

Prevalence of Head Lice (*Pediculus humanus capitis*) among Primary School Children in Baghdad Suburbs

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Abstract

A cross-sectional school-based study was performed with the objectives to determine the prevalence of head lice infestation among primary schools in Baghdad suburbs (Abu Ghraib, Al-Yousifiya, Al-Radwaniyah, Al-Al-Taji, and Al-Hussainiya). The study included examination of 920 male and female students in several elementary schools' class first to sixth (age 6-15 year). These schools include urban, rural, and economically and culturally diverse regions for the period from February to June 2018. The results of the current study showed that the total injury rate was 9%, and the Radwaniyah region recorded the highest infection rate of 13.2 and the Al-Al-Taji rejoin region recorded the lowest (6.1%). The female infection rate was greater than that of males and reached 12.3 and 5.6 respectively. The results indicated a significant relationship between the spread of head lice and the educational status of parents, sharing of the head comb, and infection with dandruff.

Keywords: *Pediculus humanus capitis*, head lice, epidemiology.

Introduction

Lice or head lice (*Pediculus humanus*) infestation is a public health problem in many developing countries where the WHO primary health care program is incompetent and random. Lice are parasitic insects that do not have wings, that live in the scalp and hair, and that they feed on small amounts of blood. And lead to skin irritation. In Iraq, external parasites, including head lice, remained neglected, according to the Center for Communicable Disease Control, in its annual reports (1986-1991), the presence of a total infection rate for head lice amounted to (0.047%) for the all population of the country. Although contamination of body lice has been almost eliminated in the world, but head lice can be seen all over the world and in Iraq, it can be seen in abundance especially in poor places with high population

density and lack of personal hygiene instructions. It is easy to spread, especially among children in school, direct contact with the injured, and Share tools, brushes, towels, blankets, and clothes ⁽¹⁾. Female head lice lay around 3000 eggs, and lice transmit many diseases, such as a disease Epidemic typhus, which causes Rickettsia bacteria (*Candidatus rickettsia pediculicola*) that supply the lice with B-vitamins, absent in the human blood ^(2,3), and recurrent fever while feeding on human blood and causing a high body temperature ⁽⁴⁾. Several studies were conducted in Iraq, including AL kubiassy ⁽⁵⁾ in Baghdad and Kadir *et al* ⁽⁶⁾ in the city of Kirkuk and a study conducted by Jabber ⁽⁷⁾ in the city of Amara. Despite the use of insecticides in treating head lice insects, the misuse of these pesticides and their overuse led to the occurrence of insect resistance to them and thus increases the prevalence of that insect ⁽⁸⁾. The objectives of the recent study are to determine the prevalence of head lice infestation among primary schools in Baghdad suburbs

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Materials and Method

This cross-sectional descriptive study was conducted in primary school children urban and rural in Baghdad suburb s (Abu-Ghraib, Tagi, Al-Yousifiya, Al-Radwaniyah and Al-Hussainiya regions from February

to June 2018. The study was conducted on 30 randomly selected primary schools to test the pupils from first to sixth grade. In general, 920 pupils residing in urban, and rural were selected in the 6-15 years age group studied individually and privately under a flashlight for all stages of the head lice life cycle such as lice/eggs (Nits), nymphs or adult lice. In this process, a handled magnifying lens was used to accurately display it using gloves and for the purpose of dispersing hair, thin wooden sticks were used to examine the presence of lice stages. The infestation was indicated when there was the adult, nymph or nits (eggs), The hair of each child examined for at least 2-3 minutes depending on hair longevity. Examined students were grouped according to their gender (sex) and age.

Statistical Analysis: Data analysis was analyzed using SPSS software, version 24. P- value ≤ 0.05 regarded statistical significance.

Results and Discussion

The rate of head lice infestation in primary schools in the outskirts of Baghdad was 9% with an average infestation by Nits 3%, Nymphs 4.6% adults 8.7%, and the infestation by more than one stage was 4.3% of the infected pupils (Table 1).

Table 1: The parasites stages on the infected head of pupils in the elementary schools of the suburbs of Baghdad

Growth stage	Number examined	Infected	Infection rate %
Nits (Egg)	920	28	3.0 %
Nymph	920	42	4.6 %
Adult	920	80	8.7%
More than one stage	920	40	4.3 %
Chi squ are test P-value 0.001***			

*** Very high significant (P < 0.001)

The results indicated that there are statistical differences for head lice infestation between the suburban areas of Baghdad, where the region of Al-Radwanayah topped the infection rate by 13.4% and the lowest infection was recorded 6.1 % of the Al-Taji region (Table 2).

Table 2: Prevalence of head lice infestation in relation to Baghdad suburbs

Provence	Number examined	Infected	Infection rate %
Abu-Ghraib	177	17	9.6 %
Al-Hussainiya	171	13	7.6 %
Radwania	201	27	13.4%
Tagi	297	18	6.1 %
Yousfia	74	8	10.8 %
Total	920	83	9 %
Chi squ are test P-value 0.049			

In Iraq, several epidemiological studies of head-lice were performed and a wide range of infection rates was observed. In Baghdad the infestation rate ranged from 2.9%⁽⁹⁾ to 48.9%⁽¹⁰⁾. In city of Kirkuk 20%⁽¹¹⁾, in city of Samarra 15.29%⁽¹²⁾. And in Mosul 33.2%⁽¹³⁾. In addition, infestation in rural areas outpaced urban areas,

by 10.1% and 7.5% respectively, and that may be due to better hygiene in urban area, higher socio-economic levels, and better family education. These results were consistent with what found by Nejati⁽¹⁵⁾, who reported a 6.58% and 12.44% prevalence of pediculosis in urban and rural areas in Iran

The results also proved that the female infection was more than the male infection, as it recorded 12.3 % and 5.6 %, respectively (Table 3). This significant difference can be attributed to the behavior patterns between boys and girls, which have affected prevalence rate such as

girls' clothes. Moreover, girls generally have longer hair compared to boys and long hair that requires better combing. Moreover, fit female hair as a place for breeding head lice, covering female hair with scarf etc.

Table 3: Prevalence of head lice infestation in relation to Gender

Gender	Number examined	Infected	Infection rate %
Male	449	25	5.6 %
Female	471	58	12.3 %
Total	920	83	9 %
Chi squ are test P-value 0.001			

All Iraqi studies indicated a high rate of infection among females compared to that of males, and it is believed that the difference in the infection between the sexes with head lice does not have a physiological basis, but rather depends on the difference in hairstyle, as long, wavy hair is a predominant characteristic of older girls and the few number of cuts hair in females helps to maintain and permanence of the injury ⁽¹⁶⁾. This phenomenon can be explained by the fact that girls have longer hair, which facilitates the transmission of lice from head to head, that they are more social, and often touch the hair of other girls. Additionally, in long hair, nits remain attached to hair growth accordingly, these

are signs of previous infection, which were successfully treated, and remained for months, while short boys' hair was cut, and led to removing head lice.

With regard to the relationship of head lice infestation with the age group (Table 4), it was observed that the highest rates of infection were a group of age 6–7 to 12-13 years % in both sexes ($P > 0.05$). This result is consistent with what Al-Aboody (16) found that head lice infestation abounds within the ages from 7 to more than 11 year, and Salehi ⁽¹⁷⁾ who found that there were no statistical differences between the ages of primary school students for grades 1 through 6 in Isfahan, Iran.

Table 4: Prevalence of head lice by age group of primary schools in Baghdad suburbs

Age group	Number examined	Infected	Infection rate %
6-7 yr	339	35	10.3 %
8-9 yr	256	21	8.2 %
10-11 yr	214	18	8.4 %
12-13 yr	91	8	9.9 %
14–15 yr	20	1	5 %
Chi squ are test P-value 0.843			

In Present study, the frequency of washing of hair, the number of family members, sharing bed and towels, and the length of the hair did not differ significantly between affected and uninfected children. Whereas, parent education, the habits of sharing combs, and the presence of dandruff had a significant effect on the prevalence of head mice in pupils of elementary schools (Table 5). The percent of infected pupils whose

parents were uneducated was 19.1% compared to 4.5 for pupils whose parents were educated (P -value < 0.001). Likewise, the percentage of infection increased with the presence of dandruff, where the infection rate was recorded 52 and 48%, respectively. Sharing combs recorded 97.6% of the haired combs. These results are consistent with Degirli ⁽¹⁸⁾, Nejati ⁽¹⁹⁾.

Table 5: Prevalence of head lice in relation to frequency of bathing, sharing towel, sharing beds, sharing combs, hair length, and dandruff infection of primary schools in Baghdad suburbs

Character	Number examined	Infected	Infection rate %	P-value
Parent Education				
Educated	637	29	4.5%	0.001***
Not educated	283	54	19.1%	
Frequency of bathing				
1 a week	789	71	9.0%	0.882
2 a week	115	10	8.7 %	
3 a week	16	2	12.5 %	
Sharing Towel				
Sharing	868	78	9.0	0.878
No Sharing	52	5	9.6	
Sharing Beds				
Sharing	54	29	9.0	0.992
No Sharing	599	321	9.0	
Sharing Comb				
Sharing	882	81	9.2	0.041*
No Sharing	38	2	5.3	
Hair Length				
Short	255	16	6.3	0.137
Medium	456	43	9.4	
Long	209	24	11.5	
Dandruff				
Infected	140	43	23.5	0.001***
Not infected	737	40	5.4	

*,*** Probability value < 0.05, < 0.001 respectively

Conclusion

The results obtained from the current study showed a greater prevalence among children aged 6-12 years with greater of the female gender, housing in rural areas, children who shared head combs jointly with the rest of the family, children with dandruff in the scalp and children whose parents are not educated. Our suggestion is that social and economic levels and health conditions should be improved for the successful treatment of lice infestation, by raising parents' awareness through educational programs.

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References

- Hunter, J. A. and Barker S. C. Susceptibility of head lice (*Pediculus humanus capitis*) to pediculicides in Australia. *Parasitol. Res.*, 2003. 90 (6): 476–478.
- Kirkness, E. F., Haas, B. J., Sun, W., Braig, H. R., Perotti, M. A., Clark, J. M. Genome sequences of the human body louse and its primary endosymbiont provide insights into the permanent parasitic lifestyle. *Proc. Natl. Acad. Sci. U.S.A.* 2010.107, 12168–12173
- Boyd, B. M., and Reed, D. L. Taxonomy of lice and their endosymbiotic bacteria in the post-genomic era. *Clin. Microbiol. Infect.* 2012. 18, 324–331
- Chosidow, O. 2000. Scabies and pediculosis. *Lancet* 355, 819–826.
- Al-Kubiassy, W; Abdul Karim E.T. Head lice in pupils of two primary schools in Baghdad. *J Bahrain Med Soc.* 2003.15:34–38.
- Kadir, Mohammed A.; Dawood S. Awad; Khulood Talab Khalil Al-Sheikhly. Prevalence study of head lice among pupils in some primary schools

- in Kirkuk city and its effects in some of the hematological and biochemical parameters. *Tikrit Journal of Pure Sciences* 2012. 17 (3): 7-12
7. Jabber, Aswan Kadhium. Prevalence of head lice infestation among some primary school students in Amara city, *Mesan Research Journal*, 2005. volume 1 (2) -191.206
8. Burgess, I. F. Human lice and their control. *Annu. Rev. Entomol.* 2004. 49:457_481
9. Al-Muethin, Thilal Mahdi Hassan. Comparison of prevalence of infection - with intestinal parasites and infection with family lice in Baal primary school students and kindergartens in Baghdad after nine years of the siege. Master Thesis, College of Science, University of Baghdad: 2011.151 pages.
10. Al-Kubiassy, W; Abdul Karim E.T. Head lice in pupils of two primary schools in Baghdad. *J Bahrain Med Soc.* 2003.15:34–38.
11. Kadir, Mohammed A.; Dawood S. Awad; Khulood Talab Khalil Al-Sheikhly. Prevalence study of head lice among pupils in some primary schools in Kirkuk city and its effects in some of the hematological and biochemical parameters. *Tikrit Journal of Pure Sciences* 2012. 17 (3): 7-12
12. Al-Samarrai R.J. and Kadir, M.A. Prevalence of head lice among primary schools children in Sammara City urban and rural Samarra areas in – Salahaddin Province. *Med. J. Tikrit University*, 2000, 6, 47 – 51
13. Al-Abady, A.I. Survey on tick infestation in humans, in Mosul city. *Tikrit J. Pure Sci.*, 2009. 14(2), 61-67.
14. Nejati, J.; A. Keyhani; A. T. Kareshk; H. Mahmoudvand; A. Saghaipour; M. Khorminasab; R. Tavakoli Oliaee; S. M. Mosavi. Prevalence and Risk Factors of Pediculosis in Primary School Children in South West of Iran. *Iran J Public Health*, 2018. Vol. 47, No.12: 1923-1929
15. Al-Affas, N. H. The incidence of the head lous (*Pediculus humanus capitis*) among pupils of two schools in Basrah city. *J. Comm. Med.*, 1993. 6 (1): 37 – 44
16. Al-Aboudy, Bassd A. Prevalence of head Lice (*Pediculus humanus capitis*) among primary schools' pupils in Nassirya city. *Um Salama Journal.* 2008. 5 (2): 207-210.
17. Salehi, S.; M. Ban. A study of head lice infestation (*Pediculosis capitis*) among primary School Students in the village of Abadan in 2012, *IJCBNM* July 2014, vol 2, No.3: 195-198
18. Degerli, S.; E. Malayali; and K. Y. Mumcuoglu. 2013. Head Lice Prevalence and Associated Factors in Two Boarding Schools in Sivas. *Turkiye Parazit Derg.* 2013; 37: 32-35
19. Nejati, J.; A. Keyhani; A. T. Kareshk; H. Mahmoudvand; A. Saghaipour; M. Khorminasab; R. Tavakoli Oliaee; S. M. Mosavi. Prevalence and Risk Factors of Pediculosis in Primary School Children in South West of Iran. *Iran J Public Health*, Vol. 47, No. 2018. 12: 1923-1929