

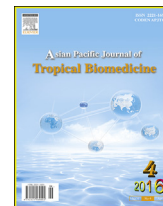
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Pediculosis capitis among primary and middle school children in Asadabad, Iran: An epidemiological study

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ABSTRACT

Objective: To investigate the prevalence of head lice in primary and middle school children in Asadabad, Iran.

Methods: This study is an analytical descriptive cross-sectional one conducted among primary and middle school children in Asadabad during the academic year of 2013–2014. Data were collected at baseline via questionnaire, checklist and head examination.

Results: A total of 600 students were examined (412 girls and 188 boys), and 14 students showed pediculosis. And the total prevalence rate was 2.3% (3.2% girls and 0.5% boys). The infestation was equal in public and private schools. The rate of pediculosis was higher in students of primary schools (4.0%) than those in middle schools (0.7%). The age of the students ranged from 6 to 14 years. The total number of infected group was 14 with mean age of 8.93 ± 2.43 years, and it was 586 with mean age of 10.98 ± 2.82 years for the uninfected group who were enrolled in the study ($P < 0.01$). This study showed significant differences between students with curly hair (5.5%) and those with straight hair (1.9%) when compared in terms of head lice infestation ($P < 0.05$). The relations of pediculosis and other socioeconomic factors such as sharing common comb and a room with other people, frequency of bathing, and parents' profession and education were analyzed, and *Chi*-square test did not show a statistically significant relationship between head lice contamination and the abovementioned socioeconomic factors ($P > 0.05$).

Conclusions: It is necessary to find the risk factors of the infection in order to understand how to control or decrease infection in students, considering the important role of health education in reduction of head lice infections.

1. Introduction

The head louse, *Pediculus humanus capitis* (De Geer, 1778) (Anoplura: Pediculidae), is a worldwide community health concern [1]. Pediculosis represents an emerging social problem in all parts of the world and in every race, socioeconomic status, family background, or personal habit [2,3]. Head lice is usually diagnosed by three different manifestations including

itching and inflammation of the scalp and neck, sighting of lice, and detection of eggs attached to hair shafts [4,5]. The head louse is a kind of blood-sucking insect which can cause pruritus (that is the most common symptom), excoriation, conjunctivitis, and secondary bacterial infestations [6]. Lice infestation dates back to 25 million years ago in primates [7]. Fertilized eggs of sucking lice are called nits and are firmly cemented to the hair shaft. Subsequently, eggs develop through three nymph instars before reaching adulthood [8]. Pediculosis is more common in young girls and those in crowded families, especially because of using similar hair products [9]. Schools, particularly primary ones, are places which play the main role in starting the prevalence of contagious disease and infestations such as the pediculosis epidemic [10]. Almost all human head lice and scabies infestations occur by direct host-to-host contact [11–13].

Many studies have been performed in Iran, comparing the social status and the rate of pediculosis in different cities. In the city of Asadabad, no studies have been recently done on

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pediculosis infestation levels. Therefore, the aim of this work is to investigate the prevalence of head lice in primary and middle school children in Asadabad, Iran. In addition, the influence of different risk factors on pediculosis infestation such as gender, hair characteristics, and socioeconomic factors have been studied.

2. Materials and methods

2.1. Study area

Asadabad is a city in Hamadan Province, Iran. It lies at 34°37'–34°50' N, 47°51'–47°90' E, and altitude of 1 591 m. It has a population of 59 617, making it the 5th biggest city in Hamadan (Figure 1).

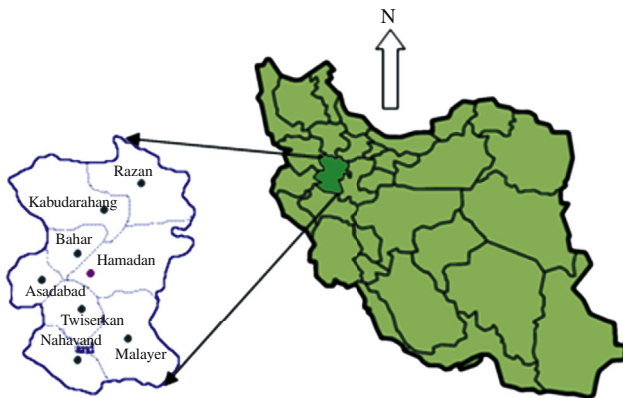


Figure 1. Location of Asadabad City in Hamadan Province, Iran.

2.2. Samples and data collection

The present research is an analytical descriptive cross-sectional study, conducted among primary and middle school children in Asadabad, Iran during the academic year of 2013–2014. Questionnaire, checklist, and head examination were the means to gather data at baseline.

The sample size was determined by considering an expected prevalence (P) of 50% with a 95% confidence and using the formula $n = z^2 \times P(1 - P)/d^2$ in which $z = 1.96$ and $d = 0.04$, which resulted in 600 (188 boys and 412 girls) children.

In the second stage, the schools were selected according to their geographical distribution to cover the whole district, and they represented public and private schools (16 primary and middle schools were randomly selected in Asadabad, and the students were systematically selected in these schools).

In order to evaluate the influence of socioeconomic factors on pediculosis prevalence, an epidemiological survey was designed to record information about gender, type of school, hygiene teacher, job and education of parents, qualified private bedroom, sharing a bed and blanket, frequency of bathing, sharing common comb, hair characteristics, and number of family members. The criteria for diagnosis of pediculosis were the presence of at least one living adult, nymph, or viable nit [14].

2.3. Statistical analysis

The Chi-square test for homogeneity of proportions was employed to compare the prevalence between some variables. Confidence intervals of 95% for prevalence were determined. The results were presented as mean \pm SD for quantitative

variables. The statistical analysis was conducted with statistical software SPSS version 20.

3. Results

A total of 600 students were examined (412 girls and 188 boys) among which only 14 students showed pediculosis, and the total prevalence rate was 2.3%. Pediculosis was more frequent in girls (13 out of 412, 3.2%) than boys (1 out of 188, 0.5%) ($P < 0.05$).

The infestation was equal in public schools (2.3%, $n = 514$) and private schools (2.3%, $n = 84$) ($P > 0.05$). The rate of pediculosis was higher in primary schools (4.0%, $n = 303$) than middle schools (0.7%, $n = 297$) ($P < 0.01$).

The age of the students ranged from 6 to 14 years. The total number of the infected group was 14 with mean age of 8.93 ± 2.43 years, and it was 586 with mean age 10.98 ± 2.82 years in the uninfected group who were enrolled in the study ($P < 0.01$).

The prevalence of head lice infestation was influenced by socioeconomic factors, as 8.5% of the infected cases had more than three family members. In this study, the pediculosis infestation in school children who had hygiene teacher (1.8%) was less than those who did not (5.6%, $P < 0.05$). This study confirmed significant differences between hair shapes when compared with head lice infestation ($P < 0.05$). The prevalence of pediculosis in school children who had straight and curly hair was 1.9% and 5.5%, respectively (Table 1).

Table 1

Head louse infestation in school pupils according to some socioeconomic factors in Asadabad, Iran, 2013–2014. n (%).

Characteristics	Infected	Uninfected	Total	P value	
Having hygiene teacher	Yes	9 (1.8)	502 (98.2)	511 (85.2)	0.043
	No	5 (5.6)	84 (94.4)	89 (14.8)	
No. of family members	≤ 3	10 (1.8)	543 (98.2)	553 (92.2)	0.003
	> 3	4 (8.5)	43 (91.5)	47 (7.8)	
Sharing common comb	Yes	5 (3.5)	137 (96.5)	142 (23.7)	0.283
	No	9 (2.0)	449 (98.0)	458 (76.3)	
Sharing a room with other people	Yes	6 (1.9)	318 (98.1)	324 (54.0)	0.397
	No	8 (2.9)	268 (97.1)	276 (46.0)	
Frequency of bathing	Once a week	3 (2.0)	145 (98.0)	148 (24.7)	0.776
	$> Once a week$	11 (2.4)	441 (97.6)	452 (75.3)	
Father's profession	Unemployed	2 (3.3)	59 (96.7)	61 (10.2)	0.229
	Businessmen	7 (1.7)	414 (98.3)	421 (70.2)	
	Government	5 (4.2)	113 (95.8)	118 (19.6)	
Mother's profession	Housewife	13 (2.4)	521 (97.6)	534 (98.0)	0.691
	Businessmen	0 (0.0)	29 (100.0)	29 (4.8)	
	Government	1 (2.7)	36 (97.3)	37 (6.2)	
Father's education	Illiterate	3 (7.0)	40 (93.0)	43 (7.2)	0.054
	Initial education	7 (1.6)	435 (98.4)	442 (73.7)	
	University education	4 (3.5)	111 (96.5)	115 (19.2)	
Mother's education	Illiterate	2 (2.4)	82 (97.6)	84 (14.0)	0.917
	Initial education	11 (2.4)	442 (97.6)	453 (75.5)	
	University education	1 (1.6)	62 (98.4)	63 (10.5)	
Hair shape	Straight	10 (1.9)	517 (98.1)	527 (78.8)	0.023
	Curly	4 (5.5)	69 (94.5)	73 (12.2)	

The relations of pediculosis and other socioeconomic factors such as sharing common comb and a room with other people, frequency of bathing, and parents' occupation and education were investigated. *Chi-square* test did not show a statistically considerable relationship between the head lice contamination and socioeconomic factors mentioned above ($P > 0.05$) (Table 1).

4. Discussion

Head lice infestation is one of the major public health problems with a world-wide distribution [15]. The lack of data on the epidemiology of head lice could hamper and disrupt the strategy for pediculosis control in Asadabad.

The highest percentage of this incidence is seen in children aged five to twelve years; however, this incidence is increasing in the range of 24–36 years old group due to their exposure to infected children [9].

The prevalence of head lice in children found in this study was 2.3% (3.2% girls and 0.5% boys). The results of this study are consistent with other studies carried out in Iran where the rate of contamination was reported to be 4.8% in Khaje City, including 6.66% girls and 2% boys [15]. However, in Aran and Bidgol, the amount of head lice contamination in female and male students of primary schools was 0.42% and 0.05%, respectively [16]. In Hamadan, Iran, the general prevalence was 6.85% (girls: 13.5%; boys: 0.7%), and the number of girls who had been contaminated was more than boys [17].

The studies carried out abroad also support the findings of this study. According to them, the rate reached 9.1% in Turkey, including 16.4% girls and 2.1% boys [18]. The prevalence of head lice in Delhi was 16.59%, including 20.42% girls and 13.86% boys [19], and 13.3% in Yemen, including 18.9% girls and 8.6% boys [20]. As it can be seen, in all of the abovementioned studies, the rate of infestation was higher in girls than boys.

Children aged 10–11 years were most frequently infested with pediculosis, which could be explained because of their age and head-to-head contact [21,22]. Head lice infestation was observed to be a common condition among primary school children, as having been documented by others [3,23]. The number of infestation was equal in public and private schools in Asadabad (2.3%), and this finding indicated a disagreement with other study results [6,24]. This study also proved that the school children with curly hair presented more prevalence rate than those with straight hair in contrast to what was believed at first, disagreeing with the results obtained from the factor of hair shape by Borges and Mendes [25] and agreeing with those of another study [17]. Many authors conceive that head lice prevalence can be associated with socioeconomic factors [18,23,26]. Head lice infestations are more widespread in poor socioeconomic status; and family size, age, level of education, and personal hygiene are important factors influencing its epidemiology [27]. Results show that screening and treating head lice among children need to be done continuously in order to decrease the infestation rates [28,29]. In our study, no differences were found between head lice contamination and socioeconomic factors like sharing common comb and a room with other people, frequency of bathing, and parents' jobs and education.

Socioeconomic status is a major factor influencing the occurrence of pediculosis among school children of both sexes. Improving standards of living and personal hygiene can

significantly reduce pediculosis capitis in school children in Asadabad. Consequently, it is necessary to find the risk factors of the infection so as to understand how to control or decrease infections in students, taking into account the important role of health education in reduction of head lice infection.

Conflict of interest statement

We declare that we have no conflict of interest.

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