



Head lice infestation (pediculosis capitis) among children in schools in some municipalities in Tripoli-Libya

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ABSTRACT

Background: Pediculus capitis is an obligate ectoparasite and considered a worldwide community health problem that affects children in both developed and underdeveloped countries. Objective of the study: to determine the prevalence rate of head lice infestation among children in school, as well as demographic and risk factors that contribute to the spread of this parasite. Study design: a cross-sectional observational study was conducted between November and December 2021 in thirty-one governmental children's schools in Tripoli. (5764) pupils were examined for head lice infestation; data were collected from infested pupils by direct interview, and statistically analyzed by the SPSS program. (Chi-square), results considered statistically significant at (P<0.05). Results: from the conducted study showed that the overall total prevalence rate of head lice infestation was (1061/18.41%) in all municipalities, Aboslim, and soq-aljuma represented high prevalence (28.97%, 23.72% respectively) with high statistically significant (P<0.001) compared with Ain-zara, and Tajura (13.93%, and 12.89% respectively). Pupils aged from 6-11 years are highly infested than those aged 12-14 years the rate (63.52%, 36.48% respectively), female more infested than male (73.33%, 26.67% respectively), smooth hair highly infested than middle and curly hair (76.81%, 17.91%, and 5.28% respectively), stage of parasite pupils was highly infested with nit than nymph and adults (86.43 %, 1.98%, 11.59% respectively), female wearing headscarves highly infested than those dose not wearing (87.40%, 12.60% respectively), pupils who washing twice per week more infested than those washing four or more than four times per week (45.81%, 26.20%, and 27.99% respectively), family have more than four members highly significant infested than those have two or four members (64.37.%, 10.74%, and 24.88% respectively). Conclusion: prevalence of head lice infestation was 18.41%, the most common risk factors were young ages, females, smooth and short hair, wearing scarves, family members, and showering twice per week.

Introduction

Pediculus capitis is a type of hematophagous louse that has existed for more than 10,000 years, and is the most common human louse [Oh et al., \(2010\)](#). Pediculosis capitis generally lives on human hair and the scalp, and is common among children [Dehghanzadeh et al., \(2015\)](#). The most common way to contract head lice infestation is contact with a person who already has head lice. Such contact is common among children during play, or by wearing clothing, such as hats, scarves, coats, hair ribbons, using combs, brushes, beds, couch, pillow, carpet [CDC, \(2019\)](#). Pediculosis capitis infestation is a global public health issue that affects children in both developed and developing countries [Motovali-Emami et al., \(2008\)](#). Repeated infection can lead to allergic reactions such as nasal obstruction, rhinorrhea, and

nightly whistles. Furthermore, *Pediculosis capitis* can carry bacteria such as *Rickettsia prowazekii*, *Bartonella quintana*, *Acinetobacter baumannii*, *Borrelia recurrentis*, and *Yersinia pestis*, which can be life-threatening to the host. [Fernández et al., \(2006\)](#). The hypothesis of this study may show a high rate of infestation with *P. capitis*, or may show a low rate, or may not report any case infested with *Pediculosis capitis*. So the objectives of the study are to determine the rate of head lice infestation among children in schools and risk factors that contribute to the spread of head lice infestation in Tripoli, Libya.

Material and methods

This study was carried out between November - December 2021 in four Municipalities in Tripoli city. a cross-sectional observational study was conducted in thirty one primary and elementary school was selected randomly by helping and approved of school health office manager in each Municipality, one class is selected randomly from first class to eight class, sample were represent 10 percent or more from total number if pupils according that showed in table (1).

Table 1: showed area, name of school, total number of students, and number of examined cases

s.n	Area	Name of school	N of pupils	N of examined cases
1.	Ain-zara municipality	Al-Nasser salhaldeen	883	264
2.		Alferdus	702	115
3		Ain-zara	1516	196
4		Rajab al-naeeb	1277	281
5		Shuhada al-fernag	934	235
6		Abd-almunem reyad	724	223
Total number			6036	1314
7.	Tajura municipality	Al-hatab	909	301
8.		Al-qlaa	1680	188
9.		Oqba ben nafee	810	285
10.		Beer alosta melad	1452	153
11.		Shuhada alhurea	1246	148
12.		Yahya alswede	886	180
13.		Al-dar al-byda	1461	251
14.		Alwadi algarbi	530	242
15.		Ibn senaa	770	297
16.		Jabber ben hyan	2022	213
Total number			11766	2258
17.	Soq-aljuma municipality	Shuhada soq-aljuma	630	188
18.		Abdallah aljetely	1378	233
19.		Al-entelak	871	202
20.		Al-rabee	1561	135
21.		Jeel al-wahda	633	157
Total number			5073	915
22.	Aboslim	Fatima al-Zahra	922	111
23.		Al-sumod	1466	125
24.		Fajer al-hurea	1247	120
25.		Alseda zinab	1108	115

26.	municipality	Shuhada berut	806	138
27.		Al-entefada	685	187
28.		Al-faroq	1099	117
29.		Alfedda	1658	141
30.		Al-eslah	1222	114
31.		Rayat al- esteklal	1711	109
Total number			11924	1277
Total number of sample			34799	5764

Statistical analysis: The obtained data were expressed by using a statistical program for Windows SPSS (2001). The effect of variables was determined by chi-square. The results showed ($P<0.05$) was considered statistically significant.

Results

Municipalities (Ain-zara, Tajura, Soq-aljuma, Aboslim) regarding to head lice infestation rate.

Results obtained in this study showed that from the total number of examined pupils, which were (5764/1061), as presented in Table (2). The Overall total prevalence rate of head lice infestation in all municipalities was (18.41%), and according to each municipality (Ain-Zara, Tajura, Soq-Aljuma, and Aboslim respectively), prevalence rates were (13.93%, 12.89%, 23.72%, and 28.97% respectively). The result showed that high statistically significant difference in Aboslim and soq-aljuma municipalities ($P<0.001$) compared to Ain-Zara and Tajura. The high infestation rate in Aboslim and Soq-aljuma may be attributed to overcrowding of pupils in schools in these municipalities.

Risk factors (age, gender, type of hair, tall of hair, stages of infestation, use of headscarves, frequency of wash per week, and family size) regarding to head lice infestation rate.

The number of infested pupils aged from 6-11 years old was (674), and the rate was (63.5). Pupils aged from 12-14 years old were (387), and the rate was (36.48%). Analysis of variance indicates that there is a highly significant statistical effect ($P<0.001$) in pupils aged from 6-11 years old than those aged from 12-14 years old. While the number of infested females and males was (778, 283, respectively), and the rate of infestation was (73.33%, 26.67% respectively). The result showed that there is a highly significant statistical effect ($P<0.001$) in females than in males. According to the types of hair (smooth, medium, and curly hair) were (815, 190, 56, respectively), and the rates were (76.8%, 17.91%, and 5.28% respectively). Results appears that there are highly statistically significant ($P<0.001$) differences in pupils who have smooth hair compared with middle and curly hair, and head lice infestation, while according to tall of hair (long, and short) was (486, 575), and rate was (45.81%, 54.19%) with statistically significant ($P<0.001$) in short hair. The number of infested pupils with nit, nymph, and adult was (917, 21, and 123, respectively), and the rate was (86.43 %, 1.98%, and 11.59% respectively). The Result showed a highly significant statistical effect on pupils infested with nit ($P<0.001$) compared with adults ($P<0.05$) and nymphs. The number of infested females who use a headscarf was (680) and the rate was (87.40%), while those pupils who have not used a headscarf were (98) and the rate was (12.60%). Results showed that this effect is a highly significant statistical effect on females infested with head lice and who used a headscarf ($P<0.001$) compared with those who did not use a headscarf. According to the number of showers per week, results showed that pupils who had showered twice, four times, and more than four times per week were (486, 278, and 297 respectively), and rates were (45.81%, 26.20%, and 27.99% respectively). Results showed that two times of showers per week have a significant statistical effect ($P<0.001$) compared with those who showered four or more times per week. While the result showed that Pupils who have family sizes of two, four, and more than four were (114, 264, and 683 respectively), and rates were (10.74%, 24.88%, and 64.37 % respectively). Analysis of variance showed a highly significant statistical effect on pupils infested with head lice and had a family size of more than four ($P<0.001$) compared with those who had two or four.

Discussion

Data about head lice infestation in the west of Libya are not available. There is one study in 1998 in Benghazi, 2019 in Houn, 2022 in Misurata, and 2020 in Sebha. This study was conducted in 2021 in Tripoli. The results showed that from



the total number of examined pupils (5764), from thirty-one schools were (1061) the overall prevalence rate of head lice infestation in children's schools was (18.41%). These results were lower than those obtained by [Ibrahim et al., \(2020\)](#). In Libya which was (38.6%), [El Moselhy et al., \(2020\)](#). In Egypt (35.8%), [AlBashtawy et al., \(2012\)](#). In Jordan (26.6%), but near the study in Egypt reported by [El-Sayed et al., \(2017\)](#); [Nada, \(2006\)](#). Which was (21.9%, 16% respectively), [Khamaiseh, \(2018a\)](#). in Jordan (20.4%). The obtained result was higher than that reported by [AL-Megrin, \(2015\)](#); [Amin et al., \(2019\)](#). In Iraq (14.43%), This variation in results may be attributed to the number of samples obtained by the researcher or the degree of infestation from one country to another, and differences in risk factors. However in a carried study, the children aged from 6-11 years old had a higher prevalence of head lice infestation (63.52%) than those aged 11-14 years old (36.48%). The results agreed with those reported by [Al-Maktari, \(2008\)](#); [AlBashtawy et al., \(2012\)](#); [Ibrahim et al., \(2020\)](#). On the other hand, females have a higher prevalence of head lice infestation than males in the carried study (73.33% vs 26.67% respectively). This corresponds to the data obtained by [Al-Maktari, \(2008\)](#); [AlBashtawy et al., \(2012\)](#); [Amin et al., \(2019\)](#); [Baghdadi et al., \(2021\)](#); [Baykan et al., \(2006\)](#); [Bharja et al., \(1988\)](#); [Ibrahim et al., \(2020\)](#); [Karaaslan et al., \(2015\)](#); [Khamaiseh, \(2018a\)](#). Smooth hair in a conducted study showed a higher rate of infestation (76.81%) than middle (17.91%) and curly hair (5.28%). While short hair has a higher rate (54.19%) than long hair (45.81%), these results disagree with results obtained by [Al-Maktari, \(2008\)](#); [AL-Megrin, \(2015\)](#); [AlBashtawy et al., \(2012\)](#); [El Moselhy et al., \(2020\)](#); [Khamaiseh, \(2018a\)](#); [Nada, \(2006\)](#). However rate of nits (86.43%) in the carried study was higher than adult lice (11.59%). The results agreed with the results obtained by [El-Sayed et al., \(2017\)](#). The use of headscarves represented (64.09%) of the examined cases that had head lice infestation, which agrees with the results obtained by [Hamid Kassiri et al., \(2021\)](#); [Hasan. Mohamed. Saleh. Ibrahim et al., \(2020\)](#); [Hoda Ghofleh Maramazi et al., \(2019\)](#); [Khamaiseh, \(2018b\)](#); [Shayesteh Salehi et al., \(2014\)](#). The use of headscarves is considered a preferred environment (suitable temperature) for lice eggs (nits) to hatch and become nymphs. On the other hand, the number of showers per week in the carried study showed that a high rate of head lice infestation in pupils who shower two times per week (45.81%) compared with those showering four (26.20%) or more (27.99%). The results agree with the reported results by [AlBashtawy et al., \(2012\)](#); [El Moselhy et al., \(2020\)](#); [Khamaiseh, \(2018a\)](#). Decreasing personal hygiene may contribute to an increased rate of lice infestation. Finally relation between family members and head lice infestation in a conducted study showed that families have more than four members (64.37%) had a higher prevalence of head lice infestation compared with those have four (24.88%) and two (0.74%). The result agrees with those reported by [Al-Maktari, \(2008\)](#); [Gharsan et al., \(2016\)](#); [Karaaslan et al., \(2015\)](#); [Khamaiseh, \(2018a\)](#); [Nada, \(2006\)](#). The increase in family members, especially in low and medium-income families, may contribute increase in the rate of lice infestation due to overcrowding and low hygiene.

Conclusions and Recommendations

The overall prevalence rate of head lice infestation in the children's school that undergoes to study was (18.41%). Children aged from 6-11 years old have a higher prevalence than those aged 12-14 years old. Infestation rate was higher in females than in males, and in smooth and short hairs. Infestation rate with nits was higher than with nymphs and adults. Females who wear headscarves are more affected than those who don't wear headscarves. Personal hygiene is a common risk factor for head lice infestation. Increased family members are at increased risk of head lice infestation. So I recommended that A survey on all children's schools in Libya at the same time by the health school office should be done. Treatment for head lice should be available at a cheap price for all Population and support poor families. Public health education and the school health office in each school should be implemented.

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Table 2: shows municipalities (Ain-zara, tajura, soq-aljuma, Aboslim) and prevalence rate of head lice infestation.

Manuciplayi	Number examined case	of Number of infested case	Infestation Rate %	significant
Ain-Zara	1314	183	13.93	N.S
Tajura	2258	291	12.89	N.S
Soq-Aljuma	915	217	23.72	S
Aboslim	1277	370	28.97	S
Total	5764	1061	18.41	

S= significant, N.S= non-significant.

Table 3: Shows risk factors (age, gender, type of hair, tall of hair, stages of infestation, used of head scarves, times of wash per week, and family size) and rate of infestation with head lice.

Risk Factors		Frequency	Rates %	Significant
Age Groups	6 -11 Years old	674	63.52	S
	12-14 Years old	387	36.48	N.S
	Total	1061	100	
Gender	Female	778	73.33	S
	Male	283	26.67	N.S
	Total	1061	100	
Type Of Hair	Smooth	815	76.81	S
	Middle	190	17.91	N.S
	Curly	56	5.28	N.S
	Total	1061	100	
Tall Of Hair	Long	486	45.81	N.S
	Short	575	54.19	S
	Total	1061	100	
Stage Of Infestation	Nit	917	86.43	S
	Nymph	21	1.98	N.S
	Adult	123	11.59	N.S
	Total	1061	100	
Use Of Head Scarves	Yes	680	87.40	S
	No	98	12.60	N.S
	Total	778	100	
Times Of Shower Per Week	Twice	486	45.81	S
	Four Times	278	26.2	N.S
	More Than Four Times	297	27.99	N.S
	Total	1061	100	
Family Size	Two	114	10.74	N.S
	Four	264	24.88	N.S
	More Than Four	683	64.37	S
	Total	1061	100	

S= significant, N.S= non-significant