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Prevalence of Intestinal Parasitic Infections Among People in Baghmalek During 2013 – 2014

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Background: Intestinal parasitic infections are one of major health problems, especially in developing countries. Several factors, such as geographical location and socioeconomic conditions, are responsible for variations in the prevalence of intestinal parasites. Baghmalek is an area in Khuzestan, a western province of Iran. This area has a mild climate and is a touristic region of the province.
Objectives: The aim of our study was to describe the occurrence of intestinal parasitic infections in Baghmalek city, southwest of Iran.
Patients and Methods: The study was carried out from October 2013 to October 2014. A total of 8469 human stool samples were examined by microscopy methods. Separation of samples, based on age, sex and season was done and data were analyzed with the SPSS software.
Results: Totally, 1131 (13.35%) samples were positive for intestinal parasites. It was found that prevalence of intestinal parasitic infections was higher in males than in females. The greatest prevalence (45%) was in the group of the under 15 years old and the prevalence rate of intestinal parasites infection was higher in summer (18.53%) compared to seasons ($P < 0.05$).
Conclusions: Because the intestinal parasitic infections are a health concern in areas with poor nutritional and socioeconomic status, intervention programs, including health education and environmental sanitation, are required.

Keywords: Intestinal Diseases, Parasitic; Nutritional Status; Male; Seasonal Variation

1. Background

Intestinal parasitic infections (IPI) still represent a major problem in many areas, especially in developing countries (1). Approximately 3.5 billion people worldwide are affected by IPI, of which 450 million are symptomatic and more than 200000 deaths have been reported, annually (2). Parasitic diseases are listed among the most common infectious diseases in the world (3). It seems that the prevalence and complications of these infections are higher in children compared to adults (4). Iron deficiency anemia, growth retardation, weight loss, abdominal pain, digestive problems, nervousness and aggression are several effects of these infections (3, 5). Surveys conducted in different parts of the world suggest that several factors are involved in the prevalence of intestinal parasites. Social, economic and cultural conditions, as well as the geographical location of the region are several of the important factors (6). Having information about the parasitic infections of each area and tracking the changes in the epidemiological pattern of parasites represent undeniable health needs and key points in the implementation of control programs, by having accurate epidemiological data. Studies conducted in various parts of Iran have reported different values of the prevalence of intestinal parasites (7). Baghmalek is a city in Khuzestan province, located in Southwest Iran. The city has a population of 110000, and more than 80% of them live in the suburban area. Because of low-quality housing, overcrowding, and lack of sanitary conditions, especially in summer, this part of the province could be an endemic area for the infectious diseases.

2. Objectives

At present, no information about the prevalence of parasitic infections in this city is available. Therefore, the aim of our study was to determine the prevalence of IPI among patients referred to health and medical centers.

3. Patients and Methods

From October 2013 to October 2014, after completing the questionnaire, 8469 stool samples were collected in plastic containers, without preservatives. Samples were evaluated within 2 hours by macroscopic and microscopic methods. Through the macroscopic method, the presence of blood, mucus and various forms of helminthic parasites were examined, while by the microscopic method, direct exami-

nation was performed by normal saline and Lugol iodine. Then, using the questionnaire completed by the patients, samples based on age, sex and season were separated. Statistical analysis was performed with the SPSS software, version 15 (SPSS Inc., Chicago, IL, USA).

4. Results

Of the 8469 patients, 3557 (42%) were male and 4912 (58%) were female. In total, 1131 (13.35%) samples were positive for parasites (Table 1). Infection rate of males and females were 15.94% and 11.48%, respectively (Table 2). In this study, *Giardia lamblia (G. lamblia), Entamoeba histolytica/dispar (E. histolytica/dispar), Hymenolepis nana (H. nana), Entamoeba coli (E. coli), Blastocystis hominis (B. hominis) and Chilomastix mesnili (Ch. mesnili)* were identified with 11.67%, 0.78%, 0.4%, 0.25%, 0.22% and 0.21% prevalence rate, respectively. Also, contamination by more than one parasite was found in two samples (Table 1). In this study, separation of samples was performed according to three age groups: The first group, < 15 years old (45% samples), the second group, 15 – 30 years old (28% samples), and the third group, > 30 years (27% samples). The contamination rates of these three age groups were 20.62%, 8.47% and 6.29%, respectively (Table 3). Our study also showed that patients' infection during the four seasons of a year were 12.59%, 18.53%, 11.57% and 13.07%, respectively (Table 4).

Table 1. Prevalence of Intestinal Parasitic Infections Among Patients Referred to Baghmalek Medical Centers [a]

Parasite	Prevalence
G.lamblia	988 (11.67)
E.histolytica/dispar	66 (0.78)
H.nana	34 (0.4)
E.coli	21 (0.25)
B.hominis	18 (0.22)
Ch.mesnili	2 (0.021)
G.lamblia **and** ***H.nana***	1 (0.011)
G.lamblia **and** ***E.coli***	1 (0.011)
Total	1131 (13.35)

[a] Data are presented as No. (%).

Table 2. Prevalence of Parasitic Infections Among Patients Referred to Baghmalek Medical Centers Based on Gender

Gender	No.	Infected Cases [a]
Male	3557	567 (15.94)
Female	4912	564 (11.48)

[a] Data are presented as No. (%).

Table 3. Prevalence of Parasitic Infections Among Patients Referred to Baghmalek Medical Centers Based on Age

Age Group, years	No.	Infected Cases [a]
< 15	3811	786 (20.62)
15 - 30	2372	201 (8.47)
> 30	2286	144 (6.29)

[a] Data are presented as No. (%).

Table 4. Prevalence of Parasitic Infections Among Patients Referred to Baghmalek Medical Centers Based on Season

Season	NO.	Infected Cases [a]
Spring	2175	274 (12.59)
Summer	1824	338 (18.53)
Autumn	2308	236 (11.57)
Winter	2162	283 (13.08)

[a] Data are presented as No. (%).

5. Discussion

Parasitic infections represent a major health problem in developing countries (8). Different values of the prevalence of IPI have been reported in different parts of Iran. Haghighi et al., in Zahedan in 2008, showed a prevalence rate of 27.3% (9). The rates of prevalence reported from different locations of Iran were, 21.2% in Tehran, in 2008 (10), 11.9% in Khorramabad, in 2010 (11) and 4.7% in Karaj, in 2008 (12). The obtained rate in this study (13.35%) is situated somewhere in between the rates reported by previous trials from Iran. Patients' lifestyle social and cultural characteristics of each region are the effector factors for the distribution of the infection. Intensive research conducted in recent years reveal a significant reduction of helminthic infections, compared to protozoan infections (13). Unlike worms that have a complicated life cycle and need to soil, meat or intermediate snail, protozoa are directly transmitted through water , food and even from person to person. Accordingly, the results in this study indicated rates of 97% and 3% for intestinal protozoan and helminthic infections, respectively. In the current study, like multiple studies conducted in Iran (14-16), *G. lamblia* (11.67%) was the most common protozoa. The high prevalence of *G. lamblia* appears to be the result of contamination of water supplies of the region (17), although further studies are recommended. Chronic infection, cyclic disposal and asymptomatic infection of this parasite, are responsible for the easy distribution in the community (18). In this study, the infection rate of males was higher, compared to females; this issue may be due to more contact with sources of contamination or accuracy of females in personal health care. These result are similar to the results obtained by Haghighi et al. in Zahedan, in 2008 (9) and Akhlaghi et al. in Tehran, also in 2008 (10). The rate of pathogenic parasite infection is one of the indicators of community health. Children are one of the most sensitive groups for infection. A complication of pathogenic parasites is more pronounced in this group (19). *Giardia lamblia*, *E. histolytica/dispar, H. nana* and *E. coli* were more prevalent in the first age group (< 15 years) than in others ($P < 0.05$), probably because of the incomplete maturation of the immunitary system, lack knowledge and reduced supervision by their parents. Prevalences of *B. hominis* and *Ch. mesnili* in the three age groups were almost the same, which puts into discussion the validity of age as a risk factor for infection with these parasites. Intesti-

nal infection has several causes and changes of seasons and weather are just several of them (20). Although these changes are not controllable by humans, improvement of health care systems is something that can be invested in. In this study, the prevalence of parasitic infections in summer (18.53%) was higher, compared to the other seasons ($P < 0.05$). Perhaps the reason is the increasing population of the city and consumption of more water and vegetables, which enhance the availability of parasite transmission. The results of this study showed that IPI can still be regarded as a threat to public health, especially in children. Therefore, preventive measures to increase public awareness to improve the nutritional and behavioral status of individuals are essential.

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