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## A survey of intestinal parasites in a population in Qazvin, north of Iran

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## PEER REVIEW

## Peer reviewer

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## Comments

This is a good study in which the authors describe the occurrence of intestinal parasitic infections in north of Iran, considering all people, including hospitalized, outpatients, and healthy people, with the suspect of intestinal parasitosis whose fecal samples were sent to the laboratory.

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## ABSTRACT

**Objective:** To study the distribution of intestinal parasites in a population in Qazvin city in north of Iran.

**Methods:** A retrospective cross-sectional study of patients with suspicious intestinal parasitic infections referred to the Zakaria Razi Laboratory in Qazvin, north of Iran, was conducted from April 21, 2009 to October 20, 2012. A total of 5739 stool specimens from 4053 (70.6%) males and 1686 (29.3%) females were examined for intestinal parasites using direct wet mounting, formol-ether concentration and modified acid-fast staining techniques.

**Results:** The overall infection rate of intestinal parasite was 5.8% (3.7% in males and 2.1% in females). The distribution of intestinal parasites detected in stool specimens was as follows: 116 (2.0%) *Entamoeba coli*, 110 (1.9%) *Giardia lamblia*, 49 (0.85%) *Blastocystis hominis*, 30 (0.5%) *Enodolimax nana*, 12 (0.2%) *Iodamoeba butschlii*, 2 (0.03%) *Trichomonas hominis*, 9 (0.1%) *Hymenolepis nana*, 1 (0.01%) *Strongyloides stercoralis*, 1 (0.01%) *Dicrocoelium dendriticum*, and 1 (0.01%) *Trichuris trichura*. Parasites detected in cellophane tape specimens included 5 (0.08%) *Enterobius vermicularis*.

**Conclusions:** In this regard, findings of this study can be used as a basis to develop strategies and preventive programs for targeting groups at greater risk of intestinal parasitic infections.

## KEYWORDS

Intestinal parasites, Distribution, Patient, North of Iran

## 1. Introduction

Intestinal parasitic infections are endemic worldwide and continue to constitute important public health concern in many tropical and subtropical countries. Epidemiological research carried out in different countries has shown that the poverty, illiteracy, poor hygiene, lack of access to potable water, and a hot and humid tropical climate are the common factors attributed in the prevalence of intestinal parasites[1].

Parasitic intestinal protozoa together with soil-transmitted helminths are causes for a lot of morbidity, abdominal discomfort, mechanical irritation of intestinal mucosa, malabsorption syndromes and often mortality in tropical and sub-tropical regions around the world. People of all ages are affected by this cycle of prevalent parasitic infections;

however, children are the most affected.

The prevalence and epidemiologic features of intestinal parasites vary in different parts of the world. For instance globally, the prevalence of *Entamoeba histolytica* (*E. histolytica*) ranges from 5% to 81% and was suggested infecting approximately 480 million people. *Giardia lamblia* (*G. lamblia*) was reported as the most common intestinal parasite in the United States. Intestinal parasitic infections are an important public health problem in Iran, especially among 7–14 years old school children. A national epidemiologic study (1999–2000) of a random sample of the Iranian population reported a prevalence of 19.3% for intestinal parasites in Iran[2]. In recent years, several researches have been conducted in different parts of Iran to reveal the status of prevalence of intestinal parasitic infections. All these studies indicated that there was a sharp

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decline in the prevalence of intestinal parasites compared to those studies of previous three decades or before that<sup>[3–7]</sup>.

The aim of the current research was to determine the prevalence of intestinal parasites among patients presenting at Zakaria Razi Laboratory in Qazvin city in North of Iran and to identify associated risk factors.

## 2. Materials and methods

This study took place in Qazvin, in north of Iran with a population of 99841. Available water supply is pipeline water system, although some may use welling water as their water supply. Garbage disposal is carried out by the municipal collection system.

This survey was carried out at the Zakaria Razi Laboratory, a referral laboratory center in Qazvin. Between April 21, 2009 and October 20, 2012, 5739 patients with suspected intestinal infections were referred to the Zakaria Razi Laboratory from various health care facilities, out-patient clinics and private offices in the study area. All stool samples were processed within 2 hours of collection. Different stool examinations were used for efficacy in detecting parasites. These were direct wet-mount, formol-ether sedimentation method and modified acid-fast staining techniques.

Detection of intestinal protozoa and helminth was based on morphological characteristic of specific protozoa and helminth. Associations between parasitism and host characterizes were made using the *Chi*-square. Data were analyzed and statistical comparisons were performed using SPSS 16.0.

## 3. Results

The overall infection rate of intestinal parasite was 5.8% (3.7% in males and 2.1% in females). The distribution of intestinal parasites detected in stool specimens was as follows: 116 (2.00%) *Entamoeba coli* (*E. coli*), 110 (1.90%) *G. lamblia*, 48 (0.85%) *Blastocystis hominis*, 30 (0.50%) *Enodolimax nana*, 12 (0.20%) *Iodamoeba butschlii*, 2 (0.03%) *Trichomonas hominis*, 9 (0.10%) *Hymenolepis nana*, 1 (0.01%) *Strongyloides stercoralis*, 1 (0.01%) *Dicrocoelium dendriticum*, and 1 (0.01%) *Trichuris trichura*. Parasites detected in cellophane tape specimens included 5 (0.08%) *Enterobius vermicularis* (Table 1). No statistically significant difference was found between intestinal parasites and sex ( $P>0.05$ ).

**Table 1**

Prevalence of intestinal parasites found in 5739 patients in Qazvin, Iran (2009–2012).

Intestinal parasites	Host infected (%)		Total infected	Prevalence (%)
	Male (n=4053)	Female (n=1686)		
Protozoa				
<i>E. coli</i>	80 (1.90)	36 (2.10)	116	2.00
<i>G. lamblia</i>	89 (2.10)	21 (1.20)	110	1.90
<i>Blastocystis hominis</i>	31 (0.70)	17 (1.00)	48	0.85
<i>Enodolimax nana</i>	19 (0.40)	11 (0.60)	30	0.50
<i>Iodamoeba butschlii</i>	7 (0.10)	5 (0.20)	12	0.20
<i>Trichomonas hominis</i>	1 (0.02)	1 (0.05)	2	0.03
Helminth				
<i>Hymenolepis nana</i>	8 (0.10)	1 (0.05)	9	0.10
<i>Enterobius vermicularis</i>	3 (0.07)	2 (0.10)	5	0.08
<i>Strongyloides stercoralis</i>	1 (0.02)	0 (0.00)	1	0.01
<i>Dicrocoelium dendriticum</i>	1 (0.02)	0 (0.00)	1	0.01
<i>Trichuris trichura</i>	0 (0.00)	1 (0.05)	1	0.01

## 4. Discussion

Intestinal parasites illustrates a relevant clinical problem, especially in developing countries, where they are responsible for morbidity and mortality in children and adults and many epidemiological data are available for these areas<sup>[8]</sup>. In this study, we found prevalence of intestinal parasites to be 5.8% among a population in Qazvin in north of Iran which was lower (56.6%) than previous study<sup>[5]</sup>. This may be due to changes in social behavior and life styles during years. In contrast, higher prevalence of intestinal parasites was reported from Tehran<sup>[8]</sup>, Gorgan in north of Iran (28.8%)<sup>[9]</sup>, Mazandaran in north of Iran (9.1%)<sup>[10]</sup> and Zahedan in southeast of Iran (27.3%)<sup>[11]</sup>. Regional differences in the prevalence of parasites may be attributed to sample size/population and methodology used to collect the data. In fact, socio-economic, geographic, sanitary/hygienic, cultural, and nutritional factors may contribute that the prevalence of intestinal parasites in Iran is different and also vary across the country.

Our findings showed that *E. coli* and *G. lamblia* were the most common intestinal parasites among the study population. In the same manner, in a review of 300 cases of intestinal parasitic infection in Iran *G. lamblia* and *E. histolytica* were found to be the most common intestinal parasites<sup>[4]</sup>. Nevertheless, *G. lamblia* and *Ascaris lumbricoides* has been already reported as the most frequent microorganisms causing intestinal parasitic infections in Iran<sup>[2]</sup>. Moreover, in economically developing countries such as Mexico, the most cause of acute diarrhea and dysentery in children requiring hospitalization were found to be *G. lamblia* as well as *E. histolytica*<sup>[12]</sup>.

It is noteworthy to indicate that *G. lamblia* is not a life-threatening parasite, nevertheless, it is still considered as the most common water-borne diarrhea-causing disease<sup>[13]</sup>. *G. lamblia* is usually found in soil, food, water, or surfaces that have been contaminated with the feces from infected humans or animals and its mode of transmission is oral-fecal. It is estimated that about 200 million infections occur each year in the world's population. Globally, worldwide distribution of giardiasis varied between 20%–30%, while infection rate in Iran ranged from 2.6% to 19.4%<sup>[6]</sup>.

In this study, most of the patients infected with intestinal parasitic infections were with low level of education and/or were homemakers and workers. Other studies have shown an association between socioeconomic status and prevalence of parasitic infections<sup>[14–16]</sup>.

There was no significant difference in prevalence of intestinal parasites between males and females. Sex seemed to have no effect on prevalence of parasitism. Similarly, Nobre *et al.*<sup>[17]</sup> and Kitvatanachai and Rhongbuttsri<sup>[15]</sup> showed that gender is not a factor contributing to the differences in risk of intestinal protozoan infection.

In conclusion, findings of this survey emphasize that intestinal parasitic infections is a public health challenge that needs to be addressed to decrease its burden on the health care system as well as the society as a whole. It is to be noted that this study along with other similar studies in Iran<sup>[2,5,7,8]</sup> suggest that Iran is still one of the endemic areas for such infections. The authors believe that public education, health promotion, improving sanitation conditions of underdeveloped areas/communities, community involvement, and supporting

evidence-based practice/programs are the keys to success in preventing the spread of intestinal parasitic infections in Iran. In this regard, findings of this study can be used as a basis to develop strategies and preventive programs targeting groups at greater risk of intestinal parasitic infections.

### Conflict of interest statement

We declare that we have no conflict of interest.

### Acknowledgements

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### Comments

#### Background

Intestinal parasitic infections have a worldwide distribution and remain as the most common causes of diseases in the developing countries. High prevalence is found in people with low socio-economic status, poor living condition, overcrowded areas, poor environmental sanitation, improper garbage disposal, unsafe water supply and unhygienic personal habits.

#### Research frontiers

The main objective of this study was to determine the prevalence of intestinal parasites in the faeces of gastroenteritis patients in north of Iran.

#### Related reports

In recent years, several researches have been conducted in different parts of Iran to reveal the status of prevalence of intestinal parasitic infections. Little data, however, present about intestinal parasite in Qazvin area.

#### Innovations & breakthroughs

Most studies on gastroenteritis have focused on viral and bacterial infections, while gastroenteritis where intestinal protozoan and helminth parasites may have played a role has not been well studied. There is no data about prevalence of intestinal parasites in mentioned area.

#### Applications

Findings of this study can be used as a basis to develop strategies and preventive programs targeting groups at greater risk of intestinal parasitic infections.

#### Peer review

This is a good study in which the authors describe the occurrence of intestinal parasitic infections in north of Iran, considering all people, including hospitalized, outpatients, and healthy people, with the suspect of intestinal parasitosis whose fecal samples were sent to the laboratory.

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