



EGYPTIAN ACADEMIC JOURNAL OF
BIOLOGICAL SCIENCES

MEDICAL ENTOMOLOGY & PARASITOLOGY

E



ISSN
2090-0783

WWW.EAJBS.EG.NET

Vol. 17 No. 1 (2025)



Sociocultural Determinants of *Pediculus humanus capitis* Infestation Among Primary School Students: A Comprehensive Analysis

Arshad M. Abdullah¹; Fatma S. Shamsadin²; Nareen A. Othman² and Lilav S. Omer²

¹Department of Basic Sciences, College of Pharmacy, University of Duhok, Iraq.

²Department of Science, College of Basic Education, University of Duhok, Iraq.

*Email : arshadzanko@gmail.com

ARTICLE INFO

Article History

Received:27/9/2024

Accepted:11/3/2025

Available:15/3/2025

Keywords:

Pediculus humanus capitis,
Human head lice,
Infestation,
Primary students,
Pediculosis.

ABSTRACT

Human head lice infestations (*Pediculus humanus capitis*) are one of important health problem among children in schools in different countries. Direct contact between children is main route of transmission, mainly via contact of head-to-head, and infestation by this ecto-parasite can lead to health problems in children. Focusing on this issue is important for supporting student's health. This study aimed to detect of head lice infestation in students, and the main elements that related to it in school students in Duhok city-Iraq. Current study involved 829 students, in several Duhok elementary schools, from February to June 2023. All school students' hair was tested to detection of head lice by our research staff and school personnel, and Pearson chi-square test was used in this study. The findings of this study showed that the infestation rate was 8.93%, with 6.15% and 2.77% among female and males students respectively. Regarding age groups, the highest rate of infestation was recorded in 6–7-year age group in both male and female. The main association was shown within the head lice infestation and several factors such as hair length, bathing frequency, sharing towels and combs between students. In conclusion, current study determined that, the incidence of head lice infestation affected by several factors as age, hair length, gender, bathing frequency and practice of towels and combs sharing among students.

INTRODUCTION

Pediculus humanus capitis (Human head lice) are blood-sucking ectoparasites (wingless insects) that can infest the humans body, and is one of the most important problems in the public health sectors, particularly in children. (Amanzougaghene *et al.*, 2020; Yingklang *et al.*, 2018). The most important body infestations type in human are body lice, head lice and human pubic lice (Mohammed 2012). Countries with this types of infestations have critical human health problems, which this countries need improvement in medical and health education (Morsy *et al.*, 2001). The high prevalence of this parasite infestation in children, particularly in the ages group of 4 and 14, is seen as a public health concern. (Tappah *et al.*, 2012). Although this ectoparasite infestation affects all people in all parts of the world regardless of human race, origin and color, it has the unfavorable effects in the developing countries, persons with inadequate health and hygiene, socioeconomic condition, and children in school (Davarpanah *et al.*, 2013; Kamiabi *et al.*, 2005). Developing countries peoples, especially in rural and urban parts, have social and economic statuses which measured by head lice infestation (Zahirnia *et al.*, 2005).

Head lice infestation, sometimes play important role in transmission of several diseases particular in children (Galassi *et al.* ,2018; Kamiabi *et al.* ,2005; Moosazadeh *et al.* 2015). This type of ectoparasite can be transmitted by hair-to-hair contact among children; it can also survive many hours out of contact with animal and human bodies: in hair brushes, sharing towels and combs (Burkhart *et al.*, 2007; Izri *et al.*, 2006; Meister *et al.*, 2016) Moreover, the humidity and temperature can effects *P. humanus capitis* in a particular manner. (Bartosik *et al.*, 2022). Scientific studies among students in primary schools, have shown that the incidence of head lice actually varies in different parts of the world (Omidi *et al.*, 2013). Systematic reviews about this ectoparasite infestation are the best method to find the transmission routes of this ectoparasite. The aim of this study is to show the prevalence of head lice infestation among primary school students in Duhok City, Iraq, in order to better understand this public health concern.

MATERIALS AND METHODS

1-Samples Collection:

This study was carried out among students of elementary school in Duhok City, from February to June 2023. In this study, several primary schools were selected at randomly from different area in city, including a total of 829 students in grades one to six regarding to the age and gender and all students were arranged in

four age groups from 6 to 13 years old. Subsequently, all students' hair was tested to detection of head lice by our research staff and school personnel, and tested. lice. In this process we used gloves, a flashlight, a small magnifying lens, and wooden sticks. For visual testing of the students scalp to find the eggs or adult lice, all students was examined by using hand gloves, separating of the hair by fingers and using of flashlight with small magnifying, for about three minutes, afterward, a questionnaire form was filled out based on the student's responses.

2-Statistical Analysis:

The results of this study were examined by using the chi-square test within the SPSS software, version 21, and at a level of $P < 0.05$ the statistical significance was identified.

RESULTS

In current study, a total of 829 students were tested to investigate of head lice infestation percentage among primary schools in Duhok city. The results showed that the total infestation percentage was 8.93%, with 6.15% and 2.77% in female in male respectively. According to the students age groups, all students were grouped into four age groups, which The highest head lice infestation prevalence was observed among students aged 6-7 years, with 2.53% in females and 1.09% in males, while, the lowest infestation were recorded in students with the age groups of 12-13 years in male (0.36%) and female (0.84%) which are shown in Table 1.

Table 1: Prevalence of *Pediculus humanus capitis* (Head Lice) among Primary School Children.

Age Groups	Examined No.	Total infestation	Infested with Head Lice/gender		P. Value
			Males	Females	
6-7	212	30	9 (1.09%)	21 (2.53%)	0.98
8-9	205	20	6 (0.72%)	14 (1.69%)	
10-11	211	14	5 (0.60%)	9 (1.09%)	
12-13	201	10	3 (0.36%)	7 (0.84%)	
Total	829	74 (8.93%)	23 (2.77%)	51 (6.15%)	

Pearson Chi-squared test was performed for statistical analysis

Based on gender, there were no significant differences statistically recorded

in the current study. As shown in results (Table. 2), the sociocultural factors in

students with infestation, regarding bathing frequency, the highest percentage of infestation (71.62%) was recorded in students who bathed once a week, while the lowest percentage rate (6.75%) was recorded among those who bathed 3 times per week. Regardless, there were no significant differences among these rates. According to the hair length, the highest rate of students infestation (60.81%) was recorded among long hair students, and this difference was significant statistically ($P < 0.041$), while, the lowest rate of infestation was recorded in short hair students (12.16%). The present study showed a

higher rate of infestation among students who shared combs (60.81%) as compared to those students who did not share combs (39.18%). This finding was significant statistically ($P < 0.034$). Students who shared towels, were recorded with the high infestation (56.75%) as compared to those who did not share towels (43.24%), however, there were no significant differences. In addition, results (Table 2) shows that among infested children with head lice, 16.21% exhibited the presence of hair dandruff, while 83.78% of children revealed no dandruff (no significant difference).

Table 2: Sociocultural elements of infested students with head lice.

Variables		Total Infestation %	P. Value
Bathing Frequency	1 per week	71.62%	0.68
	2 per week	21.62%	
	3 per week	6.75%	
Hair Longevity	Short	12.16%	0.041
	Medium	27.02%	
	Long	60.81%	
Sharing Comb	YES	60.81%	0.034
	NO	39.18%	
Sharing Towel	YES	56.75%	0.075
	NO	43.24%	
Dandruff	YES	16.21%	0.67
	NO	83.78%	
Pearson Chi-squared test was performed for statistical analysis			

DISCUSSION

Human head lice infestation is one of the important public health problems in numerous parts of the world (Abdullah *et al.*, 2017; Alberfkani *et al.*, 2020; Nategh *et al.*, 2018). In this research, head lice infestation prevalence in primary school students was recorded in 8.93%, which aligned with the results of Hama-Karim *et al.*, in Sulaimani (Hama-Karim *et al.*, 2022) and Al-Barrak in 2021, in Sulaimani and Baghdad (Al-Barrak 2021). On the other hand, it against with reported results of Abdulla, 2015 in Erbil City (Abdulla 2015) and Al-Mendalawi, 2012 in Iraqi students (Al Mendalawi *et al.*, 2012). The results also revealed a higher infestation rate in

females (6.15%) as compared with the infestation rate in males (2.77%), these differences can result from type of females' clothing, hair long, and behavioral differences, as female hair makes an appropriate environment for head lice (Al-Barrak 2021; Hatam-Nahavandi *et al.*, 2020). The recorded result is aligned with the findings of Hama-Karim *et al.*, 2022, in Sulaimani (Hama-Karim *et al.*, 2022). Regarding the age groups and methodology in sample collection, our study is similar to the findings of Al-Barrak (2021) in Baghdad City. Additionally, our results, which show the highest infestation rate within the 6–7 year age group in both males and females, closely resemble those of

Baghdad City (Al-Barrak 2021), Al-Aboody and Salehi and Ban respectively in Nassirya and Abadan cities (Al-Aboody 2008; Salehi *et al.*, 2014). The current study revealed that the highest percentage of head lice infestation was recorded in younger age groups compared to older students. This may be related to closer physical interactions, the sharing of personal items such as combs and hats, and the lower immune response in younger students, additionally, younger students may be less attentive to hygiene practices, unlike older children who are typically more aware of personal cleanliness (Baghdadi *et al.*, 2021; Mohammed 2012). Regarding bathing frequency in this study, it was observed that a higher infestation rate was shown in children who bathed once per week, this result agrees with the findings of Al-Barrak in Baghdad City (Al-Barrak 2021), and research in South West of Iran (Nejati *et al.*, 2018). good hygiene system, Involving regular good bathing, are the main factors that prevent head lice infestations among children (Kassiri *et al.*, 2016). Concerning hair length, the highest percentage of head lice infestation was shown among both genders with long hair, this finding agrees with the result of infestation among children in Sulaimani primary school (Hama-Karim *et al.*, 2022) and Erbil city (AL-Marjan *et al.*, 2022). several studies show that there is no relation between children cutting hair and head lice infestations (Kassiri *et al.*, 2016). In this research, the higher infestation rate was recorded among children who shared towels and combs, which agrees with the finding of Sulaimani primary school students (Hama-Karim *et al.*, 2022) and Baghdad City (Al-Barrak 2021). Direct and indirect contact between children when sharing towels, combs, and clothing, is one of the main factors in head lice infestation in children (Burgess 1995). Regarding to the hair dandruff, in current study, 16.21% of infested children with head lice were shown with dandruff, and on the other hand pathobiology of dandruff is not related to head lice infestation, this

study agrees with results of primary school students in Baghdad (Al-Barrak 2021). The limited number of schools included and small sample size, are the main limitations of this study.

CONCLUSIONS

Regarding this study, we can conclude several points. Firstly, the findings reveal the highest percentage of head lice infestation among female students, which may be due to their longer hair, higher infestation in age group of 6-7 years which may be relevant to closer physical interactions, head combs and towels shared students and less frequent bathing. Consequently, the head lice infestation rate affected by different causes such as: age, hair length, hair washing, gender, sharing of towels and combs and socioeconomic status.

Declarations:

Ethical Approval: The research was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The research was subjected to review and approval by the Scientific/Ethics Committee of the College of Pharmacy, University of Duhok. (Reference no. 642, Feb. 02, 2023).

Competing interests: The author states that there are no competing interests to declare.

Author's Contributions: The study's conception and design were carried out by AMA and FSS. Fieldwork contributions came from NAO and LSO. AMA with FSS, analyzed the data. The initial draft of the paper was written by AMA, NAO and LSO, with all authors participating in discussions about the results and contributing to the final version of the manuscript.

Funding: This study did not receive any external funding.

Availability of Data and Materials: All the data utilized in this study are accessible.

Acknowledgments: Our special gratitude to all contributed students, and all schools academic staffs and teachers for their supports in our study.

REFERENCES

- Abdulla, B. S. (2015). "Morphological study and Prevalence of head lice (*Pediculus humanus capitis*) (Anoplura: Pediculidae) infestation among some primary school students in Erbil City, Kurdistan region," *Zanco Journal of Pure and Applied Sciences* (27:5), pp 29-36.
- Abdullah, N., and Kaki, R. (2017). "Lindane Shampoo for Head Lice Treatment among Female Secondary School Students in Jeddah," *Journal of Ancient Diseases & Preventive Memedies* (5: 173), pp 1-4.
- Al-Aboody, B. A. (2008). "Prevalence of head lice (*Pediculus humanus capitis*) among primary schools pupils in Nassiryia city," *Baghdad Science Journal* (5:2), pp 207-210.
- Al-Barrak, H. T. (2021). "Prevalence of head lice (*Pediculus humanus capitis*) among primary school children in Baghdad suburbs," *Med Legal Update* (21:1), pp 280-284.
- AL-Marjan, K. S., Abdullah, S. M., and Kamil, F. H. (2022). "Epidemiology study of the head lice *Pediculus humanus capitis* Isolated among primary school students in Erbil city, Kurdistan Region, Iraq," *Diyala Journal of Medicine* (22:1), pp 141-160.
- Al Mendalawi, M., and Ibrahim, J. (2012). "Pattern of dermatoses in Iraqi children," *EMHJ-Eastern Mediterranean Health Journal*, 18 (4), 365-371, 2012).
- Alberfkani, M. I., and Mero, W. M. (2020). "The incidence of scabies and head lice and their associated risk factors among displaced people in Cham Mishko Camp, Zakho City, Duhok Province, Iraq," *Polish Journal of Microbiology* (69:4), pp 463-469.
- Amanzougaghene, N., Fenollar, F., Raoult, D., and Mediannikov, O. (2020). "Where are we with human lice? A review of the current state of knowledge," *Frontiers in Cellular and Infection Microbiology* (9), p 474.
- Baghdadi, H. B., Omer, E. O., Metwally, D. M., and Abdel-Gaber, R. (2021). "Prevalence of head lice (*Pediculus humanus capitis*) infestation among schools workers in the Eastern Region, Saudi Arabia," *Saudi Journal of Biological Sciences* (28:10), pp 5662-5666.
- Bartosik, K., Janczaruk, M., Zając, Z., Sędzikowska, A., Kulisz, J., Woźniak, A., Jaształ-Kniażuk, A., Kulbaka, E., and Tytuła, A. (2022). "Head lice infestation in schoolchildren, in Poland—Is there a chance for change?," *Journal of Clinical Medicine* (11:3), p 783.
- Burgess, I. F. (1995). "Human lice and their management," *Advances in parasitology* (36), pp 271-342.
- Burkhart, C. N., and Burkhart, C. G. (2007). "Fomite transmission in head lice," *Journal of the American Academy of Dermatology* (56:6), pp 1044-1047.
- Davarpanah, M. A., Kazerouni, A. R., Rahmati, H., Neirami, R. N., Bakhtiary, H., and Sadeghi, M. (2013). "The prevalence of pediculus capitis among the middle schoolchildren in Fars Province, southern Iran," *Caspian journal of internal medicine* (4:1), p 607.
- Galassi, F. G., Fronza, G., Toloza, A. C., Picollo, M. I., and González-Audino, P. (2018). "Response of *Pediculus humanus capitis* (Phthiraptera: Pediculidae) to volatiles of whole and individual components of the human scalp,"

- Journal of Medical Entomology* (55:3), pp 527-533.
- Hama-Karim, Y. H., Azize, P. M., Ali, S. I., and Ezzaddin, S. A. (2022). "Epidemiological Study of Pediculosis among Primary School Children in Sulaimani Governorate, Kurdistan Region of Iraq," *Journal of Arthropod-Borne Diseases* (16:1), p 72.
- Hatam-Nahavandi, K., Ahmadpour, E., Pashazadeh, F., Dezhkam, A., Zarean, M., Rafiei-Sefiddashti, R., Salimi-Khorashad, A., Hosseini-Teshnizi, S., Hazratian, T., and Otranto, D. (2020). "Pediculosis capitis among school-age students worldwide as an emerging public health concern: a systematic review and meta-analysis of past five decades," *Parasitology Research* (119), pp 3125-3143.
- Izri, A., and Chosidow, O. (2006). "Efficacy of machine laundering to eradicate head lice: recommendations to decontaminate washable clothes, linens, and fomites," *Clinical Infectious Diseases* (42:2), pp e9-e10.
- Kamiabi, F., and Nakhaei, F. H. (2005). "Prevalence of pediculosis capitis and determination of risk factors in primary-school children in Kerman," *EMHJ-Eastern Mediterranean Health Journal*, 11 (5-6), 988-992, 2005).
- Kassiri, H., and Esteghali, E. (2016). "Prevalence rate and risk factors of pediculus capitis among primary school children in Iran," *Archives of Pediatric Infectious Diseases* (4:1). e26390.
- Meister, L., and Ochsendorf, F. (2016). Head lice: Epidemiology, biology, diagnosis, and treatment. *Deutsches Ärzteblatt International* (113:45), p 763.
- Mohammed, A. (2012). "Head lice infestation in schoolchildren and related factors in Mafraq governorate, Jordan," *International Journal of Dermatology* (51:2), pp 168-172.
- Moosazadeh, M., Afshari, M., Keianian, H., Nezammahalleh, A., and Enayati, A. A. (2015). "Prevalence of head lice infestation and its associated factors among primary school students in Iran: a systematic review and meta-analysis," *Osong public health and research perspectives* (6:6), pp 346-356.
- Morsy, T. A., El-Ela, R., Mawla, M., and Khalaf, S. (2001). "The prevalence of lice infesting students of primary, preparatory and secondary schools in Cairo, Egypt," *Journal of the Egyptian Society of Parasitology* (31:1), pp 43-50.
- Nategh, A., Eslam, M.-A., Davoud, A., Roghayeh, S., Akbar, G., Hassan, B., and Mehdi, S. (2018). "Prevalence of head lice infestation (pediculosis capitis) among primary school students in the Meshkin Shahr of Ardabil province," *American Journal of Pediatrics* (4:4), pp 94-99.
- Nejati, J., Keyhani, A., Kareshk, A. T., Mahmoudvand, H., Saghafipour, A., Khoraminasab, M., Olliaee, R. T., and Mousavi, S. M. (2018). "Prevalence and risk factors of pediculosis in primary school children in South West of Iran," *Iranian journal of public health* (47:12), p 1923.
- Omidi, A., Khodaveisi, M., MOGHIM, B. A., Mohammadi, N., and Amini, R. (2013). "Pediculosis capitis and relevant factors in secondary school students of Hamadan, West of Iran," *Journal of Research in Health Sciences* (13:2), pp 176-180.
- Salehi, S., Ban, M., and Motaghi, M. (2014). "A study of head lice infestation (Pediculosis capitis) among primary school students in

- the villages of Abadan in 2012," *International journal of community based nursing and midwifery* (2:3), p 196.
- Tappeh, K. H., Chavshin, A., Hajipirloo, H. M., Khashaveh, S., Hanifian, H., Bozorgomid, A., Mohammadi, M., Gharabag, D. J., and Azizi, H. (2012). "Pediculosis capitis among primary school children and related risk factors in Urmia, the main city of West Azarbaijan, Iran," *Journal of arthropod-borne diseases* (6:1), p 79.
- Yingklang, M., Sengthong, C., Haonon, O., Dangtakot, R., Pinlaor, P., Sota, C., and Pinlaor, S. (2018). "Effect of a health education program on reduction of pediculosis in school girls at Amphoe Muang, Khon Kaen Province, Thailand," *PloS one* (13:6), p e0198599.
- Zahirnia, A., Taherkhani, H., and Bathaie, S. (2005). "A Comparative Study On The effectiveness of three different shampoos in treatment of head lice (*Pediculus Capitis*) in primary school-children in Hamadan province, Iran 2000-2001," *Journal of Mazandaran University of Medical Sciences* (15:49), pp 16-24.