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Pediculus capitis, infestation according to sex and social factors in Gaza Governorate

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Abstract: Human head lice (*Pediculus capitis*) infest people worldwide and are most prevalent in children, the aim of this study was to determine the socioeconomic status of the family and hygienic practices in the home on prevalence of head lice infestation in children. The prevalence was investigated among 192 houses in Gaza city with 608 children. The hair was examined for head louse infestation. A total of 197 children were infested with head lice. Males had lower infestation than females. Children aged 4-9 years were the most frequently affected, there was a significant relationship between head louse infestation, family size, number of rooms in the homes, family income, frequency of shampooing and combing the hair and frequency of examination the hair for lice. It was found that 26.7% of infested children had other family members who had been infested with head lice and 52.6%of the families used insecticides, 28% used louse comb for treatment of children. There was no correlation between mothers' Education and infestation of head lice that mean head louse infestation depends on hygienic practices in the home rather than socioeconomic status of the family.

Key words: *Pediculus humanus capitis, epidemiology*, prevalence, Gaza Governorate.

ملخـص: أجريـت هذه الدراسة بغرض تحديد معدل انتشار الإصابة بقمل الرأس عند الأطفال ، وتحديد العوامل الاجتماعية والبيئية في الأسرة التي تساعد على انتشاره. شملت الدراسة 192 بيت فـي محافظة غزة، وبلغ مجموع الأطفال في هذه الأسر 608 طفل، حيث تم فحص شعر الأطفال للكشف عن الإصابة بعدوى القمل، وتبين أن عدد المصابين من الأطفال 197 طفلاً أكثرهم إصابة سـن 4-9 سـنوات. وأيضـا كانت إصابة الإناث أكثر من الذكور وقد وجد أن هناك علاقة بين الإصابة بالقمل وبعض العوامل مثل حجم الأسرة، عدد الغرف في البيت، دخل الأسرة، عدد مرات اسـتخدام الشـامبو واسـتخدام مشط القمل وعدد مرات فحص الشعر. وتبين أن نسبة 26.7% من الأطفـال المصابين لديهم أفراد آخرين مصابين بالقمل من العائلة، وأن 52.6% من الأسر يستخدم مبـيد القمل، و28% تستخدم مشط القمل في المعالجة. ودلت الدراسة على أنه لا يوجد علاقة بين تعليم الأم والإصابة بالقمل، مما يدل على أن الإصابة بالقمل تعتمد على الظروف الصحية أكثر منها علي الحالة الاجتماعية للأسرة.

Introduction :

Pediculus humans capitis, head louse, (Anoplura: Pediculidae) is a blood sucking, wingless insect with a hard exoskeleton. It is usually 2 to 3 mm long. The female louse lays approximately 140 eggs during her life time

of about 30 days. The eggs are coated with a fixative that cements them to the hair shaft. Newly-laid viable eggs have a coffee color. The adult louse takes 9-12 days to complete it is life cycle (1).

Head lice affect millions of children world wide especially between 5 and 14 years of age (2,3,4). The infestation spreads between adults and children. It is considered as a public health problem affecting individuals regardless of their social class (3).

Transmission of head lice from person to person could be either direct during children's play or indirect through contact with lice carrying objects as brushes, combs, clothing and towels (1,5).Many factors also help to increase the prevalence of head lice such as poor hygiene and socio-economic status, lack of medical treatment and resistance to the treatment in the parasite (6,7).

In Gaza a study by Al-shawa, (8) has shown that girls 6-12 year old were infested with lice.The aim of this study was to examine the relationship between prevalence of head lice infestation and the socio-economic factors (family size, father' job, education of parents and number of rooms) of the Gaza population, and hygienic practices (shampooing, examination for lice, combing and sharing articles) in the home.

Materials and Methods

The survey was performed in Gaza Governorate, from June to October 2006, and included 192 houses with 608 children below age 16.Data was collected by house to house survey and a field team from four trained inspectors visited each household and examined the hairs of children for head lice as well as for eggs/nits by hand examination and by parting the hair every 1–2 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, eggs either live or dead or nits were detected. Regardless of morphologic features or localization, it was considered as pedicuolsis infestation**.**

The guardian (i.e. mother or women in this study) was interviewed face to face and a questionnaire included questions relating to the following: socio-economic status, such as age, level of education of the women and spouse, family income and family size and number of rooms. Public health questions focusing on head lice and manifestation of pediculosis as frequency of using shampoo, grooming habits of children and sharing of combs, brushes and clothing among family members, and infestation among family members were completed during the interview.

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Statistical analysis :

Data were analyzed by computer using Statistical Package for Social Science (SPSS).Statistical analyses were performed by chi-square test with a significant cut-off value of 0.05.

Results :

A total of 192 household were investigated, the number of children in the families is 608. Number of children who were infested with head lice was 197 (32.4 %). Table 1 showed that the prevalence of head lice in females is significantly higher than in males, 42.2 % versus (18.3 %) at P< 0.001. Age group is significantly related to the prevalence of head lice, where children aged 4-9 years have a higher prevalence of head lice than children less than 3 years old.As regards to socio-economic factors, infestation with head lice in children was decreased when the level of education increased with significant difference, in father's education (P<0.001) and no significant difference in mother's education P>0.05. Higher infestation (38.4%) of lice in children was in families who their income was 250 USD monthly (P<0.001). Family size and house size were also associated with head lice infestation. Children in large family (8 and above) have a higher prevalence (34.3%) of head lice infestation with P<0.05 and children living in big houses have a lower prevalence of head lice infestation (9.2%) with P value <0.001.

Table 1. Sex, educational level. socio-economic status and the prevalence of head lice.

Variable	No examined	No. positive	% positive	p-value
Sex				
Male	251	46	18.3	< 0.001
Female	357	151	42.2	
Total	608	197	32.4	
Age(years)				
< 3	124	21	16.9	
4-6	171	67	39.2	< 0.001
7-9	140	53	37.8	
10-12	112	39	34.8	
13-15	51	17	33.3	
Family size				
< 4	53	9	17	< 0.05
5-7	193	64	33.2	
8+	362	124	34.3	
Family income ($)				
< 250	185	71	38.4	
250-400	180	63	35	< 0.001
400-500	94	29	30.9	
500+	149	34	22.8	
Father's Education				
Elementary & less	180	59	32.8	< 0.001
Secondary	225	93	41.3	
University	171	43	25.1	
Higher education	32	2	6.3	
Mother's Education				
Elementary & less	197	72	36.5	
Secondary	274	93	33.9	
University	135	32	23.7	P>0.05
Higher University	2	0	0	
No. of rooms				
1-2	78	37	19	
3-4	475	140	71.8	<0.001
5+	36	18	9.2	

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In terms of hygiene practices, Table 2 indicated that the prevalence of head lice infestation was associated with the frequency of using shampoo and frequency of hair examination ($p<0.05$). As the frequency of shampooing increase as using shampoo more than 6 times in a month, the number of infested children decreases (6.2%). Also low prevalence of lice infestation (17.8 %) was in children whom their hairs were examined every week and a high prevalence (37%) in infested children who do not use louse comb. A strong correlation ($P<0.01$) was found between lice infestation and sharing articles as combs and brushes between children in the same family. The prevalence of infestation was high (35%) in such children, and this may explain to us why high prevalence of other family members (26.7%) were infested with lice.It was found that 52.6% of the families used pediculicides, 11.5% were used Kerosene and 28.1% used louse comb for treatment their children**.**

Table 2. Association of different variables with lice infestation

Variable	No. examined	No. positive	% positive	p-value
Shampooing in a month				
1-2 times	278	105	54.4	
3-5 times	277	76	39.4	< 0.05
6+ times	28	12	6.2	
Examination for lice				
Once a week	134	35	17.8	
Once in 2 weeks	292	109	55.3	
Once a month	182	53	26.9	< 0.05
Combing				
Using louse comb	170	36	21	< 0.01
Not using louse comb	432	158	37	
Sharing articles	519	184	35	
Not sharing	89	13	15	< 0.01

Discussion :

High level of infestation wsith head lice were found in children from different countries. Values range from 5-8% to more than 50% due to the overcrowding and poor hygienic condition. (9).The prevalence of head lice in children found in this study is 32.4% which is comparable with those reported in other studies in children. In Egypt, in a study was done by (10),

the prevalence of head lice in school children was (21.67%) and in Jordan (11) (13.4%) while in Saudia Arabia is 12% (12).

Children aged 4-9 years were the most frequently affected with head lice infestation which could be explained by children in this age contact with each other, and make social relationship, (5, 8, 13, 14), while children below age 3 years have low prevalence due to their short and fine hair and were easy to examine and this agreed with that previously reported (5) .

The distribution of sex shows female predominance of head lice infestation than males in most previous studies (13, 15, 16). This may be due to close head contact between girls and also hair length plays a role in the differences of infestation between two sexes. Lower prevalence in boys due to short haircut of hair make it difficult to detect previous infestation. Also changing behavior and susceptibility to head lice infestation included the frequency of personal grooming, the degree and frequency of close physical contact with friends and family shared clothing and changing in hair style.

As related to parents' education, there is a decreased in infested children as the number of years schooling increased with significant difference in father's education. This may be explained as father is the dominant of the family structure and he is aware of any problems that may affect the family members. As regards to mother education, no significant difference was found in prevalence and education in mothers. It is possible that educated mothers have less time to regularly examine and treat their children for lice and this is in accordance with (17,18).

It also seems that infestation rate rises with large family 8 and above (34.3%). This is possibly because children in large families have a higher risk of being infested by their sibling and also large families may pay less attention to hair care (19, 20). Regarding family's socio-economic status on the presence of head lice, Pediculosis has linked to social classes with lower economic and cultural resources. Families with lower socio-economic status (250$) at month were highly infested (38.4%) and this due to lack of support and financial limitation and this is in agreement with other studies (21,11,22).

Clean scalp provides lice with good supply of blood from which they feed (6). In spite of this, frequent shampooing, brushing of the hair and examination the hair for lice were found to be important factors in the prevention of lice infestation.

A strong correlation was found between infested children and shampooing the hair besides using louse comb in examination the hair ($P<0.001$). The number of infested children who do not use louse comb was

high and combing the child's head with a louse comb every weak is one of the best method to decrease and prevent infestation as the small number of lice which first infest the child's hair are easily removed (23) .

It was found that 52.6% of the families used pediculicides for treatment their children and 28.1% of mothers treat their children by a louse comb as it can used instead of a pediculicides for treatment especially in children with short or medium length, straight or wavy hair. However, a low percent (11.5%) of families were used kerosene in treating their children from head lice which reflects the knowledge of some parents about the harm of using Kerosene as it is toxic and highly inflammable.

The infestation rate in children shared in using articles was high (35%) and head lice may be transmitted by sharing infested items. Such articles commonly implicated in the spread of head lice include hair-care items and accessories as combs, hair brushes, head ribbons, etc.; clothing items, including hats, caps, scarves, sweaters, etc.; and sleep items such as pillows, bed linen and this agreement with (24). This sharing resulted in infestation of another member in the family as 26.7% of infested children had another family members infested.

In our study mothers had the more infestation rate due to close contact between children and their mothers while the percentage of parents who had been infested with lice was very low as in 91.7% of the families, mother was responsible for examining the children for lice.

This is the first community prevalence study of pediculosis conducted in Gaza. A previous study in Gaza demonstrated marked variation in prevalence in schoolchildren in urban and rural regions by (8).The prevalence of head lice was very high in Gaza which was associated with several factors. A lower prevalence can be achieved by increasing awareness of hygienic concepts, health promotion, particularly about the importance of early detection and effective management strategies, and increasing awareness about the educational programs directed towards parents, medical staff by performing epidemiologic assessments. Therapeutic strategies should be conducted.

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