

Head Louse Infestations in Gaza Governorates

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ABSTRACT In total, 2,408 primary school girls (6-14 yr old) in two districts within the Gaza Governorate were examined for the presence of head lice, *Pediculus humanus capitis* De Geer. The localities chosen for the study were the Old Gaza city and the rural village Jabalia. The rate of infestation with lice was 14.1%, and an additional 35% of girls had nits (eggs) only. The prevalence of louse infestation was high among the 6-12-yr-old girls. A sharp decline in infestation was observed after 12 yr of age. No lice were found on the 13 to 14-yr-old girls examined. Approximately 67.1% of infested girls had one to 10 lice and 49.8% had one to 10 nits on their hair. Significant difference in louse and nit only infestations was found between girls with short and long hair.

KEY WORDS *Pediculus humanus capitis*, epidemiology, prevalence, Gaza Governorates

Head louse *Pediculus humans capitis* De Geer, infestation is a common public health problem in many parts of the world, including Middle Eastern countries such as Egypt, Jordan, Israel, Turkey, and Lebanon. Lice are mainly transmitted by head to head contact. Kindergarten and school children (4-13-yr old) are the population at greatest risk (Kokturk et al. 2003). Itching is the primary symptom of pediculosis, which is caused by allergic reactions to louse saliva being injected during blood feeding (Flinders and Schweinitz 2004).

To our knowledge, no studies regarding louse infestations have been carried out in the Gaza Governorates. The aim of this study was to document the prevalence of head louse infestations in primary school girls in the city of Gaza and a neighboring rural village, Jabalia.

Materials and Methods

In total, 2,408 children aged 6-14 yr from four primary girls' schools in the Gaza Governorates were examined for head lice by five trained inspectors during the period December 2003 to April 2004; 1,308 girls from the three schools that were located in the city of old Gaza and 1,100 girls from one school in Jabalia, a rural village, were examined. The hair was inspected for head lice as well as for eggs (nits) by hand examination and by parting the hair every 1 to 2 cm. According to the length and structure of the hair, the scalp was examined for a period of 3-5 min. A child was considered infested if living lice were detected. Children with nits only were considered as having been infested during the previous 6 mo and were treated successfully. Total counts of lice and nits on each

student represent estimates only because time and resources did not allow for the physical removal of every louse and nit present on each girl. After each examination, a form was filled out with the child's name, age, and hair characteristics. Hair was classified according to the length (short, above collar; medium, to collar; or long, below collar).

The data were analyzed statistically using the chi-square test. Statistical significance was considered at a *P* value <0.05. The average percentage of the three urban schools was used for all calculations.

Results

Overall, 14.1% of the children were infested with lice and 35% with nits. The infestation rate with lice and nits in the urban area was 16.7 and 28.6%, whereas in the rural area it was 11 and 42.5%, respectively. Statistically significant differences in the infestation rate of girls with lice and nits was observed between the average rate of the three urban schools area and the rural school, whereas girls from urban schools had more lice, and girls from the rural school had more nits (Table 1).

The prevalence of louse infestation was high among the 6-12 yr olds. A sharp decline in infestation was observed after 12 yr of age. No lice were found on the 13 to 14-yr-old girls examined (Fig. 1).

Table 2 shows the approximate number of lice and nits found on the hair of an infested child. Accordingly, 67.1% of infested girls had one to 10 lice and 49.8% had one to 10 nits on their hair. Only 4.7% of the infested girls had >50 lice and 9% of the girls had >50 nits on their hair.

Girls with short hair had a higher infestation rates with lice (20%) than girls with medium (14.7%) or long hair (12.8%). Significant difference in louse in-

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Table 1. Prevalence of head louse infestation by school and locality

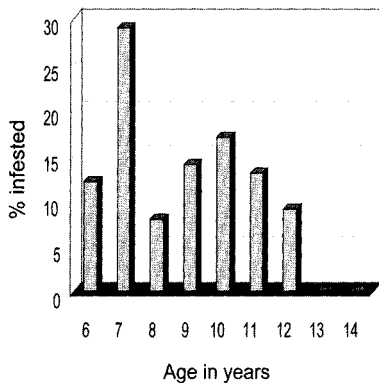
School and locality	No. children examined	No. children with lice	% with lice	No. children with nits	% with nits only
Urban 1	480	116	24.2	170	35.4
Urban 2	421	56	13.3	71	16.9
Urban 3	407	47	11.5	133	32.7
Subtotal	1,308	219	16.7	374	28.6
Rural 4	1,100	121	11.0	468	42.5
Total	2,408	340	14.1	842	35.0
χ^2 (rural versus urban)			16.25		51.14
P value			0.000		0.000

festation was found between girls with short and long hair ($\chi^2 = 8.8$, $P = 0.003$), whereas there were no significant differences between girls with short and medium hair ($\chi^2 = 3.68$, $P = 0.055$) and girls with medium and long hair ($\chi^2 = 1.4$, $P = 0.237$). There were significant differences in nit infestation between girls of short and long hair ($\chi^2 = 4.695$, $P = 0.03$) and girls with medium and long hair ($\chi^2 = 17.7$, $P = 0.000$), whereas there were not significant differences in nit infestation between girls with short and medium hair ($\chi^2 = 4.07$, $P = 0.524$) (Table 3).

Discussion

In this study, the rate of infestation with lice was 14.1%, whereas an additional 35% of the girls had nits only. Children who had nits only were considered as infested with lice in the previous months but they had since been treated successfully. It is possible, however, that some of these children had living eggs, meaning that the infestation rate of children with lice was even higher.

Similar results were obtained in Israel, where (12.1%) of the examined children had lice and an additional 22.8% had nits only (Mumcuoglu et al. 1995). Lower infestation rates were reported from Jordan (13.4%) (Amr and Nusier 2000), Egypt (5.5%)

**Figure 1. Prevalence of lice infestation in different age groups.****Table 2. Severity of infestation with lice and nits among 2,408 girls examined**

Estimated no. of lice and nits per infested child	Lice		Nits	
	n	%	n	%
1-10	228	67.1	419	49.8
11-20	63	18.5	219	26.0
21-50	33	9.7	128	15.2
>50	16	4.7	76	9.0
Total	340	100	842	100

(El-Basheir and Fouad 2002), Lebanon (8%) (Saab et al. 1996), and Turkey (6.8%) (Korturk et al. 2003). These differences could partially be explained by the fact that the surveys were conducted in different years and seasons and with different populations of children, e.g., different socioeconomic status, rural versus urban, and boys and girls versus girls alone. Also, the examination of the children with either a louse comb or visually with the help of fingers or a stick might be responsible for the differences in the different studies. To our knowledge, this is the first study on the epidemiology of head lice in Gaza Governorates.

There are apparently no major differences in infestation rate between urban and rural girls. The overall poor hygienic conditions prevailing in the Gaza Governorates and the high overcrowding in schools where the number of girls in each class may exceed 40 could explain the high infestation rates found in this study.

Children between 6 and 12 yr of age had high infestation rates, whereas a sharp decline was seen in older children. This finding is in accordance with observations made by Downs et al. (1990), Mumcuoglu et al. (1990), and Amr and Nusier (2000). In contrast, Korturk et al. (2003) found that children 12 yr and older had the highest prevalence of lice. It is possible that the frequency of personal grooming, the degree of physical contact with friends and family, and the changing of behavior patterns at different age groups might affect the infestation rate.

In this study, one to 10 lice were found in 67.1% and one to 10 nits in 49.8% of the children. These values are in accordance with the results of Mumcuoglu et al. (1990) and Koch et al. (2001) where in most cases, fewer than 20 lice were found on the head of an infested child.

In the current study, girls with the shortest hair had the highest head lice infestation rate, perhaps because detection of lice in short hair is easier than in long hair. Nits, which are signs of previous infestations, remain

Table 3. Head louse infestation according to length of hair

Length of hair	No. children examined	No. children with lice	% with lice	No. children with nits	% with nits
Short	252	50	20.0	83	32.9
Medium	715	105	14.7	220	30.7
Long	1,441	185	12.8	539	37.4
Total	2,408	340	14.1	842	35.0

in long hair, whereas nits in short hair are eliminated when hair is cut. This finding is in agreement with previous studies (Mumcuoglu et al. (1990), Borges and Mendes (2002).

This is the first prevalence study of pediculosis conducted in Gaza Governorates. The high prevalence of pediculosis is probably because of the large number of girls in each class and close contact between girls. Increasing awareness and education of teachers, nurses and parents; higher standards of personal hygiene; and giving each child a separate desk could significantly reduce the percentage of pediculosis in this area.

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