Survey of Giardiasis Symptoms in Patients Referred to Health Care Centers in Zahedan, South-Eastern Iran, 2017-2018

Vahid Raissi¹, Mohammad Zibaei², Parvaneh Sarani Aliabadi³, Zeinab Hashemi Baghi³, Soudabeh Etemadi⁴,⁵*

¹Department of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
²Department of Medical Parasitology and Mycology, School of Medicine, Alborz University of Medical Sciences, Karaj, Iran
³Department of Medical-Surgical Nursing, Faculty of Nursing and Midwifery, Islamic Azad University, Zahedan Branch, Zahedan, Iran
⁴Department of Sociology, Zahedan Branch, Islamic Azad University, Zahedan, Iran
⁵Infectious Diseases and Tropical Medicine Research Center, Resistant Tuberculosis Institute, Zahedan University of Medical Sciences, Zahedan, Iran

*Corresponding Author:
Soudabeh Etemadi, Department of Parasitology and Mycology, Faculty of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran
Email: sssetemadi@gmail.com

Published Online December 21, 2019

Keywords: Epidemiology, Giardiasis, Clinical signs, Iran

Abstract

Background: There are many pathogenic intestinal parasites in humans, one of which is Giardia lamblia. This parasite has a variety of clinical symptoms in individuals. Poor health, weather conditions, and inappropriate lifestyle are all factors contributing to the high incidence of giardiasis.

Objective: Based on factors influencing the prevalence of giardiasis in the region, this study was performed on subjects referred to Zahedan health care centers.

Materials and Methods: A total of 671 stool specimens of subjects who referred between March 2017 and October 2018 were examined using direct and formalin ether concentration techniques. All demographic and clinical data in questionnaires were recorded. Data were analyzed using X² test to determine any differences in the prevalence of giardiasis and clinical symptoms between different age groups.

Results: Of 671 samples, 346 (51.1%) were positive. The most common complaint among participants was abdominal pain (64.1%), followed by diarrhea (53.7%), abdominal cramps (44.7%), nausea (32.6%), weight loss (30.9%), anorexia (26.8%), headache (22.2%), fatigue (14.1%), and fever (13.2%). Most of the clinical symptoms such as abdominal pain, abdominal cramp, weight loss, and headache were reported in females, and the results of chi-square test showed a significant difference (P<0.05). The age group of 1-12 years had the highest percentage of infection (49.42%). The data indicated that the highest rate of infection was observed in this group, showing a significant difference in comparison with other age groups (P<0.05).

Conclusion: The results of this study showed that in addition to health education, preventing the transmission of parasites to children would also be necessary.

Received August 10, 2019; Revised September 23, 2019; Accepted October 1, 2019

Background

Giardia lamblia is one of the pathogens of the human small intestine that is endemic in most countries. The parasite has been reported all over the world and the rate of human infection by this parasite varies between 1% and 25%. The outbreak of Giardia infection is directly related to lack of hygiene and health facilities. Giardiasis is more common in primary schools, kindergartens, and orphanages.¹ Humans are the main host and reservoir of the parasite, therefore, direct transmission (oral-fecal), contaminated food or water, and mechanical transmission of the parasite cysts by insects can be major pathways of infection.² About 70% of infected people living in indigenous areas lack specific symptoms. However, children (1-12 years), pregnant women and people with weakened immune systems are at high risk for infection and have clinical symptoms.³⁴ Steatorrhea (fatty stool), watery or greasy stools, delayed growth and weight loss, fatigue or malaise, abdominal cramps and bloating, gas or flatulence, nausea and allergic symptoms may be important clinical signs of giardiasis in individuals.⁵ In spite of increasing health care services in most countries, there is still a high incidence of infection due to poor health status.⁷ The aim of this study was to determine...
the prevalence and clinical signs of giardiasis in patients referred to health care centers in Zahedan between 2017 and 2018.

Materials and Methods

Study Area
Sistan and Baluchistan is the second largest province in Iran. It is located between 29°49'24"N and 60°86'69"E and is about 1352 meters above sea level with desert climate (with average annual temperature and rainfall of 22.8°C and 98.8 mm, respectively) (Figure 1).

Sample Collection
This study was performed from March 18, 2017 to October 29, 2018 on individuals referred to health care centers in Zahedan (Sistan and Baluchestan province), south-eastern Iran. The sample size was calculated using Epi6 software. A total of 671 samples were taken from individuals who presented with intestinal disorders. The questions included in the questionnaire (Wieger, 2001) were asked orally (this questionnaire is used to understand the association between clinical symptoms and Giardia lamblia genotypes). Individuals with intestinal disorders caused by other microbial agents were excluded from the study.

Sample Preparation
Stool specimens were macroscopically divided into watery, soft and formed stools. Persons with acute, subacute, and chronic clinical symptoms had watery stool (containing trophozoites and cysts), soft stool (similar to acute form), and formed stool (containing cysts), respectively. Stool specimens were collected using stool bottles. Then, the samples were transferred to the parasitology laboratory and examined immediately. After confirmation of giardiasis by wet mount and direct smear, using normal saline and D’Antoni iodine stain solution 1.5%, (for watery samples) and formalin-ether (for soft and formed samples), patient data were collected. Figures 2A and 2B show Giardia lamblia cyst and trophozoite in individuals’ samples, respectively.

Statistical Analysis
Data analysis for this study was performed using the SPSS software version 20.0 (SPSS, Chicago, IL, USA). In order to determine the difference in the prevalence of giardiasis and symptoms of infection between males and females as well as different age groups of individuals, the X² test was used.

Results
Of 671 samples, 346 (51.1%) were positive. The age of individuals ranged from 1 to 76 years. The highest and lowest percentages of positive cases were reported in July (92 of 671, 26.1%) and October (7 of 671, 2%), respectively. The most common complaint among patients was abdominal pain (64.1%). Briefly, in present study, diarrhea (53.7%), abdominal cramps (44.7%), nausea (32.6%), weight loss (30.9%), anorexia (26.8%), headache (22.2%), fatigue (14.1%) and fever (13.2%) were also reported in patients. Most of the clinical symptoms such as abdominal pain, abdominal cramp, weight loss, and headache were reported in females, and the chi-square test showed a significant difference (P<0.05) (Table 1).

Among the age groups, the highest percentage of infection (49.42%) was reported in the age group of 1 to 12 years, followed by age groups 13–26 (33%), 27–46 (12.7%), and over 47 years (4.6%) (Table 2). There was no significant difference in terms of the symptoms of giardiasis and different age groups. In addition, data indicated that the highest rate of infection belonged to this group, showing a significant difference in comparison with other age groups (P<0.05). The results showed that 186 (53.7%), 124 (35.8%), and 36 (10.4%) of the samples were watery, soft, and formed stool, respectively.

Discussion
Due to the specific geographical and climatic characteristics of south-eastern Iran such as low moisture content of soil and lack of vegetation, Giardia lamblia is one of the most common protozoa in this area. In several previous studies conducted in Zahedan, the most important pathogenic protozoa reported in children was Giardia lamblia. In a meta-analysis study conducted by Daryani et al in 2007, Giardia was identified as the most common parasite infecting children in Iran. In a study conducted by Taherkhani et al in Hamadan, 20.4% (55.4% males and 44.6% females) were individuals...
In 2019, Egyptian researcher studied the clinical symptoms of giardiasis and found that 36% of children were infected with Giardia lamblia (15% less compared to our study). The most common symptom was abdominal pain. Furthermore, the least reported symptom was vomiting, which is different from the present study. Diarrhea is one of the most common symptoms of giardiasis. Some studies in other countries had shown that Giardia can infect up to 60% of children. In the present study, the prevalence of giardiasis in the present study was lower compared to these studies. In 2 other studies, the prevalence of abdominal pain among individuals was reported to be higher compared to our study. In 2019, Egyptian researcher studied the clinical symptoms of people with giardiasis and found that the prevalence of diarrhea, abdominal colic, abdominal distension and vomiting was reported to be 100%, 90.3%, 28%, and 6.6%, respectively. Therefore, it can be concluded that the prevalence of diarrhea and other symptoms were different from the present study. Diarrhea is one of the most common symptoms of giardiasis. Some studies in other countries had shown that Giardia infection can be reported in 60% to 100% of individuals. The prevalence of giardiasis in the present study was less compared to these studies. In 2 other studies, the prevalence of abdominal pain among individuals was reported to be higher compared to our study.

### Table 1. Survey of Giardiasis Symptoms in Individuals Referred to Health Care Centers in Zahedan Based on Gender

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Female</th>
<th>Male</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Fever</td>
<td>21</td>
<td>12.2</td>
<td>25</td>
</tr>
<tr>
<td>Weight loss</td>
<td>63</td>
<td>36.8</td>
<td>44</td>
</tr>
<tr>
<td>Headache</td>
<td>50</td>
<td>29.2</td>
<td>27</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>140</td>
<td>81.8</td>
<td>82</td>
</tr>
<tr>
<td>Abdominal cramp</td>
<td>94</td>
<td>54.9</td>
<td>61</td>
</tr>
<tr>
<td>Anorexia</td>
<td>32</td>
<td>18.7</td>
<td>61</td>
</tr>
<tr>
<td>Nausea</td>
<td>63</td>
<td>36.8</td>
<td>50</td>
</tr>
<tr>
<td>Fatigue</td>
<td>29</td>
<td>16.9</td>
<td>20</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>101</td>
<td>59.0</td>
<td>85</td>
</tr>
</tbody>
</table>

### Table 2. Survey of Giardiasis Symptoms in Individuals Referred to Health Care Centers in Zahedan Based on Age Groups

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>1-12</th>
<th>13-26</th>
<th>27-46</th>
<th>47+</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>25</td>
<td>16.6</td>
<td>13</td>
<td>11.3</td>
<td>0.80</td>
</tr>
<tr>
<td>Weight loss</td>
<td>61</td>
<td>35.6</td>
<td>32</td>
<td>27.8</td>
<td>0.06</td>
</tr>
<tr>
<td>Headache</td>
<td>40</td>
<td>23.3</td>
<td>21</td>
<td>18.2</td>
<td>0.98</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>115</td>
<td>67.2</td>
<td>75</td>
<td>65.2</td>
<td>0.11</td>
</tr>
<tr>
<td>Abdominal cramp</td>
<td>77</td>
<td>45.0</td>
<td>63</td>
<td>54.7</td>
<td>0.06</td>
</tr>
<tr>
<td>Anorexia</td>
<td>43</td>
<td>25.1</td>
<td>34</td>
<td>29.5</td>
<td>0.06</td>
</tr>
<tr>
<td>Nausea</td>
<td>53</td>
<td>30.9</td>
<td>42</td>
<td>36.5</td>
<td>0.06</td>
</tr>
<tr>
<td>Fatigue</td>
<td>23</td>
<td>13.4</td>
<td>16</td>
<td>13.9</td>
<td>0.06</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>95</td>
<td>55.5</td>
<td>64</td>
<td>55.6</td>
<td>0.21</td>
</tr>
</tbody>
</table>
in dairy calves from Western Australia and Western Canada. 


14. Taherkhani H, Srdaryan GH. Epidemiology and clinical sign giardiasis infection in individuals referred to the Parasitology Research Laboratory, School of Medicine, Hamadan, in the years 1384-1383. Journal Science Laboratory. 2007;11:44-45.


