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# Prevalence of Intestinal Parasitic Infections in Shush County, Southwest of Iran during 2014 - 2016

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## Abstract

**Background:** Approximately, one-third of the worlds population are in the influence of intestinal parasite infections (IPIs). The infections can cause a whole range of clinical symptoms such as watery or mucoid diarrhea, dehydration, vomiting and nausea, abdominal pains, as well as a fever.
**Objectives:** The aim of this study was to evaluate IPIs in Shush County, southwest Iran, during 2014 - 2016.
**Methods:** In this descriptive cross-sectional survey, 15132 stool samples were collected during 2014 - 2016. The stool samples were evaluated microscopically for the presence of parasite trophozoites, cysts, and eggs using direct and formalin-ether concentration methods. The data were analyzed by SPSS version 21 and statistical Chi-square test.
**Results:** Of the 15132 stool samples, 778 (5.14%) were positive for IPIs, where 429 (55.14%) were female and 349 (44.85%) were males, respectively. *Entamoeba histolitica/dispar* was detected as the most common parasite in 313 (2.06%) specimens (172 females, 141 males). Other parasites were included, 158 (1.04%) *Giardia lamblia* (83 females, 75 males), 150 (0.99%) *Blastocystis hominis* (84 females, 66 males), and 155 (1.02%) *Entamoeba coli* (90 females, 65 males). Furthermore, 2 (.0.013%) *Trichuris trichiura* were detected only in males.
**Conclusions:** The results show that a relatively high prevalence of intestinal parasite infections were observed among individuals. Since the parasitic infections can cause malabsorption, severe diarrhea, paralytic ileum, intestinal obstruction, cholecystitis, liver inflammation, pulmonary, as well as renal complications, the health authorities of Shush County must pay more attention to control and prevent the transmission of intestinal parasites to individuals.

*Keywords:* Prevalence, Intestinal Parasites, Infection, Shush, Iran

## 1. Background

Intestinal parasitic infections (IPIs) have a high prevalence around the world, especially in developing countries (1). Approximately, one-third of the worlds' population (more than 2 billion people) are in the influence of IPIs. About 450 million people suffer from IPIs and at least 50% of these individuals are children. Lack of health care, the tropical wet climate, lack of access to safe drinking water, poverty, and illiteracy are some factors associated with IPIs (2, 3). Some flies as mechanical vectors might play a role at the transmission of some intestinal parasites such as *Giardia lamblia*, *Entamoeba histolytica/dispar*, *Hymenolepis nana*, and *Ascaris lumbricoides* (4). Intestinal parasitic infections in majority of the cases are asymptomatic; however, IPIs can cause a whole range of clinical symptoms such as watery or mucoid diarrhea, dehydration, vomiting and nausea, abdominal pains and fever, vitamin deficiencies, growth retardation in children, iron deficiency anemia as well as mental and physical health disorders (3, 5). In addition, the chronic IPIs are related with the risk of other infections, such as malaria, tuberculosis and viral infections (6, 7), especially in immunocompromised individuals (8).

Despite improving hygiene status, IPIs are considered as an acute problem. However, the deaths and pathogenesis caused by IPIs vary from the specie to other species. Due to various species, the prevalence of IPIs depends on the geographic, social, and economic situation of individuals (9). *Giardia lamblia* has a global prevalence and is the most common parasite that causes diarrhea. The infection occurs by eating the protozoan cysts available in contaminated food and water (10). In addition, *Entamoeba histolytica/dispar* is known as the second factor that causes death among individuals with parasitic diseases. The parasite is one of the main causes that threatens the individuals health, especially in travelers (11). In recent years, the prevalence of IPIs have been reported in different areas of Iran (5,

9, 12, 13).

## 2. Objectives

IPIs are a serious concern of public health, especially in the tropical and subtropical areas. On the other hand, in summer season, Shush County has a temperature of about 50°C. Thus, Shush has tropical and subtropical climates. Hence, due to the climatic and ecological conditions in Shush County, evaluation of the rate of IPIs was essential. Therefore, the aim of this study was to evaluate the prevalence of intestinal parasitic infections in Shush County, southwest Iran, during 2014 - 2016.

## 3. Methods

### 3.1. Study Area

Shush county is located in the Khuzestan province, which is in southwest Iran. The population of Shush was reported as 53.897 until 2006 and the county has an area of 3.577 square kilometers. During the summer, the county has a temperature of about 50°C.

### 3.2. The Study Population

In this descriptive cross-sectional survey, the study population included all individuals that were referred to the Nezam Mafi hospital of Shush County during 2014 - 2016. First, the purpose as well as nature of the study was conveyed to the referred individuals. Next, stool samples were collected among them. Data such as sex, age, contact with animals, occupation, use of vegetables, swimming, disease symptoms, and travel were collected using a questionnaire (9, 14).

### 3.3. The Stool Examination

The stool specimens (1 - 3 g) were collected in labeled plastic vials without any preservatives and were tested immediately (less than 60 minutes after collecting). Then, we evaluated the consistency of stool samples, the presence of mucus, blood, as well as the worm parasites, microscopically. Finally, the stool samples were evaluated microscopically for the presence of parasite trophozoites, cysts, and eggs using direct and formalin-ether concentration methods. Briefly, 0.5 - 1.5 g stool samples were mixed with 4 g formol saline. After filtering, diethyl ether was added and mixed once again. After centrifuging, the sediment was stained with 0.85% iodine and finally, was examined by a light microscope ($\times$ 100 magnification). The diagnosis of protozoa and helminth, in accordance to a microscopic morphological, is like the shape of cyst as well as an ova and trophozoite size. All the parasitic cases (worms and protozoa) were reported separately (14, 15).

### 3.4. Statistical Analysis

The data were analyzed using the SPSS version 21 (SPSS Inc., Chicago, IL, USA) as well as statistical Chi-square tests (14).

## 4. Results

Table 1 shows the prevalence of IPIs according to the year and gender in Shush County, southwest Iran, during 2014 - 2016. Based on the results, of the 15132 stool samples, 778 (5.14%) were positive for IPIs, where 429 (55.14%) were female and 349 (44.85%) were male, respectively. In addition, Table 2 indicates the frequency of IPIs in the population of Shush County, southwest Iran, during 2014-2016. Based on the table, *Entamoeba histolitica/dispar* was detected in 313 (2.06%) specimens as the most common parasite, where 172 were female and 141 males, respectively. Other parasites were included, 158 (1.04%) *Giardia lamblia* (83 females, 75 males), 150 (0.99%) *Blastocystis hominis* (84 females, 66 males), and 155 (1.02%) *Entamoeba coli* (90 females, 65 males). Furthermore, 2 (.0.013%) *Trichuris trichiura* were detected only in males. No positive cases with *A. lumbricoides*, Hookworms, and *Strongyloides stercoralis* were reported.

## 5. Discussion

IPIs are serious concerns for public health in several countries, in particular the tropical and subtropical developing countries. The infections have been seen mainly in children. The prevalence of IPIs in each community is an indicator of the health status of the area. Some environmental factors such as geographical location, climate, poverty, inadequate health conditions, and economic situation, as well as, personal factors such as nutrition, safety conditions, health status, cultural habits, literacy, and the high density of population help the prevalence of IPIs (3, 16). Several evaluations conducted in the different areas of Iran showed the high prevalence of IPIs (5, 9, 12, 13), however, in recent years, the prevalence of the infections have significantly dropped parallel to the development of public health (17). Our results indicate that during approximately 2014 - 2016, no changes were observed in the percentage of this infection (between 5.03% - 5.23%). These results signify the probability that there were no improvements in the health status of Shush County during the years.

According to the findings of the study, the overall prevalence of IPIs was 5.14% in Shush County, southwest Iran, during 2014 - 2016 (Table 1). It is consistent with conducted studies in Karaj and Qazvin city with the overall prevalence of 4.7% (18) and 5.8% (2), respectively. While, a

**Table 1.** The Prevalence of IPIs According to Year and Gender in Shush County, Southwest of Iran During 2014 - 2016[a]

| Year | Number of referred | Positive cases | Female | Male |
|---|---|---|---|---|
| **2014** | 5189 (34.29) | 270 (5.2) | 154 (57.03) | 116 (42.96) |
| **2015** | 6331 (41.83) | 319 (5.03) | 161 (50.47) | 158 (49.52) |
| **2016** | 3612 (23.86) | 189 (5.23) | 114 (60.31) | 75 (39.68) |
| **Total** | 15132 (100) | 778 (5.14) | 429 (55.14) | 349 (44.85) |

[a]Values are expressed as No. (%).

**Table 2.** The Frequency of IPIs in the Population of Shush County, Southwest of Iran During 2014 - 2016

| Parasite species | Frequency, No. | Percentage, % | Women, No. | Men, No. |
|---|---|---|---|---|
| | | No. of people examined (n = 15132) | | |
| ***E. histolytica/dispar*** | 313 | 2.06 | 172 | 141 |
| ***E. coli*** | 155 | 1.02 | 90 | 65 |
| ***G. lamblia*** | 158 | 1.04 | 83 | 75 |
| ***B. hominis*** | 150 | 0.99 | 84 | 66 |
| ***T. trichiura*** | 2 | 0.013 | 0 | 2 |
| **Total** | 778 | 5.14 | 429 | 349 |

higher prevalence rate of IPIs was observed in the city of Hamadan and Isfahan as well as the Mazandaran province with the overall prevalence of 35.1% (19), 10.42% (20), and 9.1% (21), respectively. Furthermore, the results of the study showed that the most common parasite was *E. histolitica/dispar* that was detected in 313 (2.06%) specimens. *E. histolitica/dispar* is known as the second factor causing death among individuals with parasitic diseases. The parasite is one of the main causes that threatens the individuals health, especially in travelers (11). The result is consistent with the study conducted by Koohsar et al. in 2013, in the Gorgan province (22). Furthermore, in a systematic review and meta-analysis study, in Iran during 1988 - 2009, Karambaigi et al. showed that the prevalence of *E. histolytica/dispar* was observed 1.3% (2.5% and 0.8% at rural and urban areas, respectively) (23).

In the study, the prevalence of IPIs in females with 55.14% was higher than males. This could be explained by sample size, number of individuals referred to the hospital, as well as cultural habits such as women working in farms. Overall, the differences of the present study with other studies may be attributed to the study population number, cultural habits of the region, methodology, type of sampling, occupations, sanitary status, geographical location, and many other factors. Our findings showed that the prevalence of IPIs is still high and it can be a serious and dangerous threat to the public health, especially, in children. Therefore, the improvement in the life style of individuals is essential and its result can lead to preventing the risk of IPIs.

### 5.1. Conclusion

The results show that a relatively high prevalence of intestinal parasite infections were observed among individuals referred to the Nezam Mafi hospital of Shush County. Since the parasitic infections can cause malabsorption, severe diarrhea, paralytic ileum, intestinal obstruction, cholecystitis, liver inflammation, as well as pulmonary and renal complications, health authorities of Shush County must pay more attention to control and prevent the transmission of intestinal parasites to individuals.

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## Footnotes

**Authors' Contribution:** All authors had an equal role in design, statistical analysis, work, and writing as well as

editing the manuscript.

**Conflict of Interests:** None declared.

**Ethical Considerations:** Ethical issues (Including informed consent, plagiarism, misconduct, data fabrication and/or fal-sification, double publication and/or submission, redundancy, etc.) have been completely observed by all of the authors.

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