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Epidemiologic study of Pediculosis and the effective factors in the Sari Township kindergartens in 2014

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Abstract
Background and purpose: Pediculosis is one of the parasitic diseases, that is a main factor in the health level assessment society. The present study conducted determine the effective factors in the pediculosis in the kindergartens of Sari Township in 2014.
Methods: This descriptive cross sectional study was done on the Sari Township kinder gardens. Of 60 kinder gardens keeping 3328 children (1517 girls and 1811 boys), 10 with 416 children (293 girls and 123 boys) were selected randomly after clustering and examined for presence of pediculosis (the ovum or matured lice). Using the questionnaire consisting the variables such as gender, living place etc. the data were collected, and the obtained results were analyzed using the statistical analysis of correlation coefficient and X^2 tests.
Findings: Among 416 kinder garden children of Sari Township, 27 subjects were infected with pediculosis, the prevalence rate was determined 6.49%. The rate of pediculosis prevalence had significant relationship with the variables such as, using the personal devices, the parents' level of education, having health expert in the kinder gardens and the fathers' education level (P<0.05). But the relationship between pediculosis prevalence and the variables such as, living place, sleeping in the common room and hair style was insignificant.
Conclusion: The present findings show the role of education and instruction of the parents and the kinder gardens' health experts in improving the personal public hygiene in reduction of acquiring pediculosis in the kindergartens of the regions under study.

Keywords: Pediculosis, epidemiology, kindergartens children, Sari Township, Mazandaran

1. Introduction
Hygiene and public health in every society are very important, particularly in development of society and infection to parasites is health threatening. Despite health improvement and development of medical sciences, parasital infections are the main health concerns. Based on the WHO report, and despite much spending in health improvement, pediculosis has not been controlled reasonably in different countries [1]. Pediculosis is one of the common parasital diseases seen as head trunk and public region lice [2]. About 6 to 12 million people become infected with this parasite annually. This disease is one of the most common contagious diseases in the society [3]. Relevant worldwide studies on the children show its prevalence rate 10%, sometimes to 40% or higher [4]. Many sporadic studies have been done in different part of Iran, for example, a study by Pourbaba in 2002 showed its prevalence rate 4.5% in the elementary school students of Gilan province [5], and report of Dehghani *et al*., 9% in the elementary school students indicated in the Kashan Township (Iran) 9% [6]. Droudgar *et al*., showed the prevalence of pediculosis 0.47% in the elementary school students in 2007 [7].
Data of Davari *et al*., in 2005 on the elementary school students of Sanandaj Township revealed pediculosis 7.7% [8], and in the Kindergartens of Rasht Township 5.1% in 2009 [9].
Gotizor showed pediculosis42.7% in the Kinder gardens at Bahia Balanca city in Argentina in 2011 [10].
Lice bite by introducing saliva protein in the host causes irritation and fatigue. The secondary infection may appear as itching at bite site, leading to cutaneous inflammation, impetigo, and the similar symptoms that can lead to the depression, mental problems, education retardation, insomnia and missing of social status [11].
The main route of pediculosis is direct transmission through contact with infected individuals and indirectly through the contact with the clothes, personal belongs, bed sheet or comfort chair cover contaminated with the lice or lice ovum.

The most effective way of prevention is using the pesticides containing shampoo such as, linden and permetrin in the infected patients and the public training and improvement of public hygiene [12, 13]. The humid climate and dense population, provide suitable circumstances for the increase of lice in the Mazandran province. Since, pediculosis could be a good indicator of lack of personal and public hygiene, knowing its prevalence rate could be a good hygienic index in the region.

This study was aimed at to determine the prevalence rate of pediculosis and the effective factors in the 3-7 years old children at the Sari Township kindergartens in 2014-2015. May be the results of the present study could help the state administrators implement proper action to control the pediculosis, particularly at the kinder gardans.

2. Materials and methods

This cross-sectional descriptive study was done on the kinder garden children of the Sari Township with prior arrangement with the Sari Township welfare office, and among 60 kinder gardens with 3328 (1517 boys and 1811 girls) children, 10 with 416 (293 girls and 123 boys) children were selected by survey sampling method.

After referring to the kinder garden, the hairs on neck or temporal region of the children were examined by health expert, for the presence of ova, nymph and/ or matured lice.

In case of observing any form of the above mentioned trace of lice, the subject was considered infected. Then the questionnaire consisting of demographic features such as, age, gender etc. were filled up by the kinder garden authorities or the student's family.

The data obtained were analyzed after coding, using the statistical correlation coefficient and X^2 tests.

3. Findings

From 416 kinder gardans under study in Sari Township, 27 (6.49%) children 19 (6.48%) girls and 8 (6.5%) boys were infected with pediculosis. The infection rates in the urban and rural children were 6.47% and 6.5%, respectively which reveal insignificant difference. Infection rate between the boys and girls shows insignificant difference (P>0.05), (table-1).

The relation between the infection and fathers' profession, shows the highest percentage of infection (6.49%) in children with business man father and the lowest (6.48%) with government employed father, which is statistically significant difference (P>0.05), (table- 2).

Significant difference was observed between the profession and level of education of mother and the pediculosis and between the level of education of father and pediculosis (P<0.05), (table-2).

Table 1: Frequency distribution of the under study variables based on the pediculosis in the Sari Township Kinder gardens children in 2014

Population variables	Infected		Non infected		Total		P value
	Number	%	Number	%	Number	%	
Living place							
Urban	16	6.47	231	93.53	247	100	3.19 (0.074)
Rural	11	6.5	158	93.5	169	100	
Total	27	6.49	389	93.51	416	100	
Gender							
Girl	19	6.48	274	93.52	293	100	6.044 (0.014)
Boy	8	6.5	115	93.5	123	100	
Total	27	6.49	389	93.51	416	100	

Table 2: The relationship between the pediculosis and parents' education and profession in the Sari Township Kinder gardens in 2014

Population variables	Infected		Non infected		Total		P value
	Number	%	Number	%	Number	%	
Fathers' level of education							
High school	7	6.48	101	93.52	108	100	9.49 (0.009)
Twelve standard	15	6.49	216	93.51	231	100	
University degree	5	6.49	72	93.52	77	100	
Mother's level of education							
High school	10	6.49	144	93.51	154	100	9.36 (0.009)
Twelve standard	5	6.49	72	93.51	77	100	
University degree	12	6.48	173	93.52	185	100	
Father's profession							
Employed	12	6.48	173	93.53	185	100	0.297 (0.585)
Business man	15	6.49	216	93.51	231	100	
Unemployed	-	-	-	-	-	-	
Total	27	6.49	389	93.51	416	100	
Mother's profession							
Employed	18	6.49	259	93.51	277	100	9.532 (0.009)
Business woman	4	6.45	58	93.55	62	100	
Housewife	5	6.49	72	93.51	77	100	
Total	27	6.49	389	93.51	416	100	

Pediculosis in subjects using and not using common belongings was 9.41% and 4.47% respectively. Significant difference was observed between pediculosis and using common belongings (P<0.05), (table-3). Rate of infection in the study subjects observing and not observing personal hygiene was 6.45% and 6.49% respectively with statistically significant difference (P<0.05), (table-3).

Insignificant relationship was observed between pediculosis and the hair style and length (P>0.05), (table-3).

Pediculosis in subjects using and not using common room was observed in 6.49% and 6.48% respectively, With statistically insignificant difference (P>0.05), (table-3).

Statistically significant pediculosis prevalence rate difference was observed in the study subjects with and without health expert (P<0.05).

Pediculosis in the kinder gardens having and not having health expert was observed in 6.49% and 6.47% children respectively. With statistically significant difference (table-3).

Table 3: The relationship between pediculosis and the variables of personal hygiene, common devices, health expert, hair style, sleeping in common room in the Sari Township Kinder gardens in 2014

Population variables	Infected		Non infected		Total		P value
	Number	%	Number	%	Number	%	
Observing personal hygiene							
Yes	4	6.45	130	93.53	139	100	9.82 (0.002)
No	23	6.49	259	43.51	277	100	
Total	27	6.49	389	93.51	416	100	
Using the private belongings							
Yes	16	9.41	154	90.59	170	100	13.81 (0.0001)
No	11	4.47	235	93.53	246	100	
Total	27	6.49	389	93.51	416	100	
Health expert							
Has	9	6.47	130	93.53	139	100	4.34 (0.029)
Does not have	18	6.49	259	93.51	277	100	
Total	27	6.49	389	93.51	416	100	
Hair length							
Long	8	6.5	115	93.5	123	100	1.71 (0.19)
Short	19	6.48	274	93.52	293	100	
Total	27	6.49	389	93.51	416	100	
Hair type							
Plain	15	6.49	216	93.51	231	100	1.27 (0.26)
Curly	12	6.48	173	93.52	185	100	
Total	27	6.49	389	93.51	416	100	
Sleeping in common room							
Yes	5	6.49	72	93.51	77	100	2.3 (0.129)
No	22	6.48	317	93.52	339	100	
Total	27	6.49	389	93.51	416	100	

Number of infected children = 27
Percentage of infection= 6.49
Examined number= 416

4. Discussion

Despite the development of the society at different hygienic levels, pediculosis still remained main health concern in the poor and developing countries. Studies indicate the presence of pediculosis in different parts of Iran, and based on the WHO report, Iran is the infected part of the world [1].

In this study, the prevalence of pediculosis in all of the children of Sari township kindergardens was obtained 6.49% which corresponds with the data of 7.4% given by Golchi *et al*. (1999) from the Rasht (Iran) kinder gardens [9].

Gulgun *et al*. (2013) in a study in Keyseri City in Turkey on the 5-16 years old children reported pediculosis 13.1% [14]. Gutierrez in 2011 in Argentina kindergarden reported pediculosis 42.7% (53.5 girls and 28.4 boys) [10]. Similar relevant studies on prevalence of pediculosis in elementary schools from different parts of Iran are as follow: Rasht 5.1% [4], Gilan 4.5% [5], Kashan 9% [6], Aran-Bidgol0.47% [7] and Sanandaj 7.7% [8].

In the present study, rate of pediculosis prevalence in the girls higher than the boys, the reason could be the long hair and head cover in the girls. In the study of Golchi *et al*. (1998) rate of pediculosis was higher in the girls [9]. Similar data were given by Pour Baba, Gutierrez and Gulgun [5, 10, 14]. Rate of pediculosis in the urbans was lower than in the rurals, could be due to the regular supervision of the bosses and health experts of the kindergardans on observing the hygienic behavior and on time being referred to the health centers.

The present data indicate a statistically significant relationship between prevalence of pediculosis and education levels in the student's parents.

High level education leads to the increase of awareness, as a result, presenting proper resolution in solving the hygienic problems of family. The children with employed parents had lower rate of pediculosis than the other groups.

The reason could be the higher education and better prevision of economic and social welfare of the family, that could be effective in the follow up of the treatment. It corresponds with the data given by Rfinejad [13]. Results of the present study shows significant relationship between the pediculosis and using the shared devices and observing of the personal hygiene, which agree with the report given by Babapour [5], Dehghani [6]. Considering the results from variables tests, statistically significant difference was noticed between the Kindergardens having and not having health expert, which corresponds with the data given by Babapour. These findings reveal that the presence of health experts in the kinder gardens play very crucial role in reduction of pediculosis prevalence rate.

In this study, insignificant relationship has been found between the pediculosis and the hair style which agrees with the study of Soultana [15] and disagree with the findings of Rafinejad [13].

Benefiting from the health staff in the Kinder gardens, in order to control the hygienic conditions of the children and also improving of the parents' knowledge on hygiene, through conducting the workshop and training class could help reduce the rate of pediculosis.

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