Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-3 Issue-3 || June 2024 || PP. 64-68 https://doi.org/10.55544/sjmars.3.3.8

Investigating the Prevalence of the *Giardia lamblia* Parasite in Children in Salah Al-Din Governorate

Rania Ghasan Abd[1], Dunia Abed Hussein Al-Tikrity[2] and Khansaa Ahmed Hasan[3]

[1,2,3]Department of Life Science, College Education for Woman, Tikrit University, IRAQ.

[1]Corresponding Author: rghasan@tu.edu.iq

www.sjmars.com || Vol. 3 No. 3 (2024): June Issue

Date of Submission: 26-06-2024	**Date of Acceptance:** 29-06-2024	**Date of Publication:** 06-07-2024

ABSTRACT

The research was conducted from June 2023 until December 2024 to detect the prevalence of infection with the Giardia lamblia parasite among children with diarrhea attending Tikrit Teaching Hospital in Salah al-Din Governorate. The study included collecting 400 stool samples for children whose ages ranged between (1-12) years. Direct wet swab to detect the presence of the parasite. The level of infection with the parasite reached 14.75%. The highest rate of infection was in males at 67.7% and lower in females at a rate of 32.2%. The highest rate of infection was at the age of (1-3) years at a rate of 38.9% and the lowest rate was 11.8% at the age of (9-12) years. The infection rate was 69.4%, high in families with 10 or more members, while in small families (4-5) individuals, the infection rate was 30.5%. The infection rate was highest in children who drank unfiltered river water, at 50.8%, and lowest in children who drank pure water, at 3.3%. The prevalence of this parasite in rural areas was higher than in urban areas, at a rate of 55.9% in all areas of the governorate. It was found that there were varying rates of infection in the different months of the year, reaching 28.8% in the summer, and the lowest infection rate in the winter.

Keywords- *Giardia lamblia*, Giardiasis, trophozoite, cyst.

I. INTRODUCTION

The parasite *Giardia lamblia* is an important cause of diarrhea and is considered one of the main causes of death for millions of people every year (1). This parasite infects the upper part of the small intestine in humans and causes giardiasis (2). The disease is the most common among children compared to adults and causes symptoms of fatty diarrhea, weight loss and malabsorption in the small intestine (3). It also causes malnutrition and a deficiency in some important elements and vitamins for humans (4**).**

The disease is transmitted by contaminated water and occurs largely in developing countries whose populations lack adequate sanitation, causing outbreaks of disease in entire communities and sometimes epidemics (5). The protozoan *Giardia* is among the most common organisms found in Contaminated water and these microorganisms are transmitted through feces and mouth. Trophozoites hatch from the cyst and settle and multiply in the mucous lining of the duodenum, causing abdominal cramps, loss of appetite, fatigue, diarrhea, and nausea (6). The parasite is one of the common pathogens between humans and animals, Zoonotic agent, due to the presence of a genotype of *Giardia* that is shared between humans and animals (7).

II. MATERIALS AND METHODS

1- Sample collection: 400 stool samples were collected for children aged (1-12) years old and attending Tikrit Teaching Hospital. A 2 gram sample was taken from each sick child and placed in tightly sealed plastic tubes. It was transported to

Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-3 Issue-3 || June 2024 || PP. 64-68 https://doi.org/10.55544/sjmars.3.3.8

the laboratory, and low temperatures were provided for the samples in the laboratory, then the Conducting the necessary laboratory tests on the samples within one hour of collecting the sample (8).

Parasite diagnosis:

1- Macroscopic examination: It included describing the shape and texture of the stool sample as being soft, watery, or well-formed, as it is considered evidence of the type of parasites present in it. The vegetative stages of intestinal rudiments are present in the sample with a light, soft texture, while the cystic stages appear in the samples. Of a solid consistency in large numbers and if the stool sample contains blood or mucus, this indicates an infection, and it can be observed whether the stool is greasy or not, and the color and smell are typical, which is like the smell of arsenic (9).

2- Microscopic examination.

The examination was done in two ways

1- Direct stool examination: A clean glass slide was prepared, a drop of normal saline was placed on one end of it, and a small amount of stool taken from different places was taken from the soft sample using wooden sticks(10) . The sample was mixed with the salt solution. Physiologically, we put a drop of lugols iodine solution on the other end, mix it with part of the stool for the same sample, then we cover the slide with a cover slide. The examination was done with an optical microscope under 40X magnification (11).

2- Concentration method: is based on the Saturated salt flotation method, which transforms the solution to a density greater than the density of the parasites , Take one gram of the freshly taken stool sample and mix it with 100 ml of distilled water. The solution is filtered through four layers of medical gauze to remove large suspended materials. Then, discard the suspension in the centrifuge for one minute at a speed of 2300 rpm(12). Then we pour out the filtrate and add 2 ml of distilled water and mix it with the sediment. Then we centrifuge it in the centrifuge again at the same speed. Then we repeat this process until the layers of gauze become clear. Then we pour out the filtrate and add 2 ml of zinc sulphate in the centrifuge tube to the end of the nozzle and put it in Centrifuge for one minute at a speed of 2300 rpm, then put a drop of iodine on it and examine it on a glass slide under minimum and then maximum force (9).

III. RESULTS

Table (1) shows the total *Giardia* infection rate, which reached 14.75% In different areas of Salah al-Din Governorate.

Table 1: Total *Giardia* infection rate

Number of samples tested	Number of positive samples for diagnosis	Percentage of positive samples %
400	59	14.75%

Table (2) The results showed a higher infection rate for males, 67.7% than females, 32.2%, and most of those infected are males.

Table (2): Distribution of *Giardia* infection among infected people based on gender

Gender	infected people	percentage %
Male	40	67.7
Females	19	32.2
total summation	59	100

The results according to age groups showed an increase in the infection rate in the age group (1-3 years) by 38.9% and lower in the age group (9-12 years) by 11.8%, as in Table (3).

Table (3) Distribution of *Giardia* infection according to age group

Age group	Number of infected people	Percentage of infection %
1-3 years	23	38.9
3-6 years	18	30.5
6-9 years	11	18.6
9-12 years	7	11.8
total summation	59	100

Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-3 Issue-3 || June 2024 || PP. 64-68 https://doi.org/10.55544/sjmars.3.3.8

The results, according to the number of family members, showed a variation in the infection rate in families with more than 10 members, which amounted to 69.4%, while in families with less than 10 members, it amounted to 30.5%, as in Table (4).

Table 4: Distribution of *Giardia* infection according to the number of family members

Number of family members	Number of infections	Percentage of infections %
10-12	41	69.4%
4-8	18	30.5%
total summation	59	100

The results of the study showed that the highest infection rate was for children who drank river water at a rate of 50.8%, the lowest rate was for children who drank fresh water at a rate of 45.7%, and the lowest rate was for children who drank pure sterile water at a rate of 3.3%.

Table: (5) Distribution of Giardia infection according to water quality

Type of water	Number of infections	Percentage of infections %
River water	30	50.8
Tank water	27	45.7
Pure water	2	3.3
total summation	59	100

The results of the study showed that the prevalence of the disease was higher at 55.9% in children who live in the countryside and at 44.0% in children who live in the city.

Table (6): Distribution of *Giardia* infection based on the nature of residence

Nature of housing	Number of infections	Percentage of infections %
Rural areas	33	55.9
urban areas	26	44.0
total summation	59	100

The highest infection rate was in the summer, during the months of July and August, and the lowest was in November, and there was no infection in December.

Table (7): Distribution of *Giardia* infection by month of the year

the month	Number of infections	Percentage of infections %
June	8	13.5
July	15	25.4
August	17	28.8
September	10	16.9
October	7	11.8
November	2	3.3
December	0	0
total summation	59	100

IV. DISCUSSION

It is clear in the research results that there is a convergence with infection rates in other governorates of Iraq and that there are no vast differences between these rates. The reason is due to the similarity of environmental conditions and the convergence of the economic, social and cultural levels and health awareness of the population. The overall infection rate of 14.75% is close to what was found in (13), as the infection rate reached 14.8% in Najaf Governorate. The reason for

this closeness is due to the unhealthy habits of eating and playing with dirt for children, and not washing hands and eating contaminated food, which play a role in the spread of this parasite. The activities and events carried out by the individual have a significant impact on the occurrence of the injury (14).

The incidence rate was higher than (15) in the Kingdom of Saudi Arabia, reaching 8.4%. The difference is due to several reasons, including the extent of similarity and difference in environmental and climatic conditions, the size and quality of the sample population studied, in addition to the date and duration of conducting the two studies.

The higher incidence of infection in males compared to females is consistent with (16) and the reason may be due to the multiplicity of activities and activities carried out by males compared to females. The highest infection rate was also recorded in the age group (1-3) and lower in the age group (9-12). This is consistent with (17), as they showed that the highest infection rate was in the age group under 18 years.

The high infection rate in children and adolescents is due to the nature of their actions and activities, as well as the lack of care for personal hygiene in most members of this age group. Eating uncovered foods contaminated with parasite cysts and purchasing them from street vendors near schools represents a means of transmission of infection for this age group, (18). The highest infection rate was 69.4% in people who belong to families with 10 or more members, and the lowest rate was 30.5% in people who belong to families with 4-5 members.

This result is consistent with (19), who indicated that the infection rate increases with the increase in the number of family members. This is explained on the basis that transmission of infection between individuals occurs as a result of their presence in the same place in large numbers, as crowding provides a greater opportunity for the infection to be transmitted from one person to another through contact. Or using the same tools or clothing (20) found that there is a relationship between infection with the parasite and the sources of drinking water used. The highest percentage was among individuals who drank river water at 50.8%, followed by brackish water, and the lowest percentage was among those who drank pure sterile water. By 3.3%, because water is a major source of infection. Chlorinated drinking water is an important means of controlling many diseases such as diarrhea and cholera. River water is polluted as a result of the use of animal and human fertilizers, in addition to being polluted by waste resulting from hospitals and sewage. The infection rate among individuals who use tap water as a source of drinking may be due to the multiple sources of pollution of drinking water, such as the leakage of sewage and swamp water into the drinking water network, as well as About the lack of sterilizers and disinfectants that are added to water and other sources such as contaminated food and contact with infected people (21) The study showed a slight increase in the infection rate among children who live in rural areas compared to children who live in the city. The increase is attributed to the availability of conditions that helped the parasite spread locally, such as an unclean environment, unhealthy eating habits, and the population's economic and social level, as well as lack of observance of health rules. In general, the infection rate was highest in the summer and lowest in the winter, and it was consistent with the findings of (22). This is explained by the fact that intestinal parasites are to a large extent during the hot summer months. On the other hand, the decrease in infection rates in the winter is attributed to Cold conditions that kill infectious parasite cysts (23).

REFERENCES

[1] 1-Verweij, J. J. ; Blange, R.A. ; Templeton, K. ; Schinkel, J. ; Brienen, E.A. T. ; Rooyen, M. A. A.V. ; Lieshout, L. V. and Polderman, A. M. (2004). Simultaneous detection of *Entamoeba histolytica*, *Giardia lamblia*, and *Cryptosporidium parvum* in fecal samples by using multiplex Real–Time PCR. J. Clin. Microbial., 42 (3) :1220 – 1223.

[2] Lalle, M. (2010). *Giardia duodenales* 14-3-3 protein is polyglycylated by atubulin tyrosin ligase-like member and deglycylated by two metallocarboxy peptidases. J. Biol. Chem., 286 (6): 4471 – 4484.

[3] David, E.B.; Coradi, S.T.; Oliveira-Sequeira, T.C.G. ; Ribolla, P.E.M. ; Katagiri, S. and Guimaraes, S. (2011). Diagnosis of *Giardia* infectionsby PCR-based methods in children of an endemic area. J. Venom. Anim. Toxins incl. Trop. Dis, 17 (2) : 210 - 215.

[4] El-Sayad, M. H. ; El-Taweel, H. A. and El-Banna, S. G. (2011). Evaluation of some micronutrients, antioxidant biomarkers total antioxidant capacity in human giardiasis. P.U.J., 4(2) : 211 – 218.

[5] Rosado-Garcia F.M, Guerrero-Florez, M.;Karanis,G. (2017). Water-borne protozoa parasites: The latin American perspective. Int,J.Hyg Environ Health.220(5):783-798.

[6] Mahdavi, F.;Sadrebazzaz,A. ,Chahardehi,A.M.(2021).Global epidemiology of *Giardia duuodenalis* infection in cancer patients :asystematic review and meta-analysis Int Health.

[7] Monis, P.T. ; Caccio, S.M. and Thompson, R.C .(2009) . Variation in*Giardia*: towards a taxonomic revision of the genus. Trend. Parasitol., 25: 93 - 100.

[8] Kudo, R.R. (1966). Protozoology, 5th edn. , Charles C . Thomas publ., Springfield : 1174 pp.

[9] Ichhpujani, R. L. and Bhatia, R. (1994(. Medical Parasitology. Jaypee Bros. Med . Publ ., New Delhi : 384 pp.

[10] Garcia, L. S. and Ash, L. R. (1975). Diagnostic parasitology: Clinicallaboratory manual. C. V. Mosby Co., Saint Louis: 112 pp.
[11] Singh, A.; Ericttouft, B.H and Willim, A. C. (2009). Rapid diagnosis of intestinal parasitic protozoa. J. infect. Dis.,61 (3): 280-286.
[12] Faust, E. C.; Russell, P. F. and Jung, R. C. (1970). Craig and Faust's clinical parasitology, 8th edn., Lea & Febiger, Philadelphia : 890 pp .
[13] Al-Mehna, Widad Hashem Yahya. (2013). An epidemiological and diagnostic study of the genetic variant of the *Giardia lamblia* parasite that causes diarrhea in patients in Najaf Governorate using PCR technology. Master's thesis, College of Education for Girls/University of Kufa.
[14] Amaral, F.M.M.; Ribeiro, M.N.S.; Barbosa- Filho, J.M.; Reis, A.S.; Nascimento, F.R.F. and Macedo, R. O. (2006). Plants and chemical constituents with giardicidal activity. Rev. Bras. J. Farmacogn Braz. J. Pharmcogn., 16: 696 - 720.
[15] Al-Megrin,W.A. (2010). Intestinal parasites infection among immunocompromised patients in Riyadh , Saudi Arabia. Pakist . J. Biol. Sci., 13(8) : 390 – 394.
[16] Ejiofor, O.S.; Onyire, A. and Ofomata, J.A. (2011). The prevalence of *Giardia lamblia* in children presenting with diarrhoea at secondary health facility in Awka, South-East Nigeria. Europ. J. Sci. Res., 57(4):529-532.
[17] Nkrumah, B. and Nguah, S.B. (2011) . *Giardia lamblia*: amajor parasitic cause of childhood diarrhoea in patients attending a district hospital in Ghana. Parasit. Vect., 4 : 163 – 169.
[18] Al-Hamdani,1Al-Hamdani, F.G.N. (1993). Parasitic infections in rural areas around Baghdad city. M. Sc. Thesis, Coll. Sci. Univ. Baghdad: 72 pp.
[19] Júlio, C.; Vilares, A. ; Oleastro, M. ; Ferreira, I. ; Gomes, S. ; Monteiro, L. ; Nunes, B. ; Tenreiro, R. and Ângelo, H. (2012). Prevalence and risk factors for *Giardia duodenalis* infection among children: A case study in Portugal. Parasit. Vect., 5 : 22 – 30.
[20] Pereira, M. deG. ; Atwill, E.R. and Barbosa, A.P. (2007). Prevalence and associated risk factors for *Giardia lamblia* infection among children hospitalized for diarrhea in Goiânia State, Brazil. Rev. Inst. Med. Trop. Sao. Paulo, 49(3): 193-145.
[21] Tigabu, E. ; Petros, B. and Endeshaw, T. (2010) . Prevalence of Giardiasis and Cryptosporidiosis among children in relation to water sources in Selected Village of Pawi Special District in Benishangul-Gumuz Region, Northwestern Ethiopia. Ethiop. J. Health Dev., 24 (3) : 205 -213.
[22] Taran, M.; Ofer, N.; Dalit,V. (2015).Cryptosporidium and Giardia removal by secondary and tertiary waste water treatment .J.Environ.Sci Health.50(12):1265-1273.
[23] John, D.T. and Petri, W.A. (2006). Medical parasitology. Markell and Voges. 9th edition., PP:22-30.