

Study the Prevalence of *Giardia* Parasite and the Relationship of Some Living and Haematological Variables to Infection

Noor Thamer Ghafori¹, Thaer Abdulqader Salih²

¹Student, Department of biology, college of Science / University of Anbar; ²Assist Prof. College of Education for Pure Science / University of Anbar

Abstract

During the period from 10th September into 31th December-2020 study has done.. Eighty five (85) stool samples had collected from(33) females and (52) males from different age group (1-55) years among patients suffering from gastrointestinal disturbances who attending to various governmental hospitals (Fallujah General Hospital, Teaching laboratory and Consultant clinic) in Fallujah City with the main clinical features (abdominal pain, nausea, bloating , heart burn and loss of appetite), And some of them did not suffer from any pathological symptoms (control) , 25 samples were infected with *Giardia*, 25 samples were uninfected (control), and 25 samples were infected with other secondary infections.

The results showed that males are more likely than females to be infected, and that age greater than 10 years was the most affected age group, and the rate of infection in urban was slightly higher than in the rural , The results also showed a significant increase in the rate of white blood cells, unlike the rest of the other blood factors (Hb, PCV, PLT, RBC), which had no significant differences, and the blood factors for some of them had a correlation with age, sex, living status, and other factors that did not Have no affiliation .

Key Words: *Giardia*, haematological variables , living , Age , Gender

Introduction

Giardia is a protozoan zoonotic flagellated parasite that affected humans, and all other animals lead to causes giardiasis The organism founded in more than 40 animal species . Also a zoonotic transmission is possible occur in human, by Animals in farm and may constitute as a source of infection via watersheds or directly ⁽¹⁾ , The human giardiasis has been reported by Carmena *et al.* ⁽²⁾ that in developed countries range from 2% to 7%, while in the developing countries 20%-30%, also every year about 50,000 cases has been affected and more than 200 million people have symptomatic infections in Latin America and Africa as well as Asia . The transmission of *Giardia* occur through fecal to oral, either by water or food contaminated with cyst (indirectly), or from person to another or animal to person via direct contact⁽³⁾ .

The occurrence of the same genotype of *Giardia duodenalis* in humans and other animals has been well

demonstrated Such data are indicative of zoonotic potential ^(4,5) .

Aims of Study

Investigate *Giardia* parasite and find out its relationship to sex, living status, age, and some hematological variables

Methods

During the period from 10th September into 31th December-2020 study has done.. Eighty five (85) stool samples had collected from(33) females and (52) males from different age group (1-55) years among patients suffering from gastrointestinal disturbances who attending to various governmental hospitals (Fallujah General Hospital, Teaching laboratory and Consultant clinic) in Fallujah City with the main clinical features (abdominal pain, nausea, bloating , heart burn and loss of appetite).

Samples Collection

The stool samples were collected in sterile, clean, and dry plastic cups with tight lids specially made for this purpose. Distal water was added to samples used for cultivation to ensure keeping viability of *Giardia* cyst if present. Cups were labeled by given name and No. representing the patient. Each fresh fecal samples had divided into two part by using a sterile containers one of them for detection of *G. lamblia*. While the other part transported in to a cooled box (temperature approximately 10°C). Then, the samples were transported to the laboratory of Advance Scientific Center (ASCO). Every patient had reported through a specifically prepared questionnaire which includes name, age, gender, address, and draw 5ml of blood from patients with the help of sterile disposable syringes, A total of (1ml) and placed in an EDTA tube for the purpose of performing the analysis of the complete picture of the blood from 50 individual (25 infected and 25 uninfected). After ascertaining their positive

and negative results for Giardiasis through stool examination. Examination of blood was done to estimate Hb value, PCV, WBC, PLT.

Results and Discussion

85 fecal samples were collected from arrivals to Fallujah General Hospital, and it was collected from males and females of different ages and from different regions for the purpose of studying the spread of *Giardia lamblia* and to know the relationship of some blood factors and fats and the relationship of some environmental factors to the parasite infection.

Sample collection

Table (1) shows the number of 85 samples of faeces that were collected during the study, where the number of infected (positive cases) was 25, with a percentage of 29.4%, while the number of non-infected (negative cases) was 60, with a percentage of 70.6%.

Table (1) shows the number of stool samples for the infected and uninfected

Stool Exam.	Frequency	Percent %
Negative	60	70.6
Positive	25	29.4
Total	85	100.0

Explain Uchôa *et al.* ⁽⁶⁾ that increasing the collection of faecal samples will increase the number of positive samples (infected with *Giardia*), as the researchers collected 133 faecal samples and they indicated that 30 samples were infected with the parasite at a percentage of (22.6%). He explained the reason for the lack of sample collection during the specified period to many obstacles, including the method of sample collection, the place from which it was collected, the method of examination, follow-up of the method of collecting samples, and the daily commitment to the method of collection, and this is consistent with the results of our current research.

As demonstrated by Lass *et al.* ⁽⁷⁾ that the transmission of parasitic diseases through contaminated water and food is very common in Afghanistan due to poverty, ignorance, lack of health awareness, contamination of water and crops with faeces of animals and humans infected with the *Giardia intestinalis*. The researchers also explained that the best way to diagnose *Giardia* is the genetic method and the detection of the A, B gene. Where 254 samples were collected from Ghazni city in eastern Afghanistan, detection of parasite DNA and genotyping were performed using Real time PCR, specific to the β -giardin gene of *G. intestinalis*. Positive results were recorded in 52 samples (21.2%).

As for Iraq, the wars that have continued for four decades since 1980 and the subsequent accumulation of war remnants have had an effective impact on the deterioration of the health environment and the lack of health awareness due to the complete preoccupation with wars . Therefore, the researchers conducted Salman *et al.* ⁽⁸⁾ An investigation process on the Giardia parasite, 417 faecal samples from the age of less than one year to 60 years were collected from different places of Kirkuk governorate (12 regions) and those living in difficult health conditions, and the parasite infection rate was 19.66%, of which 10.31% Infection with Giardia parasite and the other rate is 9.35% of infection with other parasites, and the researchers explained that the method of examination has a great effect in detecting the parasite species and showing the true percentage.

Well, explained Hasan *et al.* ⁽⁹⁾ that they collected 614 faecal samples from Tikrit City Hospital for both sexes (males and females) with ages ranging from 1-16

years. The samples were examined and the prevalence of *Giardia* was 14.30% and the rate of infection in the countryside was more than the infections in The city, in addition to that the highest age group for infection is the age group of 4-6 years, and they mentioned that the highest rate of infection was in the month of April and May, and they indicated that the method of parasite floating for the purpose of examination and the quality of the examination has a great impact on the diagnosis of infection.

Relationship of sample collection to gender

Table (2) also clarified the differences in the numbers of samples between males and females (Gender), as the results indicated that the samples collected for males were 52, with a percentage of 61.2%, while the total of female samples was 33 samples with a percentage of 38.8%.

Table (2) shows the distribution of samples collected by gender (males and females)

Gender	Frequency	Percent
Male	52	61.2
Female	33	38.8
Total	85	100.0

Table (3) also showed the number of infected people of both sexes, males and females, as the number of males infected with the Giardia parasite reached (14), with a percentage of 56% of the total infected, while the uninfected males were 38, with a percentage of 63.3% of the total non-infected , As for the injured females, the number reached 11, with a percentage of 44% of the total injured, while the number of uninfected was 22, and a percentage of 36.7% of the total number of uninfected, and the results indicated that there were no significant differences in the general total within the probability of $p \geq 0.05$.

pointed out Hasan *et al.* ⁽⁹⁾ in Tikrit - Iraq that the incidence of males (17.30%) was higher than that of females (11.22%) , Falah *et. al* ⁽¹⁰⁾ After examining 3176 faecal samples collected from the Shomali General Hospital in Babylon, he revealed that samples were taken at different ages and from both sexes, and that males (50.65%) were more affected than females (49.35%) with slight significant differences , This is agree with the results of our research, In addition, Samie *etal.* ⁽¹¹⁾ in South Africa after collecting 516 faecal samples and diagnosing them with the ELISA method and the genetic method by investigating the A and B gene, the results showed that there were 40 samples infected with the

Giardia parasite, and the percentage of females (58.1%) was higher than that of males (41.9%) He explained the reason why women in those areas work more in crops and are more in contact with water, vegetables and other

cooking materials, so the infection is higher than males. This does not agree (disagree) with our current research findings.

Table (3) shows the number of infected and uninfected persons of both sexes (males and females)

Gender	Stool examination				Total N %
	-ve		+ve		
	N	%	N	%	
Male	38	63.3	14	56	52 (61.2)
Female	22	36.7	11	44.0	33 (38.8)
Total	60	100	25	100	85 (100)
Chi-Square Tests			0.527 N.S		

Age groups relationship with infection

Parasitic infestation has been studied in ages ranging from less than one year to more than 40 years. The highest sample collection rate was at the age of 1-5 years and it was 32.9%, while the least affected ages were 6-10 years old and it was 14.1% , As for the rest of the ages, the percentages were different for less than one year and more than 10 years old (28.2% and 24.7% respectively). **Table (4) .**

Table (4) shows the age groups for collecting samples and the collection rates

Age group	Frequency	Percent
< 1 year	24	28.2
1-5 year	28	32.9
6-10 year	12	14.1
> 10 year	21	24.7
Total	85	100.0

Table (5) also shows the high significant differences between age groups in relation to parasite infection at the probability level $P \geq 0.01$, where the results indicated that the age group more than 10 years was the most infected with *Giardia*, and the infection rate was 52%

of the total infected samples, while it was The lowest percentage of parasite infection is the age group 6-10 years and it is 4%, and for the age group 1-5 years and less than one year, the percentage of infection is 36% and 8%, respectively.

Table (5) shows the age groups for sample collection and the percentages of *Giardia* infection

Age group	Stool examination				Total N %
	-ve		+ve		
	N	%	N	%	
< 1 year	22	36.7	2	8	24 (28.2)
1–5 year	19	31.7	9	36.0	28 (32.9)
6-10 year	11	18.3	1	4.0	12 (14.1)
>10 year	8	13.3	13	52.0	21 (24.7)
Total	60	100	25	100	85 (100)
Chi-Square Tests			0.001**		

Al Saqur *et al.* ⁽¹²⁾ that the highest age group infected with *Giardia* was the age group 15-44 years with a percentage of 41% after studying the southern, northern and central governorates of Iraq, while the lowest percentage of infection was in the age group less than one year with a percentage of 0.6% , This coincides with our study on the one hand and differs on the other hand , As for Tariq ⁽¹³⁾ collected 396 samples from thi Qar Governorate Hospital - Iraq, and he indicated that the most parasitic infections of *Giardia* were in the age group 2-4 years, with a percentage of 33.3% at the significant level of $P \geq 0.05$, and that the males were Highest female infecte , In the study of Al Saqur ⁽¹²⁾, 1261 faecal samples taken from children in Dohuk Governorate - northern Iraq were examined. From 7 to 9 years, it reached 22.9%, and the male infection rate was higher than that of females, and this differs from our current study.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

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