

Original Article



Prevalence of Intestinal Parasitic Infections and Associated Risk Factors Among in Children Ilam Town, West Iran

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

ABSTRACT

Purpose: Intestinal parasitic infections (IPIs) are a major health problem worldwide, especially in developing countries. According to the literature, children are more likely to get infected due to more frequent exposure to sources of infection.

Methods: In this study, we collected 500 fecal samples from children under 15 years of age who referred to labs in Ilam city. All samples were microscopically examined using formalin-ether concentration and Trichrome staining techniques. The results were analyzed using SPSS 20.0.

Results: Among 500 investigated samples, 4 types of parasites were detected. *Giardia lamblia*, *Entameba coli*, and *Blastocystis hominis* were identified as intestinal protozoa, and pinworm as intestinal worm. In this study, 23 cases (4.6%) had parasitic infections. 13 patients (2.6%) were infected with Giardia parasite, 4 patients (0.8%) with *E. coli*, 3 patients (0.6%) with *B. hominis* and 3 patients (0.6%) had pinworms.

Conclusions: The findings of this study showed that the prevalence of IPIs among children aged under 15 years in Ilam is relatively down, which can be attributed of sufficient information of parents and children about the modes of parasite transmission and the important role of carriers in the pathogen cycle.

Keywords: Prevalence; Parasitic infections; Risk factors; Pediatrics

INTRODUCTION

Intestinal parasitic infections (IPIs) as one of the most important and serious health problems appear in most countries across the world, especially in developing countries.¹⁾ According to the results of studies in different parts of the world, the prevalence of IPI is estimated as 67%.²⁾ Children are quite vulnerable to parasitic infections. Children are always exposed to IPIs due to hygienic principles ignorance, their close contacts with each other and use of commonly shared tools and toys, as well as frequent hand contact with objects and

Author Contributions

Data curation: Jaydari A, Hataminejad M, Pouladi I; Formal analysis: Viesy S, Pouladi I; Funding acquisition: Jaydari A; Investigation: Shadpirouz M; Methodology: Viesy S, Hataminejad M, Shadpirouz M.

mouth. One of the major causes of morbidity and mortality among children is infection with various intestinal parasites. These parasites may cause stunted growth, physical weakness, malnutrition, reduced IQ, psychiatric disorders and even death in untreated, or highly severe cases. Therefore, determining the prevalence of parasites to control and prevent these infections is of great significance.^{3,4)}

IPIs are often transmitted directly through contaminated water, soil and food. These parasites may also be indirectly transmitted due to poor personal hygiene practices and living conditions.⁵⁾ Pinworm also known as enterobiasis is one of the most common intestinal parasites in children, which is caused by *Enterobius vermicularis* worm. Anal itching, especially at night, is a clear sign of enterobiasis infection, in which the child's hands are infected with parasite eggs by itching the anus where the parasites eggs are laid. As a result, objects in the environment become contaminated, and patients with contaminants can transmit the disease to other persons.⁶⁾ *Giardia lamblia*, also known as Giardia intestinalis is globally the most common intestinal parasite in humans with worldwide spread, the prevalence of this parasite in different parts of the world ranges from 5–43 percent, and 5–23% in Iran.^{7,8)} The most important complications of giardiasis include nausea, vomiting, bloating, greasy and foul-smelling diarrhea and malabsorption syndrome.⁹⁾ Iran has various species and families of human and animal parasites due to its specific geographical location and climatic diversity.¹⁰⁾ Due to the special geographical conditions of Ilam, high population density of the city, and the health and nutritional status of the inhabitants, which has increased the spread of these parasites in hot seasons, it is crucial to prevent and control the spread of these infections and improve people's awareness about different types of IPIs and routes of transmission. Therefore, we conducted this study to investigate the prevalence of IPIs in children under the age of 15 years in Ilam city.

MATERIALS AND METHODS

1. Collection and examination samples

This present descriptive cross-sectional study was carried out within the period of 10th March, 2021 to 20th July, 2021 at the 5 large laboratories in Ilam city; Ilam Health Center, Sabour Medical Laboratory, Imam Hospital Laboratory, Ghaem Hospital Laboratory, and Ilam Central Laboratory listed laboratories were among the most important and largest in the province, and people are referred to them from different parts. A total of 500 fecal samples were randomly collected from people under 15 years of age who referred to the mentioned labs. At first, the sampling container labeled with the number of the sample owner, were distributed among the study population. Demographic characteristics including age, gender, area of living, clinical signs, such as diarrhea, bloating, stomach pain and weight loss were measured by completing a questionnaire by the individual or his/her parents. After collection, samples were transferred to the laboratory for microscopic examination aimed to find trophozoites, cysts, eggs, larvae and worms of parasites. Samples without trophozoites, cysts, eggs, larvae and worms of parasites and without clinical symptoms excluded from the study. Microscopic examination was performed following formalin ether technique, concentration and trichrome staining, and direct spread with physiological serum was performed to detect protozoan parasites in diarrheal cases. In the direct expansion method, we mixed a small volume of stool samples with a drop of physiological serum on the slide and examined it after placing the slide. In the formalin ether method, a small volume of stool sample was dissolved in 10 mL of 5% formalin, then 7 mL of the filtered suspension

was shaken following addition of ether and centrifuged at 2,000 rpm for 2 minutes, and the resulted sediment was colored using trichrome stains and then observed under a microscope.

2. Data analysis

Statistical analysis was performed using SPSS, version 20.0 (IBM Corp., Armonk, NY, USA) with χ^2 test to investigate the relationship between the prevalence of IPIs and candidate variables.

3. Ethics

This study is scientifically and ethically approved, also the privacy of individuals was respected by filling out the questionnaire and confirming the consent form. This study was approved by the Ethics Committee of the Ilam University of Medical Sciences, Iran (IR.968049/135).

RESULTS

Out of a total of 500 fecal samples, 4 types of parasites were detected, *G. lamblia*, *Entameba coli* and *Blastocystis hominis* as intestinal protozoa, and enterobiasis as intestinal worm (**Fig. 1**). A total of 23 samples were IPI-infected (4.6%), of which 13 cases displayed Giardiasis infection (2.6%) (**Table 1**).

We investigated the relationship between variables and the prevalence of IPIs, using χ^2 test. Among the study variables, weight loss was eliminated due to having the same volume in

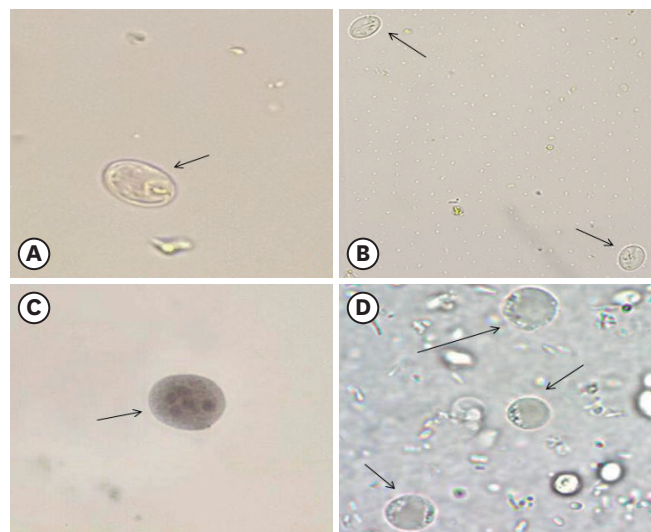


Fig. 1. The image of some protozoa isolated from pediatric stool samples. (A) Cyst *Giardia lamblia*. (B) Trophozoites *Giardia lamblia*. (C) *Entamoeba coli*. (D) *Blastocystis hominis*.

Table 1. Demographics of the study population

Parasite name	Value
Not seen	477 (95.4)
<i>Giardia lamblia</i>	13 (2.6)
<i>Entamoeba coli</i>	4 (0.8)
<i>Blastocystis hominis</i>	3 (0.6)
<i>Enterobius vermicularis</i>	3 (0.6)
Total	500 (100.0)

Values are presented as number (%).

Table 2. Frequency of intestinal parasitic infection by range-age, clinical symptoms and sex

Variables	Risk factors	Parasitics	Total parasitics	<i>Entrobios vermicolaris</i>	<i>Blastocystis hominis</i>	<i>Entamoeba coli</i>	<i>Giardia lamblia</i>	Not seen
Range-age (yr)	1-5		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	92 (100.0)
	6-10		11 (4.0)	3 (1.1)	0 (0.0)	0 (0.0)	8 (2.9)	269 (96.1)
	11-15		12 (9.3)	0 (0.0)	3 (2.3)	4 (3.1)	5 (3.9)	116 (90.6)
Clinical symptoms	Diarrhea	Positive	7 (100.0)	0 (0.0)	0 (0.0)	1 (14.3)	6 (85.7)	0 (0.0)
		Negative	16 (3.2)	3 (0.6)	3 (0.6)	3 (0.6)	7 (1.4)	477 (96.8)
	Blowing	Positive	7 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (100.0)	0 (0.0)
		Negative	16 (3.2)	3 (0.6)	3 (0.6)	4 (0.8)	6 (1.2)	477 (96.8)
	Stomach	Positive	16 (14.4)	3 (2.7)	3 (2.7)	3 (2.7)	7 (6.3)	95 (85.6)
		Negative	7 (1.8)	0 (0.0)	0 (0.0)	1 (0.3)	6 (1.5)	382 (98.2)
Clinical	Positive	23 (19.4)	3 (2.5)	3 (2.5)	4 (3.4)	13 (11.0)	95 (80.5)	
	Negative	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	382 (100.0)	
Sex	Male		18 (5.1)	1 (0.3)	3 (1.0)	1 (0.3)	13 (4.4)	278 (93.9)
	Female		5 (2.5)	2 (1.0)	0 (0.0)	3 (1.5)	0 (0.0)	199 (97.5)

Values are presented as number (%).

all samples. According to the results of this study, a significant relationship was observed between age group and parasitic infections ($P < 0.05$), that is the highest rate of infection was observed in 12-year-old subjects (9.3%) (11–15 years), and the lowest infection rate was observed in the age group of 1–5 years, as 0 subjects (0%) (Table 2). As shown in Table 2, 19.4% of patients with clinical symptoms were more likely to develop IPI.

DISCUSSION

IPIs are known as one of the major health problems in developing countries, and the majority of developed countries have reduced the prevalence of these infections by improving public health status, control of vectors and intermediate hosts, whereas in developing countries due to climatic conditions in hot and humid areas, high population density, poverty, malnutrition and lack of access to safe drinking water, provided suitable conditions for the growth and transmission of IPIs in these areas. The prevalence of these infections has been shown to be high.¹¹⁾ The frequency of IPIs in the pediatric population is high due to a weak immune system, frequent contact with sources of infection and lack of adequate knowledge about the risks and complications of these infections.¹²⁾ Studies conducted in different parts of the country indicate that infection is one of the most important health issues in all parts of the country. In many parts of Iran, accurate and complete statistics of the incidence and spread of parasitic diseases are not available. The prevalence of parasitic infections is different in different parts of Iran and the world, despite this, it is generally considered one of the most important health issues in the whole world. A review of previous studies conducted in different regions of the world shows a wide range of statistics showing the prevalence of parasitic infections. A systematic review conducted by Rivero et al.¹³⁾ found that *Giardia* was the most common intestinal protozoan in Argentina over the past 40 years and the human prevalence was estimated as 3.4–64.8 in this country. In a study conducted by Chen et al.¹⁴⁾ in Henan Province, China, the incidence of IPIs was reported 3.21%, and enterobiasis was the most prevalent parasite among the 12 detected parasites in this study. Kunwar and colleagues¹⁵⁾ conducted a systematic review meta-analysis (2016) in Nepal and showed that the prevalence of IPI in school children significantly decreased over the past 2 decades. In addition, Okay and colleagues,¹⁶⁾ reported the incidence of IPI among children aged 7–14 years as 31.8% in Aydin, Turkey. In a systematic review study conducted by Abbasian et al.,¹⁷⁾ the prevalence of *Giardia* was reported as 14.7 in Iran. In a study conducted on 764 primary school children in Semnan, Ghorbani et al.¹⁸⁾ reported the IPI rate as 13.7%. Barazesh et al.¹⁹⁾ reported the rate of IPIs in

primary school children in Bushehr as 25.1%. In this study, the rate of *G. lamblia* infection was 2.6%, which was inconsistent and lower compared to studies conducted in other parts of Iran, including Hamedan (9.32%), Kerman (3.25%), Isfahan (3.19%), Shahrekord (9.19%) and Ahvaz (5.36%), while it was consistent with the results of studies conducted in Amol (2.17%) and Yasuj (2.32%).²⁰⁻²⁶⁾ The prevalence of total Entamoeba protozoa in this study was 0.8%, which was lower than the results of Hazrati Tappeh et al.²⁷⁾ (14.6%), and higher than that of Nasiri et al.²⁸⁾ (0.3%). The rate of *B. hominis* infection in this study was 0.6%, which was lower than the prevalence reported by Hazrati Tappeh et al.²⁷⁾ (13.3%), and Akhlaghi et al.²⁹⁾ (12.5%); and it was shown to be lower than Khairandish et al.³⁰⁾ (6.5%), while Nasiri et al.²⁸⁾ reported lower (0.08%) prevalence of *B. hominis*. Arani and colleagues³¹⁾ also reported the *B. hominis* infection rate as 52% in south of Tehran, which was the highest rate compared to other studies conducted in other parts of the country. We found the rate of pinworm infection as 0.6%, which was much lower than the results of Davari et al.³²⁾ (61.8%). Heidari and colleagues³³⁾ also reported the prevalence of pinworm in Damghan city as 33.8%. Mahmoudvand and colleagues³⁴⁾ performed a study in Lorestan province in children aged 2–15 years, and reported the prevalence of intestinal worm infections as 8.9%, of which the prevalence of enterobiasis was 6.8%. Differences in temporal, spatial, ecological conditions, economic, cultural, social and health conditions can explain the differences between the results of the present study and similar previous studies in other parts of the country. In the present study, there was a significant difference ($P < 0.05$) between the prevalence of IPIs and gender, that is the prevalence was higher in boys than girls due to the fact that boys are more likely than girls to be in contact with sources of infection.³⁵⁻³⁷⁾ Found a significant difference ($P < 0.05$) between the prevalence of IPIs and age groups. As such, the highest ratio of IPI was seen in the age group of 11–15 years, which may be attributed to the higher social interaction with other young children and the society in this age group. Moreover, the prevalence of protozoan parasitic infections was higher than worm parasites, which was due to the direct transmission and simpler life cycle of protozoa compared to worms.

Anyway, the amount of IPIs in Ilam city shows a downward trend compared to the results of the research conducted in the past years,³⁸⁾ which indicates the increase in the cultural and health level as well as the increase in people's awareness in recent years.

According to the results of our study, it can be concluded that the prevalence of IPIs among <15-year-old children in Ilam is relatively down, which can be attributed of information of parents and children regarding the modes of parasite transmission and the important role of carriers in the pathogen cycle. The highest infection rate was observed in the age group of 11–15 years as 9.3%. In fact, older age is associated with higher prevalence of the parasite in children, which may be due to the greater social interactions of this age group with other young children and the society. Therefore, establishment of health training interventions in the field of personal hygienic practices to children and their parents as well providing healthy drinking water is of great importance.

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REFERENCES

1. World Health Organization. World health report conquering suffering enriching humanity. Geneva: World Health Organization, 2000.
2. Gatti S, Swierczynski G, Robinson F, Anselmi M, Corrales J, Moreira J, et al. Amebic infections due to the *Entamoeba histolytica-Entamoeba dispar* complex: a study of the incidence in a remote rural area of Ecuador. *Am J Trop Med Hyg* 2002;67:123-7.
[PUBMED](#) | [CROSSREF](#)
3. Mekonnen HS, Ekubagewargies DT. Prevalence and factors associated with intestinal parasites among under-five children attending Woreta Health Center, Northwest Ethiopia. *BMC Infect Dis* 2019;19:256.
[PUBMED](#) | [CROSSREF](#)
4. Ihejirika OC, Nwaorgu OC, Ebirim CI, Nwokeji CM. Effects of intestinal parasitic infections on nutritional status of primary children in Imo State Nigeria. *Pan Afr Med J* 2019;33:34.
[PUBMED](#) | [CROSSREF](#)
5. Gizaw Z, Yalew AW, Bitew BD, Lee J, Bisesi M. Fecal indicator bacteria along multiple environmental exposure pathways (water, food, and soil) and intestinal parasites among children in the rural northwest Ethiopia. *BMC Gastroenterol* 2022;22:84.
[PUBMED](#) | [CROSSREF](#)
6. Li HM, Zhou CH, Li ZS, Deng ZH, Ruan CW, Zhang QM, et al. Risk factors for *Enterobius vermicularis* infection in children in Gaozhou, Guangdong, China. *Infect Dis Poverty* 2015;4:28.
[PUBMED](#) | [CROSSREF](#)
7. Faraji R, Ahmadian F, Javadi GR, Barshahi PM. Prevalence of Giardiasis among children in childcare centers in Kermanshah, Iran. *Int J Res Med Sci* 2015;3:1717-20.
[CROSSREF](#)
8. Sadat Roointan E, Rafiei A, Samarbaf-Zadeh AR, Shayesteh AA, Shamsizadeh A, Borujeni MP. Genotype analysis of *Giardia lamblia* isolated from children in Ahvaz, southwest of Iran. *Jundishapur J Microbiol* 2013;6:279-83.
[CROSSREF](#)
9. Sharif M, Zeiaee H, Azadbakht M, Gholami SH, Khalilian AR. Serological levels of zinc, copper and iron elements among *Giardia lamblia* infected children. *J Gorgan Univ Med Sci* 2004;6:87-91.
10. Kia EB, Hoseini M, Niloforoshan MR, Memar AR, Rezaeian M. Study of intestinal protozoan parasites in rural inhabitants of Mazandaran province, Northern Iran. *Iran J Parasitol* 2008;3:21-5.
11. Cheng HS, Wang LC. Amoebiasis among institutionalized psychiatric patients in Taiwan. *Epidemiol Infect* 1999;122:317-22.
[PUBMED](#) | [CROSSREF](#)
12. Davami MH, Khazaii MR, Eslamirad Z, Modaresi M, Mostofi M. An investigation on intestinal parasitic infections and the effective demographic factors in children (1-3 years) in Shahrak-e-Valiasr Arak during 1999. *Arak J Med Sci* 2002;5:5-10.
13. Rivero MR, Feliziani C, De Angelo C, Tiranti K, Salomon OD, Touz MC. *Giardia* spp., the most ubiquitous protozoan parasite in Argentina: human, animal and environmental surveys reported in the last 40 years. *Parasitol Res* 2020;119:3181-201.
[PUBMED](#) | [CROSSREF](#)
14. Chen WQ, Li SH, Zhang YL, Deng Y, Xu BL, Zhang HW, et al. Prevalence and influencing factors of intestinal parasitic diseases among rural children in Henan province. *Zhongguo Xue Xi Chong Bing Fang Zhi Za Zhi* 2019;31:491-7.
[PUBMED](#) | [CROSSREF](#)
15. Kunwar R, Acharya L, Karki S. Decreasing prevalence of intestinal parasitic infections among school-aged children in Nepal: a systematic review and meta-analysis. *Trans R Soc Trop Med Hyg* 2016;110:324-32.
[PUBMED](#) | [CROSSREF](#)
16. Okyay P, Ertug S, Gultekin B, Onen O, Beser E. Intestinal parasites prevalence and related factors in school children, a western city sample--Turkey. *BMC Public Health* 2004;4:64.
[PUBMED](#) | [CROSSREF](#)
17. Abbasian L, Talebi F, Bazayr A, Shirbazo S, Sayehmiri K, Ahmad N. Prevalence of *Giardia lamblia* in Iran: a systematic review and meta-analysis study. *Resen Med* 2013;36:111-6.
18. Ghorbani R, Pazoki R, Ahmadian AR. Predictors of the intestinal parasitic infection children in Semnan Gorgan. *J Med Sci* 1999;1:39-45.
19. Barazesh A, Fouladvand MA, Tahmasebi R, Heydari A, Kooshesh F. Prevalence of intestinal parasitic infections among primary school children in Bushehr, Iran. *Avicenna J Clin Microb Infec* 2017;4:34335.
[CROSSREF](#)

20. Ahmadi N. Epidemiology survey of intestinal Amoebae in human in Assadabad. Hamadan J Pejouhandeh 1998;3:97-102.
21. Ahmad-Rajabi R, Abaszade A, Varzande F, Aaab M. Prevalence of the intestinal parasites in day-care center children in Bam. J Rafsanjan Univ Med Sci 2003;2:102-11.
22. Abedi S, Izadi S, Davari B. The prevalence of *Enterobius vermicularis* among primary school students in Isfahan. Hormozgan J Med Sci 2004;8:63-6.
23. Koroosh MN. Prevalence of intestinal parasitic infestations in patients attending the parasitology laboratory in Shahrekord, Iranian. J Parasitol 1997;11:1311.
24. Maraghi SH. Prevalence of *Enterobius* infection in day-care center children in Ahvaz. J Med Sci Ahvaz Univ 1997;21:14-8.
25. Ali AZ. Prevalence of intestinal parasites in Amol city. Tehran: Tehran University School of Health Sciences and Research Institute, 1999.
26. Sharifi A, Moghimi M. Prevalence of intestinal parasites in Yasuj city. Yasuj J Med Sci 2001;26:41-4.
27. Hazrati Tappeh K, Mostaghim M, Khalkhali HR, Makooei A. The prevalence of intestinal parasitic infection in the students of primary schools in Nazloo region in Urmia during 2004-2005. Urmia J Med Sci 2006;4:212-7.
28. Nasiri V, Esmailnia K, Karim G, Nasir M, Akhavan O. Intestinal parasitic infections among inhabitants of Karaj city, Tehran province, Iran in 2006-2008. Korean J Parasitol 2009;47:265-8.
[PUBMED](#) | [CROSSREF](#)
29. Akhlaghi L, Shamseddin J, Meamar AR, Razmjou E, Ormazdi H. Frequency of intestinal parasites in Tehran. Iran J Parasitol 2009;4:44-7.
30. Badparva E, Sadraee J, Foruzande M, Kheirandish F. Prevalence of intestinal parasitic infestations in patients attending the parasitology laboratory in Lorestan. Lorestan J Med Sci. 2012;14:107-12.
31. Arani AS, Alaghehbandan R, Akhlaghi L, Shahi M, Lari AR. Prevalence of intestinal parasites in a population in south of Tehran, Iran. Rev Inst Med Trop São Paulo 2008;50:145-9.
[PUBMED](#) | [CROSSREF](#)
32. Davari S, Masoud J, Zangi Abadi M. Epidemiologic study of intestinal parasites in Iranshahr of Zahedan. J Med Sci 1999;(1):117-22.
33. Heidari A, Rokni MB. Prevalence of intestinal parasites among children in Day care center in Damghan Iran. Iran J Public Health 2003;32:31-4.
34. Mahmoudvand H, Badparva E, Khalaf AK, Niazi M, Khatami M, Nazer MR. Prevalence and associated risk factors of intestinal helminthic infections in children from Lorestan province, Western Iran. Parasite Epidemiol Control 2020;9:e00136.
[PUBMED](#) | [CROSSREF](#)
35. Bahadoran M, Rezaeiyan M, Nikiyan Y. A survey of prevalence of intestinal parasites in primary and junior high schools of Isfahan city during the year 1993. J Kerman Univ Med Sci 1996;3:73-9.
36. Sharma BK, Rai SK, Rai DR, Choudhury DR. Prevalence of intestinal parasitic infestation in schoolchildren in the northeastern part of Kathmandu Valley, Nepal. Southeast Asian J Trop Med Public Health 2004;35:501-5.
[PUBMED](#)
37. Ghahramanloo M, Hassanjani Roshan M, Haji Ahmadi M. Prevalence of intestinal parasites in primary school children, Eastern Bandpay, Babol, 1999. J Babol Univ Med Sci 2001;3:47-51.
38. Viesy S, Abdi J, Rezaei Z. What are hidden facts behind intestinal parasitic infections in Ilam city? Infect Disord Drug Targets 2019;19:284-7.
[PUBMED](#) | [CROSSREF](#)