

## Egyptian Dermatology Online Journal

Volume 2 Number 1

### **Epidemiological studies on pediculosis capitis in Sohag governorate**

**Essam El-din A. Nada\*, Nada A. El-Nadi\*\* and Soha H. Abu-El Dahab\***

**Egyptian Dermatology Online Journal 2 (1):9, June, 2006**

Dermatology & Venereology\* and Parasitology\*\* Departments,  
Sohag Faculty of Medicine , South Valley University

**Accepted for publication in: February, 2006.**

---

#### **Abstract**

This is an observational descriptive study conducted upon three primary school pupils in Sohag Governorate. The idea was to estimate the incidence and the epidemiological factors related to Pediculosis capitis infestation amongst the selected population. It has been found that the infestation affected about 16 % of the whole group. Rural pupils were more frequently, albeit insignificantly, infested (17.44 versus 14.88 %,  $p > 0.05$ ). Pupils older than 10 years had a significantly higher risk to be infested when compared to younger ones (R.R.: 1.57, range from 1.52 to 2.0, O.R.: 1.72, P: 0.0004). Girls were more than two times affected than boys. Low socioeconomic classes were significantly more affected ( $p : 0.002$ ). Pupils belonging to bigger families (5 + members) had 2.5 times the risk to be infested compared to those coming from smaller ones. Frequent hair washing was associated with a lower infestation rate, while co-sleeping increased the chance of infestation. Pupils with dark colored and medium length hair had a higher risk of infestation besides a higher chance of this infestation to be of grade 2 . Severity of infestation was also studied against several variables. Associated clinical manifestations included fever (25.3%), scalp pruritus (58.9%), alopecia (22%), impetigo (38%), enlarged tender cervical lymph nodes (66.7%) and conjunctivitis (8%).

---

## Introduction

Human Lice (*Pediculus* sp.) is a public health problem not only in Egypt, but world wide. School children are the most important group of population at risk.[1]

Examination of Primary school pupils in Beni Suef Governorate revealed infestation rate of 48.2% [2] and in Cairo 21.86% out of 905 pupils.[3] In Turkey, examination of 4365 elementary school students, infestation rate was 4.14%. [4] Many researchers studied the epidemiological aspects of pediculosis in their localities, [2,3,5] but as far as we know, this is the first study in Sohag Governorate.

## Subjects and Methods

Pupils of three primary schools in Sohag Governorate were examined for Head lice and associated infections during the educational year 2003-2004. One was in a rural area (**Awlad Azaz**) and two in urban areas: **El-Galaa and El-Ahd El-Gadid**. For each pupil a questionnaire was filled, containing data about his/her name, age, gender, family size, co-sleeping, frequency of hair washing and socioeconomic status.[6] All pupils were examined generally, and locally for head lice or nits according to the standard method of Morsy et al (1991)[7] and for any associated dermatological disease. Hair length and colour were also recorded. Grading of the severity of infestation was done as in: Glaziou et al (1994)[8]. Collected samples were prepared and mounted,[9] then examined for identification according to Kim and Ludwing (1978).[10]

The results were tabulated and statistically analyzed. Statistical analysis of the data was done using the statistical calculation package Epi-Info 6, applying the 4 cell table to compare differences between rates.

## Results

The whole number of the examined pupils in the selected schools totaled 1402 pupils distributed between the three schools. Two hundred and twenty four pupils proved to be infested with *Pediculus humanus capitis*, a rate of 15.98 %, distributed between the three schools.

### 1- Sociodemographic characters of the studied pupils:

As shown in [table \(1\)](#), rural pupils were slightly, albeit insignificantly, more susceptible to infestations compared to their urban peers (R.R.:1.17). Age had also a prominent effect upon the incidence of infestation so that pupils above the age of 10 years had about twice the chance of being infested compared to younger ones (R.R. :1.57, range 1.52-2.0, O.R.: 1.72, p: 0.0004). Pupils younger than 8 years had slightly more tendency to be infested than those between 8 and 10 years.

Social class affected the frequency of infection in a way that pupils from the low and middle class were more frequently infested compared to those

from high socio-economic class (R.R.: 1.48, range 0.98-2.34). In addition middle class pupils were significantly less affected than those belonging to low socio-economic classes ( $p < 0.002$ ).

The family size affected and by large the incidence of infestation, so that, a pupil belonging to a large sized family (>5 persons) had more than two and half times risk to get infested when compared to one belonging to a smaller family (5 or < persons) (R.R.: 2.65, range: 1.87-3.5 at C.L.:95%). Co-sleeping, a habit with a close relation to the family size was also found to be of great influence on the infestation ratios, that co-sleepers are liable of infestation more than three and half times than single sleepers (R.R.: 3.58, range: 2.49-5.15). There was a negative correlation between the frequency of hair washing and head lice infestation so that pupils who used to wash their hair once weekly had more than double the risk to be infested when compared to those who used to wash their hair three times weekly (R.R.:2.39, range: 1.69-3.37,  $p < 0.000004$ ).

A statistically significant difference existed between the infestation rates of males and females, the risk of girls getting infested was nearly two folds compared to boys (R.R.: 2.01, range: 1.56-2.59).

## **2- The effects of hair length and colour upon the infestation with pediculosis capitis:**

Table (2) shows the effect of hair length and colour upon the rate of infestation. It was found that black hair pupils were more susceptible for head lice infestation than the brown hair pupils (R.R.: 1.38, range: 1.06-1.78,  $p < 0.01$ ) and the risk gets more when compared to yellow colour hair (R.R.: 1.8, range: 1.19-2.72,  $p < 0.004$ ) This means that the lighter the hair colour the less affinity to get infested with head lice.

Medium length hair (5-15 cm) pupils were found to be more susceptible to be infested nearly two and half times as much as those of short hair (<5cm) (R.R.: 2.4, range:1.67-3.45,  $p < 0.000005$ ). They were also found to be more susceptible for head lice infestation for more than one and half times when compared to those having long hair (R.R.:1.59, range: 1.21-2.10) also with a statistically high significant difference ( $p: 0.0007$ ).

## **3- Factors affecting the severity of infestation:**

Table (3) shows the different variables affecting the severity of infestation. More than 2/3[rds] of the *Pediculus humanus capitis* infested pupils were suffering from grade 2 infestation. Girls were suffering from the infestation more than boys at both levels. Moreover, girls seemed to reach grade 2 infestation over two times more than boys (R.R.: 2.09 range: 1.64-2.66,  $p < 0.0005$ ). On the other hand, boys' infestation tends to be mild much more frequently than being grade 2 (R.R.: 2.0, range: 1.07-3.73,  $p: 0.02$ ).

Large sized families' pupils suffer grade 2 infestation more than two and half times than pupils from small families (R.R.: 2.72, range:1.76-4.21,  $P: 0.005$ ).

Hair colour effectively contributed to both the incidence and severity of infestation, so that pupils with black hair had one and half times risk of infestation than those with lighter hair (R.R.: 1.77, range: 1-3.12,  $p < 0.04$ ). Moreover, they have more than one and half times the risk of having

grade 2 infestation (R.R.: 1.75, range: 1.12-2.73) with a statistically high significant difference (p:0.0005).

The length of the pupils' hair played also a role, so that the risk of the medium hair pupil to reach grade 2 infestation was nearly one and half times more than those having short hair (R.R.:1.35, range: 1.03-1.79 , p:0.005). Also, in pupils having medium hair length, grade 2 infestation levels were statistically significantly higher than long hair pupils (p: 0.001) and the risk of reaching grade 2 infestation was nearly one and half times more than to early control of infestation (R.R.: 1.31, range: 1.08-1.6).

#### **4- Other associated clinical manifesta-tions:**

*Table (4)* shows other clinical manifestations possibly associated with pediculosis capitis infestations. Although fever was associated in 25.3%, enlarged tender cervical lymph nodes in 66.7% and conjunctivitis in 8% of cases, yet they are considered non specific characters. While related clinical manifestations as pruritus of the scalp was represented with a risk ratio of 1.44 ( range between: 1.16-1.78) and the difference was statistically significant (p: 0.001). Alopecia was represented with a very highly statistically significant difference (p:0.00006). Impetigo on the other hand had also a statistically significant difference (p:0.003).

### **Discussion and Conclusions**

This study is, as far as we know, the first one that addressed this important public health problem in our locality. The rate of infestation of about 16% found in the present study compares favorably to rates reported amongst a similar population in Cairo (about 22%)[3] and those reported in Czech (20%).[11] Higher rates of infestation were reported in Minofiya (32.2%)[12] as well as in Beni Suef (48.2%).[2] Much lower rate of 4.14% was reported in a study including 4365 elementary school students.[4] The current study indicated that pupils from rural areas had a higher incidence of infestation. This agrees with other studies conducted in Sharkia[5] and in Beni Suef.[2] This can be explained by the cultural and hygienic differences between rural and urban inhabitants.

The influence of age on infestation rate was very prominent in our study, so that pupils at the age of 10 years and older had a significantly higher rates compared to younger ones (p:0.0004). Morsy et al (2001)[3] reported the opposite amongst primary school pupils in Cairo, where they found that younger pupils (6-8 years) had much higher rates than older ones. On the other hand, other investigators[2,12] could not find any significant influence of age upon the incidence of infestation. The sex differences may be explained, at least partially, by differences in family sizes and mother's work outdoors and attitudes toward caring with children in different communities.

The current study indicated that girls were more liable to infestation than boys, the same effect of gender was reported by many other researchers.[2,3,12]

The impact of socioeconomic status and family size upon the infestation

rate detected in our study agreed with other studies ,so that big family size ( five members or more) and low socioeconomic status significantly increased the rate of infestation.[2,5,12]

There was a negative correlation between the frequency of hair washing and head lice infestation, which also agreed with other studies,[2,5] with a significant ratio ( $p < 0.001$ ).

Medium length hair pupils were found to be susceptible to infestation more than both those with short hair and long hair. The difference was found to be very highly significant ( $p < 0.0000005$  and  $< 0.0007$  for the two groups respectively). These results did not agree with the results of El-Bashir and Fouad (2002)[5], who found that the incidence of pediculosis was higher in individuals with long hair than those with medium or short hair. Another risk of the medium hair length pupils, was that they were susceptible to reach grade 2 infestation nearly one and half times more than those having short hair or nearly than those having long hair also. The difference was found to be highly significant ( $p < 0.005$  and  $< 0.001$  for the two groups respectively).

To explain these results, we can assume that those acquiring short hair are mostly boys (had a lesser incidence of infestation), while girls of long hair seem to have better care for their hair than medium hair length girls. More than 2/3[rds] of the *Pediculus humanus capitis* infested pupils were suffering from grade 2 infestation. Girls were suffering from the infestation more than boys at both levels of infestation. Moreover, girls seemed to reach grade 2 infestation over two times more than boys, which represented a statistically significant difference ( $p < 0.0005$ ). On the other hand, boys' infestation tends to be significantly milder than girls ( $p: 0.02$ ).

As for the pupils of black hair, black hair had more risk of infestation than those with lighter hair added to the risk of having grade 2 infestation with a statistically high significant difference ( $p: 0.0005$ ).

So that the lighter the hair colour the less affinity to get infested with head lice, possibly because easy detection of the lice and hence early control is much easier in those having light hair colours.

Related associated clinical manifestations as scalp pruritus was represented with a statistically significant difference ( $p: 0.001$ ), alopecia was represented with a very highly statistically significant difference ( $p: 0.00006$ ) and impetigo on the other hand had also a statistically significant difference ( $p: 0.003$ ). Morsy et al (2001)[3] mentioned some of those associated clinical manifestations as, scalp pruritus in 14%, alopecia in 1.4%, enlarged lymph nodes in 28.1% and fever in 10.1%.

## References

1. Morsy TA, Sarwat MAA, Fawzi AFA, et al. Some clinical features of pediculosis among school children. J Egypt Soc Parasitol.1994;25(2):509-512.
2. El-Rifaie AA , Meabed MH and Mostafa OA. Epidemiology of scabies and Pediculosis capitis among primary school children in Beni Suef

Governorate. Egypt J Med Sci. 2000; 21(1):187-195.

3 Morsy TA, Abou El-Ela RGH, Abd El Mawla MYM, et al. The prevalence of lice infesting students of Primary, Preparatory and secondary schools in Cairo, Egypt. J Egypt Soc Parasitol. 2001;31(1):43-50.

4 Lhan F, Budak S and Guruz AY. The prevalence of *Pediculus humanus capitis* among the students of a secondary and three elementary schools in Karsiyaka-Izmir, Turkey. J Egypt Soc Parasitol. 1997;27(1): 157-161.

5. El-Bashir ZM and Fouad MAH. A preliminary pilot survey on head lice, Pediculosis in Sharkia Governorate and treatment of lice with natural plant extracts. J Egypt Soc Parasitol. 2002;32 (3): 725-736.

6. Fahmy S and El Sherbini A. Determining simple parameters for social classification for health research. Bull High Instit Publ Hlth. 1983;XIII (5):95-107.

7. Morsy TA, Farrag AMK, Sabry, AA, et al. Ecto and endoparasites in 2 primary schools in Qalyob. J Egypt Soc Parasitol. 1991;21(2): 391-401.

8. Glaziou P, Nyguyen LN, Moulla-Pelat JPl, et al. Efficacy of ivermectin for the treatment of head lice (*peiculosis capitis*). Trop Med Parasitol. 1994; 45: 253-254.

9. Ash LR and Orthel TC (eds.). Parasites: A guide to laboratory Procedures and identification, ASCP Press, Chicago, 1991;160-161.

10. Kim KC and Ludwing HW. The Family classification of Anoplura. Syst Entomol. 1978;3:249-284.

11. Rupes V, Moravec J, Chmela J, et al. A resistance of head lice (*Pediculus capitis*) to permethrin in Czech Republic. Cent Eur J Pub Hlth. 1995; 3(1):30-32.

12. El-Shafie O and El-Shazly H. Head lice among primary school children in Minofiya and the effect of different protocols of treatment. Egypt J Med Sci. 2000; 21(2): 331-340.