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Prevalence of intestinal parasitic infections among applicants for health cards attending Ahvaz East Health Center during 2012–2013

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ABSTRACT

Objective: To investigate the prevalence of intestinal parasitic infections among health card applicants attending Ahvaz East Health Center during 2012–2013.**Methods:** In this descriptive cross-sectional study, stool specimens were collected between 14614 and 12444 people referred to Ahvaz East Health Center respectively in 2012 and 2013. Then, stool specimens were examined microscopically for the presence of parasite eggs, cysts and trophozoites using direct and formalin-ether concentration methods.**Results:** Among 14614 applicants for health cards in 2012, 1693 cases were diagnosed with parasitic infections: *Giardia lamblia* 1445 (85.35%), *Entamoeba histolytica/dispar* 31 (1.83%), *Oxyuris* (pin worm) 29 (1.71%), *Hymenolepis nana* 60 (3.54%), and *Entamoeba coli* 128 (7.57%). Out of 12444 applicants for health cards during 2013, 632 cases were diagnosed with parasitic infections: *Giardia lamblia* 510 (80.69%), *Entamoeba histolytica/dispar* 20 (3.17%), *Oxyuris* 19 (3.01%), *Hymenolepis nana* 46 (7.28%), and *Entamoeba coli* 33 (5.86%). In both years the most outbreaks have been reported in the spring and autumn, and the lowest outbreak has been reported during the winter.**Conclusions:** The protozoa outbreak, such as *Giardia*, is more than multi-protozoa whose outbreak may be the result of parasite easy transferred by water and nutrients and the parasite cyst resistance under the worse conditions as well as its simple cell division. The outbreak percentage in 2012 is more than 2013 which may be the result of improving the individual health care level.

1. Introduction

Intestinal parasitic infections are the most common infections around the world[1]. Poverty, illiteracy, lack of health care, lack of access to safe drinking water, and the tropical wet climate are some factors associated with intestinal parasitic infections. About one-third of the people of the world, more than two billion people, are under the influence of intestinal parasite infections that about 300 million of these people are infected with the parasitic worms, in which at least 50% of these people are children of school age[2].

Parasitic diseases are among those that can easily spread to the community through the employees in a variety of businesses, especially the businesses associated with the preparation and production of food and threaten the public health. Therefore, in order to control and remove the chain, periodic checkups and health card issued by the health centers have been considered in this context[3]. On the other hand, the chronic parasitic infections of the intestine are associated with the risk of other infections, such as viral infections, tuberculosis and malaria[4,5]. Despite the development in health care, parasitic infections are an acute problem. However, pathogenesis and deaths caused by intestinal parasites are vary from the species to other species. The prevalence of intestinal parasites to various species depends on social, geographic and economic situation of the people[6].

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Various types of intestinal parasites infect humans and can create a wide variety of clinical symptoms such as watery or mucoid diarrhea, nausea and vomiting, dehydration, abdominal pains and fever that depends on immunological, physiological, social and demographic factors[7]. *Giardia lamblia* (*G. lamblia*) is the most common parasites generating diarrhea, with the global outbreak that involves more children at the ages of 2–10 years old. Infection happens with a low number and by eating the parasite cysts from a person to person or contaminated food and water. The infection may be expressed asymptotically, or can be in the form of slight or severe and bulky watery diarrhea with a very bad smell along with bloating and abdominal distention, or chronic diarrhea and malabsorption syndrome manifest[8].

Entamoeba histolytica (*E. histolytica*) is known as the second leading cause of death among parasitic diseases. So, it is one of the main causes of threats to human health and especially travelers[9]. There have been reported that worm infections may cause serious complications in the patients and cases of intestinal obstruction, paralytic ileum, liver swelling, cholecystitis, myopericarditis, pulmonary and renal complications caused by strongyloidiasis and extra-intestinal abscesses caused by *Oxyuris*[10]. The prevalence of intestinal parasitic infections has been reported in different parts of Iran[6,7,11,12]. Since parasitic diseases can easily spread to the community through the employees in a variety of businesses associated with the production of food and threaten public health and according to ecological and climatic conditions in Ahvaz City, and the existence of appropriate conditions for the release and transfer of all types of parasites, by people who handle food preparation and distribution, evaluation of the rate of the protozoan parasite and worm disease infection in these patients appears to be essential in Ahvaz. On the other hand, the evaluation of these parasitic infections in these people in the different seasons of the year is medically and healthily important, especially in the implementation of the prevention and control program in Ahvaz. Hence the purpose of the research is an assessment of the prevalence of intestinal parasitic infections among health card applicants in Ahvaz East Health Center throughout the year of 2012–2013.

2. Materials and methods

2.1. Area of study

Ahvaz is a city in the center of Khuzestan Province in Southern Iran. The city has a total area of 375 km² and its population until 2006 has been reported as 1 425 891. Ahvaz has a desert climate with temperatures above 50 °C, which is one of the warmest cities in the world. The average annual rainfall is about 230 mm.

According to a recent report by the World Health Organization, the city has had the most polluted climates in the world[11].

2.2. The study population

In this descriptive cross-sectional study, the study population was all applicants for health card referred to Ahvaz East Health Center (14 614 and 12 444 people respectively in 2012 and 2013). Stool specimens were collected among them. The subjects were informed about the purpose and nature of the study and how the partnership was. Data such as age, sex, occupation, contact with animals, use of vegetables, travel, swimming and disease symptoms, were collected using the questionnaire[6].

2.3. The stool testing

For sampling, at first, stool samples (0.5–1.5 g) were collected in plastic vials without preservatives and were tested immediately (less than 1 h).

At first, in order to check the consistency of the stool, the presence of blood, mucus and the adult worm parasites were evaluated microscopically. Finally, using the direct and the formalin-ether concentration methods, the stool samples were checked by optical microscope to assess the presence of parasite eggs, cysts and trophozoites. All the parasitic cases (protozoa and worms) were reported separately[13].

2.4. Statistical analysis

According to the year of study and the seasons, data were analyzed using SPSS version 16 and statistical tests of *Chi-square*.

3. Results

In 2012 and 2013, out of 14 614 and 12 444 applicants to get a health card, 1 693 and 632 people were diagnosed with parasitic infection respectively.

Out of 1 693 sufferers in 2012, 1 445 (85.35%), 31 (1.83%), 29 (1.71%), 60 (3.54%), and 128 (7.57%) were respectively affected with *G. lamblia*, *Entamoeba histolytica/dispar* (*E. histolytica/dispar*), *Oxyuris* (pin worm), *Hymenolepis nana* (*H. nana*), and *Entamoeba coli* (*E. coli*).

In 2013, 632 cases were diagnosed with parasitic infection, including *G. lamblia* 510 (80.69%), *E. histolytica/dispar* 20 (3.17%), *Oxyuris* 19 (3.01%), *H. nana* 46 (7.28%), and *E. coli* 33 (5.86%).

According to Figure 1, the highest prevalence in 2012 was found in autumn and the lowest incidence was observed in winter.

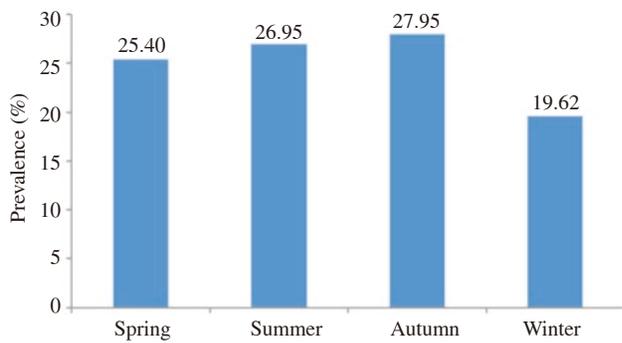


Figure 1. Seasonal prevalence of intestinal parasitic infections in 2012, Ahvaz City, Iran.

Also, as shown in Figure 2, the highest prevalence rate of intestinal parasite infection in 2013 was in spring, and the lowest prevalence rate was observed in winter.

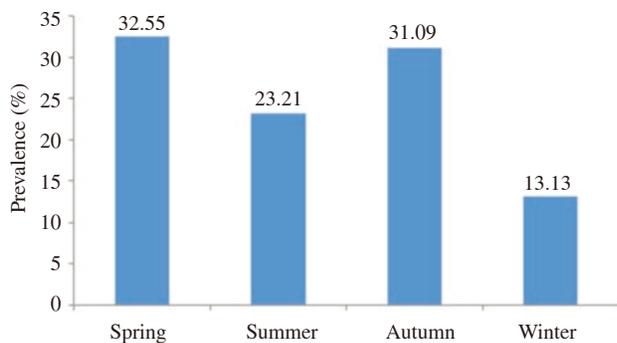


Figure 2. Seasonal prevalence of intestinal parasitic infections in 2013, Ahvaz City, Iran.

4. Discussion

Worm and protozoan parasite of the human intestine is one of the serious public health concerns in many countries, especially in the tropical and subtropical developing countries and is mainly found in children. The prevalence of intestinal parasite infections in each community will be considered as an indicator for the health status of the area. Some personal factors (safety conditions, nutrition, health status, literacy, cultural habits, etc.) and environmental factors such as climate, geographical location, poverty and economic situation, inadequate health conditions, the high density of population and failure to observe health regulations in people working in the preparation and distribution of food may help the prevalence of intestinal parasite infections[3,14].

Several assessments conducted in different parts of the country show the highest incidence of intestinal parasite infections[6,7,11,12] that in recent years, their prevalence has been significantly dropped parallel to the improvement of public health in different areas[15]. The results of this study indicated that in 2012 and 2013, out of 14614 and 12444 applicants for health card, 1693 and 632 people were diagnosed with parasitic infection respectively. The number of people suffering from an intestinal parasite infection changed from

11.58% in 2012 to 5.07% in 2013 that it was due to an increase in the level of health in the Ahvaz City.

The results of this study in 2012 and 2013 showed that the most common parasite in both years was *G. lamblia* that had a prevalence of 85.35% and 80.69% in 2012 and 2013, respectively. *G. lamblia* is the most common parasites generating diarrhea, with the world release that involves most 2–10 years old children[8]. In 2013, Maryam *et al.*[3] showed that the prevalence of parasitic infection among applicants for the health cards in Zabol City in Iran is high, so that the rates of infection with intestinal protozoa, including *G. lamblia*, *E. coli*, *E. histolytica/dispar*, *Oxyuris*, *Taenia* worm parasite and *H. nana* were 56.6%, 28.30%, 1.89%, 9.43%, 1.89% and 1.89%, respectively. They also did not find a significant relationship between gender and job with parasitic contamination rate[3]. Moreover, Vahedi *et al.*[16] in 2012 in Mazandaran Province, Iran, indicated that the most common intestinal parasite infection is *G. lamblia*.

On the other hand, the results of this study indicated that the highest prevalence of intestinal parasite infections in the year 2012 was in autumn and the lowest prevalence was in winter. Also, the prevalence of infection in 2013 was observed in the spring, and the lowest prevalence was observed in winter. In a study in Kalanki (Khasibazzar), Kathmandu, Nepal in 2012, Karki *et al.*[17] showed that most outbreaks of intestinal parasite infection, generally parasitic, were observed in summer season and the lowest prevalence was in winter[17]. Research has shown that seasonal and climatic changes affect the prevalence of parasitic infection[18]. Although these changes are not controllable by humans, the progress of the health care systems can control them. In 2015, Khoshnood *et al.*[12] showed that the prevalence of parasitic infections in Baghe-Malek (in Khuzestan Province, Iran) in summer is the maximum amount that there is a significant relationship compared with other seasons. According to Khoshnood *et al.*[12], perhaps the cause of this issue is increasing in the population of the city and consuming more vegetables and water, which will increase the likelihood of transmission of the parasite[12].

The results of this study showed that the prevalence rate of intestinal parasite infections is still high that it can be as a dangerous threat to the public health, especially in children. So the improvement in nutritional status and behavior of people appear essential that its result can lead to preventing the intestinal parasite infection risk. One of the items that can decrease the amount of intestinal parasite infections is taking herbs rich in polyphenols. These plants are celery (*Apium graveolens*)[19-21], fennel (*Foeniculum vulgare*)[22], *Heracleum persicum* and *Ziziphus jujuba*[23] that have antioxidant properties and in this way they can apply their anti-parasitic and antimicrobial effects[24].

Since parasitic infections cause severe diarrhea, malabsorption, intestinal obstruction, paralytic ileum, liver inflammation,

cholecystitis, pulmonary and renal complications, and due to relatively high parasitic infection in applicants for health cards, health authorities in Ahvaz must pay more attention to training the methods of control and preventing the transmission of intestinal parasites to people working in the preparation and distribution of food.

Conflict of interest statement

We declare that we have no conflicts of interest.

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