

Prevalence the Infection with Giardiasis in Baghdad Province / Iraq

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Abstract

The source of water and low educational level family played very important role in prevalence of giardiasis because of poor habits, overcrowded in schools and families and poor hygiene. Therefore, the aims of this study have been undertaken to study the prevalence of infection with intestinal parasite *Giardia lamblia* for both sexes (males and females). The results recorded there are no significant differences in the gender and prevalence rate of the giardiasis. Which whereas for males 51.55% and 48.45% for females from 97 cases which examined in Baghdad teaching and children central hospitals to Baghdad province, and the samples examined by laboratory examination, general stool examination, direct stool examination, in direct stool examination and concentration stool method (CSM), at period from October 2011 to the end of March 2012. While recorded the highest ratio of prevalence infection with this parasites in children with age group (1-10) years, which were 25.77%. Also in this study recorded the highest rate of infection for patients whose drinking contaminated water sources , which were 85.57%, because these water contents on the highest ratio of cyst stages , which whereas 79.3%, that causes chronic infection with *G. lamblia*.

Key words: Prevalence of giardiasis, *Giardia lamblia*, contaminated water sources, Cyst stages, Chronic infection, Intestinal parasite.

الخلاصة

تلعب مصادر المياه وانخفاض المستوى الثقافي للعائلة دوراً مهماً في انتشار الإصابة بمرض الجيارديا (Giardiasis) بسبب العادات الخاطئة وازدحام العوائل والمدارس وسوء النظافة الشخصية. تهدف هذه الدراسة إلى معرفة نسب انتشار الإصابة بالطفيليات المعوية *Giardia lamblia* لكلا الجنسين (الذكور والاناث) . كانت الاختلافات غير معنوية ما بين الجنسين وانتشار الإصابة بمرض الجيارديا والتي بلغت 51.55% للذكور و 48.45% للإناث من مجموع 97 حالة تم فحصها في مختبرات مستشفى بغداد التعليمي والطفل المركزي لمحافظة بغداد، وفحصت العينات بطريقة الفحص المختبري وطريقة فحص البراز العام بوساطة فحص البراز المباشر وغير المباشر وطريقة تركيز البراز، للمدة من تشرين الأول 2011 حتى نهاية آذار 2012. بينما سجلت أعلى نسبة لانتشار الإصابة بهذه الطفيليات في الاطفال لمجاميع الاعمار (1-10) سنوات والتي كانت 25.77% . كذلك سجلت في هذه الدراسة أعلى نسبة للإصابة في المرضى الذين يشربون مصادر مياه ملوثة والتي كانت 85.57%، لان هذه المياه تحوي أعلى نسبة من الاطوار الكيسية (cysts) والتي بلغت 79.3% وبالتالي تسبب الإصابة المزمنة بالجيارديا لامبليا .

الكلمات المفتاحية: انتشار الإصابة، الجيارديا لامبليا، مصادر مياه ملوثة، الاطوار الكيسية، الإصابة المزمنة، الطفيليات المعوية.

Introduction

Giardia lamblia (synonymous with *G. intestinalis*, *G. duodenalis*) is a flagellated unicellular eukaryotic microorganism that commonly causes diarrheal disease throughout the world (Barwick *et al.* 2000). This parasite was first discovered in 1681 by Antonym van Leuwenhoek, who found it on his own stool, but in 1915 the parasite was named in honor to Professor A. Giard in Paris (Ford, 2005). Even *Giardia lamblia* is a protozoan parasite which has worldwide distribution and is common in warm and moist climates throughout the world (AL-Saeed and Issa 2002). Therefore, can cause the giardiasis is transmitted by the farce-oral route and direct by person-to-person spread. In most causes it is associated with contaminated drinking water, but also occasionally by recreational activity in still water (Thompson, 2001).

Although this species have two major stages in the life cycle. Infection of the host is initiated when the cyst is ingested with contaminated water or, less commonly, food or through direct face-oral contact. The cysts excise into trophozoites is the vegetative form, passed in the feces, allowing completion of the transmission cycle by infecting a new host (Adam, 2001). The giardiasis especially occurs in children, the prevalence of *G. lamblia* ranges from 2-7% in the industrialized countries and 20-60% in developing countries (Graziolo, 2006), therefore, several surveys of intestinal parasitoids in Iraq have shown a high incidence of giardiasis among children (AL-Jeboori and Shfiq 1976). The symptoms of *G. lamblia* are ranging from asymptomatic (tonal latency) to acute, and chronic syndromes are usually associated with nutritional disorder, weight loss and failure to thrive (Astal, 2004) , Intestinal protozoans are considered as a significant health problem in both developed and under developed countries (Warhurs, 1999). Therefore, the aim of this study is to investigate the prevalence rate of *Giardia lamblia* in Baghdad province among patients in different age groups.

Materials and Methods

1- The Materials:

1. Microscope
2. slide
3. cover slip
4. normal saline
5. feces samples
6. Iodine

2- Collection of samples

1) Stool samples

The stool samples were collected for patients from central children hospital, in sterile clean and dry plastic containers, especially designed for stool collection and each container was labeled by a special number, name, age and gender.

2) Laboratory Examination

- General stool examination

A- Direct Stool Examination

The feces were examined by naked eye investigating color consistency, mucus and odor.

B-In Direct Stool Examination

Direct physiological Iodine smear. The stool sample was examined by putting a small amount of stool, taken by wooden stick from different spots, especially mucus then it was put in dry and clean slide by adding one drop of Iodine added and mixed thoroughly, and then put the cover slip and examined under 40x magnification to objective discover the trophozoite and cyst of intestinal protozoa and the examination was performed from the upper right angle ending in lower left angle of the slide.

C- Concentration stool method (CSM)

Using normal saline to deposit and concentrate the cysts, then the deposits were examined under the microscope (Rissan, 1997).

D- It was developed a list of questions, included drinking water source and type. As well as the type and source of food intake. In addition to the child's behavior when eating included contaminated sweets, sucking contaminated games, the suck their fingers contaminated, direct feces oral contact and pick up food from the pollution ground and eating it, these called other contamination (personal information).

3) Statistical analysis

In this study used Statistical Analysis System (SAS) (SAS, 2012). This used to find out effect of different factors in these study parameters. Chi-square test was used to find the significant differences for those ratios in this study.

Results and Discussion

During the period of study from (October 2011 to the end of March 2012), it has been shown that the percentage of infection in young ages groups were higher than the adults ages, therefore the ages of children were (1-10), (11-20), (21-30) years with high ratios (25.77%), (22.68%) and (22.68%) in respectively. Whose infection with *G. lamblia* have been recorded highly significant differentiation ($p < 0.05$) ($p < 0.01$). Although in this study recorded highly percentage in males (59.1%) in age group (11-20) years, but in females recorded the highest percentage were (63.2%) in age group (31-40) years. Therefore the prevalence ratio with giardiasis in males and females was significant differences and high significant differences ($p < 0.05$) ($p < 0.01$) in respectively. For this pathogenic infection with *Giardia lamblia*, in this research showed the percentage of infection in different age groups for both males and females in acute and chronic infection by the pollution water sources and contaminated food with the cyst stages. In this study the highest rate of an infection recorded in children with age group (1-10) years, compared with other age groups, this result agree with results of Al-Saeed and Issa (2002), whom found that the infection was increased in children under 5 ages. Also this study agrees with Gharbi (2011), who found that the high number of infection was in the age group less than 11 years. This belongs to the children which were exposed to infection because of bad habits, low health hygienic condition, overcrowded in schools and families and toilet training, these being as a result of contamination of food and water with these parasites, and addition of these the other children in primary schools which as located in a low socioeconomic areas. While this study showed no significantly of oldest year's groups which were (51-60) years and ≥ 61 years to infection with giardiasis (Tab. 1). But there are found no significant differences ($p < 0.05$) between the gender when infectious with these parasites. Therefore the percentage of infection in males were (51.55%), while the females were (48.45%) from total cases were collected 97 samples (Tab. 2). In this study there were not found significant differences in prevalence rate of *G. lamblia* in the males and females. These results agreement with Rhadi (1994), who recorded that the prevalence rate of males were (52.9%) and females were (47.01%) in Basrah, and agreed with Abed (2008), whose found no statistical significant differences between the gender and infection with *G. lamblia*. Also these result finding agrees with other study such as the study of Al- Dobiak (2001), who's finding no association between gender and rate of infection. But this study disagrees with Kadir and Naki (2000), which have shown a high prevalence of infection in females than males. Also the higher percentage and high statistical significant differences ($p < 0.05$) ($p < 0.01$) have been recorded in these study which recorded in polluted water, were (85.57%), and the prevalence rate of giardiasis in males and females were high statistical significant differences ($p < 0.05$) ($p < 0.01$). But the percentage of contaminated food was recorded (1.03%) (Tab 3). Moreover, the higher prevalence rate of infection by the water sources, which recorded the percentage of infection and was (85.57%) , this result agrees with study of Abu-Mourad (2004) , Omar *et al.* (2005), and Hussein (2010), that found the intestinal parasites was significantly higher and associated with source of drinking water. This refers to the family educational level, which played very

important role for infection by the raw water sources, is due to direct use to contaminated water from the river for a variety of requirements, and also due to usual contact with domestic animals and their products. In general the percentage of cyst stages in patient's stool was higher than the trophozoite stages, whereas the prevalence rate with trophozoite stages were (13.4%), while the cyst stages were (79.3%) (Tab. 4). Although in this study recorded highest prevalence rate of infection with cyst stages which were (79.3%). These results agreement with Al-Saeed and Issa (2002), when they found the rate of infection was increased during spring seasons. Finally, these results belong to the infection was increased in winter and spring seasons, because of these seasons are suitable for cyst stage to stay a life and can cause chronic infection.

Table (1): Distribution the patients according to the age groups

Age groups (yrs.)	No. of patients	The percentage (%)	Gender				Chi-square
			Male	Percentage (%)	Female	Percentage (%)	
1-10	25	25.77	11	44	14	56	4.79 *
11-20	22	22.68	13	59.1	9	40.9	7.23 **
21-30	22	22.68	10	45.5	12	54.5	4.61 **
31-40	19	19.59	7	36.8	12	63.2	8.94 **
41-50	9	9.28	5	55.5	4	44.4	4.78 *
51-60	Zero	Zero	Zero	Zero	Zero	Zero	0.00 NS
≥61	Zero	Zero	Zero	Zero	Zero	Zero	0.00 NS
Total	97	100	Zero	Zero	Zero	Zero	0.00 NS
Chi-square	---	8.926 **	---	11.492 **	---	13.705 **	----

* (P<0.05), ** (P<0.01).

Table (2): The number and percentage of males and females whose infection with *Giardia lamblia*

Gender	No. of examined patients	No. of infected patients	The percentage (%)
Male	50	50	51.55%
Female	47	47	48.45%
Total	97	97	100%
Chi-square	---	---	0.963 NS

NS: Non-significant

Table (3): Distribution of patients according to the source of infection (The states taken from the patients, then classified according these states.

States	No. of examined patients	No. of infected patients	The percentage (%)	Gender				Chi-Square
				Male	Percentage (%)	Female	Percentage (%)	
Food uptake	1	1	1.03	21	100	Zero	Zero	15.00 **
The nutrition	8	8	8.25	4	50	4	50	0.00 NS
Vegetables	2	2	2.06	2	100	Zero	Zero	15.00 **
Water	83	83	85.57	42	50.6	41	49	0.006 NS
Other contaminations	3	3	3.09	2	66.7	1	100	9.26 **
Total	97	97	100	51	52.6	46	47.4	1.285 NS
Chi-square	---	---	14.074 **	---	11.436 **	---	15.00 **	----
** (P<0.01)								

Table (4): Distribution the patients according to the duration

Stages of parasite	Cyst stage		Trophozoite stage		Trophozoite and cyst stages		Total	
No. of infections	74		13		10		97	
The percentage (%)	79.3		13.4		7.3		100	
Chi-square	13.481 **							
The gender type	The male	The female	The male	The female	The male	The female	The male	The female
No. of infection	36	38	9	4	5	5	50	47
The percentage (%)	48.6	51.4	69.2	30.8	50	50	51.5	48.5
Chi-square	0.963 NS		9.833 **		0.00 NS		0.960 NS	
** (P<0.01).								

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