

## The importance of socio-economic status and sex on the prevalence of human pediculosis in government schools children in Lahore, Pakistan

Sadia Chaudhry<sup>1</sup>, Azhar Maqbool<sup>2</sup>, Muhammad Ijaz<sup>3</sup>,  
Nisar Ahmad<sup>4</sup>, Muhammad Latif<sup>5</sup>, Khalid Mehmood<sup>6</sup>

### ABSTRACT

**Objective:** The present project was designed to study the effect of age, sex and socio-economic status on the prevalence of Pediculosis (*Pediculus capitis*).

**Methodology:** A survey was conducted among 1-5 class children of five public sector schools located in Lahore, where most of the students belonged to middle and low income classes. After obtaining ethical clearance from the parents, school principals and students, 500 children of age  $\geq 7$  years were examined both macroscopically and microscopically on first come first basis up to 100 children from each school.

**Results:** Of 500 children (n=122 boys; n=378 girls), overall 387 (77.40%) while in girls 323 (85.45%) and in boys 64 (52.46%) were positive for Pediculosis. A higher prevalence was recorded in children of  $\leq 11$  years as compared to above 11 years. The Pediculosis rates in Low, Middle and High socio-economic groups were 61.40%, 50.00% and 29.41% in boys whereas 95.48%, 81.90% and 60.31% in girls, respectively.

**Conclusion:** It is concluded that age, sex and socio-economic status of society are important factors for the distribution of Pediculosis in developing countries like Pakistan.

**KEY WORDS:** Prevalence, Children, Schools, Pediculosis, Socio-economic Status.

**Source of funding:** University of Veterinary and Animal Sciences Lahore, Punjab, Pakistan.

Pak J Med Sci October - December 2012 Vol. 28 No. 5 952-955

### How to cite this article:

Chaudhry S, Maqbool A, Ijaz M, Ahmad N, Latif M, Mehmood K. The importance of socio-economic status and sex on the prevalence of human pediculosis in government schools children in Lahore, Pakistan. Pak J Med Sci 2012;28(5):952-955

1. Sadia Chaudhry, M.Phil (Parasitology),
2. Azhar Maqbool, PhD,  
Professor of Parasitology,
3. Muhammad Ijaz, PhD,  
Assistant Professor of Clinical Medicine,
4. Nisar Ahmad, PhD,  
Assistant Professor of Parasitology,
5. Dr. Muhammad Latif, PhD,  
Associate Professor of Parasitology,
6. Khalid Mehmood, M. Phil (Clinical Medicine)
- 1,2,4,5: Department of Parasitology,
- 3, 6: Department of Clinical Medicine and Surgery,
- 1-6: University of Veterinary and Animal Sciences Lahore,  
Lahore, 54000, Punjab, Pakistan.

Correspondence:

Muhammad Ijaz,  
E-mail: mijaz@uvas.edu.pk

- \* Received for Publication: February 13, 2012
- \* Revision Received: June 1, 2012
- \* Revision Accepted: June 5, 2012

### INTRODUCTION

Infestations with parasites that live in or on the skin, namely ectoparasitoses are usually considered to be benign disorders, these disorders do not attract much clinical interest, but can cause momentous morbidity. Depending on the socioeconomic status, a large proportion of a population may be affected by these infestations. Ectoparasitic infestations can be sporadic, endemic or epidemic.<sup>1</sup>

Pediculosis is an ectoparasitic infestation caused by *Pediculus capitis* (head lice), which is inhabitant of the scalp and hair of humans and causes severe itching to the host.<sup>2</sup> Head lice infestation is a growing and persistent problem.<sup>3</sup> It is a common chronic disease which affects the children of school age with varying degree of prevalence in developed

countries, 8.9% in Ghent, Belgium and 0-28% in Victoria, whereas in developing countries 81.5% in Argentina, 58.9% in Alexandria, Egypt.<sup>4</sup> After every few hours the head lice taking tiny amounts of blood from the scalp of the host by injecting small amounts of saliva into the host. Heavy infestations and frequent feeding of the lice may lead to iron deficiency and subsequent anemia.<sup>5</sup>

During playing, close contact between children and sharing of personal things such as head caps, combs and clothing greatly raise the transmission of adult head lice from one person to another and thereby increasing the occurrence of pediculosis<sup>6</sup>, its presence in children may pose several health risks and social stigma.<sup>7,8</sup> With no serious or noticeable symptoms, head lice infestation is commonly overlooked as a public health problem among school children in very poor communities.<sup>7</sup>

Keeping in view the importance of this ectoparasitic infestation (*Pediculus capitis*), present study was designed with following objectives. To study prevalence of head lice infestation in children of different schools and to compare between ages specific prevalence and socio-economic specific prevalence of head lice infestation in school children.

## METHODOLOGY

A survey was conducted among 1-5 class children of five public sector schools located in Lahore. Of 500 children (n=100 from each school), age  $\geq 7$  years were included in the study. The background of the population served by the public schools was that each school had almost up to 500-700 children and these children belong to different communities (High, Middle and Low income classes), but the most of the children belonged to middle and low income classes. Before sampling the children and their parents were briefly told about the objectives of the study and then asked whether they want to participate in the study or not. The agreed parents were provided with consent letter. Then after obtaining ethical clearance from the parents,

school principals and children also, samples were collected randomly from the agreed children of 1-5 class and age  $\geq 7$  years on first come first basis up to 100 children from each school. For *Pediculus capitis*, the hair and scalp of children's head examined visually for 3-5 minutes through hand picking and combing. Regardless of morphologic features and localization, children were declared positive for pediculosis on the basis of un-hatched viable or dead eggs or nits, nymphs and adults by the wet combing method as previously described by Vander.<sup>9</sup> The suspected children with symptoms of itching, irritation, rash, sores and skin discoloration were divided into three groups according to their family income (High, Middle and Low) and age basis (7-9 year, 9-11 year and  $>11$  year).

A questionnaire including name, sex, age, monthly income, family size, pet ownership, parent's education, number of siblings, frequency of hair washing and presence or absence of social security of the family was designed and filled by getting information from their parents. *Pediculus capitis* was collected with the help of hair comb and preserved in 75% alcohol till further processing. Preservative from the head lice was removed by washing with distilled water. The dead washed lice were made transparent by dipping in 10% KOH and then washed with distilled water. For dehydration, the specimens were kept in a series of alcohol such as 30%, 50%, 70%, 90% and 100% for 5-10 minutes. After this, specimens were cleared by treating with xylene and mounted in Canada balsam.<sup>10</sup>

At the end, the mounted specimens were examined under the microscope and identified according to the key as described by Soulsby.<sup>11</sup> Data on prevalence of pediculosis was analyzed by Pearson's chi-square test using statistical package for social sciences (SPSS-16).

## RESULTS

Data regarding the overall prevalence, age specific prevalence and comparison of socio-economic

Table-I: Overall prevalence of pediculosis in children of different schools at Lahore.

Schools	No. of Students examined (n=500)		Positive for Lice (%)	
	Boys	Girls	Boys	Girls
Govt. Islamia high school khazana gate	30	70	17 (56.67%)	63 (90.00%)
City district Govt. girls high school multan road	25	75	12 (48.00%)	66 (88.00%)
Govt. Fatima Feroz girls school Sanat nagar	17	83	09 (52.94%)	70 (84.33%)
Govt. school gulshan ravi	15	85	06 (40.00%)	69 (81.17%)
Govt. happy high school	35	65	20 (57.14%)	55 (84.61%)
Total	122	378	64 (52.45%)	323 (85.45%)

P-Value= 0.73 indicate that there is insignificant difference that the girls are mostly infected with pediculosis as compared to boys, so there is no association among children and school.

Table-II: Prevalence of pediculosis in school children of different age groups.

Age Groups	Prevalence in Boys			Prevalence in Girls		
	Boys	Positive for Lice	Prevalence (%)	Girls	Positive for Lice	Prevalence (%)
7-9 Years	65	40	61.53%	163	155	95.09%
9-11 Years	35	17	48.57%	125	104	83.20%
>11 Years	22	07	31.81%	190	64	33.68%
Total	122	64	52.45%	378	323	85.45%

P-Value= 0.56 indicate that there is insignificant difference among children and pediculosis, proved that there is no association among them, children are independent of age groups.

specific prevalence of head lice infestation in various public schools of Lahore district is shown in Table I, II and III. The results of the present study revealed out of 500 children 387 were positive for pediculosis and overall 77.4% prevalence of pediculosis was recorded in school children. The results showed that 64 boys (52.45%) out of 122 and 323 girls (85.45%) out of 378 were positive for pediculosis. Overall prevalence of pediculosis was more in girls (85.45%) as compared to boys (52.45%). Age wise prevalence of pediculosis in 7-9 years, 9-11 years and >11 years were 61.53%, 48.57% and 31.81% in boys while in girls 95.09%, 83.20% and 33.68%, respectively. The prevalence was higher in children of  $\leq 11$  years as compared to >11 years. The pediculosis rates in Low, Middle and High socio-economic groups were also studied which were 61.40%, 50.00% and 29.41% in boys whereas 95.48%, 81.90% and 60.31% in girls, respectively. Pediculosis rate was more in Low socio-economic groups as compared to Middle and High socio-economic groups. It is concluded from the results of the present study that there is a significant difference ( $p < 0.05$ ) in the socio-economic specific prevalence of pediculosis in girls as compared to boys.

## DISCUSSION

Overall prevalence of pediculosis in this study is in line to the findings of Saddozai and Kakarsulemankhel<sup>12</sup> who reported 87% prevalence in school children of Quetta, Pakistan. Pediculosis has world-wide distribution with variable increasing rate up to 80%, since in the middle of 1960s.<sup>13</sup> These results

also correlate with the findings of Bugayong<sup>4</sup> who reported 85% prevalence of pediculosis among the school children in Hoilo. Overall prevalence varied from 3.6% to 61.4% in Cuba, Argentina and United States.<sup>14</sup>

The results of this study are also congruent to the findings of others<sup>15,16</sup> who reported the prevalence of pediculosis 58.2% and 61.4% in tehsil Kot Addu of Pakistan and Argentina, respectively. In present study prevalence was more in girls as compared to boys, similarly higher prevalence of pediculosis was recorded in girls as compared to boys by,<sup>14,17-19</sup> in different parts of the world. In another study Saddozai and Kakarsulemankhel<sup>12</sup> studied that pediculosis in girls was 93% as compared to boys 56%, which is in close agreement with the results of present study (85.45% in girls and 52.45% in boys).

There are different factors for sex oriented more prevalence in girls than boys, Bugayong et al<sup>4</sup> said that long hairs and borrowing of hair accessories were the main factors for higher prevalence of pediculosis in girls as compared to boys. Sex oriented behavioral differences such as close contact in small groups in particular pairs among girls and the trend of girls to bear long hair are the reasons cited for sex differences prevalence of pediculosis.<sup>20</sup>

In Pakistan girls mostly bear long hairs as compared to boys due to the some social reasons. Lower prevalence in boys as compared to girls may be due to short hairs and less interaction among boys whereas Shawa<sup>21</sup> also concluded that lower prevalence of pediculosis in boys was due to short hairs. In present study the prevalence was higher in

Table-III: Comparison of socio-economic specific prevalence of pediculosis in school boys and girls.

Family Income	Prevalence in Boys			Prevalence in Girls		
	Boys	Positive for Lice	Prevalence (%)	Girls	Positive for Lice	Prevalence (%)
Low	57	35	61.40%	199	190	95.48%
Middle	48	24	50.00%	116	95	81.90%
High	17	05	29.41%	63	38	60.31%
Total	122	64	52.45%	378	323	85.45%

P-Value= 0.04 indicate that there is significant difference between boys and girls and pediculosis is associated with socio-economic status.

those children who had Low socio-economic status as compared to High socio-economic status. Similar results were also presented by Balcioglu et al in 2007<sup>17</sup> that pediculosis which is caused by *P. capitis* is common among children and people in lower socioeconomic status.

In another study conducted in South Africa challenges the generally accepted concept that head lice infestation refers to lower socioeconomic status.<sup>22</sup> Sex and social stratum were confirmed as important modifiers of prevalence.<sup>16</sup> Individual characteristics like hair color, hair length, the number of children in the family and socio-economic status of the family were significantly associated with the prevalence of head lice.<sup>23</sup> The factors such as long hair, living in a shanty house, crowded families, lack of in house bathroom, lower levels of income, socioeconomic status, drinking artesian water and parent's education were considered to be related to pediculosis.<sup>24</sup> So, it is concluded from the results of the present study that there is a significant difference ( $p < 0.05$ ) in the socio-economic specific prevalence of pediculosis in girls as compared to boys because there is more social interaction among girls.

## CONCLUSIONS

It is concluded that age, sex and socio-economic status of society are important factors for the distribution of pediculosis in developing countries like Pakistan.

## ACKNOWLEDGMENTS

The present study was conducted on children of various public sector schools located in Lahore. So, author is very thankful to the parents and principals of public school for cooperation in collecting the data and University of Veterinary and Animal Sciences Lahore for providing funding and necessary research facilities.

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## Author's Contribution:

*Sadia Chaudhry* did data collection and research work of this study.

*Azhar Maqbool* designed the study, funding and writing the draft of the manuscript.

*Muhammad Ijaz* conceived, designed and did statistical analysis, editing of manuscript and final approval of manuscript.

*Nisar Ahmad* participated in subject selection, funding and data collation.

*Muhammad Latif* helped in data collection and processing.

*Khalid Mehmood* contributed in manuscript writing and proof reading.

**Conflict of Interest:** No conflict of the interest exists relative to this paper for all authors.

**Limitations:** There were no limitations of the study because we collected the samples after taking willingness of children, parents and school principals.