

Research Article

Prevalence of Giardiasis among children in childcare centers in Kermanshah, Iran

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ABSTRACT

Background: Giardia is a common and widespread intestinal protozoan parasite which occurs in of both humans and animals. The aim of this study is determining the prevalence rate of Giardiasis in children, Kermanshah childcare centers (2012).

Methods: This cross-sectional study was performed on 632 children (330 were female and 302 were male) with an average of 0-6 years in children, Kermanshah childcare centers (2012). Three stool samples were obtained on three consecutive days and were tested for the detection of trophozoites, and/or cysts, using both direct laboratory methods and Formalin-Ether concentration. Informations were collected by a questionnaire.

Results: Of the 632 cases in this study, the prevalence rate of gut parasite infection was 169 (26.74%), so that *Giardia lamblia* with 13.93%, *Entamoeba histolytica* with 3.48%, and *Entamoeba coli* with 2.53 were the most predominant isolate. The prevalence rate ranged in rural residents (15.67%) was more than urban residents (11.07%). The age group 4-6 years had the highest rate (14.24%) and 0-2 years the lowest (1.74%); boys with 16.29% had a higher rate than girls (10.45%). Parasitic infection was more prevalent in children whose parents had no high education (17.25). The maximum percentage of infections was in August with 5.86%.

Conclusion: With attention to the above findings, it seems that in order to decrease, control and prevent of parasitic infection we should have the necessary public education to teachers and parents of children.

Keywords: Intestinal disease, *Giardia Lamblia*, Children

INTRODUCTION

Giardiasis is a gastrointestinal and zoonotic disease that caused by protozoan parasites in the genus *Giardia*. *Giardia* can infect humans, sheep, cattle, dogs, cats, beavers, rodents, nonhuman primates, and other animals. But human is the most important source for infection. The parasite has two stages in its lifecycle; the cyst and the trophozoite. Trophozoite is active form and cyst is inactive form. Giardiasis is transmitted by the fecal-oral through direct person-to person contact or indirect through ingestion of fecally contaminated water or food.¹⁻⁵ Therefore anyone can

get giardiasis, but it tends to occur more often in international travelers, daycare centers, insufficient water treatment, individuals who drink improperly, treated surface water and with institutional facilities such as nursing homes.⁶ All age groups are affected in epidemic areas but children are infected more frequently than adults.⁷⁻⁹ The protozoan genus *Giardia* (Family *Giardiidae*, order *Giardiida*) contains at least six species that infect animals and/or humans. These species are distinguished on the basis of the morphology and ultrastructure of their trophozoite. *Giardia duodenalis* (syn. *Giardia intestinalis* and *Giardia lamblia*), *Giardia ardeae* and *Giardia psittaci*, *Giardia*

agilis, *Giardia microti* and *Giardia muris* that in mammals and humans, birds, amphibians, rodents, respectively.¹⁰⁻¹² Giardiasis is an important unresolved health problem in developing countries and has worldwide distribution in warm and moist climates.^{3,13} The incidence rate is 2%-7% in industrialized countries and 20%-60% in developing countries.^{3,14-16} About 200 million people in Asia, Africa, and Latin America have symptomatic giardiasis with some 500,000 new cases a year.⁶ It's characterized by diarrhea, abdominal cramps, bloating, weight loss, and malabsorption. The prevalence of Giardiasis has been found to vary in different parts of the Iran, with 26.2% in Damghan¹, 25.8% in south of Tehran¹⁷, 49% in Varamin¹⁸, 47.2% in Kerman¹⁹, 22.4% in Shahrekord.²⁰ According to the data, in order to manage control and preventive programs, it seems that epidemiological studies are necessary for health care personal. Therefore we decided that to determine the prevalence rate of Giardiasis in the city of Kermanshah childcare centers, in the academic year 2012.

METHODS

This cross-sectional study was carried out during a one year period from March 2012 until February 2012 on 632 children, Kermanshah childcare centers. For each person was a questionnaire. The data collection form included information such as (age, sex, parent's education, urban or rural residents). The clinical symptoms were not seen on all of the children. Three stool samples obtained on three consecutive days from each of these patients were examined for detection of trophozoites, cysts, oocysts and ova by using both direct laboratory methods and Formalin-Ether concentration (samples were collected in a sterile container and transported soon after to the laboratory for examination). For formed stool specimens, formol-ether sedimentation concentration technique was performed. The diagnosis of *Giardia* was based on parasite eggs, cysts and trophozoite.^{21,22}

RESULTS

This cross-sectional study was performed on 632 children in Kermanshah childcare centers. Of the 632 cases, 302 (47.79%) were males and 330 (52.21%) were females. The mean age was 0±6 years (P=0.000). The most prevalence rate was reported in age groups 4 to 6 years, and the lowest prevalence was related to age group 0 to 2 years. The prevalence rate ranged in males (16.29%) was more than females (10.45%). Regarding educational level, 17.25% of parent's had a high school degree or illiterate, and 9.49% had college graduates. The prevalence rate ranged in rural residents and urban residents were 15.67% and 11.07%, respectively (Table 1). The prevalence rate of gut parasite infection was 169 (26.74%), so that *Giardia lamblia* with 13.93%, *Entamoeba histolytica* with 3.48%, and *Entamoeba coli* with 2.53 were the most predominant isolate. 463 (73.26%) of children haven't infections (Table 2). The most contaminated cases were seen in August (5.86%) and July (4.44%) (Table 3).

Table 1: Frequency distribution of Giardiasis based on variable type in child, Kermanshah childcare centers, Iran (2012).

Variable	Positive case (n)	Percentage (%)
Sex		
Males	103	16.29
Females	66	10.45
Age groups (years)		
0-2	11	1.74
2-4	68	10.76
4-6	90	14.24
Parent's education		
College	60	9.49
Illiterate, high school	109	17.25
Urban residents	70	11.07
Rural residents	99	15.67
Total	169	26.74

Table 2: Frequency of different gut parasite infection isolated from child, Kermanshah childcare centers, Iran (2012).

Parasite	Positive case (n)	Percentage (%)
<i>Giardia lamblia</i>	88	13.93
<i>Entamoeba histolytica</i>	22	3.48
<i>Entamoeba coli</i>	16	2.53
<i>Blastocystis hominis</i>	13	2.05
<i>Iodamoeba bocelli</i>	11	1.75
<i>Endolimax nana</i>	9	1.42
<i>Hymenolepis nana</i>	5	0.79
<i>Ascaris lumbricoides</i>	5	0.79
No infection	463	73.26
Total	632	100

Table 3: Distribution of *Giardia lamblia* infection among children in Kermanshah city according to months of the study (2012).

Month	Positive case (n)	Percentage (%)
January	8	1.26
February	10	1.59
March	6	0.94
April	7	1.10
May	7	1.10
June	9	1.43
July	28	4.44
August	37	5.86
September	16	2.54
October	12	1.89
November	13	2.05
December	16	2.54
Total	169	26.74

DISCUSSION

Intestinal parasitosis represents have a relevant clinical problem in developing countries. Changes in socio-economic behavior, cultural, geographic, hygienic and nutritional factors may be reasons for the prevalence in the countries.²³ Childcare centers as places where children are in contact with each other so that they can better parasitic infection transmission. Therefore children are more sensitive to Giardiasis, because weak immune system, and lack of the personal hygiene. In order to prevention of parasitic infection, treatment should be done in all patients and contaminated water used for sterilization and disinfection. Nowadays Giardiasis is a major public health problem among children in Iran and worldwide. Despite preventive measures but it is abundant in many parts of the worldwide.²⁴ In our study, the prevalence rate of gut parasite infection was 169 (26.74%), so that *Giardia lamblia* with 13.93%, *Entamoeba histolytica* with 3.48%, and *Entamoeba coli* with 2.53 were the most predominant isolate. The prevalence of Giardiasis varies in different parts of Iran and worldwide. For example Heidari et al. reported the prevalence rate of the Giardiasis infection 26.2% in children resident in childcare centers in Damghan city, Semnan province, Iran.¹ Mendoza et al. in their study reported the prevalence rate of the Giardiasis infection 54.6% in children resident in childcare centers in Havanan city.²⁵ In another study which was done by Al-Saeed et al. on the children in Dohuk, northern Iraq, the prevalence rate of infection to Giardiasis was 38.5%.³ Also Newman et al. found 27.4% infection to Giardiasis in the north-east of Brazil in children resident in childcare centers.²⁶ *Giardia* contamination was seen in 49% in Aminzadeh et al. study that performance on children in childcare centers in Varamin (Iran).¹⁸ These statistics show that different prevalence rates of Giardiasis in children resident in childcare centers are seen. Likely reasons for this difference could be related to, low socio-economic, cultural, climatic conditions, poor health hygiene and nutritional factors.^{3,8} In this study boys with 16.29% had a higher rate than girls with 10.45%. Like our study in Al-Saeed et al. study the frequency distribution of Giardiasis was higher among boys (41.6%) than girls (35.6%).³ Also in another study that carried out in Palestine and Mexico reported a higher rate of Giardiasis among male than females.^{27,28} It could be said that, may be boys have more relation to sources of parasites in social and environment.²⁹ In this study the highest rate of infection was seen at 4-6 year-old age groups (14.24%), and the lowest rate was observed at 0-2 year-old age-groups (1.74%). In studies that performed in Iraq, Saudi Arabia and Senegal, the infection rate was highest in the age group 10-12 years.^{3,30,31} Toilet use and avoiding from wash hands thoroughly with water are as two of the likely reasons which might lead to *Giardia* transmission in this group of children.^{3,32} In the present study, frequency of Giardiasis occurred among children whose parents had low level of education. In Heidari study parasitic infection was more prevalent in children whose parents had no high education (42.95%).¹ Also in another study that carried out by Machado children whose parents had low level of education have the most common

infections.³³ It could be said that parents of children at high level of education provide better control on personal hygiene their children.¹ In this study the prevalence rate ranged in rural residents (15.67%) was more than urban residents (11.07%). This result is in agreement with the findings of the study by Asmar.³⁴ Increase prevalence of these parasites in rural residents may be related to high number of children, lack of health education and training, and low socioeconomic status in these rural residents. The maximum percentage of infections was in August and July with 5.86% and 4.44% respectively. Since the unfavourable temperature for *G. lamblia* cyst is less than 5 °C and 62 °C^{3,35} and According to, Kermanshah city have maximum temperature about 37-45 °C in summer and 0 °C or less to 5 °C in winter. This could be considered as one of the likely reasons frequency distribution of Giardiasis in during the summer months.

CONCLUSION

According to this study and other studies that carried out on children, the prevalence of Giardiasis and intestinal parasit infections in childcare centers could be due to the transmission of disease, and lack of awareness parents and teachers about the role of personal hygiene in controlling the disease. So by learning the basics of personal hygiene and conduct periodic examinations of children and staff in childcare centers, incidence of parasitic infections and giardiasis can be controlled.

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REFERENCES

1. Heidari A, Rokni MB. Prevalence of intestinal parasites among children in day-care centers in Damghan - Iran. Iranian J Publ Health. 2003;32(1):31-4.
2. Lara F, Carolina M. Giardiosis in children. BMC Public health 2002;2(1):5-11.
3. Al-Saeed AT, Issa SH. Frequency of *Giardia lamblia* among children in Dohuk, northern Iraq. EMHJ. 2006;12(5):555-61.
4. Gillin FD, Reiner DS. Cell biology of the primitive eukaryote *Giardia lamblia*. Ann Rev Microbiol. 1996;50:679-705.
5. Thompson RCA. The future impact of societal and cultural factors on parasitic disease some emerging issues. Int J Parasitol. 2001;31:949-59.
6. Pereira MDGC, Atwill ER, Barbosa AP. Prevalence and associated risk factors for *Giardia lamblia*

- infection among children hospitalized for diarrhea in Goiania, Goias state, Brazil. *Rev Inst Med trop S Paulo*. 2007;49(3):139-145.
7. Sayyari AA, Imanzadeh F, Bagheri Yazdi SA, Karami H, Yaghoobi M. Prevalence of intestinal parasitic infections in the Islamic Republic of Iran. *EMHJ*. 2005;11(3):377-83.
 8. Hellard ME, Sinclair MI, Hogg GG, Fairley CK. Prevalence of enteric pathogens among community based asymptomatic individuals. *J Gastroenterol Hepatol* 2000;15(3):290-3.
 9. Norhayati M, Penggabean M, Oothuman P, Fatmah MS. Prevalence and some risk factors of *Giardia duodenalis* infection in a rural community in Malaysia. *Southeast Asian J Trop Med Public Health*. 1998;29:735-8.
 10. Anuar TS, Azreen SN, Salleh FM, Mokhtar N. Molecular epidemiology of giardiasis among orang asli in Malaysia: application of the triosephosphate isomerase gene. *BMC Infectious Diseases*. 2014;14:78.
 11. Adam RDA. The *Giardia lamblia* genome. *Int J Parasitol*. 2001;30:475-84.
 12. Adam RDA. Biology of *Giardia lamblia*. *Clin Microbiol Rev*. 2001;14:447-75.
 13. Addiss DG, Mathews HM, Stewart JM, et al. Evaluation of a commercially available enzyme-linked immunosorbent assay for *Giardia lamblia* antigen in stool. *J Clin Microbiol*. 1991;29(6):1137-42.
 14. Thompson RCA, Lymbery AJ, Meloni BP. Genetic variation in *Giardia*, Kunstler 1882: taxonomic and epidemiological significance. *Protozoological Abstracts*. 1990;14:1-28.
 15. Yakoob J, Jafri W, Abid Sh, et al. Giardiasis in patients with dyspeptic symptoms. *World J Gastroenterol*. 2005;11(42):6667-0.
 16. Upcroft P, Upcroft JA. Drug targets and mechanisms of resistance in the anaerobic protozoa. *Clin Microbiol Rev*. 2001;14:150-64.
 17. Shojaei Arani A, Alahbandan R, Akhlahi L, Shahi M, Rastegar Lari A. Prevalence of intestinal parasites in a population south of Tehran, Iran. *Rev Inst Med trop S Paulo*. 2008;50(3):145-9.
 18. Amizadeh Z, Tarami M, Gachkar L. Prevalence of intestinal parasites and related factors in primary school children in Varamin. *J Compr Ped*. 2007; 1(2):55-8.
 19. Naser ZA, Jafar M. Prevalence of intestinal parasites in the city of Kerman. *Iran J Parasitol*. 1997;11:129a.
 20. Koroosh MN. Prevalence of intestinal parasitic infestations in patients attending the parasitology laboratory in Shahrekord. *Iran J Parasitol*. 1997;11:131a.
 21. Yadav P, Tak V, Mirdha BR, Makharia GK. Refractory giardiasis: A molecular appraisal from a tertiary care centre in India. *Indian J Med Microbiol* 2014;32(4):378-382.
 22. Casemore DP, Armstrong M, Sands RL. Laboratory diagnosis of cryptosporidiosis. *J Clin Pathol* 1985; 38:1337-14.
 23. Nasiri V, Esmailnia K, Karimi Gh, Nasiri M, Akhavan O. Intestinal parasitic infections among inhabitants of Karaj city, Tehran province, Iran in 2006-2008. *Korean J Parasitol*. 2009;47(3):265-8.
 24. Baruch AC. Issac-Renton JND, Adam RD. Epidemiology of *Giardia lamblia*. *Jou Infe Dis*. 1996;174:137-9.
 25. Mendoza D, Nunez FA, Escobedo A, et al. Intestinal parasitic infections in 4 child day-care centres located in San Miguel Pardon municipality, Havana city. *Rev Cubana Med Trop*. 2001;53(3):189-93.
 26. Newman RD, Moore SR, Lima AM, Nataro JP, Guerrant RL, Sears CL. A longitudinal study of *Giardia lamblia* infection in north-east Brazilian children. *Trop Med Int Health*. 2001;6(8):624-34.
 27. AL-Zain B, AL-Hindi A. Distribution of *Strongyloides stercoralis* and other intestinal parasites in household in Beit-lahia city, Gaza Strip, Palestine. *Ann Alquds Med*. 2005;1:48-52.
 28. Quihui L, Valencia ME, Crompton DW, et al. Role of the employment status and education of mothers in the prevalence of intestinal parasitic infections in Mexican rural schoolchildren. *BMC Publ Health*. 2006;6:225.
 29. Hooshyar H, Bagherian T, Baghbani F. Prevalence of intestinal parasitic infections among patients referred to Kashan reference laboratory in 2007-2011. *Jundishapur J Health Sci*. 2013;5(1):17-22.
 30. Bolbol AH, Mahmoud AA. Laboratory and clinical study of intestinal pathogenic parasites among the Riyadh population. *Saudi Med J*. 1984;5:159-66.
 31. Dieng Y. Les parasitoses intestinales chez des habitants d'une zone peri-urbaine a nappe phreatique polluee par les nitrates d'origine fecale (Yeumbeul, Senegal) [Intestinal parasitosis in the inhabitants of a suburban zone in which the groundwater is polluted by nitrates of fecal origin (Yeumbeul, Senegal)]. *Sante*. 1999;9(6):351-6.
 32. Mercado R, Otto JP, Perez M. Variacion estacional de las infecciones por protozoos intestinales en pacientes ambulatorios del sector norte de Santiago, Chile, 1995-1996 [Seasonal variation of intestinal protozoa infection in outpatients of the north section of Santiago, Chile, 1995-1996]. *Boletin chileno de parasitologia*. 1999;54(1-2):41-4.
 33. Machado RC, Maraci E. Giardiasis and helminthiasis in children of both public and private day-care centers in the city of Mitassol, Saopaulo state. *Brazil Rev Sec Bras Med Trop*. 1999;32(6):697-704.
 34. Asmar M. Prevalence of intestinal parasite in primary school children in Mazandaran. *Iran J Infec Dis*. 2000;9:53-9.
 35. Meyer EA, Radulescu S. *Giardia* and giardiasis. *Adv Parasitol*. 1979;17:47-1.

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