ORIGINAL ARTICLE

PREVALENCE OF HEAD LICE AMONG SCHOOL CHILDREN

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ABSTRACT

Background: Pediculosis is a common public health problem affecting school children. The objective of this study was to determine the overall prevalence of pediculosis in school children and comparison between sex, age groups, and income groups.

Material & Methods: This comparative cross-sectional study was conducted at the Department of Life Sciences, The Islamia University of Bahawalpur, Pakistan from September 2013 to December 2013. A sample of 1320 children aging 05-15 years was collected by convenience sampling from two schools at Samina Town in district D.G. Khan of south Punjab. The presence of louse was determined macroscopically and microscopically. Sex, age groups, income groups, and presence of louse (pediculosis) were variables. All these categorical data were analyzed by number and percentage. Chi-square test was used to determine the significance of difference in proportion for pediculosis between the two groups of sex, three age groups, and three income groups. Alpha value of <0.5 was fixed.

Results: Out of 1320 school children, 465 (35.22%) were boys and 855 (64.78%) girls. Out of 1320, 980 (74.24%) were positive for pediculosis. Pediculosis was positive in 272 (20.60%) boys, and 708 (53.64%) girls with higher prevalence in girls ($p<0.001$). Pediculosis had highest prevalence i.e. 470 (35.60%) in age group of 5-7 years ($p<0.001$). Pediculosis had highest prevalence i.e. 610 (46.21%) in low income group ($p<0.001$).

Conclusion: Pediculosis is a common public health problem affecting school children. The prevalence is significantly more in girls, lower age group, and lower income group.

KEY WORDS: Head lice; Pediculus; *Pediculus capiti;* Lice infestations; Pediculosis; Nymph; Prevalence; Public health.

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INTRODUCTION

Louse is an ectoparasite of many warm blooded animals.[1] The three major lice that infest humans are Pediculus humanus capitis (head lice), Phthirus pubis (crab lice) and Pediculus humanus corporis (body lice).[2] Pediculosis capitis has been well-known since ancient times.[3] Infestation with Pediculosis capitis or head lice is a common health problem which most commonly involve children five to 15 years old.[4,5]

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Head lice infestation is a growing and persistent problem. 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 city, Belgium and 0-28% in Victoria, Australia whereas in developing countries 81.5% in Argentina, 58.9% in Alexandria, Egypt.[4] After every few hours the head lice take tiny amounts of blood from the scalp of the host and inject small amounts of saliva into the host. Heavy infestations and frequent feeding of the lice

may lead to iron deficiency and sub sequent anemia.[6] 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.[7] Its presence in children may pose several health risks and social stigma, with no serious or noticeable symptoms. Head lice infestation is commonly overlooked as a public health problem among school children in very poor communities.[8]

It is more common in girl's hair length; the frequency of shampooing and brushing does not influence the risk of head lice infestation,[7] while head-to-head contact is by far the most common route of lice transmition[9] and may also be transmitted by inanimate objects such as clothes, hats, scarves, combs, towels, beddings, hair brushes and upholstered furniture or carpets.[10]

The objective of this study was to determine the overall prevalence of pediculosis in school children and comparison between sex, age groups, and income groups.

MATERIAL AND METHODS

This comparative cross-sectional study was conducted at the Department of Life Sciences, The Islamia University of Bahawalpur, Pakistan from September 2013 to December 2013.

A sample of 1320 children was collected by convenience non probability sampling from Government Higher Secondary School for Boys and Government Girls High School at Samina Town in district D.G. Khan of south Punjab. All the students aging 05-15 years were eligible for enrollment.

The louse was collected and infestation was determined by inspecting each child's head with the aid of a magnifying hand lens, a student was considered infested if at least one adult, nymph, or egg was present.[11] The collected samples of lice were transferred to Parasitology Laboratory of Department of Life Sciences, The Islamia University of Bahawalpur in 70% alcohol for identification. 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, the specimens were cleared by treating with xylene and mounted in Canada balsam.[12] Then the prepared slides were observed under light microscope.

Sex, age groups, and income groups were the demographic variables, while presence of louse (pediculosis) was a research variable. There were three age groups as; 5-7 years, 8-12 years, and 13-15 years. There were three income groups: low income group (≤ Pak Rs. 5000 per month), middle income group (Pak Rs. 5001 to 10,000 per month), and high income group (Pak Rs. >10,000 per month).

All these categorical data were descriptively analyzed by frequency and percentage. Inferential statistical analysis was carried out by Chi-square test to determine the significance of difference in proportion for pediculosis between the two groups of sex, three age groups, and three income groups by Chi-Square Test Calculator at http://www.socscistatistics.com/tests/chisquare/. Alpha value of <0.5 was fixed.

RESULTS

The sample size was 1320 school children, including 465 (35.22%) boys and 855 (64.78%) girls. Out of 1320 school children, 980 were positive for pediculosis, giving overall prevalence of 74.24%. The prevalence for boys was 20.60% i.e. 272 out of 1320 cases, and for girls it was 53.64% i.e. 708 out of 1320 cases. It was more for girls with significant statistical difference. (Table 1)

Age group wise analysis indicated that the pediculosis had highest prevalence in age group of 5-7 years with statistical significance. (Table 2) Group wise analysis for income groups revealed that the pediculosis had highest prevalence in low income group with statistical significance. (Table 3)

DISCUSSION

In the present study overall prevalence of pediculosis was 74.24%. The lower prevalence rate in school children was observed in the previous studies in Pakistan by Ali and Ramzan[13] in

Table 1. Pediculosis cases by sex in school children of D.G. Khan (n=1320)

Sex	Pediculosis n (%)	Non Pediculosis	Row Totals	Chi-Square Value	Degree of freedom	p-value
Boys	272 (20.60)	193	465	93.09	1	<0.001
Girls	708 (53.64)	147	855			
Column Totals	980 (74.24)	340	1320 (Grand Total)	Chi-Square Test		

Table 2. Pediculosis cases by age groups in school children of D.G. Khan (n=1320)

Age groups	Pediculosis n (%)	Non Pediculosis	Row Totals	Chi-Square Value	Degree of freedom	p-value
5-7 years	470 (35.60)	100	570	38.67	2	<0.001
8-12 years	320 (24.24)	135	455			
13-15 years	190 (14.40)	105	295			
Column Totals	980 (74.24)	340	1320 (Grand Total)	Chi-Square Test		

Table 3. Pediculosis cases by income groups in school children of D.G. Khan (n=1320)

Income Group	Pediculosis n (%)	Non Pediculosis	Row Totals	Chi-Square Value	Degree of freedom	p-value
Low	610 (46.21)	155	765	50.35	2	<0.001
Middle	250 (18.93)	90	340			
High	120 (09.10)	95	215			
Column Totals	980 (74.24)	340	1320 (Grand Total)	Chi-Square Test		

D.I. Khan, Suleman and Fatima[14] in Peshawar, and Kazmi et al[15] in Karachi as 26%, 45% and 25.5% respectively. Saddozai and Kakarsulemankhel[16] recorded higher prevalence rate of 87% in Quetta. The results of this study are congruent to the findings of Chaudhry et al[17] who reported the prevalence of pediculosis as 77.40% in Lahore district of Pakistan.

Present study demonstrates that the prevalence of pediculosis was more prevalent in girls (53.64%) than boys (20.60%) and this result correlate well with the reports from Quetta[16] and five international studies.[18-22] In Inchon city, Korea[23] while studying infestation rate of head lice in primary school children reported that infestation rate for girls were 19 times higher than that for boys. This may be due to girls generally having longer hair as compared to boys, close head contact between girls, and the heightened grooming and combing requirements that accompany longer hair. A study from Saudi Arabia showed no difference in gender distribution of head louse.[24]

The comparison of age on infestation rates was seen very prominently in the present study, with children 5-7 years of age demonstrating the highest rates of infestation compared to those who were older. The higher infestation rate in these children may indicate poor personal hygiene practices, including combing and washing of the hair. Morsy et al[11] reported similar findings among primary school children in Cairo, where they found that younger children (6-8 years) had much higher rates of infestation than older ones. On the other hand, other investigators[25] did not find any significant influence of age upon the incidence of infestation.

The impact of socioeconomic status upon the infestation rate detected in present study agreed with other studies, indicating that low socioeconomic status significantly increased the rate of infestation.[26] This may be because children in poor families have a higher risk of being infested by their siblings or because members of large families may pay less attention to hair care.[27,28] The economic condition have great association with head lice infestation because poor economic conditions as well as playing together are likely to result in crowding at home as reported by Ali and Ramzan.[13]

Improvements in socioeconomic and cultural conditions may reduce the prevalence of *Pediculosis capitis* because these are factors that affect the rate of infestation. A lower prevalence can be achieved through health education programs for students and parents, particularly with regard to the importance of early detection and effective management strategies. These measures, along with curing infected students and possible cases within the family, will decrease the rate of infestation and lead to greatly improved control.

CONCLUSION

Pediculosis is a common public health problem affecting school children in southern areas of Punjab Province of Pakistan. The prevalence is significantly more in girls, lower age group, and lower income group.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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