

Prevalence of intestinal parasitic infections among patients referred to Kashan Reference Laboratory in 2007-2011

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Abstract

Introduction: Intestinal parasitic infections are still a healthy problem in many developing countries, although intestinal parasitic infection has reduced in recent years, it is still prevalent in many regions of Iran. This study was carried out in order to determine fauna and prevalence of human intestinal parasites in patients referred to Kashan Reference laboratory in 2007-2011.

Methods and Materials: Stool samples of patients were examined by Formalin-Ether concentration and direct smear methods, Microscopic results were recorded and analyzed according to demographic data.

Results: Totally 6348 persons (53% female and 47% male) were examined which among these 7.6% were infected to at least one parasitic infection. Rate infections to intestinal parasite were: Giardia lamblia 2.7 %, Blastocystis sp 2.5%, Entamoeba coli 1.9%, Iodamoeba butshili 0.2% , Dientamoeba fragilis 0.2%, Chilomastix mesnili 0.2%, Entamoeba histolytic a/E. dispar 0.16% , Entamoeba hartmanni 0.13%, Endolimax nana 0.09%, Trichomonas hominis 0.05%, and Hymenolypis nana 0.02%.

The high and low prevalence of infection was 10.5% and 3.6% in 40-50 and 1-10 year- old groups respectively. Prevalence rate in male (8.6%) was higher than female (6.7%). One parasite was seen in 93% of infected persons and 7% were infected with more than one parasite simultaneously (maximum 4 species).

Conclusions: This study showed that intestinal helminthic infection is rare but intestinal protozoa are more prevalent in Kashan region. This finding is in agreement with other studies in central region of Iran. More effort should be done to control or eradicate enteric protozoan infection.

Keywords: Intestinal parasite, Prevalence, Kashan, Iran.

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Introduction

Human infection with intestinal parasites has a worldwide distribution and is most common in developing countries. According to World Health Organization estimates, approximately 3.5 billion individuals are suffering from intestinal helminthes and protozoa around the world (1). It is estimated that every year 85 million new cases of intestinal parasite infection occur in children (2). Studies on epidemiology of intestinal parasite have shown that reduced public and personal health's condition, low socioeconomic status and unsanitary condition are significant risk factors for these infections, so the prevalence of infection is varied in different parts of one country. Also age, sex, and climate conditions are influenced on the prevalence rate of these infections (3). Some studies on the prevalence of parasitic disease showed a decrease in the rate of infection in Iran, but the frequency of enteric parasites is still high in some parts of the country (3-4). Recent studies confirmed that although the prevalence of human intestinal helminthes has a significant decrease compared to three decades ago, but some human enteric protozoan infections such as *Giardia lamblia*, *Blastocystis* sp and *Entamoeba coli* has a high prevalence and has remained as a health problem in Iran (5,6,7, 8).

Epidemiological studies and prevalence determine of intestinal parasites are necessary for health care personal in order to manage control and preventive programs. Due to serious and important symptoms and signs of pathogenic human intestinal parasites including diarrhea, weight loss, abdominal pain, cramping, fever and anemia, early and correct diagnosis is very important for the treatment of infected individuals and prevention of the spread of infection in community. Medical diagnostic laboratory with good trained staff and workers, using appropriate diagnostic equipment and methods are needed to reduce and control parasitic infections. The majority of persons

which are suspected to intestinal parasitic infection in Kashan region have referred to Reference laboratory for stool examination. This study was carried out in order to determine fauna and prevalence of human intestinal parasites in patients referred to Kashan Reference laboratory in 2007-2011.

Methods and Materials

This descriptive study was carried out from 2007 through 2011 on all patients referred to parasitology section of Kashan Reference laboratory. Demographic data such as age, sex, medical history, and home location (rural or urban) were recorded. Stool samples were collected from each patient in a labeled clean stool cap. Direct wet-mount smear was prepared and examined for diarrhea sample in order to detect any motile protozoa. In the next step, a formalin-ethyl acetate concentration method was performed according to Garcia protocol (9). The sediment smears were microscopy examined by staining with Lugol's iodine solution for detection of helminthes ova and cyst of protozoa. Data analysis was carried out using *Chi-square* and *Fisher* test in *EPI Info* software with a probability value (p value) of ≤ 0.05 .

Results

Of the 6348 individuals examined 3361 (53%) were female and 2987 (47%) were male. Totally 483 (7.6%) of individuals were infected with at least one of human intestinal parasites. The frequency of the pathogenic and nonpathogenic intestinal parasites in this study is reported in table 1. According to table 1, the most common intestinal pathogenic parasites were *Giardia lamblia* (2.7%) and *Blastocystis* sp (2.5%). The low common intestinal parasites were *Hymenolypis nana* (0.02%) and *Trichomonas hominis* (0.05%) respectively. The only helminthic genus seen in this study was *Hymenolypis nana*. The prevalence of intestinal parasite among men (8.6%) was higher than women (6.7%) and the difference was significant ($P \leq 0.005$) (Fig1). Frequency distribution of protozoa and helminthes

infection according to the sex has been presented in table 1. There was a significant relation between sex and *Giardia lamblia* infection ($P \leq 0.001$). The highest rate of infection was seen at 40-50 year-old age-groups (10.5%), and totally at >40 year olds but the lowest rate was observed at 1-10 year-old age-groups (3.6%), (Table 2). The difference was statistically significant ($P < 0.0001$). In this study 345 (5.4%) persons were infected with pathogenic and

148 (2.3%) persons were infected with nonpathogenic intestinal parasites. The rate of single and multiple simultaneously infections were 93% and 7% respectively. Based on data in Fig2, 449 (7.07%) of individuals were infected with one species, 29 (0.45%) with two species, 4 (0.06%) with three species and only one person (0.01%) was infected with four species of intestinal parasites simultaneously.

Table 1: Prevalence of intestinal parasites according to sex in patients referred to Reference laboratory

| Parasite \ Sex | Male | | Female | | Total | | P.v |
|--|------|------|--------|------|-------|------|-------|
| | No | % | No | % | No | % | |
| <i>Giardia lamblia</i> | 101 | 3.4 | 69 | 2.05 | 170 | 2.7 | 0.001 |
| <i>Blastocystis Sp</i> | 87 | 2.9 | 72 | 2.1 | 159 | 2.5 | 0.06 |
| <i>Entamoeba coli</i> | 66 | 2.2 | 56 | 1.7 | 122 | 1.9 | 0.1 |
| <i>Iodamoeba butschlii</i> | 11 | 0.4 | 4 | 0.1 | 15 | 0.2 | 0.07 |
| <i>Dientamoeba fragilis</i> | 5 | 0.16 | 10 | 0.3 | 15 | 0.2 | 0.4 |
| <i>Chilomastix mesnili</i> | 3 | 0.1 | 11 | 0.32 | 14 | 0.2 | 0.09 |
| <i>Entamoeba histolytica/E. dispar</i> | 6 | 0.24 | 4 | 0.1 | 10 | 0.16 | 0.3 |
| <i>Entamoeba hartmanii</i> | 5 | 0.16 | 3 | 0.08 | 8 | 0.13 | 0.4 |
| <i>Endolimax nana</i> | 2 | 0.06 | 4 | 0.1 | 6 | 0.09 | 0.4 |
| <i>Trichomonas hominis</i> | 1 | 0.03 | 2 | 0.05 | 3 | 0.05 | 0.5 |
| <i>Hymenolypis nana</i> | 1 | 0.03 | 0 | 0 | 1 | .03 | 0.4 |

Table 2: Prevalence of intestinal parasites according to age in patients referred to Reference laboratory

| Age groups | Infected | | Non infected | | Total | |
|------------|----------|------|--------------|------|-------|-----|
| | No | % | No | % | NO | % |
| 0-10 | 65 | 3.6 | 1731 | 96.4 | 1796 | 100 |
| 10-20 | 65 | 8.3 | 719 | 91.7 | 784 | 100 |
| 20-30 | 102 | 8.5 | 1096 | 91.5 | 1198 | 100 |
| 30-40 | 73 | 8.9 | 747 | 91.1 | 820 | 100 |
| 40-50 | 75 | 10.5 | 640 | 89.5 | 715 | 100 |
| 50-60 | 48 | 9.5 | 457 | 90.5 | 505 | 100 |
| >60 | 55 | 10.4 | 475 | 89.6 | 530 | 100 |
| total | 483 | 7.6 | 5865 | 92.4 | 6348 | 100 |

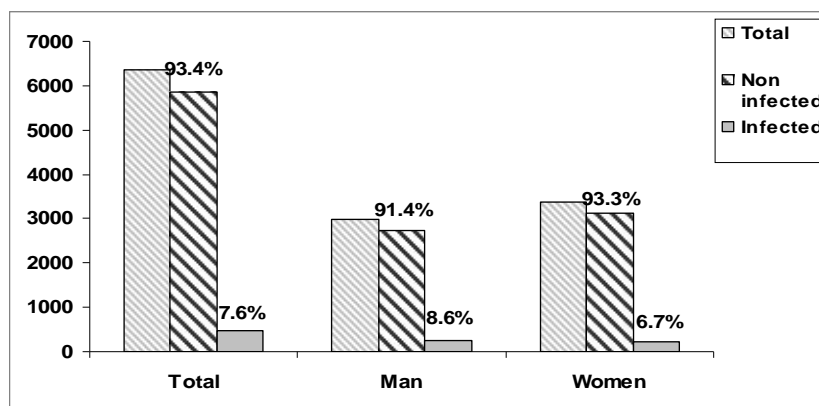


Fig. 1: Prevalence of infection according to sex in patients referred to Reference laboratory

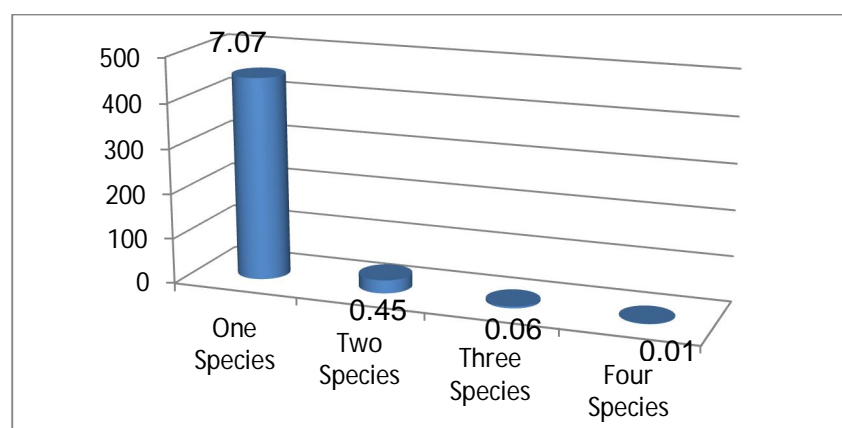


Fig. 2: Prevalence of multiple infections to intestinal parasites in patients referred to Reference laboratory

Discussion

This study was carried out in order to determine fauna and prevalence of human intestinal parasites in patients referred to Kashan Reference laboratory in 2007-2011. The result of this study showed that 7.6% of patients were infected with at least one of the pathogenic or nonpathogenic intestinal parasites. As we expected the helminthic infection is rare and human intestinal protozoa has more prevalent in Kashan region. This finding is similar to results of other studies in that all support a high reduce of infection with intestinal balastocystis sp are pathogenic. *Giardia lamblia* and *Blastocystis* are more prevalent enteric protozoa in this study; this finding is in agreement with another research in this subject (5, 6, 8, and 12). Although the prevalence of *E.histolytica*/*E. dispar* was 0.16% in this study, but this is not an Indicative for *E. histolytica* prevalence. *Entamoeba histolytica* and *E. dispar* are two morphologically identical but genetically separate species.

helminthes in many regions especially central part of Iran (5, 7-11). One important explanation about this clear decrease is the progress in socioeconomic status of people in recent years. Indeed improvement of knowledge and personal hygiene and reduction in the use of human and animal fertilizer in agriculture action have a basic role in the decrease of incidence of intestinal helminthes infection (7, 8, 10).

Among intestinal protozoa detected in this study, *Giardia lamblia*, *Dientamoeba fragilis*, *Entamoeba histolytica* and

Entamoeba histolytica is a potential pathogen and *E. dispar* is a nonpathogenic organism, these species cannot be differentiated by routine microscopy examination. Differential diagnosis of them needs some expensive methods such as PCR or is enzyme analysis (10). According to this study, the common intestinal parasitic infections were more frequent in adults, which suggest that adults have closer relation to sources of

parasites in social and environmental conditions such as job condition that predisposes them to intestinal parasitic infections. *Giardia lamblia*, *Blastocystis* Sp and *Entamoeba coli* are the most prevalent infections in this study which is in agreement with the findings of studies in Kermanshah, Yazd, Tehran, Kerman and Ahvaz (5, 12-15). This is important to note that simple transmission of protozoa (Fecal-oral), usage of unfiltered water and existence of many cyst passer in community are responsible for high rate of infection to enteric protozoa. Indeed the correct diagnosis of intestinal protozoa has progressed in recent years. Decrease of multiple infections can be a good index for progress in personal and public health in this region. In conclusion we can note that although infection to intestinal helminthes showed a remarkable decrease but more effort such as public education, sanitary measurement and progress in health care should be done for control or eradication of enteric protozoan infections.

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