

Giardia lamblia affecting humans in Sohag governorate and its related symptoms

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Abstract

Background and study aim: Giardiasis is a gastrointestinal disease, caused by the protozoan parasites *Giardia lamblia*. This infection occurs through ingestion of contaminated water or food by *Giardia lamblia* cysts. The aim of this study was to correlate between the presence of *Giardia lamblia* and different gastrointestinal symptoms.

Subjects and methods: experimental study was performed at the laboratories of Parasitology Department, Faculty of Medicine, Sohag University from October 2016 to October 2017. It was done on 93 patients, who had *Giardia* from different localities in Sohag governorate after examination by saline and iodine wet mount. History taking and questionnaire survey about gastrointestinal symptoms was followed.

Results: Diarrhea was the first complaint that affected all cases, abdominal colic was the second most common complaint affecting 84 (90.3 %) cases, followed by failure to thrive affecting 32 (34.5 %) cases, followed by abdominal distension affecting 26 (28 %) cases, and vomiting affecting 6 (6.6 %) of cases.

Conclusion: We concluded that However diarrhea was the first complaint that affected all cases, abdominal colic was the second most common complaint affecting 84 (90.3 %) cases, followed by failure to thrive affecting 32 (34.5 %) cases, followed by abdominal distension affecting 26 (28 %) cases, and vomiting affecting 6 (6.6 %) of cases.

Keywords: Giardiasis, *Giardia lamblia*, gastrointestinal disease.

Introduction

Giardia lamblia is an intestinal parasite found in a wide range of mammals, including humans [1]. In developing countries, approximately 200 million people have symptomatic giardiasis [2], specially among young aged people in poor communities, with a prevalence percentage of infection ranged between (10-50%) in developing countries [3].

Giardia cysts can be ingested through contaminated food or water, and this is the most common way of infection transmission, as well as person to person transmissions may happen directly by feco-oral contact among family members [4], children in day care centers and schools [5], and by sexual practices of adults [6]. *Giardia* Cysts have the ability to remain infectious for few months as

they can resist critical environmental conditions [4]

Subjects and methods:

This experimental study was conducted from October 2016 to October 2017 at the laboratories of Parasitology Department, Faculty of Medicine, Sohag University.

• Stool sample collection and examination:

Stool samples had been collected from 525 patients who had diarrhea from different cities in Sohag Governorate, 93 samples only had *Giardia* after examination by saline and iodine wet mount using the light microscopic. Every positive sample for *Giardia lamblia* had been divided into two parts and put in eppendorf tubes. the first one of them was examined immediately, the second put in formalin 10 % in a ratio 1 to 3.

• **History taking and questionnaire survey:**

A standard questionnaire was completed by cases or parents of the 100 children in order to obtain a demographic description including the age, gender and, presence of symptoms as diarrhea, abdominal distention, vomiting and failure to thrive.

Statistical analysis:

Data were organized, tabulated, and statistically analyzed using SPSS version, 23.00. P values were calculated. Chi-square test (χ^2) was used to compare the frequency data. P value < 0.05 indicates significant (S) values. P value < 0.01 indicates highly significant (HS) values. P value > 0.05 Non significant (NS).

Results

- out of 93 cases there were 60 (64.5%) male and 33 (35.5%) female. The P value for gender distribution using legacy dialog non parametric test was 0.05 (significant). And the Chi-square (χ^2) test for gender distribution was 7.83.
- The age of patients ranged from 9 months to 18 years. The cases with *Giardia lamblia* included in this study was classified to 4 age groups as shown in table (1).

Age group	<i>Giardia lamblia</i>	P value	Chi-square (χ^2) test
Age < 2 years	5 (5.4%)	0.001 (HS)	116.84
Age 2-6 years	67 (72.1%)		
Age 6-12 years	19 (20.3%)		
Age 12-18 years	2(2.2%)		

Table 1: The relation between age groups and *Giardia lamblia*

- The relation between locality and *Giardia* is shown in table (2)

Locality	<i>Giardia lamblia</i>	P value	Chi-square (χ^2) test
Urban	19 (20.4 %)	0.001 (HS)	32.52
Rural	74 (79.6 %)		

Table 2: The relation between locality and *Giardia lamblia*

- The relation between grades of diarrhea and *Giardia lamblia* is shown in table (3).

Diarrhea	<i>Giardia lamblia</i>	P value	Chi-square (χ^2) test
Mild diarrhea	54 (58.1%)	0.001 (HS)	34.12
Moderate diarrhea	31 (33.3%)		
Severe deiarrrhea	8 (8.6%)		

Table 3: The relation between grades of diarrhea and *Giardia lamblia*

- The relation between types of diarrhea and *Giardia lamblia* is shown in table (4).

Diarrhea	<i>Giardia lamblia</i>	P vaue	Chi-square (χ^2) test
Acute diarrhea	72 (77.4%)	0.001 (HS)	27.96
Chronic diarrhea	21 (22.6%)		

Table 4: The relation between type of diarrhea and *Giardia lamblia*

- The relation between abdominal distension and *Giardia lamblia* is shown in table (5).

Diarrhea	<i>Giardia lamblia</i>	P vaue	Chi-square (χ^2) test
Positive abdominal distension	26 (28%)	0.001(HS)	18.07
negative abdominal distension	67 (72%)		

Table 5: The relation between abdominal distension and *Giardia lamblia*

- The relation between abdominal colic and *Giardia lamblia* is shown in table (6).

Diarrhea	<i>Giardia lamblia</i>	P vaue	Chi-square (χ^2) test
Positive abdominal colic	84 (90.3%)	0.001 (HS)	60.48
negative abdominal colic	9 (9.7%)		

Table 6: The relation between abdominal colic and *Giardia lamblia*

- The relation between failure to thrive and *Giardia lamblia* is shown in table (7).

Diarrhea	<i>Giardia lamblia</i>	P vaue	Chi-square (χ^2) test
Positive failure to thrive	33 (35.5%)	0.005 (HS)	7.83
Negative failure to thrive	60 (64.5%)		

Table 7: The relation between failure to thrive and *Giardia lamblia*

- The relation between vomiting and *Giardia lamblia* is shown in table (8).

vomiting	<i>Giardia lamblia</i>	P vaue	Chi-square (χ^2) test
Positive vomiting	6 (6.5%)	0.001 (HS)	70.54
negative vomiting	87 (93.5%)		

Table 8: The relation between vomiting and *Giardia lamblia*:

Discussion

The intestinal protozoan *Giardia lamblia* was frequently found in diarrheal disease throughout the world affecting humans and other mammalian species [7].In the current study, 93 positive stool samples for

Giardia lamblia by microscopy were detected.

As regards the relation of sex to the prevalence of giardiasis, out of the 93

positive samples there were 60 (64.5 %) males while 33 (35.5 %) female. The variation in sex distribution was found to be statistically highly significant (PV = 0.005). This agreed with **Julio et al.** [8], **Mohran.** [9] and **De Lucio et al.** [10], who stated that the incidence of giardiasis is higher in males than in females. These results disagreed with **Duldova et al.** [11], who stated that the prevalence in females was higher than males. They assumed that due to caring of these females to their own children or from working in nursing homes or care-day centers.

As regards relation of age to the prevalence of giardiasis in the present study, the highest incidence was between 2 - 6 years represented 72.1 % then 6 - 12 years represented 20.3 % then < 2 years represented 5.4 % lastly 12 - 18 years represented 2.2 %. The variation in age distribution was found to be statistically highly significant (PV = 0.001).

This study showed that, the highest group was 2 - 6 years and this can be explained by highly active attitude of these children who play outside home and this makes them more subjected to highly polluted surrounding area by *Giardia* cyst not only from humans as a source of infection but also from animals as an another source of infection.

These results agreed with **Bernard et al.** [12], Who stated that the highest prevalence was between 3 to 5 years, and **Mohran et al.** [9], who stated that, the highest prevalence was between 1 - 10 years.

These results disagreed with **Heehong et al.** [13], and **El-Badry et al.** [14], who stated that giardiasis was highest in children aged 6 to 12 years.

As regards severity of diarrhea, in the present study, diarrhea was classified into mild, moderate, and severe. The current results showed that mild diarrhea, 54 (58.1%) was the highest prevalence than moderate, 31 (33.3%) and severe, 8 (8.6%).

The results also showed that *Giardia* caused acute diarrhea, 72 (77.4%) more than chronic diarrhea, 21 (22.6%) These results agreed with **Gelanew et al.** [15], **Al-Mohammed** [16], **Mohran.** [9], **Puebla et al.** [17], who assumed that *Giardia* was associated with all types of diarrhea.

On the other hand, the results of this study disagreed with **Eligo-Garcia et al.** [18], who found no correlation between digestive manifestations and *Giardia lamblia*.

As regards relation of *Giardia lamblia* with abdominal distension, abdominal colic, failure to thrive and vomiting: for abdominal distension, only (28 %) were affected, For abdominal colic, 84 (90.3 %) were affected, for failure to thrive, 33 (35.5%) were affected, and for vomiting, 6 (6.5%) cases only had vomiting.

From the previous results regarding diarrhea, abdominal distension, abdominal colic, failure to thrive and vomiting, abdominal colic is the second most common complaint affecting (90.3 %) cases after diarrhea, followed by failure to thrive affecting (34.5 %) cases, followed by abdominal distension affecting (28 %) cases, and lastly vomiting affecting (6.6 %) of cases.

These results agreed with **Abd-El Hafed** [19], **Lebbad et al.** [20], **Mohran.** [9], **De Lucio et al.** [10] and **Puebla et al.** [17], Who assumed that *Giardia* was associated by many gastrointestinal manifestations.

These results disagreed with **Misra et al.** [21], who stated that giardiasis was associated with little gastrointestinal symptoms.

There were many factors which can affect the variability in clinical outcome in giardiasis as: host factors, immune status, nutritional status and virulence and pathogenicity of *Giardia lamblia* genotypes.

Conclusion

We concluded that However diarrhea was the first complaint that affected all cases,

abdominal colic was the second most common complaint affecting 84 (90.3 %) cases, followed by failure to thrive affecting 32 (34.5 %) cases, followed by abdominal distension affecting 26 (28 %) cases, and vomiting affecting 6 (6.6 %) of cases.

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