

Frequency of Giardia lamblia among Iraqi children in Kirkuk governorate

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ABSTRACT

Background: Giardiasis is one of the famous gastroenteritis, characterized by a diarrheal illness that is caused by a microscopic parasite, called Giardia lamblia. Giardia lamblia is a flagellate infectious protozoan parasite that able of causing gastrointestinal disease in human and animals, an etiological agent that infects the small intestine of human and may be asymptomatic or cause acute or chronic diarrhea, weight loss, and malabsorption in children.

Methods: A total of 152 stool samples were collected from children attending to General Pediatrics Hospital in Kirkuk City., including 82 males and 70 females their aged were ranged between 6 months to 5 years. Wet mount preparation and Zinc sulphate solution flotation techniques were used for Giardia lamblia detection.

Results: The study results revealed that the Giardia lamblia prevalence rate ranged in males (34.14%) was slightly higher than females (32.85%). The higher rate of infection was reported in age groups 48-60 months 6(40%).

Aim of the study: The study aims to investigate the prevalence rate of Giardia lamblia in Kirkuk city among children patients of limited age groups.

Conclusion: The rate of infection was higher in males than in females.

Keywords: Frequency of Giardia lamblia, Iraqi children in Kirkuk governorate

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INTRODUCTION

The assessment of the global extent of morbidity and mortality due to the parasitic infections is a major anxiety of public health worldwide ⁽¹⁾. Giardiasis is caused by a flagellate protozoan parasite, known as *Giardia lamblia* affects human worldwide including people living in developed countries, but is more prevalent in areas with inadequate sanitary conditions and cause diarrhea in human and other mammals ⁽²⁾. It is common in warm moist climates, recognized as the most common intestinal protozoan parasite infecting human, and it is widespread in Iraq ⁽³⁾. The most of infections are probably asymptomatic but some are associated with subacute or chronic diarrhoea and intestinal agitation ⁽⁴⁾. The parasite is monogenetic with a lifecycle alternating between proliferative trophozoites and the resistant cyst harbors in the duodenum, jejunum and upper ileum region of the intestine ⁽⁵⁾. *Giardia lamblia* is transmitted by the swallowing of the mature cyst in fecally contaminated water or foods through fecal-oral route ⁽⁶⁾. Children are infected more frequently than the adult individual in epidemic areas ⁽⁷⁾. Giardiasis is an important unresolved health problem in developing countries and has a worldwide distribution with the high prevalence among people with low socio-economic status and poor living environmental sanitation ⁽⁸⁾. The incidence rate of Giardiasis is 2% -7% in industrialized countries and 20% - 60% in developing countries ⁽⁹⁾. This present study was undertaken to estimate *Giardia lamblia* among preschool children in Kirkuk city for the limited period.

MATERIAL AND METHODS

This study was undertaken at General Pediatrics Hospital in Kirkuk City. From 1st of June of 2019 to 23 of December 2019. A total of 152 stool samples were collected, a single sample collected from each patient, placed into a clean disposable plastic container with tight

fittings. The consistency of the stool was directly observed and examined by the direct and Zinc sulphate flotation methods.

Direct method

Stool samples were processed for microscopy by the direct smear method used a drop of 0.9% sodium chloride and a drop of Lugol's iodine for staining the Giardia cysts. Slides were observed under the microscopy for *Giardia lamblia* trophozoites and cysts by using eye lens X10 and objective lens X40.

Zinc sulphate Flotation method

All the stool samples were investigated by the zinc sulfate flotation method by mixing about 10 parts of tape water with 1 part of the stool. The suspension is strained through gauze and a Wassermann tube is filled with the strained suspension. The preparation in the tube is centrifuged for 45 to 60 seconds at 2300 rpm. The supernatant fluid is poured off, 3 ml. of water added, the sediment is mixed with additional water to fill the tube, this step repeated several times until the supernatant fluid is clear. The last supernatant fluid is poured off, 2 ml. of zinc sulfate solution added, the sediment resuspension, and the zinc sulfate solution added to fill the tube to 4 mm. below the rim. The tube is centrifuged for 45 to 60 seconds at 2300 rpm. And allowed to stop without interference.

After 15 to 20 seconds without removing the tube from the centrifuge, several loopful of the surface film is removed by a wire loop onto a clean slide, mixed with 1 drop of iodine stain and mounted with a coverglass and examined by using eye lens X10 and objective lens X40 of the microscope⁽¹⁰⁾.

RESULTS

A total of 152 children were included in this study. There were 82 (53.9%) males and 70 (46.1%) females. Out of

152 children, 88(57.89%) are found positive for various intestinal parasitic. (Table 1)

Table 1. Distribution of *Giardia lamblia* and other Intestinal Parasites by using Direct Microscopy

Parasites name	Samples showed different parasites	Percentage (%)
<i>Giardia lamblia</i>	51	58.0
<i>Entamoeba histolytica</i>	12	13.6
<i>Hymenolepis nana</i>	17	19.3
<i>Enterobius vermicularis</i>	08	9.1
Total	88	100

The highest prevalence rate of *Giardia lamblia* was reported in age groups 48-60 months 6 (40%), followed by age groups 36-47 months 12 (38.71%), and the lowest

prevalence rate was related to age group 12-23 months 17 (29.31%) (Table 2).

Table 2. Distribution of *Giardia lamblia* according to patient's age groups

Age group/months	No. examined	No. positive	Percentage (%)
12 – 23	58	17	29.31
24 – 35	48	16	33.33
36 – 47	31	12	38.71
48 – 60	15	06	40
Total	152	51	33.5

The study revealed that the *Giardia lamblia* prevalence rate ranged in males 28(34.14%) was higher than females 23(32.85%) (Table 3).

Table 3. Distribution of *Giardia lamblia* according to patient's gender

Patients gender	No. examined	No. positive	Percentage (%)
Male	82	28	34.14
Female	70	23	32.85
Total	152	51	33.5

The most contaminated cases were found on August 33(21.71%) followed by July 31(20.4%), whereas the lowest was 12(7.89%) in October, (Table 3) according to

the data collected by the Kirkuk pediatric hospital. (Table 4)

Table 4. Distribution of *Giardia lamblia* according to the months from the 2019 in Kirkuk city

Months	No. positive	Percentage (%)
June 2019	29	19.08
July 2019	31	20.40
August 2019	33	21.71
September 2019	20	13.16
October 2019	12	7.89
November 2019	14	9.21
December 2019	13	8.55
Total	152	100

DISCUSSION

Giardia lamblia is a medically significant gastrointestinal protozoan associated with diarrhea, predominantly in society without proper purification, and drinkable water. Acute diarrhea is the main cause of mortality and morbidity among children, especially those below 5 years, in developing countries (11). The incidence rate in the present study similar to other studies in Iraq. The results are also consistent with Study verses in other regions of the world (9). This high rate of infection among children. It can be concerning to a number of factors such as poor hygiene and toilet use, Overcrowding, low child education, low socioeconomic status, and climatic status. *Giardia lamblia* was isolated from stool samples to children at all initial stages of infection. The distribution of *Giardia lamblia* was recorded highest 58% compared to other different parasites (Table 1). This is in agreement with the previous study in the north of Iraq (5). In contrast, the results in Table 1 disagreed with Hoge et al., 1995 (12). The distribution of *Giardia lamblia* was recorded also

highest between ages (12-23) months compared to other ages (Table 2). While the lowest distributions were registered between ages (48-60) months (Table 2). This study also in agreement with a previous study (5). Who found ages less than one year highly distributed compared to other ages. Regarding sex in male was higher than female (Table 3). This study is agreed with previous studies (5,6,8). However, most contaminated cases were found in August (Table 4) compared to other months. The high prevalence rate 6 (40%) was obtained in age groups 48-60 months, this is maybe due to they have very active playing habits in the soil, which harbors this parasite and are less mindful of some very important personal hygiene practices such as the washing of hands with soap and water before eating, after playing in soil and after toilets use (6). Buying a lot of food from street vendors some of whom do not have a proper personal hygiene practice, may be regarded as carriers of the infective parasites(7).

CONCLUSION

The rate of infection was higher in males than in females as well as the distribution in ages (12-23) months were higher than compared to other ages. Finally, in spite of this paper, further studies are required under different areas and different hospitals in order to improve and to increase our knowledge about this very interesting parasite as a potential parasitological marker for *Giardia lamblia*.

Conflict of Interests

The author confirms that there is no disagreement of attention and he has no significant relationships with collective that can inappropriately influence his work; there is no professional or other personal attention of any nature or kind in any product, service, and/or hospital that could be interpreted as influencing the situation presented in this paper.

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