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Original Article

Prevalence of Intestinal Parasitic Infections in Jiroft, Kerman Province, Iran

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Abstract

Background: Intestinal parasitic infections have a worldwide distribution. High prevalence of intestinal parasitic infections in individuals with low socioeconomic status and environmental conditions was found. No study has ever been conducted on the prevalence of these infections in Jiroft. Therefore, in this study prevalence of intestinal parasitic infections was evaluated in Jiroft, Kerman Province, Iran.

Methods: A total of 1060 individuals from rural and urban areas of Jiroft were sampled accidentally, during 2013-2014. Fresh stool samples were collected from all individuals and examined by formalin ether concentration and agar plate culture. Direct examination was performed on watery samples.

Results: Out of 1060 individuals, 563 (53.1%) and 497 (46.9%) people were from rural and urban areas, respectively. In general, 297 individuals (28%) were infected with intestinal parasites. The prevalence of infection for protozoa and helminthes infections were 27.4% and 1.8%, respectively. The most prevalent protozoans were *Blastocystis hominis* (13.7%) and *Giardia lamblia* (7.8%), and that of helminth was *Hy-menolepis nana* (1.1%).

Conclusion: Intestinal protozoan parasites were more prevalent than helminth parasites. Source of water supply and personal hygiene were important factors in the distribution of parasites in the study area.

Introduction

Intestinal parasitic infections have worldwide distribution. The high prevalence is related to poor personal sanitation, unsafe water supply, and lack of health education (1). Many protozoans live in human gastrointestinal tract. Some of those are pathogenic, like *Giardia lamblia*, and *Entamoeba histolytica*, and some are nonpathogenic forms, living in gastrointestinal tract as commensals (1). *E. histolytica*, causative agent of amoebiasis, is a parasitic infection with considerable worldwide morbidity and mortality (2). *Giardia lamblia* is another pathogenic Protozoa. *G. lamblia* is the most common infection in temperate and tropical countries (1). The prevalence of *G. lamblia* has been estimated that 2–3% in the developed countries and 20–30% in developing countries (3, 4). *Blastocystis hominis* is a common intestinal protozoan and its pathogenicity is still controversial (5-7). The prevalence of *B. hominis* has been reported to be higher in developing countries (30-50%) than developed countries (1.5-10%) (8).

Soil-transmitted helminthes (STH) infections are widely distributed throughout the tropics and subtropics. Climate, moisture and warm temperature are important elements of transmission of these infections (9). The most prevalent these helminthes infections are *Ancylostoma duodenale*, *Necator americanus*, *Ascaris lumbricoides* and *Trichuris trichiura* that infect approximately one-sixth of people all over the world (10, 11). There are low rates of tapeworm infections in Muslim populations in different regions of Asia and Africa. However, there are some reports from Africa (12-15).

Regarding to climate variation and different social and cultural condition in Iran, epidemiologic survey in different areas is necessary.

Records on intestinal parasitic infections have been reported from some parts of Iran (16-20), however, there are no data available on distribution of intestinal parasitic infection in Jiroft, Kerman Province. In this study we

evaluated intestinal parasitic infection rates in Jiroft, Kerman Province.

Material and Methods

Study area

This study was performed in Jiroft, located approximately 248 km² southeast of Kerman Province (Fig. 1). It is comprised of four districts, fourteen rural districts, and four towns. Jiroft have a population of 277,748, among them 121,988 people (36%) living in urban areas and the rest in rural areas. It has three different climate zones: cold, warm, and moderate. Humidity stemming from the Indian Ocean causes torrential rains result in floods. Jiroft is considered as the most suitable region in Kerman Province for agriculture (Available at: https://en.wikipedia.org/wiki/Jiroft_County).

Sampling

During 2013-2014, 1060 individuals including 563(53.1%) from rural and 497(46.9%) from urban areas of Jiroft were selected by accidental systematic method. Fresh stool samples were collected from all individuals and examined by formalin ether concentration and agar plate culture. Direct examination was performed on watery samples. Examinations of samples for parasitic infections were performed in the Department of Medical Parasitology, School of Public Health, Tehran University of Medical Sciences.

For every individual a questioner was filled and data about gender, age, place of residency, education, job, gastrointestinal disorder and contact with soil or animals, source of drinking water and use of sanitary toilets were entered.

Analysis

Detection of intestinal parasites was based on morphological characteristic of the para-

sites. Analysis was performed using SPSS version 18 (Chicago, IL, USA) and Chi-square test was used to analyze statistical relationship

between prevalence of parasites and different criteria entered in the questioners.

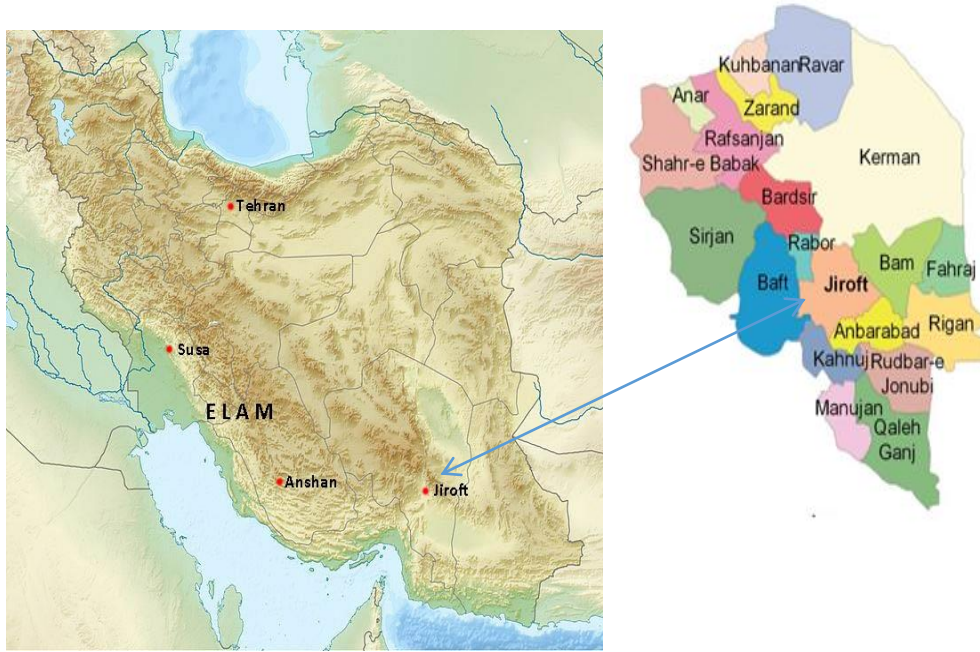


Fig. 1: Situation of Jiroft in Kerman Province, southeast Iran

Results

Out of 1060 individuals, 563 people (53.1%) and 497 people (46.9%) were from rural and urban areas, respectively. Infection rate in rural areas (29.3%) was more than urban areas (26.2%), without significant difference.

In general, 297 individuals (28 %) were infected with intestinal parasites. The prevalence of infection with intestinal protozoa and helminth parasites are summarized in Table 1. The prevalence of infection for protozoa and helminthes infections were 27.4% and 1.8%, respectively. The most prevalent protozoan parasite was *B. hominis* (13.7%); followed by *G. lamblia* (7.8%). The most prevalent helminth parasite was *Hymenolepis nana* (1.1%).

The prevalence rates of infection in females and males were 29% and 27%, respectively. There was no significant correlation between gender and infection rates.

Although the most prevalence rate of infection was found in age group of 30-39 years (34.9%); but, there was no significant correlation between age and prevalence of infection. The highest *Giardia* infection rate was found in age group 0- 9 years old (11.6 %) and there was significant correlation between age and prevalence of *Giardia* infection (P-value: 0.023).

Respect to the job, the most infected people was pastors (37.5%) and housekeepers (32.2%); but there was no significant correlation between job and infection rates.

The prevalence rates of infection in people who consumed drinking water from different sources including wells, pipe and spring were 41.3%, 28.1% and 18.6%, respectively. There was statistical correlation between water supply and infection rates (P-value: 0.001) (Fig. 2).

There was significant correlation between use of unsanitary toilet and rate of infection (P: 0.031). There was no statistical correlation between gastrointestinal disorders, and contact

with soil or animal and infectivity with intestinal parasites. In general, 29 individuals (28%) were infected with intestinal parasites; among

those, 254 (85.5%), 35(11.8%), 7 (2.4%), and 1(0.3%) individuals had one, two, three and four parasites, respectively.

Table 1: Prevalence of intestinal parasitic infections in Jiroft, Kerman Province, according to gender

Infection	Gender				Total	
	Male Number	Percent (%)	Female Number	Percent (%)	Number	Percent (%)
<i>Blastocystis hominis</i>	57	11.75	88	15.3	145	13.7
<i>Giardia lamblia</i>	48	9.8	35	6	83	7.8
<i>Entamoeba coli</i>	28	5.8	49	8.5	77	7.2
<i>Entamoeba histolytica/ dispar</i>	4	0.8	6	1	10	0.9
<i>Iodamoeba butschilli</i>	10	0.2	9	1.6	19	1.8
<i>Chilomastix mesnili</i>	2	0.4	6	1	8	0.8
<i>Entamoeba hartmani</i>	0	0	2	0.3	2	0.2
<i>Hymenolepis nana</i>	6	1.2	6	1	12	1.1
<i>Ascaris lumbricoides</i>	0	0	2	0.3	2	0.2
<i>Enterobius vermicularis</i>	2	0.4	0	0	2	0.2
<i>Trichostrongylus sp</i>	1	0.2	0	0	1	0.1
<i>Dicrocoelium dendriticum</i>	0	0	1	0.2	1	0.1
<i>Taenia saginata</i>	1	0.2	0	0	1	0.1
No parasite	359	74	406	70.7	765	72.2
Total	485	45.8	574	54.2	1060	100

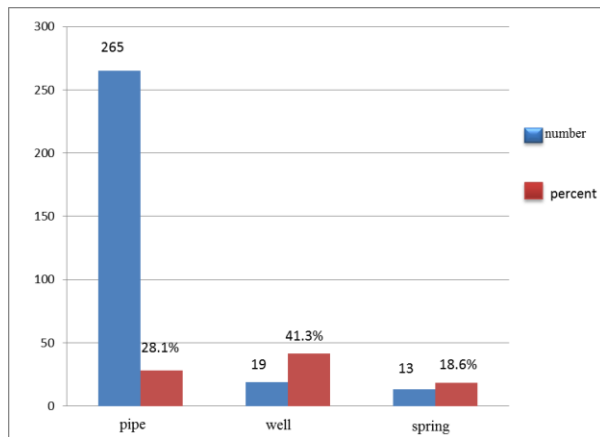


Fig. 2: Prevalence of intestinal parasites in Jiroft, Kerman according to the source of drinking water

Discussion

Consumption of unsafe drinking water, Lack of sanitation and hygiene are strong determinants for infection with intestinal protozoa (21-23). In the current study, 28% of people

were infected with intestinal parasites. In a survey (24), parasitic infection rate in Kerman was 47%. Prevalence of parasitic infection in part of Khuzestan Province, southwest Iran was 25.2% in 2007 (20).

The prevalence of infection for protozoan and helminthic infection in the present study were 27.4% and 1.8%, respectively. The result of this study showed the highest prevalence of intestinal protozoa was related to *B. hominis* (13.7%), followed by *G. lamblia* (7.8%). Prevalence of *E. coli*, *I. butschilli* and *E. histolytica/ dispar* were 7.2% and 1.8% and 0.9, respectively. *B. hominis* and *G. lamblia* were the most common parasites in some of studies (1, 17-20). *B. hominis* (31.7%) and *G. lamblia* (29.6%) were the most prevalent protozoa in the Tonkabon (18). Shojaei, et al. reported the prevalence of 10.7% for intestinal parasites in Tehran during 2004-2005 and *B. hominis* and *G. lamblia* were the most frequent intestinal parasites (25).

In a survey on 196 disable people in Golestan Province in 2009, protozoan and helminth prevalence rates were 11.2% and 0.5%, respectively. *Enterobius vermicularis* was the only helminth was found. The most common protozoa was *B.hominis* (4.2%) and prevalence of *G. lamblia*, *E. coli* and *E. histolytica/dispar* were (3.1%), (2.5%) and (1.5%), respectively (26).

The prevalence rates of infection in this study were 29% and 27% in female and male, respectively. There was no significant correlation between gender and infection rates. Similarly, the results of some other studies showed that gender is not a factor subscribe to the differences in possibility of intestinal parasitic infections (17, 18, 27, 28).

In the present study, the highest infection rate (34.9%) was found in 30-39 yr old age group, although there was no significant correlation between age and parasitic infection rates. The highest *Giardia* infection (11.6%) was found in 0-9 yr old age group, as it is expected, There was significant correlation between age and *Giardia* infection rates ($P= 0.023$).

In the present study, the most prevalent helminth infection was *Hymenolepis nana* (1.1%), followed by *Ascaris lumbricoides* (0.2%) and *Enterobius vermicularis* (0.2%).

Intestinal helminth infection in Isfahan in 1987 (19) was reported 80.7% and the most common helminthes were *Trichuris trichiura* (76.7%) and *A. lumbricoides* (46.7%). Parasitic infection rate in a study was 69.2% in 1990 (17). The most common helminthes infections in that study were *T. trichiura* (26.8%) and *A. lumbricoides* (17.8%). Prevalence of parasitic infection in Tonekabon in 1992 (18) was 74.6% and high rates of helminthes infections were related to *T. trichiura* (22.5%) and *A.lumbricoides* (6.3%). Low prevalence of intestinal helminth infections in Jiroft is in concordance with the result of recent studies in other parts of Iran (16, 19, 20), indicating decrease of infection compared to last decades.

In the current study, coinfection was found from two to four parasites. The most com-

mon co-infection was observed between *B. hominis* and *E. coli* in 13 cases (4.3%).

Considering other criteria, there was no significant correlation between place of residency (rural or urban), education, job, gastrointestinal disorder, and contact with soil or animals and parasitic infection rates. However, source of water supply was important criteria for infectivity with intestinal parasites. Unsafe water supply led to higher prevalence of infection. So that, prevalence of infection in people who consumed well water (41.3%) and untreated pipe water (28.1%) were more than that of spring water (18.6%); and the difference between water supply and infection rate was statistically significant ($P: 0.001$). In addition, in this study, there was significant correlation between use of unsanitary toilet and infection rate. Therefore, unsafe water supply and unsanitary toilets are important causative agents for intestinal parasitic infection in the study area.

Conclusion

In spite of decreasing trend of parasitic infection in Iran, compared to past decades, nowadays-intestinal parasitic infections are still one of the public health problems wherever safe water and hygiene measures are lacking.

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