



Research Paper: The Prevalence of Pediculosis in Behbahan County From 2017 to 2018



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ABSTRACT

Background: The present project presented the prevalence of pediculosis in Behbahan County, Iran, to plan effective control programs in this area.

Materials & Methods: The data of head lice were collected from the Behbahan Public Healthcare centers. Accordingly, the relevant prevalence rate was estimated according to the age, gender, residential place, and season of the year.

Results: There were 8002 pediculosis cases reported in Behbahan County from January 2017 to December 2018. The prevalence of pediculosis was reported as 2.31% and 1.99% in 2017 and 2018, respectively. The prevalence among females (3750 per 100000 population) was significantly higher than that in males (929 per 100000 population) ($P < 0.001$). Respecting age, the highest prevalence was among the 6-12 years age group with a prevalence of 8067 and 7285 subjects per 100000 population in 2017 and 2018, respectively. The highest number of cases were found in October.

Conclusion: According to our collected results, the illness requires a higher degree of concentration management to adequately manage.

Keywords: Pediculosis, Behbahan, *Pediculus capitis*, Head lice

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1. Introduction

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ediculus capitis or head louse, *P. corporis*, or body louse, and *Pthirus pubis* or pubic louse are 3 species that belong to Anoplura (Insecta: Phthiraptera) that exist solely on the human body. The body louse has

been highly significant in human history as a vector of typhus, trench, and relapsing fevers. It is unclear if head lice can act as human pathogen vectors; however, they can bear pathogens [1-3]. Thousands of lice can infest a louse-infested individual and bite 5 times a day [4]. Louse transmission is closely linked to close body contact and infestations are more frequent in crowded envi-

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ronments, such as homeless shelters, refugee camps, and prisons; notably where hygienic standards are missing [5]. Pediculosis, caused by *P. capitis*, is commonly referred to as head lice infestation [6]. They are particularly attracted to the hair and have laid their eggs on the hair shafts [7]. Pediculosis is more widespread in low socioeconomic status students and inadequate grooming hygiene helps sustain it [6, 8].

Pediculosis is more common in some populations than others. It is linked to age, gender, hair characteristics, and the degree of physical touch between the hair on two individuals [9]. Additionally, pediculosis follows a seasonal trend [10, 11].

Pediculosis is a highly prevalent issue in children [12]. Pediculosis is usually observed in early childhood environments, such as nurseries, classrooms, childcare centers, and facilities with a high infant density [9]. Thus, pediculosis varies depending on cultural traditions, social values, and environmental conditions [13].

Pediculosis can cause several problems, including inflammation, scalp lesions, secondary bacterial infection, nonspecific generalized dermatitis, anemia, and allergic reactions [14, 15]. Moreover, feeling humiliated, nervous, uncomfortable, and disturbing school results are the adverse effects of pediculosis [16]. In exceptional cases, the infestations of the head lice may cause mental distress [17].

A lice infestation is a massive public health issue on a global scale. However, resource-poor nations present higher rates of lice infestation [18]. It exists in all countries regardless of how developed they are and can influence millions worldwide [14].

To our knowledge, European studies found a wide variety of pediculosis incidence, with figures ranging from 1% to 20% of the population [9, 19]. Furthermore, previous studies have demonstrated that various pediculosis prevalence (1.6%–67%) occurred in Iranian school-aged children [6, 13]. The prevalence of low-income female elementary school lice infestation in south-eastern Iran was reported as 67.3% [13].

Analyzing pediculosis prevalence in different locations can effectively design pediculosis treatment and prevention programs. This investigation objective was to determine how numerous individuals are affected by head lice and identify potential risk factors in Behbahan County, Iran, in 2017 and 2018. The main purpose of the research was to establish the total and seasonal prevalence of pediculosis in the Behbahan society; accordingly, we aimed

to help officials spread services while also focusing on locating and tackling risk factors that lead to an infestation.

2. Materials and Methods

This descriptive-analytical research was performed on all individuals with head lice, referring to the healthcare centers in Behbahan from January 2017 to December 2018. Behbahan is located in Khuzestan Province, Iran, in an arid and semi-arid climate region with latitude 30° 35' 45" N and longitude 50° 14' 30" E (Figure 1). The average annual temperature is 27.6°C (between -2.8°C and 50.2°C). Behbahan receives 329 millimeters of rain on average; i.e., 50.3% is in winter, 7.5% in the spring, and 0.2% in autumn and summer [20].

The relevant personal characteristics of the infected individual, including age, gender, residency, and the date of visit, were collected from healthcare records. The obtained data were then processed and analyzed. The population of the 2016 census was considered as the denominator of the prevalence estimate.

The present research findings were analyzed using SPSS v. 25. The Chi-squared test was used to compare gender, residency, years, age groups, and seasons of the year. A $P < 0.05$ was considered significant.

3. Results

In total, 8002 cases of head lice infestation were diagnosed throughout the 2-year study period. Over the study years, the prevalence of head lice infestation has decreased in the year 2018. Table 1 presents the prevalence estimate of head lice according to the individual characteristics, month, and year of the study.

The prevalence of head lice infestation among females and males was 3750 and 1976 per 100000 population in 2017, and 3275 and 761 per 100000 population in 2018, respectively. In both study years, there was a statistically significant difference in prevalence estimates in terms of gender ($P < 0.001$).

The prevalence of head lice infestation indicated a significant association with place of residence. The prevalence of head lice in the inhabitants of urban areas was equal to 1976 per 100000 population; however, it was reported as 3535 per 100000 population for the residents of rural areas, in 2017. Additionally, the prevalence was estimated as 1167 in the inhabitants of urban areas and 5221 per 100000 population were the residents of rural areas, in 2018. Individuals with foreign nationality con-



Figure 1. Area of research in Behbahan County (Khuzestan Province) in southwestern Iran, in 2017-2018



sisted 0.9% of the total infestation cases. Concerning the age group, the highest and lowest prevalence estimates in both years were observed in those aged 6-12 years and >18 years, respectively.

Figure 2 illustrates the monthly distribution of head lice infestation in 2017 and 2018. In 2017, the highest prevalence was in October and July and the lowest was in March. Similarly, the highest head lice infestation in 2018 was observed in October; however, the lowest prevalence belonged to April. There was a significant association between headlice infestation and the season of the year. The highest prevalence was reported to be in the autumn in both years.

4. Discussion

Head lice infestations do not pose a direct threat to health or function as a vector for disease; however, they are a critical social issue with significant costs [7]. In total, 8002 cases were affected with head lice during the study period. The prevalence of pediculosis in the current study was reported to be 2313 and 1991 per 100000 population in 2017 and 2018, respectively. Previous estimates from comprehensive research in Iran demonstrated an estimate between 1 to 8303 per 100000 population [21]. Previous studies reported the various pediculosis prevalence from 1.6% to 67% in school children in Iranian provinces [6, 13].

The prevalence of *P. capitis* in studies in Asia indicated a range between 0.7% to 59%, in Europe, the same rate was equal to 0.48% to 22.4%, in Africa, it was 0% to 58.9%, in America, it was 3.6% to 61.4%, and in Oceania, this rate was measured as 13% [22].

The data analysis findings revealed that head lice infestation further occurred during autumn, compared to other seasons. Our result was consistent with a study in Germany; they found the prevalence of pediculosis capitis varies by season, with the peak occurring in late summer and early autumn [10]. There was a rise in the activities of children as they attended school during the autumn. After the holidays, when school resumes, the infested children's presence may build up a stock; subsequently, head lice may disperse others from the enlarged pool [10]. Numerous individuals, as a result, wore extra clothes and sought shelter in defined areas to keep warm during the autumn and winter when these cold climatic conditions are present; consequently, children are more prone to change these clothes, this can lead to an increased transfer of head lice in the cold season [10, 23].

We observed that the age group of 6-12 years was the most infested; this age group is precisely the age of students in primary schools. This result was consistent with those of numerous other studies conducted in various parts of the world [24, 25]. The children are also relatively child- and friend-focused during this age range, but are unaware of pediculosis paths.

Table 1. The number and prevalence estimate of head lice infestation according to the study characteristics in Behbahan County, in 2017-2018

Year	Characteristics	Population	No.	Prevalence Per 100000 Population	
2017	Gender	Male	93835	872	929.3
		Female	90340	3388	3750
	Residency	Urban	144317	2851	1975.5
		Rural	39858	1409	3535
	Age group	< 6	18158	966	5320
		6-12	19089	1540	8067
		13-18	13825	785	5678
		> 18	133103	969	728
	Season	Spring	184175	764	414.8
		Summer	184175	1130	613.5
		Autumn	184175	1496	812.3
	2018	Gender	Male	95823	729
Female			92005	3013	3275
Residency		Urban	149575	1745	1166.6
		Rural	38253	1997	5221
Age group		< 6	18724	860	4593
		6-12	19683	1434	7285
		13-18	13521	608	4497
		> 18	135900	840	618.1
Season		Spring	187828	849	452
		Summer	187828	835	444.6
		Autumn	187828	1145	609.6
Year		Winter	187828	913	486.1
	2017	184175	4260	2313	
	2018	187828	3742	1991	



These research results revealed that girls were much more heavily infested than boys. This finding was in line with those of the previous studies in Iran and other countries, suggesting that girls were more affected than boys [21, 26-29]. As per an Iranian study on 200306 individuals, *P. capitis* was present in 1.6%, 8.8%, and

7.4% of primary school pupils, respectively, for boys, girls, and all students [6]. The infestation rate in females was almost 41 times greater than that in males in one study [11]. It is likely due to the gender-wise differences in behavior characteristics; boys have short hair, while girls have long hair suitable for living and breeding sites

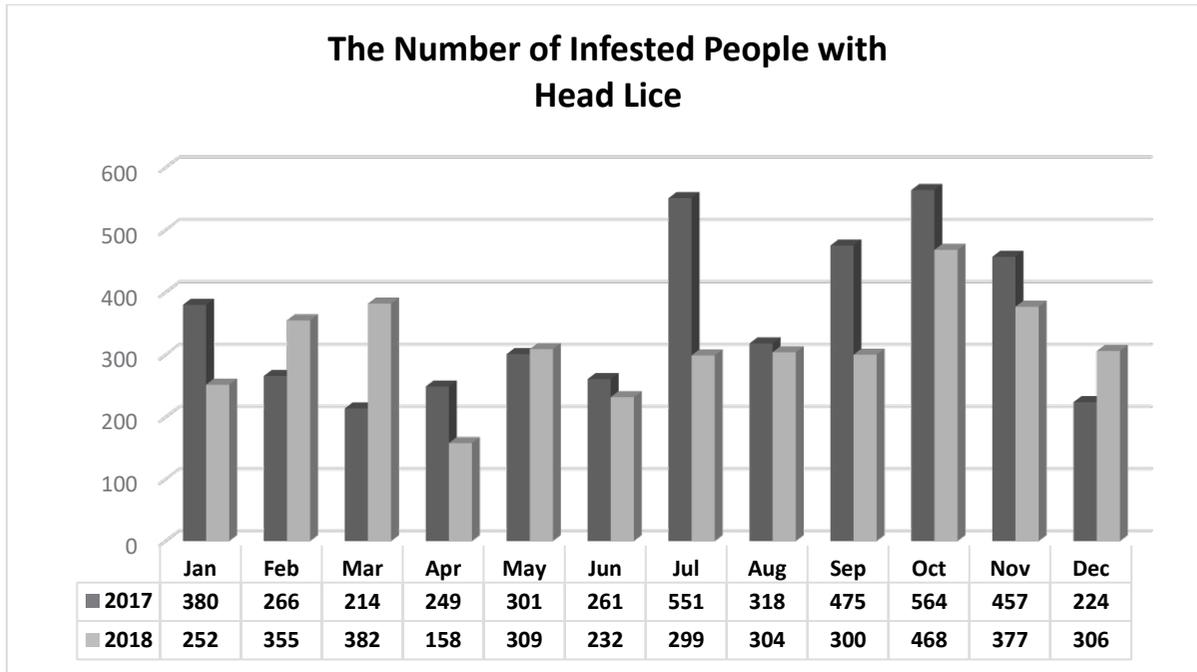


Figure 2. The monthly distribution of head lice in Behbahan County, Southwest Iran (2017–2018)



for lice. This effect might also be related to the limited physical interaction between boys than girls [11].

The prevalence of head lice in individuals living in rural environments was nearly 2 to 4 times more than that in the urban-living community. Besides, the difference between urban and rural was significant. These results were inconsistent with those of the previous studies concerning the frequency of *Pediculus capitis* in students in Khuzestan and Hamadan Provinces. They indicated that the head lice infestation was more marked among urban students [30, 31]. An explanation for their study's findings was higher health education for rural residents performed by rural healthcare workers, resulting in better protection against *Pediculus capitis* among students and their families in rural areas [32]. They concluded that the distinction was that more schools were sampled and preserved in urban areas, compared to the rural ones [30]. Furthermore, pediculosis seems to be an urban epidemic that can be linked with overcrowding [33]. However, the disease was more common in rural areas in several research areas [11, 21, 34, 35], per our findings.

The primary limitation of this study was that some patients might ignore the problem, and some prefer to receive care from private practices or to commit self-care or self-medication. As a result, they avoid visiting a public health center; therefore, the prevalence rate presented here might be underestimated. Moreover, the obtained data were anonymous; thus, duplicated patients

were not properly managed and removed from the study, which may inflate the prevalence rate.

5. Conclusion

Lice are not nearly as prevalent as before the advent of chemical pesticides; however, they remain a significant concern in numerous communities. The infestation is the product of several factors, including social, cultural, and economic problems and sanitary levels. Therefore, cooperation between different organizations is essential to control and eradicate head lice. It is also strongly suggested that elementary school teachers make health education accessible to students and help train, screen, and follow-up the infested students to control pediculosis in the region.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of the Ahvaz Jundishapour University of Medical Sciences (Code: IR.AJUMS.REC.1399.163).

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflicts of interest.

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