



# A Survey on Prevalence of Intestinal Parasites Infections in Patients Referred to the Public Hospital in Khoy, West Azarbaijan Province, Iran, 2014 - 2016

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## Abstract

**Background:** Intestinal parasites are one of the most important human infections in many tropical and sub-tropical areas.

**Objectives:** The aim of the present study was to determine the prevalence of intestinal parasites and their association with some demographic factors in patients referred to the Ghamar Bani Hashem hospital Khoy, West Azarbaijan province.

**Methods:** This cross-sectional study was conducted from April 2014 to March 2016. Stool samples of 5610 patients referred to the Ghamar Bani Hashem hospital were examined using the formalin-ether concentration and direct smear methods. Determination of intestinal parasites was based on the morphological characteristics of the parasites. The scotch tape method was used for detection of *Enterobius vermicularis* ova in 133 suspected individuals. Microscopic results were recorded and analyzed.

**Results:** A total of 5610 people (51.6% male and 48.4% female) were examined. The mean age of the patients was  $47.26 \pm 1.3$ . Among these, 32.1% were infected to at least 1 of the intestinal parasites. Prevalence of protozoa and helminths parasites was 30.1% and 1.2%, respectively. The prevalence rate of intestinal parasites was: *Blastocystis* sp.12.9%, *Giardia lamblia* 11%, *Entamoeba coli* 4.1%, *Iodamoeba butschlii* 2.1%, *Endolimax nana* 1.5%, *Entamoeba histolytica/E.dispar* 0.25%, *Trichomonas hominis* 0.09%, *Ascaris lumbricoides* 0.09%, *Hymenolypis nana* 0.03%, and *Enterobius vermicularis* 4.5%.

Although the highest prevalence was in the age group of 20 - 29 years (31.8%), there was no significant relationship between age and parasite infection. However, a significant relationship was observed between the *Giardia lamblia* infection and age.

**Conclusions:** Human intestinal parasite infections, especially protozoan infection, are still abundant in the Khoy region. Adequate knowledge and periodic surveillance of the prevalence of parasites and the variables that affect frequency are important for effective control.

**Keywords:** Parasites, Human, Prevalence, Iran

## 1. Background

Intestinal parasites are prevalent as 1 of the agents of the gastrointestinal disorders in different countries; although, developed countries have reduced parasitic infection rates with health progress (1, 2). According to the world health organization (WHO) report, approximately 3.5 million patients worldwide suffer helminthic and protozoan infections, which resulted in almost 450 million deaths per the year (3, 4).

Climate change, nutrition, health and cultural conditions, lack of clean water, diversity and population density, as well as close contact with infected animal reservoirs are important factors in the occurrence and spread of the parasitic diseases. For this reason, control of parasitic in-

fections in the world is faced with serious problems (5, 6). The availability of such factors in Iran has resulted in the spread of parasitic infection. Therefore, there is a need for the study of epidemiology in different areas of the country.

Previous studies on the prevalence of parasitic infections in different parts of the country have shown infection rates from 2% to 61% (7). A high abundance of intestinal parasites are still reported in some areas of Iran (8-12); although, a number of studies have shown a reduction in infections rate (13-15). These results show that the prevalence of intestinal parasitic infections in the different areas of Iran are variable.

The prevalence of *Giardia lamblia*, as a protozoan parasite, is estimated in developing countries as 8% - 30% and in

developed countries about 2% - 3% (16, 17). The prevalence of *Blastocystis* spp in developed countries is 1.5% - 10% and 30% - 50% in developing countries (18-20).

Despite various studies on the prevalence of intestinal parasitic infections in different parts of Iran, there are no studies regarding the distribution of intestinal parasitic infections in Khoy, West Azarbaijan province. However, the prevalence of intestinal parasites in school children in rural and urban areas of Sylvania and Brandoz Chai of Uremia, near Khoy, has been reported as 42.5% and 52.6%, respectively (13, 21).

## 2. Objectives

Due to the lack of data in this area, the aim of this study was to determine and assess the prevalence of intestinal parasites in individuals referred to the Ghamar Bani Hashem hospital in the city of Khoy.

## 3. Methods

This cross-sectional descriptive study was conducted from April 2014 to March 2016 in Khoy, West Azarbaijan Province. In total, 5610 individuals referred to the Ghamar Bani Hashem hospital laboratory were examined for intestinal parasites. Demographic data such as age, sex, living location (rural or urban), and medical history were recorded. Fecal samples from all patients and Scotch tape from 313 individuals were collected. The Scotch tape method was done in symptomatic patients according to physician order. After macroscopic examination of stool samples in terms of color and form, for the diarrhea sample, the direct wet mount smear was prepared and examined in order to detect any motile protozoan trophozoite.

The formalin-ethyl acetate concentration method was used according to the Garcia protocol (22). Smear took after staining with lugols iodine solution and was examined for protozoa cysts and worm eggs at a magnification of  $\times 100$  and  $\times 400$ .

SPSS-16 software and Chi-square test was used for analyzing and evaluating the correlation between the parasite prevalence and different criterion.

## 4. Results

A total of 5610 individuals were examined for intestinal parasites. The mean age of the patients was  $47.26 \pm 1.3$ . Overall 32.1% of the patients were infected with at least 1 intestinal parasite. The patients included 2895 (51.6%) men and 2715 (48.4%) women. The prevalence of infection in

men was 27.1% and in women 24.1%. No significant relationship between parasites and sex was observed ( $P > 0.60$ ).

From the 5610 people, 2524 (45%) lived in urban areas and 3086 (55%) lived in rural areas. The prevalence of intestinal parasites between individuals who lived in urban areas was 23.6% and in rural areas, 34.3% was observed. Therefore, no statistically significant relationship between place of residence and the prevalence of intestinal parasites was observed (Table 1).

**Table 1.** Prevalence of Intestinal Parasitic Infection Among Patients Referred to Ghamar Bani Hashem Hospital, Khoy 2014 - 2016<sup>a</sup>

Variable	Total Cases	Positive	Negative
<b>Gender</b>			
Male	2895 (51.6)	785 (27.1)	2110 (72.9)
Female	2715 (48.4)	654 (24.1)	2061 (75.9)
<b>Age group, y</b>			
< 10	2163	417 (19.3)	764 (79.7)
10 - 19	643	136 (20.1)	507 (79.9)
20 - 29	935	297 (31.8)	638 (69.2)
30 - 39	744	192 (25.9)	552 (74.1)
40 - 49	465	97 (20.8)	368 (79.2)
50 - 59	357	62 (17.4)	295 (82.6)
60 - 69	193	43 (22.2)	150 (77.8)
70 - 79	66	10 (16.2)	56 (83.8)
> 80	44	4 (9.8)	40 (90.2)
<b>Local Residency</b>			
Rural	3086 (55)	1925 (34.3)	1161 (65.7)
Urban	2524 (45)	1324 (23.6)	1200 (76.4)
<b>Total</b>	5610 (100)	3211 (32.1)	2389 (67.9)

<sup>a</sup>Values are expressed as No. (%).

Although the highest prevalence was in the 20 - 29 year age group (31.8%), there was no significant relationship between age and parasite infection ( $P = 0.452$ ). However, the *Giardia lamblia* infection was high in the under 10 years age group (11.6%), a significant relationship between the prevalence of *Giardia* infection and age was found ( $P < 0.05$ ) (Table 1).

The study results showed that the frequency of the protozoa infection was (30.1%) higher than helminthic parasites (1.2%). The most common protozoan parasites were *Blastocystis hominis* (12.9%) and *Giardia lamblia* (11%). In 133 Scotch test samples that were tested, the highest incidence of parasitic helminthes was *Enterobius vermicularis* (4.5%) (Table 2).

The prevalence of multiple simultaneous parasite in-

fections was 2.08%. Coccidian parasites were not observed.

**Table 2.** Prevalence of Protozoa and Helminths Infections Among Patients Referred to Ghamar Bani Hashem Hospital, Khoy 2014 - 2016

Parasite	Sex					
	Male		Female		Total	
	No.	%	No.	%	No.	%
<i>Blastocystis</i> spp	419	57.9	305	42.1	724	12.9
<i>Giardia lamblia</i>	397	64.1	222	35.9	619	11
<i>Entamoeba coli</i>	121	52.6	109	47.4	230	4.1
<i>Entamoeba histolytica/E. dispar</i>	9	64.3	5	35.7	14	0.25
<i>Iodamoeba butschlii</i>	69	58	50	42	119	2.1
<i>Endolimax nana</i>	39	46.4	45	53.6	84	1.5
<i>Trichomonas hominis</i>	1	33.3	2	66.7	3	0.09
<i>Ascaris lumbricoides</i>	3	60	2	40	5	0.09
<i>Hymenolepis nana</i>	0	0	2	100	2	0.03

## 5. Discussion

Parasitic infections are still a major public health problem in some of the developed and many of the developing countries. Some factors such as population density, weather conditions, lack of awareness, poor hygiene, and lack of sanitation have an impact on the spread of parasitic infections in the world (11, 22-24). Due to the suitable weather, ethnic diversity, agricultural activities, as well as close human contact with domestic animals, the city of Khoy is a suitable region to spread the parasites agents.

There are many studies on the prevalence of intestinal parasites in different regions of Iran; however, there are no studies in this field in the city of Khoy, West Azarbaijan province, Iran.

Results of the present study showed that the most prevalent intestinal protozoan in this region are *Blastocystis hominis* (12.9%) and *Giardia lamblia* (11%). This finding is similar to another study in this subject. For example, result of a study on the prevalence of intestinal human parasite in rural area of Tonekabon, showed that *Blastocystis hominis* (31.7%) and *Giardia lamblia* (29.6%) were more prevalent than other intestinal parasites (12). Another study on intestinal parasite in Jiroft, Kerman (south of Iran), in 2016, showed that *Blastocystis* spp 13.7% and *Giardia lamblia* 7.8% were the most frequent (25).

In the present study, the highest prevalence rate of infection (31.8%) was seen in the 20 - 29 year old age group. Although, no significant correlation was found between intestinal parasitic infections and age, most of the *Giardia*

*lamblia* infection (11.6%) was observed in the age group under 10 years old. A significant relationship between age and the *Giardia* infection was observed ( $P = 0.025$ ).

Based on the results obtained in this study, the prevalence of the intestinal helminths infection was 0.12% and for *Enterobius vermicularis*, 4.5%. These results indicate that the helminthic infection has declined compared to previous studies in Iran (6, 12, 25-31).

In a study done in 1991, in the rural areas of Tonekabon, Rezaeian, and Hooshyar, a high prevalence (76.4%) of intestinal parasites infection was reported (12). Based on the total prevalence of infection obtained in this study (32.1%) as well as other recent studies (12, 15, 30), an impressive decline in the prevalence of human intestinal parasites was seen in recent decades in Iran.

In this study, no significant relationship between the prevalence of intestinal parasites and sex was observed in patients referred to the laboratory, which was consistent with results of some other studies in the world and Iran (25, 29, 31-33). A significant association between sex and parasites infection has been reported in Kashan (27). However, according to various studies, the same pattern was not shown and most seem to not have a significant relationship.

In this study, no significant relationship was observed between the prevalence of intestinal parasites and residency location, which is similar to the findings of other studies (29, 30), however, in a study in Nigeria, a significant correlation has been reported (34).

### 5.1. Conclusion

The results of this study showed that nearly all intestinal parasites considerably decreased and appears to increase awareness, improve hygiene, and reduce the use of human feces and animal as fertilizer in agriculture are the major role in reducing the incidence of parasitic infections. Sufficient awareness, care, and environmental sanitation can be effective for the prevention and control of parasitic infections.

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### Footnote

**Conflict of Interests:** All contributing authors declare no conflicts of interest.

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