Archives of Razi Institute, Vol. 77, No. 1 (2022) 497-501

DOI: 10.22092/ARI.2022.357091.1969

Original Article

Prevalence of *Pediculus humunus capitis*, *Pediculus humanus corporis,* and *Pthirus pubis* in Al-Kut, Iraq

Khais Muri Laabusi, A[1 *], Mohsan Rhadi, M[2]

1. Agriculture Collage, Sumer University, Rifai, Iraq
2. Ministry of Education, Wasit Education Directorate, Iraq

Received 14 December 2021; Accepted 16 January 2021
Corresponding Author: mustafa.2t.2t.2t@gmail.com

Abstract

Lice infestations or pediculosis occurs throughout the world and is caused by *Pediculus humunus capitis* (head louse), *Pediculus humanus corporis* (body louse), and *Pthirus pubis* (crab louse). This study was conducted within March-October 2020 and aimed to investigate the presence of human lice among 1,632 individuals from 225 families living at different economic and social levels in AL-Kut city, Iraq, and its suburbs (urban, rural, and slum areas). Data collection was performed on volunteer families by completing survey forms and visual examinations. The families were divided by the number of members into 10-15, 7-9, 4-6, and 3-2 persons, for which, the infestation rates were estimated at 24.2%, 21.4%, 12.5%, and 8.6%, respectively. Moreover, in this study, urban, rural, and slum areas were infected at 11.5%, 33.6%, and 21.6 %, respectively. The infestation appeared in all ages, and the higher and lowest rates were obtained for the age ranges of 3-17 and 18-40 years old (79.04% and 20.9%), respectively. Based on the results, the rates of infestation were 21.8% and 13.3% in females and males, respectively. The findings of this study showed that the infection rate of *Pediculus humanus corporis* among the subjects aged 4-24 years old was 11.0% and that of *Pthirus pubis* was 3.0% in the cases aging 14-32 years old. Due to the high infestation with ectoparasites in these areas and large families, it is highly important to create conditions for health and provide information to control and prevent infection.

Keywords: *Pediculus humuns capitis*, *Pediculus humuns corporis*, *Pediculus Phthirus pubis*

1. Introduction

Human lice, including *Pediculus humunus capitis*, *Pediculus humanus corporis*, and *Pediculus Pthirus pubis*, are important medical arthropods in human life. These arthropods caused medical problems that are called pediculosis and sometimes lead to serious diseases with mortality (1). The lice are transmitted from place to host or host to host and adapt to live on the human body (2). *Pediculus humanus capitis* is detected on human head hair since it is a suitable environment for its nourishment and reproduction.

The length of an adult *Pediculus humanus capitis* is estimated at 2-3 mm, and it feeds on the blood present in the blood vessels extending in the scalp causing itching in this area. An adult *Pediculus humanus capitis* lives for 3-4 weeks, during which it lays about 300 eggs with the size of 0.3×0.8 mm (Figure 1). After mating, the eggs are attached to the hair near the scalp through the gelatinous substance secreted by the mother during spawning. The eggs hatch and become nymphs after 6-9 days, the nymph goes through three steps to reach adulthood (3-5).

Body lice (i.e., *Pediculus humanus corporis*) are bigger than head lice (4-5 mm) and resemble a sesame seed (. They adhere to the body clothes,

especially under the armpits and around the waist, and often move on the surface of the skin to feed, causing itching and rashes that develop skin ulcers that are a place for the growth of bacteria and fungi (Figure 2). The life cycle of body lice is 5-7 days, and they are found in abundance among people who live in unsanitary areas. *Pediculus humanus corporis* lays about 50 eggs on a person's clothes that hatch after about 9 days. The nymphs go through three steps to reach adulthood (6-8).

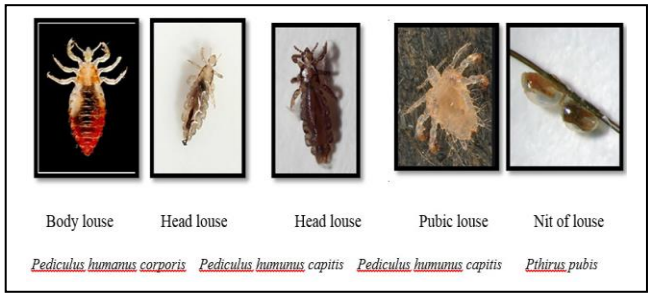

Figure 1. Types of human lice (9)

Figure 2. Body lice infestation with rash (10)

Pubic lice (*Pthirus pubis*) are found in the pubic hair, and in rare cases, around human eye eyelashes (Figure 3) (11, 12). Their size is approximately 1.5-0.2 mm (Figure 3). *Pthirus pubis* lays approximately 30 eggs within 3 weeks that hatch after 6-10 days into nymphs, which stay 2-3 weeks in this stage, leading to adults. Routh, Mirensky (13) showed that human lice are transmitted from one person to another by having contact with or wearing the clothes of the infected person, which is dependent on personal hygiene. The results of a different study in Iraqi provinces, such as Baghdad, Basra, and Kirkuk, showed high rates of infection with these ectoparasites, especially in poor health conditions (14). Mahmood (15) conducted a study on public primary school students (boys and girls) aging 6-12 years old and found that the overall prevalence rate of *Pediculus humanus capitis* was higher in girls than in boys. The present study mainly aimed to determine the prevalence of *Pediculus humunus capitis*, *Pediculus humanus corporis*, and *Pediculus Pthirus pubis* among the inhabitants of a different area of Al-Kut city in Iraq.

Figure 3. Eyelashes infested with lice (16)

2. Material and Methods

2.1. Sampling

This study was conducted on 1,632 individuals from 225 families in different zones of Al-Kut city (urban, rural, and slum areas) within March-October 2020 to determine the distribution and prevalence of *Pediculus humunus capitis*, *Pediculus humanus corporis*, and *Pthirus pubis* (Figure 4).

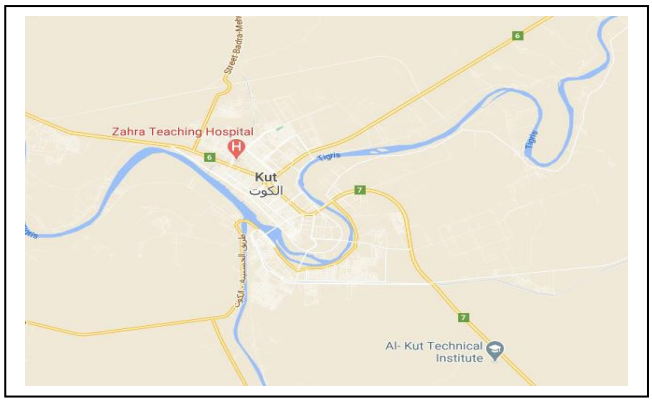

Figure 4. Study area, Al-Kut city, Iraq

This study was based on the visual examination of the hair and scalp (especially behind the ears and above the neck), in a special form with 225 families. The collection of nymphs and lice after the examination of front temporal, parietal, occipital, retro auricular, and nape was accomplished by combing wet hair (14). Data collection on pubic lice infestation was performed on volunteer families by completing survey forms and interviews.

This project was approved by the Ethics Committee of the Agriculture College, Sumer University, Rifai, Iraq. Parents of the families were informed of the research objectives. The authorization of the Ethics Committee was obtained to carry out experiments on humans.

2.2. Statistical Analysis

The gathered data were analyzed in SPSS software (version 20). The significant differences between mean scores were assessed using a t-test, and the correlations between parameters, such as area, age, and gender, were estimated by Pearson correlation coefficient. A p-value of < 0.05 was considered significant.

3. Results and Discussion

A total of 1,632 individuals completed the questionnaires, among whom 315 cases were infected with *Pediculus humunus capitis*, *Pediculus humanus corporis*, and *Pthirus pubis*. The overall infection rate with head lice was obtained at 19.3%. Table 1 presents the relationship of head lice infection with the number of family members and type of living zone. The results of the study showed that the highest infection rates were observed in families with 10-15 members, whether in the urban, rural, or slum areas, accounting for 4.1%, 12.0%, and 8.1%, respectively. However, the lowest infection rates were obtained at 1.8%, 4.7%, and 2.1% for families having 2-3 members in the urban, rural, and slum areas, respectively. Based on the findings of the study, the gender and age of the person were important factors in influencing the infection rate, as it was reported that 234 (22.8%) females suffered, while 81 (13.3%) males were infected (Table 2). Furthermore, the results of the study showed that 249 (79.3%) males and females were infected at the age range of 3-17 years old, while 66 (20.9%) males and females aged 18-40 years old suffered from these infections (Table 3). In a study conducted by Amin and D Mahmood (17), 1,277 (14.43%) out of 8,847 cases were infected with *Pediculus humanus capitis* aging 6-11 years old from Kalar district, Kurdistan region, Iraq. According to the findings of the mentioned study, the rate of infection was higher in girls than in boys.

Table 1. Percentages of *Pediculus humanus capitis* according to the number of family members in urban, rural, and slum areas

No.	Members of family	Urban	Rural	Slum	Total rate (%)
1	10-15 people	4.1	12.0	8.1	24.2
2	7-9 people	3.2	10.9	7.3	21.4
3	4-6 people	2.4	6.0	4.1	12.5
4	2-3 people	1.8	4.7	2.1	8.6
5	Total	11.5	33.6	21.6	66.7

Table 2. Infection rate of *Pediculus humanus capitis* by gender

	Positive cases (n)	Surveyed cases (n)
Female	234 (21.8%)	1025
Male	81 (13.3%)	607
Total	315 (19.35)	1632

Table 3. Infection rate of *Pediculus humanus capitis* by age

Age group (year)	Gender (n)		Total (%)
	Female	Male	
3-17	194	55	79.04%
18-40	40	26	20.9%

The data collected from healthcare centers and clinics for dermatology in those regions showed varying numbers regarding the infected cases, as the average infection with *Pthirus pubis* was 11 person per 100 people visiting these centers during the aforementioned study period. The ages of the infected individuals ranged from 4 to 32 years old who lived in various regions (Table 4). Based on the findings of the study, the infectious rate was various, as the average infection

with *Pediculus Humanus Corporis* was obtained at 3 people per 100 people visiting these centers during the aforementioned study period.

Table 4. Infection rate of *Pediculus humanus corporis* and *Pthirus pubis* by age

Age group (year)	*Pediculus*	Percent %
9-18	*Pediculus humanus corporis*	3.00
14-32	*Pthirus pubis*	11.00

Lice feed several times a day, and heavy infestations can cause intense irritation and severe itching. Toxic reactions to the saliva injected into the skin may lead to weariness and a general feeling of illness, (18). *Pediculus humanus corporis and Pthirus pubis* feed on blood and cause itching, which leads to ulceration, and vectors of pathogens, such as *Rickettsia prowazekii*, *Borrelia recurrentis*, and *Bartonella quintana*, cause the transmission of epidemic typhus, relapsing fever, and trench fever among humans. A more general reaction of fever, headaches, a diffuse rash, fatigue, and myalgias may appear a few weeks or months after the beginning of the parasitism (8, 19, 20). *Pediculus humanus capitis* feeds on blood and causes itching, which leads to ulcers; however, it is not a vector for any disease (21, 22). As with other lice infestations, intense itching leads to scratching, which can cause sores and secondary bacterial infection of the skin. Individuals infected with pubic lice should be evaluated for other sexually transmitted diseases. Due to the fact that infection with *Pediculus humunus capitis*, *Pediculus humanus corporis*, and *Pthirus pubis* is common in densely populated areas with low public health and hygiene, giving information is highly important in reducing the pollution of these insects.

Authors' Contribution

Study concept and design: A. K. M. L.
Acquisition of data: A. K. M. L.
Analysis and interpretation of data: M. M. R.
Drafting of the manuscript: M. M. R.
Critical revision of the manuscript for important intellectual content: A. K. M. L.
Statistical analysis: A. K. M. L.
Administrative, technical, and material support: A. K. M. L.

Ethics

All the procedures were approved by the ethics committee of Sumer University, Rifai, Iraq under the project number 62835-29647.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Durden LA, Lloyd JE. Lice (Phthraptera). In: Mullen GR, Durden LA, editors. Medical and veterinary entomology. 2nd ed. Amsterdam Elsevier 2009. p. 59-82.
2. Abdel-Hafez K, Abdel-Aty MA, Hofny ER. Prevalence of skin diseases in rural areas of Assiut Governorate, Upper Egypt. Int J Dermatol. 2003;42(11):887-92.
3. Orkin M, Maibach H. Scabies and pediculosis. ermatology in general medicine. 5th ed. New York: McGraw-Hill. p. 2677-84.
4. Rassami W, Soonwera M. Epidemiology of pediculosis capitis among schoolchildren in the eastern area of Bangkok, Thailand. Asian Pac J Trop Biomed. 2012;2(11):901-4.
5. Takano-Lee M, Yoon KS, Edman JD, Mullens BA, Clark JM. In vivo and in vitro rearing of Pediculus humanus capitis (Anoplura: Pediculidae). J Med Entomol. 2003;40(5):628-35.
6. Burgess IF. Human Lice and their Management. In: Baker JR, Muller R, Rollinson D, editors. Advances in Parasitology. 36: Academic Press; 1995. p. 271-342.
7. McMeniman CJ, Barker SC. Transmission ratio distortion in the human body louse, Pediculus humanus (Insecta: Phthiraptera). Heredity (Edinb). 2006;96(1):63-8.
8. Raoult D, Roux V. The body louse as a vector of reemerging human diseases. Clin Infect Dis. 1999;29(4):888-911.
9. Boutellis A, Abi-Rached L, Raoult D. The origin and distribution of human lice in the world. Infect Genet Evol. 2014;23:209-17.

10. Sangare AK, Doumbo OK, Raoult D. Management and Treatment of Human Lice. Biomed Res Int. 2016;2016:8962685.
11. Leone PA. Scabies and pediculosis pubis: an update of treatment regimens and general review. Clin Infect Dis. 2007;44 Suppl 3:S153-9.
12. Rodríguez G, Barrera GP, González M, Bulla F. Pediculosis pubiana. Biomédica. 1997;17(3):231-5.
13. Routh HB, Mirensky YM, Parish LC, Witkowski JA. Ectoparasites as sexually transmitted diseases. Seminar Dermatol. 1994;13(4):243-7.
14. Kadir M, Ali a, Taher H. Head lice infestation among local and displaced secondary school girls and its effect on some haematological parameters in Kirkuk city. Kirkuk Univ J Sci Stud. 2017;12:286-96.
15. Mahmood SA. Head pediculosis in Baghdad area elementary school children. Iraqi J Sci 2010;51(1):49-55.
16. James GH, Dinulos. Lice Infestation (Pediculosis). MD, Geisel School of Medicine at Dartmouth 2021 [Available from: https://www.msdmanuals.com/
17. Amin O, D Mahmood H. Prevalence of head lice, Pediculus humanus capitis L. and their relation to anxiety among primary school children in Kalar district, Kurdistan region-Iraq. J Garmian Univ. 2019;6:330-9.
18. Sinniah B, Sinniah D, Rajeswari B. Epidemiology and control of human head louse in Malaysia. Trop Geogr Med. 1983;35(4):337-42.
19. Brouqui P. Arthropod-borne diseases associated with political and social disorder. Annu Rev Entomol. 2011;56:357-74.
20. Nutanson I, Steen C, Schwartz RA. Pediculosis corporis: an ancient itch. Acta dermatovenerologica Croatica. 2007;15(1):33-8.
21. Robinson D, Leo N, Prociv P, Barker SC. Potential role of head lice, Pediculus humanus capitis, as vectors of Rickettsia prowazekii. Parasitol Res. 2003;90(3):209-11.
22. Watt G, Parola P. Scrub typhus and tropical rickettsioses. Curr Opin Infect Dis. 2003;16(5):429-36.