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Original Article

A Study on the Prevalence of Intestinal Parasitic Infections in Patients Referred to Laboratories of Teaching Hospitals and the Central Laboratory in Jiroft City

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A B S T R A C T

Introduction: Intestinal parasitic infections are still a major health concern in developing countries due to associated complications and negative impact on physical and intellectual development, especially in low-income populations, poor personal and environmental hygiene, overcrowding, and lack of access to clean water. This study aimed to determine the prevalence and type of intestinal parasitic infections in individuals referred to teaching hospitals and the central laboratory of Jiroft city.

Materials and Methods: All individuals referred to teaching hospitals and the central laboratory of Jiroft city who had undergone stool testing for parasites were included in the study. Information such as age, sex, and parasite type were collected from the registry books of these centers. The obtained data were analyzed using SPSS software based on the comparison of percentages and ratios and descriptive statistics.

Results: Among the 6,857 people who participated in the study, 220 (3.2%) were infected with intestinal parasites. The most prevalent parasite found in the study was *Giardia lamblia* (76.8%), followed by *Entamoeba coli* (20.5%). *Trichomonas hominis, Blastocystis hominis, hookworm*, and *Tenia saginata* were other isolated parasites. The Chi-Square test and Cramer's V showed that there was no significant relationship between age, gender, and sample positivity (Cramer's coefficient V = 0.06, P > 0.05).

Conclusions: The significant prevalence of intestinal parasitic infections in Jiroft city requires the attention of various organizations and improvement of personal and social health education, as well as improvement of water and food quality.

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Introduction

Parasitic diseases are part of the group of neglected tropical diseases and are considered a major public health problem due to their mortality burden in several population groups and negative impact on physical and intellectual development. It is estimated that up to 36 percent of the world's population suffers from some form of parasitosis [1]. About 24% of the world's population is infected with soil-transmitted helminth infections. In African countries like Ethiopia, the prevalence of intestinal parasitic infections in children is estimated at 48% [2]. There is a clear link between social and environmental factors, such as overcrowding, low income, low level of education, poor levels of sanitation and hygiene, and intestinal parasitic infections, as they can be caused by consuming contaminated water and food [3, 4]. Common clinical manifestations of intestinal parasitic infections can include: diarrhea, dysentery, reduced micronutrient absorption, nausea, vomiting, anemia, anal itching, intestinal obstruction, abdominal pain, and dehydration that the severity of which depends on the individual's health level [1, 5]. Intestinal parasitic infections are still a major health concern in developing countries, especially in Asia, sub-Saharan Africa, and Latin America, which is accompanied by inadequate water supply, environmental sanitation, rapid population growth, and other social and economic problems [6]. *Entamoeba histolytica*, *Giardia lamblia*, and *Cryptosporidium* are the most common intestinal protozoans in developing countries [5]. Monitoring intestinal parasitic infection is essential to determine intervention strategies, healthcare, and mortality reduction [7]. Jiroft city in southern Iran has a hot and humid climate and a large population in the suburbs. In this regard, continuous monitoring of intestinal parasitic infection among people in the city is essential. This study was conducted to determine the prevalence and type of intestinal parasitic infections in individuals referred to teaching hospitals and the central laboratory of Jiroft city.

Materials and Methods

This cross-sectional study was conducted from April 2017 to March 2018. All individuals referred to teaching hospitals and the central laboratory of Jiroft city who had undergone stool testing for parasites were included in the study. The procedure at these centers is to mix the stool sample with normal saline on a slide and then examine it under a microscope to find parasites. Information such as age, sex, and parasite type was collected from the registry books of these centers. The obtained data were analyzed using SPSS software based on the comparison of percentages and ratios and descriptive statistics.

Results

The study examined stool samples from 6,857 people. Almost half of the people were under 30 years old (Table 1). The test result was negative in 6637 (96.8%) individuals and positive in 220 (3.2%) people. Of the 220

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positive samples, only 3 (1.4%) had helminthic infections, and the rest (98.6%) had protozoan infections. The most common parasite reported was *Giardia lamblia* (76.8%), followed by *Entamoeba coli* (20.5%). *Trichomonas hominis*, *Blastocystis hominis*, *hookworm*, and *Tenia saginata* were other isolated parasites (Table 2). The Chi-Square test and Cramer's V showed that there was no significant relationship between age, gender, and sample positivity (Cramer's coefficient V = 0.06, p > 0.05). There was a significant relationship between age and prevalence of *Giardia lamblia* and *Entamoeba coli* (p = 0.01). The highest prevalence of *Giardia lamblia* and *Entamoeba coli* was seen in people aged 30-45, and the lowest prevalence was seen in people over 60 years of age. *Giardia lamblia* was more prevalent than *Entamoeba coli* in all age groups. In those over 60 years of age and under 15 years of age, all infections were with *Giardia lamblia* (Table 3). The prevalence of *Giardia lamblia* and *Entamoeba coli* was higher in summer and autumn; however, there was no significant relationship between the prevalence of these two parasites and the seasons (p > 0.05) (Table 4). In this study, 3142 samples were collected from Imam Hospital, 193 samples from Kashani Hospital, and 3522 samples from the central laboratory. Most of the positive cases were from the central laboratory and only included *Giardia lamblia* and *Entamoeba coli* (Table 5).

Table 1. Age distribution of the people surveyed in the study

Age	Absolute abundance	Relative abundance
<15	2046	29.8%
15-29	1807	26.4%
30-44	2164	31.6%
45-60	495	7.2%
>60	345	5%
Total	6857	100%

Table 2. Parasite frequency in individuals with positive stool tests

Parasite type	Absolute abundance	Relative abundance
Giardia lamblia	169	76.8%
Entamoeba coli	45	20.5%
Trichomonashominis	2	0.9%
Blastocystishominis	1	0.5%
Hookworm	1	0.5%
Teniasaginata	2	0.9%
Total	220	100%

Table 3. Prevalence of *Giardia lamblia* and *Entamoeba coli* by age

Age	*Giardia lamblia*	*Entamoeba coli*	Total	P-value
<15	29	0	29	0.01
15-29	54	21	75	
30-44	65	21	86	
45-60	16	3	19	
>60	5	0	5	
Total	169	45	214	

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Table 4. Prevalence of Giardia *lamblia* and *Entamoeba coli* by season

Season	*Giardia lamblia*	*Entamoeba coli*	Total	P-value
Spring	32	10	42	0.61
Summer	50	13	63	
Autumn	58	13	71	
Winter	29	9	38	
Total	169	45	214	

Table 5. Absolute frequency of intestinal parasites in individuals with positive stool tests by location

Parasite type	Central Laboratory	Kashani Hospital	Emam Hospital	Total
Giardia lamblia	118	4	47	169
Entamoeba coli	45	0	0	45
Trichomonashominis	0	1	1	2
Blastocystishominis	0	0	1	1
Hookworm	0	0	1	1
Teniasaginata	0	0	2	2
Total	163	5	52	220

Discussion

In the present study, 3.2% of the samples were positive for intestinal parasites, and 96.8% of the individuals were free of intestinal parasites. Among the positive cases, the most common parasite reported was *Giardia lamblia*, which accounted for 76.8% of cases, followed by *Entamoeba coli*, which accounted for 20.5% of cases. Only three helminth infections were reported, accounting for 1.4% of positive cases. The only pathogenic protozoan was *Giardia lamblia*, which accounted for 77.8% of protozoan cases, and its overall prevalence was 2.5%. Non-pathogenic protozoa included *Trichomonas hominis*, *Blastocystis hominis*, and *Entamoeba coli*, which accounted for 21.8% of positive cases and 0.74% of total samples. In the study by Arshad et al., *Entamoeba histolytica* was the most common parasite isolated, which was not consistent with our results, but a high proportion of *Giardia lamblia* and *Entamoeba coli* were isolated, which was consistent with our study. Also, in their study, children and adolescents were the most affected, which was not consistent with our study, where most positive cases were seen in middle-aged people [8]. In the study by Talebimeymand et al., intestinal parasites were isolated from 17% of the samples, which did not match the result of our study. The high prevalence of *Giardia lamblia* and *Entamoeba coli* in their study, as well as the low prevalence of *Blastocystis hominis*, were consistent with our study [9]. In the study by Asmar et al., intestinal parasites were isolated from 15.1% of the samples, which did not match the result of our study. The prevalence of *Giardia lamblia* in their study was similar to ours [10]. In the study by Noor Azian et al., stool tests were positive in 72.3% of samples, and

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Blastocystis hominis was found in 52.3% of cases, which was not consistent with our study, but the high prevalence of *Giardia lamblia* and *Entamoeba coli* was consistent with the present study [11]. In the study by Sayyari et al., stool tests were positive in 19.3% of samples, which was not consistent with our study, but the high prevalence of Giardia and the presence of helminth infections such as *hookworm* and *Tenia saginata* were consistent with our study [12]. In the study by Diaz et al., intestinal parasites were isolated from 44% of children with acute diarrhea. The high prevalence of *Giardia lamblia* in this study was consistent with our study, but the high prevalence of *Blastocystis hominis* and *Entamoeba histolytica* did not match with the present study [13]. Moreover, this study only examined children, which was different from the current study, which examined multiple age groups. In the study by Mehraj et al., children aged 1-5 years were examined, and 52.8% of them were infected with intestinal parasites. *Giardia lamblia* was the most common parasite isolated, which was consistent with our study, but the high prevalence of *Ascaris lumbricoides* and *Blastocystis hominis* in their study was not consistent with the results of our study [14]. The reason for the difference in the results of the mentioned studies may be related to factors such as characteristics of the studied population, such as age and gender, the technician's skill in identifying parasites, study method, geographical region, and community health level.

Conclusion

The results of this study showed that despite the improvement in the general health of the community, intestinal parasitic infections can still cause problems for some people in Jiroft city. This study also showed that, like many of the studies mentioned, *Giardia lamblia* has a high prevalence in this city. In addition, it can be concluded that helminth infections cannot be a serious threat to health in this city due to their low prevalence. Health education, raising the level of health culture in the region, and preparing healthy food can be among the ways to reduce intestinal parasitic infections in this city.

Ethical Considerations

This study was approved by the Ethics Committee of Jiroft University of Medical Sciences (IR.JMU.REC.1398.47).

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Not applicable.

Conflict of Interest

The authors declared no conflict of interest.

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Authors' Contributions

MS. S, M. TS: Study concept and design; MS. S: Sample collection, M. TS: Analysis and interpretation of data; MS. S, M. TS: Drafting of the manuscript.

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