

# Prevalence of *Giardia lamblia* and *Entamoeba histolytica* /*Entamoeba dispar* infections among Children in AL-Shulaa and AL-khadimya –Baghdad-Iraq

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## ABSTRACT

The prevalence of *Giardia lamblia* and *Entamoeba histolytica*/*E.dispare* were screened among 513 children aged less than 12 years in Al-Shulaa and Al-Khadimya - Baghdad, to evaluate the relationship of some factors (gender, age, grade and type of drinking water) with the prevalence of these two intestinal protozoal parasites, this study was done during the period from the beginning of April 2009 till the end of March 2010, in human. The study revealed that the total rate of (*G.lamblia* and *E. histolytica*/ *E.dispare*) infection was (13.64%), the infectivity rate of *G.lamblia* was higher than the infectivity rate of *E.histolytica*/ *E.dispare* as their rate was (10.72%) and (2.92%) respectively, and there was no significant relation ( $p \leq 0.05$ ) between infectivity rate of these parasites and each of gender, age and grade (school and preschool) while there were very high significant relation between the type of drinking water and infectivity rate of both (*G.lamblia* and *E. histolytica*/ *E.dispare*) the maximum infectivity rate of (*G.lamblia*, *E.histolytica*/ *E.dispare*) was observed in patients who consumed tap water (17.56%) while patient who consumed the other kind of drinking water showed the minimum infectivity rate which was (3.49%).

## Introduction

Intestinal protozoan parasites are widely prevalent causing considerable medical and public health problem in developing countries [1]. Malabsorption, diarrhea, blood loss, impaired work capacity, and retarded growth can be associated with these intestinal infections [2], some infections occur focally in school and preschool age children [3, 4]. *Giardia lamblia* and *Entamoeba histolytica*/ *E.dispare*, are among the major intestinal parasitic agents [5], both of *G.lamblia* and *E. histolytica*/ *E.dispare* are frequently transmitted via contaminated food or drinking water, but may also be spread from person to person through fecal – oral contact [6]. Approximately 10% of the world's population is infected by either *E.histolytica* or *E.dispar* of which 50 million people have invasive disease due to *E.histolytica*[7]. The annual death of 40.000-100.000 is due to *E.histolytica* /*E.dispare*, place amoebiasis as the second leading cause of death from the parasitic disease worldwide [8], while 5-10% of population is at risk of giardiasis[9].

In Iraq literatures showed different incidence level of *Giardia lamblia* and *E. histolytica*/ *E.dispare* infection [10, 11,12] in all age group well as some papers focus on sex related, occupation related prevalence [12] and age related especially in children [13,14], although we need more descriptive data to update our knowledge about these two parasites especially in children.

## Materials and Methods

This study was conducted in: AL-Noor primary health care center, AL-Noor General Hospital, AL-Khadimya Teaching Hospital and AL-Khadimya Hospital for children / Baghdad, during the period from beginning of April 2009 till the end of March 2010.

Faecal samples were collected from 513 diarrheal and non diarrheal patients of both gender at age less than 12 years old, each sample was put in a clean screw cap container used for collecting stool samples, labeled with the number and date of collection. A special form of information was filled for each patient, which include source of drinking water and the grade (school , preschool).

The samples were concentrated by formalin-ether method. A drop was taken from each deposit by

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pasture pipette and was smeared on a glass slide and then was examined by light microscope with  $\times 100$  objectives [11].

Experimental data were presented in terms of observed numbers and percentage frequencies, and then analysed by Statistical Package for Social Sciences (SPSS 10.01) using the Chi square: P value  $\leq 0.05$  was considered statistically significant.

### Results and Discussion

The prevalence of *Giardia lamblia* and *Entamoeba histolytica* was studied among children in two locations, in north of Baghdad (AL-Shulaa and AL-khadimya), the results showed that the total rate of parasitic protozoan infection (*G.lambli*a, *E.histolytica/ E.dispare*) was (13.64%), the infectivity rate of *G.lambli*a was higher than the infectivity rate of *E.histolytica/ E.dispare* as their rate was 10.72% and 2.92% respectively figure (1), these result were differ from the result done by Sa'el,2009[12] which showed high prevalence of *E.histolytica/ E.dispare* (28.4%) comparing with *G.lambli*a (12.9%), while it was in agreement with Atia, 2009 [11] who recorded high infectivity rate of *G.lambli*a (48%) comparing with less infectivity rate of *E.histolytica/ E.dispare* (33.8%). The differences between prevalence of these intestinal parasites from one study and other may due to different factors such as: Environmental, nutritional, socio-economic, geographical conditions, demographic and health-related behavior as well as number of patients samples in screening study and diagnostic method used [11, 13, 14].

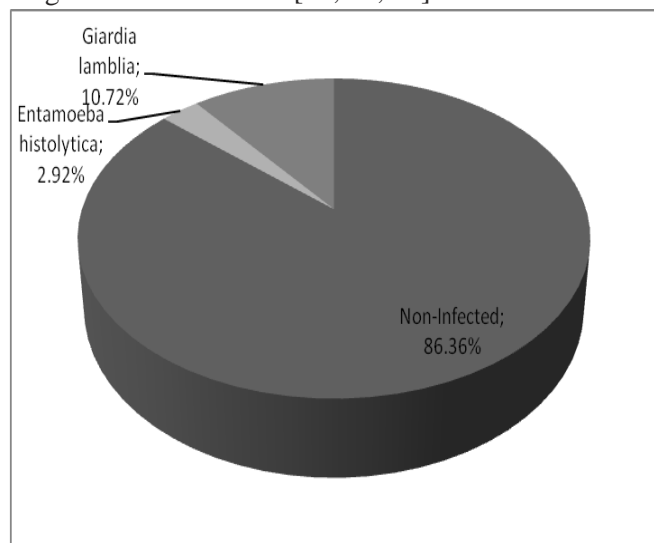


Figure 1: total infectivity rate of *G.lambli*a and *E.histolytica* among children

Gender related prevalence of both *G.lambli*a and *E.histolytica/ E.dispare* was screened and the result showed that there were no significant differences ( $p \leq 0.05$ ) between male and female as their rate of infection were 12.28% and 15.35% respectively, results also showed that the prevalence of *G.lambli*a in both male (9.82%) and female (11.84%) were higher than the prevalence of *E.histolytica/ E.dispare* in both male (2.46%) and female (3.51%) table (1). This result was in agreement with Shrestha, 2001 [15] and Tasawar *et al.* 2010 [16] who showed that the infection with intestinal parasites was not associated with particular gender, while these results were disagreed with Al-Saeed & Issa, 2006 [17], who showed that there were significant differences between male and female infected with *G.lambli*a. Although clinical studies of humans and field studies of non-human animals are suggestive, several factors, including exposure rates, social behavior, habitat, and diet cannot be held constant and could contribute to the observed differences between male and female in parasite infection [18].

Table 1: infectivity rate of *G.lambli*a and *E.histolytica* among children and its relation with gender

Gender	No. of sample examined	No. of positive (infected with <i>Giardia</i> and <i>E.histolytica</i> )	% positive	No. of positive (infected with <i>Giardia</i> )	% positive <i>Giardia</i>	No. of positive (infected with <i>E.histolytica</i> )	% Positive <i>E.histolytica</i>
Male	285	35	12.28%	28	9.82%	7	2.46%
Female	228	35	15.35%	27	11.84%	8	3.51%
Total	513	70	13.64%	55	10.72%	15	2.92%
Chi square:1.013 Degree of freedom:1 P value: 0.3141852				Chi square:1.009 Degree of freedom:2 P value: 0.57723836			

Results of children age distribution for both parasites was as follow: low infectivity rate (8.79%) was observed in age group (0-3) years, and high infectivity rate was observed in age group (4-6), (7-9)

and (10-12) which were (18.75%),(17.64%) and (20%) respectively, the prevalence of *G.lambliia* was predominant 6.94%, 13.75%, 13.72% and 17.5% in all age group respectively when it compare with less prevalence of *E.histolytica/ E.dispare* 1.85%, 5%, 3.9% and 2.5% in all age group respectively table (2), and the low infectivity rate in age group less than three years , perhaps because parents are responsible for their hygiene[19] while the infection rate was higher in other age groups, this may be because this group of children are more involved in outdoor activities which might lead to parasites transmission [20]

But statistical analysis of the current study showed that there was no significant relation ( $p \leq 0.05$ ) between age and infectivity rate of both parasites in children. These results agreed with Kia *et al.*,2008[21] and Mohammed *et al.*,2009 [22] who illustrated that there were no significant differences between age groups,while it was disagreed with Sa'el,2009 [12], Al-Saeed & Issa, 2006 [17] and Ouattara *et al.*,2010 [23] who showed that the infection was significantly associated with age.

Table 2: infectivity rate of *G.lambliia* and *E. histolytica* among children and its relation with age groups

Age	No. of sample examined	No. of positive (infected with <i>Gairdia</i> and <i>E.histolytica</i> )	% positive	No. of positive (infected with <i>Giardia</i> )	% positive <i>Giardia</i>	No. of positive (infected with <i>E.histolytica</i> )	% Positive <i>E.histolytica</i>
(0-3)	432	38	8.79%	30	6.94%	8	1.85%
(4-6)	80	15	18.75%	11	13.75%	4	5%
(7-9)	51	9	17.64%	7	13.72%	2	3.9%
(10-12)	40	8	20%	7	17.5%	1	2.5%
Total	513	70		55		15	
<b>Chi square:5.697</b> <b>Degree of freedom:3</b> <b>P value: 0.12731929</b>				<b>Chi square:6.595</b> <b>Degree of freedom:6</b> <b>P value: 0.35992879</b>			

The prior results of the current study were confirmed by the result of grade (preschool and school) related prevalence of children which examined in this study, high but no significant infectivity rate (*G.lambliia* & *E.histolytica/ E.dispare*) were seen in school children followed by preschool children as their rate of infection 18.64% and 12.15% respectively, while statistical analysis showed less significant differences between school and preschool children, high prevalence were observed in school children infected with *G.lambliia* 16.94% and *E.histolytica/ E.dispare* 3.29% when it compared with preschool children infected with *G.lambliia* 8.68% and *E.histolytica/ E.dispare* 1.69% table (3). Because of low sanitary levels, in developing countries, infection with some intestinal parasites occurred mostly in the first years of the life, but in developed countries the infection can be linked and easily transmitted in nurseries, day care centre and schools [24].

Table 3: infectivity rate of *G.lambliia* and *E. histolytica* among children and its relation with grade

Grade	No. of sample examined	No. of positive (infected with <i>Gairdia</i> and <i>E.histolytica</i> )	% positive	No. of positive (infected with <i>Giardia</i> )	% positive <i>Giardia</i>	No. of positive (infected with <i>E.histolytica</i> )	% Positive <i>E.histolytica</i>
School	118	22	18.64%	20	16.94%	13	3.29%
Preschool	395	48	12.15%	35	8.86%	2	1.69%
		70		55		15	
Chi square: 3.25 Degree of freedom:1 P value: 0.07142346				Chi square: 6.779 Degree of freedom:2 P value: 0.006307063			

Contaminated water is a high risk factor for *G.lambliia* and *E.histolytica* infection, so prevalence of these parasites were screened child related with tab water and other kind of drinking water (boiled, filtered and bottled water), the maximum infectivity rate of (*G.lambliia*, *E.histolytica*) was observed in patients who consumed tab water (17.56%) the priority of infectivity rate was for *G.lambliia* followed

by *E.histolytica* as their rate was 13.78% and 3.78% respectively while patient who consumed the other kind of drinking water showed the minimum infectivity rate which was (3.49%), the priority of infectivity rate was for *G.lamblia* followed by *E.histolytica* as their rate was 2.79% and 0.7% respectively table (4). Statistical analysis showed that there was very high significant relation ( $p \leq 0.05$ ) between the source of drinking water and the prevalence of these parasites, these results agreed with Hadi & Faraj,(2008) [25] who showed that the contamination rate of some parasites in tap water reach to 17.2%.

*Giardia* and *E.histolytica* cysts have the greatest potential for transmission through drinking water because: human infective cysts are widely distributed in the environment, cysts can penetrate physical barriers in water treatment processes and are disinfectant resistant [26, 27] and each of *Giardia* and *E. histolytica* has a low infectious dose for humans [28].

From the previous results we conclude that both gender and age were not significantly associated with *Giardia* and *E. histolytica*, while drinking water can consider high risk factor .

Table 4: infectivity rate of *G.lamblia* and *E. histolytica* among children and its relation with source of drinking water

Source of Drinking Water	No. of sample examined	No. of positive (infected with <i>Gairdia</i> and <i>E.histolytica</i> )	% positive	No. of positive (infected with <i>Giardia</i> )	% positive <i>Giardia</i>	No. of positive (infected with <i>E.histolytica</i> )	% Positive <i>E.histolytica</i>
Tap	370	65	17.56%	51	13.78%	14	3.78%
Other	143	5	3.49%	4	2.79%	1	0.7%
Total	513	70		55		15	
Chi square:17.33 Degree of freedom:1 P value: 0.00003142			Chi square:17.322 Degree of freedom:2 P value: 0.0050095				

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## دراسة انتشار طفيلي *Giardia lamblia* و طفيلي *Entamoeba histolytica* / *Entamoeba dispar* بين الأطفال في مناطق الشعلة والكاظمية

حارث سعيد جعفر

### الخلاصة:

تمت دراسة معدل انتشار طفيلي الجيارديا والزحار الأميبي في 513 طفل بعمر اقل من 12 سنة، يقطنون مناطق الشعلة و الكاظمية في بغداد، وذلك لتقييم علاقة بعض العوامل ( الجنس، العمر، المرحلة الدراسية و مصدر ماء الشرب) مع انتشار الخمج بهذين الطفيليين و قد اجريت هذه الدراسة ضمن الفترة الممتدة من بداية شهر نيسان 2009 و لغاية نهاية شهر آذار 2010. كشفت هذه الدراسة ان معدل الإصابة الأجمالية بالطفيليين كانت (13.64%)، اظهر فيها طفيلي الجيارديا معدل اصابة اعلى من معدل الاصابة لطفيلي الزحار الأميبي حيث بلغت نسب الإصابة (10.72%) و (2.92%) على التوالي. كما ظهر عدم وجود علاقة معنوية على مستوى ( $P \leq 0.05$ ) بين معدل الإصابة بالطفيليات وكل من الجنس، العمر و المرحلة الدراسية للأطفال، بينما لوحظ وجود علاقة معنوية بين مصدر ماء الشرب و معدل الإصابة بالطفيليات حيث بلغ اعلى معدلات الإصابة في الأطفال الذين يشربون ماء الحنفية (13.56%) مقارنة بالأطفال الذين يشربون الأنواع الأخرى من المياه (المغلي، المغلتر و المعبأ) الذين اظهروا اقل معدلات الإصابة بالطفيلي (3.94%).