

Research Article

A study of the prevalence of Giardiasis in children of the kindergartens of Islam Abad Gharb city, Iran

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Abstract: Giardia Lamblia is a virulent protozoan parasite that is regarded as the most common intestinal pathogen worldwide, particularly in developing countries due to its high prevalence. The aim of this study is to determine the prevalence rate of the Giardiasis in children of the kindergartens of Islam Abad Gharb city, Iran in 2011. This descriptive-analytic study was performed on 532 pre-school children (280 were female and 252 were male) in the kindergartens of Islam Abad Gharb city with an average of 0-6 years. Using a questionnaire, data were collected. The samples were randomly selected. Three samples of feces were taken alternately and then tested by two methods including direct and formalin-ether. Statistical analysis was performed using the SPSS. In this study, 172 children (32.3%) were infested with both pathogenic and non-pathogenic intestinal parasites. Infestation rate of intestinal protozoan was 29.8%, of intestinal worms was 2.5% and of Giardiasis was 16.16%. Prevalence rate of Giardiasis in rural kindergartens was 9.59%. Given the prevalence of Giardiasis in children, the prevalence of such disease should be prevented by continuous training of teachers, particularly rural kindergartens and the parents on the observance of the principles of personal hygiene.

Keywords: Giardiasis, Giardia Lamblia, Children, Western Iran

INTRODUCTION

Giardiasis is one of the most common parasitic infestations in children which are caused by a protozoan called Giardia Lamblia. The parasite is replaced in the upper part of small intestine (duodenum and jejunum) and sometimes the gallbladder and bile ducts, and it lives there in two forms of trophozoite and cyst [1]. The transmission of this parasite is done directly in a fecal-oral way and indirectly through water, contaminated food, soil, as well as direct contact of person to person [2]. This organism is the most common intestinal pathogen in the world [3]. This parasite infestation is more prevalent in developing countries and it is regarded as an agent of diarrhea in children in kindergartens [4, 5]. Based on cross-sectional studies conducted in these countries, this organism is the most common factor known to be associated with diarrhea in children in kindergartens [5, 6]. Kindergartens play roles in the transmission of Giardia as an important factor in the survival of the parasite in the community [7]. The main route of transmission of the parasite is from person to person in kindergartens, but it can be transferred directly from food, water and toys as well

[1]. Clinical symptoms of Giardiasis are highly variable and often asymptomatic. The most common symptoms include acute and chronic diarrhea, anorexia, vomiting, failure to thrive, abdominal pain and weight loss [7]. The most important adverse effects of this parasite include mal-absorption disorders, weight loss and reduced growth in children. In the severe infestations, patients can suffer from fatty diarrhea, folic acid deficiency, gamma globulins and lack of fat-soluble vitamins, also the shortage of elements such as zinc and iron [8]. The protozoan parasitic diseases in terms of morbidity and mortality in the world are regarded as the most important infectious diseases. In Iran, there is no complete and accurate statistics on the incidence and the prevalence of parasitic protozoans. To know more about the situation of this disease and taking action to control them it is necessary to perform accurate, comprehensive and coordinated studies. Regarding the parasitic worm diseases, intestinal worm infestation in Iran had been developed at a very high level, which fortunately is now declining. Islam Abad Gharb city is one of the most vulnerable areas to the spread of the disease and no study already has been conducted in this

area on the prevalence of Giardiasis in children. The present study attempts to determine the percent of the prevalence of Giardiasis in the children in a kindergarten according to variables such as age, gender, etc.

MATERIALS AND METHODS

The type of the study was descriptive-cross sectional and the sampling method was simple random method. For data collection, a sampling was done on 532 children in the kindergartens of Islam Abad Gharb city in a period of six months in 2011. A questionnaire was designed for each participant. Some factors were included in the questionnaire including age, sex, education level, parents' job, the habit of washing hands before meals and after defecation, and history of parasitic infestation. Three samples of feces were taken from each sample and preserved in disposable plastic containers with lids. The containers were numbered and then transferred into parasitology laboratory. The samples were tested by two methods including direct method and formalin-ether method. To do a direct microscopic test, two slides were prepared, which one drop of Logel was added to one of the slides and one drop of physiology serum was added to another slide, then they were examined by the magnification of 40. In the case of the observation of parasite eggs, cysts and trophozoites were elected as the patient. To do formalin-ether test, a suspension of the samples was

first provided and then the suspension was passed through the filter into centrifuge tube and then ether was added to it, and the material inside centrifuge tube was mixed and the tubes were centrifuged for a period of 1 to 2 min with the rpm of 1500 to 2000. Then the outer layer formed in the tubes was discarded and the underside deposited layers ejected. Next, by the sterile pipette a drop of the deposit was put on the slide, one or two drops of Logel 5% added to it and we analyzed it with a magnification of 40. In the case of the observation of parasites, larvae, trophozoite and cyst were reported as positive cases [9]. The data collected were analyzed using SPSS software.

RESULTS

In this study, 532 children in Islam Abad Gharb kindergartens were analyzed for a period of 12 months. All the samples was in the age range of 0 to 6, which 252 (47.3%) was male and 280 (52.7%) was female. 334 kids (62.8%) were in civil kindergartens and 198 (37.2%) were in rural kindergartens.

The highest rate of prevalence (318) was related to the age group of 4 to 6 years and the lowest rate related to age group of 0 to 2. The infestation rate of the kindergartens with the intestinal parasite was 32.33% (Table 1). The prevalence rate of Giardiasis by two methods of direct and formalin-ether was 16.16%.

Table 1: The absolute and relative frequency distribution of the children under study in the kindergartens of Islam Abad Gharb city in terms of affliction with intestinal parasites in 2011-2012

Test Result	Number	Percent
Positive (infested Persons)	172	32.33
Negative (Non-infested ones)	360	67.67
Total	532	100

Also, based on the results of the present study, the highest rate of the infection (101) was observed in the age group of 4 to 6. The male genus with 18.8% infection was more dominant than females. Also, in the rural kindergartens, the infestation rate (48.17) was

higher than that of civil kindergartens (Table 2). After Giardia Lamblia with 16.16% infestation, Entamoeba histolytica and Entamoeba coli caused the highest rate of infestation among the children by 3.75 and 3.20% (Table 3).

Table 2: The absolute and relative frequency distribution of the children under study in the kindergartens of Islam Abad Gharb city in terms of the type of the variable in 2011-2012

Variables	Number of Positive Cases n(%)	Number of Negative Cases n(%)
Age Group (year)		
0-2	1.7(9)	6.8(36)
2-4	11.6(62)	20.1(107)
4-6	19(101)	40.8(217)
Sex		
Boys	8.8(100)	28.6(152)
Girls	13.5(72)	39.1(208)
Type of Kindergarten		
Civil	85.24(79)	47.93(255)
Rural	48.17(93)	19.73(105)

Table 3: The absolute and relative frequency distribution of the intestinal parasites and worms in the children of the kindergartens of Islam Abad Gharb city variable in 2011-2012

Type of Protozoans and Worms	Absolute Frequency	Relative Frequency (%)
Entamoeba histolytica	20	3.75
Giardia lamblia	86	16.16
Entamoeba coli	17	3.20
Iodamoeba butchli	13	2.44
Endolimax nana	9	1.70
Blastocyst is hominis	14	2.63
Oxyure	7	1.31
Hymenolepis nana	4	0.76
Ascaris lumbricoides	2	0.38
taenia saginata	0	0
Trichocephal	0	0
No pollution	360	67.6
Total	532	100

DISCUSSION

In the present study, the infestation rate of Giardiasis was 16.16%, which it is different compared to the research done in other parts of Iran. In a study done by Saiari *et al.*; the infestation rate of Giardiasis in children over 2 years was 10.4%, which had the highest rate of prevalence compared to other intestinal parasites [10]. This rate was lower than our one, due to the difference between age range of the participants and the size of the sample. In a study done in the kindergartens and primary and secondary schools of Kashan city over 5 to 15 years old students, the infestation rate of Giardiasis was 38.5%, which 17% of the cases lacked clinical symptoms [11]. In the study of the infestation of parasitic infections in the kindergartens of Yasouj city, infestation rate of Giardiasis was 18.3%, accounting for the highest rate of infestation among other protozoans [12]. In the epidemiological study of Giardiasis in a kindergartens in Qazvin city, the prevalence of Giardiasis was 13.5%, and in Bandar Abbas city was 17.23% [13, 14], that is almost consistent with our study. In a study in Havana city on the kids 1 to 5 years old, the infection rate of Giardiasis was 54.6%, introducing Giardiasis as the most common pathogen in the age range of 2 to 4 years old both in males and females [15]. In a study on a kindergarten in Houston State, the most common cause of the infestation during a year was Giardiasis, and the infection rate in this kindergarten was 33%, that only 7% of it was symptomatic [16].

In a study on a poor residential area in north east of Brazil, the infestation rate of Giardiasis in the children was 27.4%, which 7.6% of them were infested with acute diarrhea [17]. Probably, the main cause of such high rate of infestation in these countries is geographical and economic situations. In our study, the prevalence of Giardiasis among boys was higher than girls. In a study conducted in Kashan and Qazvin

kindergartens, the prevalence of Giardiasis in girls was higher than boys [11, 13]. These findings are different from our study findings in terms of sexual prevalence, which probably it is due to the greater contact of boys with peers and environment. The prevalence of Giardiasis in the rural kindergartens was higher than that of private ones in Islam Abad Gharb city, which this difference was significant statistically ($p < 0.05$). The main cause of this difference can be lack of observance of hygienic issues and consequently an increase in personal contacts and person to person transmission in the rural kindergartens, a difference between social and economic situation of families and also further supervision of teachers in private kindergartens to attract more families.

The prevalence of Giardiasis in the kindergartens outside Qazvin city and also among the children living in suburbs is higher than that of Qazvin city, which is consistent with our study. In this regard, researchers have regarded the main causes of the infestation as the number of family members, hygienic problems, and a difference in social and economic situation [13]. In our study, there was a significant relationship between infestation rate and the place of living (city, suburbs and rural areas, probably due to the fact that our study was done in the kindergartens of civil and rural areas. However the number of the children living in rural areas and suburbs in civil kindergartens is less than the number of children living in city. In our study, the prevalence of Giardiasis in the subjects with degrees of high school and under of the mothers education's level was higher than that over high school mothers education's level ($P < 0.05$).

In a study done in Sirjan city, there was a significant relationship between educational level and infestation rate of Giardiasis, and the maximum rate of infestation was observed in the children under 6 years

old and primary schools and the minimum rate was related to the children over this year and educational level [18]. These studies are consistent with our study and the probable cause of the prevalence of Giardiasis in the children of the mothers with the low educational level (i.e. primary school) was the lack of sufficient information on the observance of hygienic considerations. In our study, the children with an infectious history has a higher rate of Giardiasis infestation than other children, and this correlation was statistically significant ($P < 0.05$). Probably, given that the disease is transmitted in a person to person and fetes-oral form, shared use of the family rest room in the families has increased the infection rate of Giardiasis. In the studies conducted in Qazvin and Tehran cities Protection Complex, the infestation rate of Giardiasis among the children from a low social class and ones who used shared bathroom was higher [13]. Despite the fact that the present study does not confirm the significant relationship between the infestations of Giardiasis, the maximum rate of the infestation was related to domestic mothers, and also 15.61% of the children with Giardiasis belonged to over-populated families (more than three children).

CONCLUSION

The results of present study was shown the prevalence of Giardiasis in the kindergartens that can be due to the transmission of the disease, the presence of healthy carriers and mothers and kindergarten teachers' ignorance of the role of personal hygiene in the prevention of the disease. Therefore, with the training of the principles of personal hygiene and performing periodic testing of children and the kindergarten personnel, it is possible to control the prevalence of parasite infestations and Giardiasis.

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REFERENCES

1. Keating PJ; Giardiasis Figin Textbook of pediatric infectious dis. 14th ed. Philadelphia: Saunders. 1998; 2400-04.
2. Brown HW; Textbook basic clinical parasitology. 4th Appleton Co, London. 1995; 129-130.
3. Farthing MJG Blaser MJ, Smith PD, Ravdin JJ, Greenberg HB, Guerrant RL; Giardia Lamblia, In: Infections of the Gastrointestinal Tract Raven Press, New York. 1995; 1081-105.
4. Pickering LK, Woodward WE, Dupont HL, Sullivan P; Occurrence of Giardia Lamblia in children in day care centers. J Pediatr. 1984; 104(4): 522-6.
5. Polis MA, Tuazan CU, Alling DW, Talmanis E; Transmission of Giardia Lamblia from a day care center to the community. Am J Public Health, 1989; 76(9): 1142-4.
6. Mahmud MA, Chappell C, Hossain MM, Habib M, Dupont HL; Risk factors for development of first symptomatic Giardia infection among infants of a birth cohort in rural Egypt. Am J Trop Med Hyg. 1995; 53(1):84-8.
7. Aucott J; Giardiasis in. Nelson Textbook of pediatrics Fourtenthed WB Saunders co, Phil. 1996; 970-3.
8. Hill DR, Bennett JE, Mandell GL, Dolin R, Giardia Lambelia; In principles and practice of infectious diseases. 5th Ed, New York, Churchill Irving Stone. 2000; 2888-92.
9. Garcia LS, Brokes D; Medical Parasitology and diagnosis methods in parasitology, 1995. Translated by Mohammad Fallah, Hamadan, and Publications of Hamadan University of Medical Sciences.
10. Sayyari AA, Imanzadeh F, Bagheri Yazdi SA, Karami H, Yaghobi M; Prevalence of intestinal parasitic inections in the Islamic Republic of Iran. East Mediter Health J. 2005; 11(3): 377-83.
11. Talebian A, Talari SF, Parvaresh S; A study of the prevalence of Giardiasis and its clinical symptoms in the children 5 to 15 years old in Kashan city in 1997. Faiz Research and Scientific Journal. 2001; 12:59-64.
12. Moghimi M, Sharifi A; The prevalence of parasitic infection and Oxyuris in the children referred to the kindergarten in Yasouj city in 2002-2003; Armaghan Danesh; 2003; 26:41-4.
13. Mahiar A, Daneshi Kohan M, Hadilou H; An epidemiological study of Giardiasis in the kindergartens of Qazvin city in 1997. Journal of Shahid Beheshty Medical Sciences University; 2001; 24(3):257-63.
14. Sharifi Sarasiabi K, Madani AH, Zare S; [Prevalence of intestinal parasites in primary school publishes of Bandar Abbas. (Persian)]. Journal of Hormozgan University of Medical Sciences. 2002; 4(5):25-30.
15. Mendoza D, Nunez FA, Escobedo A, Pelayo L, Fernandez M, Torres D, *et al.*; Intestinal parasitic infection in 4 child day- care centers located in San Miguel pardon municipality, Havanan City. Rev Cubana Med Trop. 2001; 53(3): 189-93.
16. Rauch AM van R Bartlett AV, Pikerling LK; longitudinal study of Giardia Lamblia infection in a day care center population. Pediatr infect Dis J. 1990; 9(3): 186-9.
17. Robert D, Newman Sean R, Moore R, Aldo A, Lima M; A longitudinal study of Giardia Lamblia infection in northeast Brazilian children. Trop Med Int Health. 2001; 6(8): 624-34.
18. Sharifi, Kh, Masoud J; A study of the frequency of intestinal parasites in Sirjan city, 1994. Hormozgan Medical Journal; 2001; 4(3):19-24.