 500 primary schools students aged 6–12 from two male and two female public primary schools in four educational directorates were selected randomly in this cross-sectional study. **Materials and Methods:** Data were collected using a modified questionnaire that was completed by the students with the help of their parents. Students were then asked to return the questionnaire a day ahead of the examination date with a signed consent from the parents. **Statistical Analysis:** SPSS software was used with Chi-square testing to study the significant relationship between lice infestation prevalence and the independent variables. Statistical significance was set at $P < 0.05$. **Results and Conclusion:** The overall prevalence of lice infestation was 20.4% and was significantly higher among girls than boys. The prevalence rate was higher among rural residents, those living in shared rooms, families with a monthly income of <200 Jordanian Dinar, illiterate father and mother, those living in families with more than five members, houses with fewer than three rooms, students with longer hair, those with a history of infestation in the previous year, and students who share home articles with other family members. Female gender, low socioeconomic status, a history of contact, inadequate hygiene practices, and sharing articles were the major risk factors.

Keywords: Jordan, lice infestation, prevalence, primary schoolchildren, risk factors

INTRODUCTION

Pediculosis, a common social and health problem among all age groups, is especially widespread among school-aged children.^[1-2] Physical contact is the main cause of pediculus capitis (commonly known as the head louse). For this, good hair hygiene can do at least two things. First, it can prevent loss of hair, itching, infection, accumulation of dirt, dandruff, oil, and tangles; second, it helps to remove pediculi and thus significantly reduces the prevalence of lice.^[3]

As a health problem, millions of individuals are infested with lice every year worldwide.^[4] Head lice infestation prevalence rates of 5.8%–35% have been reported from different regions in different institutions.^[5] Head lice infestations cause social problems for the infected, including embarrassment and misunderstanding. Not only this, but the effort and cost spent on remedies are significant. Due to lack of accurate information and correct preventive measures, management of episodes of pediculosis in schools is notoriously difficult.

Although adults are susceptible to lice manifestation, primary schoolchildren aged between 6 and 12 years (and children of other ages who have direct or indirect contact with primary schoolchildren) are mostly affected.^[6] It is worth mentioning here that head louse infestation is ignored by the public and thus remains undetected.^[7] As its prevalence varies according to the social situation, as well as genetic and cultural aspects, it is recommended that it be investigated regionally.

In Jordan, for example, little information is available about this topic to date.^[6] Concisely, the documentation of school students' health risk behaviors of pediculosis is limited and there is a deficit in Jordanian parents' knowledge and practices relating to pediculosis capitis.^[8] The findings of our current

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Access this article online

Quick Response Code:



Website:
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DOI:
10.4103/jgid.jgid_19_17

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How to cite this article: Khamaiseh AM. Head Lice among Governmental Primary School Students in Southern Jordan: Prevalence and Risk Factors. J Global Infect Dis 2018;10:11-5.

study may then help policymakers in the Ministry of Education to face the challenge. They can design health education courses and programs regarding hygienic needs for the school environment. Specifically, it is hoped that the current study will provide new avenues of information and remedies for lice manifestation among school students (as the future contributors to the country's economic prosperity).

Objectives

This study was reported to assess the prevalence of pediculosis capitis among governmental primary school students in Al-Karak Governorate/Southern Jordan and its related risk factors. Concisely, our goal is two folds. On the one hand, we hope to increase our students' awareness about the most effective healthy lifestyles to avoid such a health risk. On the other hand, we hope to make available to the country's policymakers at all levels the necessary information to face the challenge.

MATERIALS AND METHODS

Study area

Karak is one of the governorates of Jordan, located about 140 km southwest of the country's capital, Amman. Al Karak is the main city in the governorate, which is the home of about 320,000 people in that region.

Study design and sample

The present study, which was carried out as a cross-sectional study from October to December 2015, mainly targeted governmental primary schoolchildren in Al-Karak Governorate. A multistage random sampling was used for data collection from the four educational directorates of Karak Governorate (Al-Karak Directorate, Al-Mazar Directorate, Southern Ghour Directorate, and Al-Qasser Directorate). The participants were randomly selected from Al-Karak Directorate. Two male and two female public primary schools were then selected randomly. The inclusion criteria included: the nationality of the participants so that only students who had Jordanian nationality were included; the age of the participants so that only students aged between 6 and 12 years were included; and a parental consent form so that only students willing to participate in the study were included.

The number of students (n) to be included in the study was estimated using the following equation: $n = N \times p(1-p)/(n-1 \times [d^2 \div z^2]) + p[1-p]$.

Since the actual prevalence of pediculosis is unknown, the probability of its occurrence was estimated to be equal to that of its nonoccurrence ($p = q = 0.50$) and a value of 0.05 was chosen as the acceptable limit of precision (D) at 95% confidence intervals where ($Z = 1.96$). Based on these assumptions, the sample size was estimated to be 377 students, but for ease of calculation and analysis, 500 students were chosen as the sample size.

Data were collected using a modified questionnaire by ALBashtawy and Hasna,^[6] which was used to determine the

prevalence and distribution of pediculosis humanus capitis among primary schoolchildren in Mafraq Governorate, Northern Jordan. A detailed questionnaire was completed by the students with the help of their parents. They were then asked to return the questionnaire a day ahead of the examination date with a signed consent from the parents (481 students returned parent's signed consent with response rate of 96.2%). The final version of the questionnaire was composed of sociodemographic variables and hygiene practice variables, which included sex, age, place of residence, family income in Jordanian Dinar (JD), parents' level of education, family size, house size, hair length, history of infestation, bathing facilities, frequency of hair washing, frequency of bathing, and sharing of articles. To insure the validity of the instrument, three experts from the faculty of nursing at Mutah University revised the field tests before being administered.

Data collection procedure

All the students who returned the questionnaires were prepared for hair examination. A classroom with enough light was chosen in every selected school to conduct the examination and female students were examined in a separate room by female research assistants. Then hair was examined for head lice, as well as for eggs/nits, by full-head examination. The scalp and around the ears and at the base of the neck were examined with the use of a hand light lens. Data were collected by clinical nurse instructors who were trained to do hair examinations. A student was considered as an infested case if live lice or nits were found.

Ethical considerations

Written approval was granted by the Ministry of Education based on ethics and research committee approval from the nursing faculty and a university administration letter. The parents were provided with adequate information about the study purpose and were assured that their children's participation in the study would be voluntary and that they could withdraw at any time they wished. Confidentiality was ensured by asking students not to mark their names on the questionnaires, and a code number was given for each participant; this number was used instead of the real name during the study. All participants' dignity, autonomy, and safety were preserved throughout the study.

Data analysis

The researcher used IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp. for analyzing the data and the analyzed data were tabulated and frequency percentages were used with Chi-square testing to study the significant relationship between lice infestation prevalence and the independent variables. Statistical significance was set at $P < 0.05$.

RESULTS

Sociodemographic characteristics and prevalence of infestation

The mean age of the 481 school students who participated in our study was 8.94 ± 1.98 years, with 238 (49.5%) being

male and 243 (50.5%) being female. Table 1 shows that the overall prevalence of infestation was 20.4% (98/481). The prevalence of infestation was significantly higher among girls (27.6%) than that of boys (13.0%) and students aged 10 years constituted the highest infestation rate (27.5%).

On the other hand, the analysis showed that the prevalence rate was higher among rural residents, those living in shared rooms, families with a monthly income of <200 JD, illiterate father and mother [Table 1], those living in families with more than five members, houses with fewer than three rooms, students with longer hair, and those with a history of infestation in the previous year [Table 2], with no significant relationship with manifestation ($P > 0.05$ for all).

The highest percentage of pediculosis infestation was among children living with families that had a history of infestation (50%), with a statistically significant finding ($P < 0.05$).

Prevalence of pediculosis capitis according to characteristics of infested children and hygiene practices

In terms of hygiene practices, it was found that the students who had bathing facilities in their houses were more infested than those who did not have such facilities and the ones who bathed only once a week were more infested with head lice than those who were bathing more, but this was not statistically significant ($P > 0.05$) [Table 2].

In addition, the prevalence of infestation was significantly higher among children who shared articles such as combs, scarves, and towels among the family (28.3%) compared with children who did not share (9.9%) ($P < 0.05$) [Table 2].

DISCUSSION

As a public health problem in both developed and developing countries,^[4,9] the prevalence of head lice (or pediculosis in

Table 1: Prevalence of pediculosis capitis according to sociodemographic data of students

	Examined	Positive	Prevalence (%)	P	Total
Sex					
Male	238	31	13.0	0.012	481
Female	243	67	27.6		
Age				0.046	481
6	70	13	18.6		
7	71	9	12.7		
8	70	12	17.1		
9	70	9	12.9		
10	68	20	29.4		
11	69	19	27.5		
12	63	17	27.0		
Residence				0.694	469
Urban	319	61	19.1		
Rural	150	31	20.7		
Bedroom				0.144	465
Private	203	36	17.7		
Shared	262	61	23.3		
Income				0.334	461
>200 JD	64	16	25		
200-500 JD	233	44	18.9		
>500 JD	164	27	16.5		
Father education				0.193	460
Illiterate or read and write	54	14	25.9		
Educated	406	75	18.5		
Mother education				0.269	461
Illiterate or read and write	52	13	25		
Educated	409	76	18.6		
Family size				0.774	462
<3	9	1	11.1		
3-5	188	35	18.6		
>5	265	53	20.0		
House size				0.435	461
<3	70	17	24.3		
3-5	295	52	17.6		
>5	19	96	19.8		

JD: Jordanian Dinar

Table 2: Prevalence of pediculosis capitis according to characteristics of infested children and hygiene practices

Characteristics	Examined	Positive	Prevalence (%)	P	Total
Hair length					
Short, <3 cm	174	28	16.1	0.275	457
Medium, >3 cm to shoulder level	155	31	20.0		
Long, > shoulder level	128	30	23.4		
Lice history					
Yes	40	11	27.5	0.154	462
No	422	77	18.2		
Family history					
Yes	16	8	50.0	0.001	462
No	446	80	17.9		
Bathing facilities					
Yes	450	84	18.7	1.000	463
No	13	2	15.4		
Bathing per week					
1	12	3	25.0	0.168	462
2	176	26	14.8		
≥3 times	274	58	21.2		
Sharing articles					
Yes	269	76	28.3	0.00005	472
No	203	20	9.9		

more scientific terms) is increasing. In the area surveyed, the present study has shown that the overall prevalence of head lice (20.4%) was slightly lower than that previously reported in some other areas in the country (e.g., Mafraq Governorate, where the prevalence was 26.6%,^[6] but much higher than others, e.g., Northern Jordan, where the prevalence was 13.4%, or Umm el-Jimal district, where the prevalence was 14.6%).^[8,10]

Our study has shown that this local rate is very close to those reported globally. For example, the manifestation prevalence rate in Cairo was 21.86%.^[11] Likewise, the manifestation prevalence rate in the eastern area of Bangkok/Thailand was 23.3%.^[12]

A number of factors could have contributed to the high prevalence rate of pediculosis in Southern Jordan. First, this may be partly due to the relatively poor socioeconomic status of the families living there; the prevalence was highest in lower class families, but within average in middle-class families and lowest in upper-class families [Table 1]. The observable low socioeconomic status of the families living in this area has led to deficiencies in their living sanitation standards, a state of affairs that contributed to head lice infestation. At the school level, the overcrowding of students in the classrooms (approximately 40 students per classroom), the lack of health education programs, and the absence of screening programs could also be considered extra contributing factors.

In the present study, it was revealed that age is another key variable that requires further intensive investigation. To illustrate, 10-year-old children were more infested than all other age groups, a finding that echoes a study in primary schoolchildren in Kerman, where 9-year-old children were the most infested age group.^[13]

Sex was also a causative variable. The infestation was significantly higher among girls than among boys. In fact,

it was twice as high among girls than among the boys. This corroborates the findings reported in other international studies beside Jordan.^[6,9,14-17] It is claimed that close head contact between boys tends to be less than between girls. This is probably the case as girls generally have longer hair, leading to closer head contact. This is one of the findings of this study, i.e., those with longer hair (vis-à-vis shorter hair) are more likely to be infested.

Finally, the current study demonstrated that the presence of lice was slightly more common in rural areas than in urban areas. This finding is consistent with the findings reported in other studies.^[6-7,18] This might be justified because the educational level and the living standards of urban people are relatively higher than those of rural people. Unlike urban areas, some rural areas still lack piped water supply and public sewerage systems, a state of affairs that definitely leads to low sanitation.

At the family level, large family size facilitates transmission of head lice due to closer contact with siblings who share fewer rooms in the house. Thus, our findings are consistent with a study conducted in primary schoolchildren living in rural and urban areas in Kayseri, Turkey, which indicated that the prevalence of infestation was higher among students who shared rooms than among students occupying private rooms.^[18] This is probably the case because people sharing the same floor not only have more body contact with each other, but they also share belongings, factors that definitely increase the risk of cross infection.

Although it turned out that the relationship between infestation rate and family size was not significant, our findings have still shown that the infestation rate was higher among schoolchildren who came from families with more than five members. This supports a result of a study that studied the prevalence of head

lice among schoolchildren in the Sharkia Governorate/UAE.^[19] This could also be explained because larger families use less hygienic facilities and have lower standards of living.

With regard to the relationship between infestation and family income and the educational level of the parents, our finding is in agreement with the findings of many previous studies conducted in Turkey,^[18] Jordan,^[6] Poland,^[20] Iran,^[7] and Belgium,^[21] which revealed that children from lower socioeconomic levels and those who had parents with lower education were more frequently infested.

In the present study, students who came from families that had previous infestations were at a greater risk of being re-infested. This finding is in line with previous studies^[14,17] which reported that if one member of the family is infested with head lice, other family members have a high risk of infestation.

Although a previous study in another Jordanian location revealed a significant relation between more frequent hair washing and lower rate of infestation,^[6] the current study did not detect any statistically significant linkage between head lice infestation and frequency of bathing.

In the current study, the infestation rate was significant among students who shared home articles such as combs, scarves, and pillows with other family members. This is in agreement with some different studies,^[6,9,22] which all found that sharing articles with family members increased the opportunity of physical contact, and thus leads to increasing the manifestation rate.

Implications for public health

The result of this review will help the public health-care professionals and policymakers to reduce the prevalence of children's health risk behaviors and promote their health and well-being. The study findings provide the public health nurses with the needed information and skills required to perform school-based health assessments, screenings, and implement primary prevention strategies to promote students' health and prevent such infestation for the school setting.

CONCLUSION

Pediculosis is a public health issue among primary schools in Al-Karak Governorate. Almost one-fifth of the students were infested with head lice. Female gender, low socioeconomic status, a history of contact, inadequate hygiene practices, and sharing articles were the major risk factors. There is a need for school nurses to implement health education and promotion programs for the community as well as promoting routine programs about sanitation, hygiene, and head lice screening for school settings. Furthermore, dispelling myths and stigmas regarding lice infestation among individuals, families, and community is another pivotal role of school health nurses.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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