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PEDICULOSIS HUMANUS CAPITIS PREVALENCE AS HEALTH PROBLEM IN ELEMENTARY SCHOOL OF KARACHI PAKISTAN: A COMMUNITY BASED STUDY

Aisha Jabeen[1], Mirza Tasawer Baig[2*,] Sadaf Ibrahim[3], Nayel Syed[4], Samina Sheikh[5], Aiman Syed[6], Quratulain Pirzada[7], Noorulain Pirzada[8]

[1,3]Department of Pharmacology, Faculty of Pharmacy, Ziauddin University, Pakistan
[2,4,5]Department of Pharmacy Practice, Faculty of Pharmacy, Ziauddin University, Pakistan Karachi, Pakistan
[6]Karachi Medical and Dental College
[7,8] Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Ziauddin University, Pakistan, Jinnah University for Women, Karachi Pakistan

***Corresponding Author:** Prof. Dr. Mirza Tasawer Baig
*Department of Pharmacy Practice, Faculty of Pharmacy, Ziauddin University, Pakistan,
Email: (mirzatasawerbaig@gmail.com)

Abstract

Background: Head lice (*Pediculosis humanus capitis*) are a significant public health concern globally. This study aimed to assess the prevalence of head lice infestation among elementary school children in Karachi, Pakistan, and identify associated risk factors.

Methods: A descriptive cross-sectional study was conducted from January to May 2023 in randomly selected elementary schools (government and private) in Karachi. A total of 1501 students aged 5-13 years were examined for head lice and nits. Data on demographics, hygiene practices, and family history were collected using a pretested questionnaire with informed consent.

Results: Head lice infestation was identified in 351 (23.4%) participants. Females had a significantly higher prevalence (59.5%) compared to males (40.45%). The highest infestation rate (44%) was observed among children aged 3-4 years, followed by 5-10 years (34.7%) and 10-13 years (20%). Students with parents of lower educational attainment, unemployed fathers, and a history of infestation were more likely to be infested ($p<0.001$). Infrequent combing (less than daily) and infrequent bathing (once or less per week) were associated with a higher prevalence ($p<0.05$). Head covering among girls significantly reduced transmission risk ($p=0.004$). Having lice in other family members were significant risk factors ($p<0.05$). Itching was the most prevalent symptom ($p=0.004$). Family size did not significantly influence infestation rates.

Conclusion: Head lice infestation remains a common public health problem among elementary school children in Karachi. The study identified several risk factors, including age, gender, socioeconomic status, hygiene practices, and family history. School-based screening programs, coupled with education on hygiene and transmission prevention, are crucial for controlling head lice infestation in this population.

Key Words: School-based screening, Hygiene practices, Pediculus humanus capitis, Prevention

Introduction:

The human head louse, Pediculus humanus capitis De Geer, 1767, (Anoplura: Pediculidae), is an obligatory hematophagous ectoparasite that is associated with several deleterious public health threats worldwide (Durden.2019) Head louse (plural: head lice) is a hematophagous parasite belonging to the Anoplura family that causes pediculosis capitis. It is one of the most common ectoparasites and causes one of the most common human parasitic infestations in the world, with Pediculus humanus var. capitis being the most common in the world (Kitvatanachai *et al*.,2023). *Pediculus humanus capitis* is a kind of capitis. "De Geer is a 6-legged, blood-sucking, wingless bug that feeds on the scalp" of humans and other animals (Torre *et al*., 2017; Ahmed *et al*., 2018; Singhasivanon *et al*.,2018). Head lice are well-known for their remarkable adaptation to the human physiology, since the body's temperature and relative humidity provide ideal circumstances for their life cycle to take place on the host (Amanzougaghene *et al*., 2020; Mumcuoglu *et al*., 2021). Head lice life cycle is divided into three stages: the egg, the nymph, and the adult. The life cycle is typically four weeks long maximum of 35–50 days (Abah *et al*.,2023). Head lice are not known to transmit disease, although they are infectious and can be irritative because of their saliva, Pediculus humanus var. capitis feeds on the skin of the scalp, causing numerous symptoms/signs (such as pruritus and eczematous changes) in its victims (Muric *et al*., 2018; El-Sayed *et al*.,2017; Amanzougaghene *et al*., 2020). Aside from these side effects, it can also cause social difficulties including sleeplessness and mental irritation as well as academic failure, depression and anaemia as well as cervical adenopathy and bacterial infections and allergic responses (Greive *et al*., 2018; Maramazi *et al*., 2019; Batool *et al*.,2021). On the basis of the variable morbidity, social stigma and decreased efficiency associated with the louse burden, the WHO has newly added pediculosis to the priority list of neglected tropical diseases (WHO 2017).

Method:

This descriptive cross-sectional study was performed in elementary school of Karachi Sindh province of Pakistan during Jan 2023 to May 2023. The survey was carried out elementary government and private sector schools selected randomly. Total 1501 pupils from the selected elementary schools were tested for the presence of head lice. Data from school children and parents and/or guardians were collected using a pretested questionnaire after agreement and signature of the informed consent form. The screening of each student will consist of a visual check of the head in adequate daylight. All 1501 students (in the age range of 5–13-year-old) were examined individually and privately under the flashlight for all life cycle stages of head lice such as nits/eggs, nymph or adult lice. The study was approved from Animal Ethics Committee (AEC) and Ethics Review Committee (ERC) of Ziauddin University for interventions on Human. A questionnaire of was adopted with some modifications. The questionnaire containing 20 questions was validated and is based on an individual, social, economic, cultural and health information like grade of education, parent's job, the number of students in class, family size, shared personal hygiene products (hairbrush, comb, towel, pillow, bed, hat), number of combing, Health care teacher at school, number of bathing per week, having itching, dandruff and head cover, hair type, using hair oil, background of family infestation, previous infestation and treatment type (Maramazi *et al.*,2019).

Data analysis

Data evaluation was performed by using SPSS. Descriptive analysis included frequency, means, standard deviation and also compare means were done by t-test. Chi-square test was applied to access the univariate association between independent variables and outcome. $P<0.05$ was considered to be statistically significant (Maramazi *et al.*,2019).

Table 1: Socio-demographic features of the study subjects and the prevalence of pediculosis capitis among school children

S. No	Features	Level	Non-Pediculosis 1150	Pediculosis n=351	P Value
1	Age	3-4 5-10 10-13	421 400 329	156 122 73	0.041
2	Gender	Female Male	700 450	209 142	0.002
3	Education Grade	I to III IV to VI	800 350	245 106	0.522
4	Father's Job	Employed Unemployed	960 180	295 55	0.001
5	`Mother's Job	Employed Unemployed (house hold)	395 750	41 310	0.002
6	Father's education	Educated Illiterate	800 350	291 60	0.001
7	Mather's education	Educated Illiterate	655 495	189 162	0.002
8	Family Size	<5 >5-7 <8-10	554 340 256	100 131 120	0.621
9	Shared Personal things	Common Uncommon	700 450	195 156	0.003
10	No of combing per day	0-1 1-3	600 550	210 141	0.041
11	No of bathing per week	0-1 >2 Daily	313 487 350	51 123 177	0.045
12	Head cover at home	Yes No Not applicable	53 647 450	10 199 142	0.004
13	Hair Type	Straight Curly	1031 119	328 23	0.677
14	Using Hair oil	Yes No	952 198	150 201	0.821
15	Dandruff in Hairs	Yes No	452 698	165 186	0.003
16	Lice in other family members	Yes No	345 805	251 100	0.002

17	Previous lice treated	Yes No	150 1000	122 229	0.004
18	Treatment type	Traditional Chemical Both Never treated	79 41 30 1000	10 15 326	0.003
19	Head Itching	Yes No	380 770	312 39	0.004
20	Having health staff	Yes No	830 320	193 158	0.005

Results:

This study investigated head lice infestation among 1501 students aged 3 to 13 years old. The study found a significant difference ($p=0.002$) in infestation rates between genders. (60.9%) of the non-infested participants were female, while only (59.5%) of the infested participants were female. This indicated a slightly higher prevalence of lice in males, although females still made up the majority of participants overall. There was a significant difference ($p=0.002$) in infestation rates across age groups. The highest infestation rate (44%) was found among the youngest age group (3-4 years old). This rate decreased to 34.7% for children aged 5-10 years old and further down to 20% for the 10–13-year-old age group. This trend suggests that younger children may be more susceptible to head lice infestation. The study investigated the relationship between infestation and grade level (1-3 vs. 4-6). While a higher infestation rate (69.8%) was found in grades 1-3 compared to grades 4-6 (30.1%), the difference wasn't statistically significant ($p=0.5$). The study revealed a significant association ($p<0.001$) between head lice infestation and certain socioeconomic factors. Children with parents who had lower education levels and unemployed fathers were more likely to be infested. Additionally, a history of lice infestation within the family increased the child's chance of being infested. These findings suggest a potential link between socioeconomic factors and head lice prevalence. The study looked at the hygiene habits of participants and their relation to lice infestation. A significant difference ($p<0.05$) was found between combing frequency and lice presence. Students who only combed their hair once a day had a higher infestation rate compared to those who combed more frequently. Bathing habits also showed a trend, with less frequent bathing (once a week or less) being associated with a higher chance of lice infestation, although this wasn't statistically significant. This study specifically investigated the impact of head covers worn by girls on lice infestation. The results showed a significant difference ($p=0.004$), indicating that wearing a head cover reduced the chances of lice transmission from one student to another. The study examined the effect of hair type (straight vs. curly) on lice infestation. Due to the uncommonness of curly hair in your culture, the analysis didn't show a statistically significant difference ($p=0.61$) between hair types. The study investigated whether hair oil usage played a role in lice infestation. The results didn't show a statistically significant association ($p>0.05$) between hair oil use and lice presence. The presence of dandruff was significantly associated with lice infestation ($p=0.003$). The study found a significant difference ($p=0.002$) between lice presence in the family and individual infestation. Children with lice-infested family members were more likely to be infested themselves. The study looked at the impact of previous lice treatment (traditional or chemical) on current infestation. The results didn't show a statistically significant difference ($p>0.05$), suggesting that previous treatment may not always be successful in preventing re-infestation. Head itching was the main symptom associated with lice infestation, and the difference between infested and non-infested participants was statistically

significant (p=0.004). This finding reinforces the importance of recognizing itching as a potential sign of lice infestation.

Discussion

Infestation with head lice is a public health issue in many regions of the world Al Abdullah and (Baghdadi *et al*.,2021; Nategh *et al*., 2018; Alberfkani and Mero, 2020). In this study prevalence of head lice infestation was 59.9% among girls and 40.45% among boys. This study found a significant association between gender and head lice infestation, with females having a higher prevalence (Sanei-Dehkordi *et al*.,2017). This aligns with previous research suggesting closer head-to-head contact among girls might contribute to lice transmission. Younger children (3-4 years) showed the highest infestation rate, potentially due to increased caregiving needs and closer physical contact with caregivers (Liao *et al*.,2019; Ghavami et al.,2023). The prevalence decreased with increasing age, suggesting older children may practice better hygiene or have less close contact that facilitates transmission (Maramazi *et al*.,2019; Husni *et al*.,2021). The study suggests a correlation between head lice infestation and lower parental education and unemployment. This might be linked to factors like crowded living conditions or limited access to hygiene resources. The findings indicate a significant association between infrequent combing and head lice. Daily combing helps remove lice and nits, reducing the risk of infestation. Similarly, less frequent bathing was associated with higher infestation rates. The use of head covers by girls significantly reduced lice transmission (Nejati *et al*.,2021). This highlights the importance of protective measures, especially for long-haired individuals. While curly hair may theoretically make lice removal more challenging, the study didn't find a significant association in this specific population where curly hair was less common (Shea *et al*.,2023) Hair oil usage and previous treatment (both traditional and chemical) did not show a statistically significant impact. However, dandruff presence and having lice in other family members were significantly linked to head lice infestation. This suggests dandruff might create a favorable environment for lice, and infestations within families require a holistic treatment approach. The study confirms head itching as a significant symptom of lice infestation, which can be helpful in identifying cases. Although lice cases increased in larger families, the difference wasn't statistically significant. This suggests factors beyond family size might play a more prominent role in transmission.

Conclusion:

This study provides valuable insights into factors associated with head lice infestation in school children. It highlights the importance of promoting good hygiene practices, including frequent combing and regular bathing. The study also suggests the potential benefit of head coverings in lice prevention. Further research could explore the effectiveness of specific treatment methods and investigate the influence of hair length on infestation rates. Implementing educational programs promoting good hygiene and early detection alongside addressing social determinants of health could be crucial steps towards reducing head lice burden in school communities.

Limitations: The study acknowledges limitations, such as the possibility of under-reporting due to social stigma. Additionally, the lack of significance for some factors might be due to the study population or sample size.

Future Directions: Further research could explore the role of specific hygiene practices and educational interventions in reducing lice transmission. Additionally, investigating the biological factors associated with dandruff and its link to lice infestation could be valuable. Overall, this study provides valuable insights into the factors associated with head lice infestation in children. By addressing hygiene practices, promoting preventive measures like head covers, and considering socioeconomic factors, public health initiatives can be tailored to effectively manage head lice infestations in school settings and communities.

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