Prevalence of *Entamoeba histolytica* in Human from Baghdad City

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انتشار طفيلي الاميبا في الانسان في مدينة بغداد

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Abstract

The result of microscopic examination of 100 human stool samples showed that 33% of them were infected with *Entamoeba histolytica*. The rate of infection with *Entamoeba histolytica* in the males was 21% while in the females was 12% with a significant differences at (P<0.01).The highest infection rate 12% was found at age >6-10 years, while the lowest rate 4% was found at age group ≥20 years. The highest infection rate 54.54% occurred in July/2021, while, the lowest 18.18% was reported in January and February/2021 with significant differences at (P<0.01).The study revealed that the presence of infections with *Entamoeba histolytica* in different locations of Baghdad City. The highest rate of infection13% was recorded in Abu Gharab hospital followed by Central Child Hospital, Medical city hospital and Al Rusafa Laboratories, with rates of 6%, 9%, and 3% respectively, The lowest rate 2% was recorded in Al_Karkh laboratories with significant differences (P<0.01).

Keywords: Entamoeba spp, *Entamoeba histolytica*, diarrhea, mature cyst

المستخلص

اظهرت نتيجة الفحص المجهري لمائة عينة براز الانسان أن 33% من العينات مصابة بطفيلي الاميبا, وان معدل الاصابة في الذكور هي 48.83% وفي الاناث هي 21.05% مع وجود فروقات معنوية بينهم عند مستوى الاحتمال 0.01

اعلى نسبة اصابة كانت 12% لدى الاعمار بين 6-10 سنوات واقلها 4% عند الاعمار اكثر من 20 سنة. فضلا عن ذلك لوحظ ان اعلى معدل الإصابة والذي هو 54.54% قد سجل بشهر تموز \2021و اقلها سجلت في شهري كانون ثاني وشباط من العام نفسه وهي 18.18% وبفروق معنوية عند مستوى الاحتمال 0.01. الدراسة اوضحت ايضا تسجيل الاصابة بطفيلي الاميبا بعدة مناطق من مدينة بغداد واعلى نسبة كانت 13% في مستشفى ابو غريب تبعتها مستشفى الطفل المركزي ومدينة الطب ومن ثم مختبرات الرصافة وبنسب 6%, 9% و3% على التوالي بينما اقل نسبة اصابة كانت قد سجلت في مختبرات الكرخ وهي 2% وبفروق معنوية عند مستوى الاحتمال 0.01عن باقي المناطق.

الكلمات المفتاحية: طفيليات الاميبا، الاسهال، الكيس الناضج و *Entamoeba histolytica*

Introduction

Entamoeba spp. is a free-living protozoan or parasitic species that can infect a variety of vertebrate and invertebrate hosts (Matsubayashi *et al.,* 2015; Kawano *et al.,*2017; Matsubayashi *et al.,* 2018). There are up to 24 species of Entamoeba described worldwide, but only species such as *Entamoeba histolytica, E. coli, E. dispar, E. moshkovskii, E. hartmanni and E. polecki* reside in the lumen of human intestine (Ali, 2015). After malaria and schistosomiasis, *Entamoeba histolytica* infection is the third parasite in the world to cause mortality, it affects about 180 million persons, with 40,000 to 110,000 individuals dying per year (Pestehchian *et al.,* 2011; Al-Areeqi *et al.,* 2017).

Entamoeba histolytica infection is worldwide, more common in the tropics and subtropics. Contaminated food and water with feces contain cysts is a common source of infection. Most cases arise from human carriers, mature cyst passers, which pass in formed or semi formed stools (Debnath *et al.,* 2019). Monkeys, dogs, and probably pigs are naturally infected with *E. histolytica*, although these animals are only a small source for human exposure when compared to man himself (Watanabe and Petri,2015). The goal of this study is to record the infection with *Entamoeba histolytica* in Baghdad City hospitals.

Materials and Methods

Samples collection

One hundred stool samples were collected from patients attended the Al-Rusafa laboratories, Al-Karkh laboratories Medical Hospital and Abu-Ghraib hospital in Baghdad City. Stool samples were collected in screw-

capped stool containers and transported in cold bag to the Parasitology Laboratory, College of Veterinary Medicine,University of Baghdad. In addition, questionnaire formula including (gander, age and areas) was distributed.

Microscopic examination

About 1-2 gm from each stool sample was used and examined by direct smear preparation, using iodine stain and concentration method, for the detection and identification of parasite cyst, as described by (Bahrami *et al.,*2019). Examination of smears was made by light microscope (Olympus) under low power 10X then higher power magnification 40X.

Statistical Analysis

To determine the influence of several factors on study percentage, the Statistical Analysis System- (SAS,2012) application was utilized. Moreover, the Chi-square test was employed to compare percentages (0.05 and 0.01 likelihood).

Results and Discussion

Microscopic examination

The results of microscopic examination by direct wet mount method with normal saline and logus iodine at high power (40x) for detection the trophozoite and cyst stage of *Entamoeba histolytica* spp were illustrated in (Fig. 1).

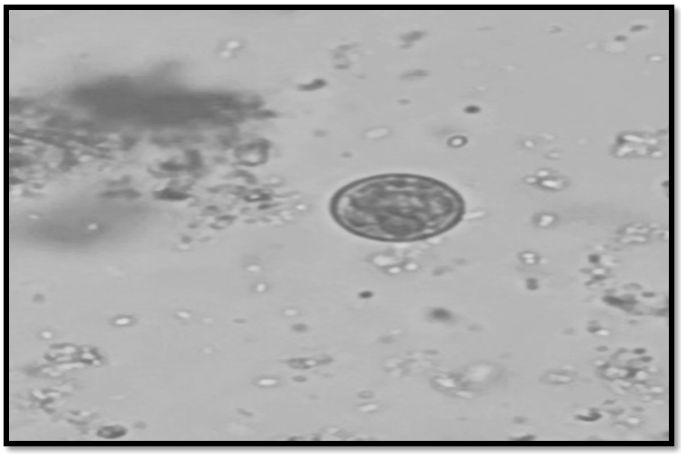

Figure (1): The cysts of *Entamoeba histolytica* by logus iodine at (40X)

The microscopic examination showed that 33(33%) patients out of 100 were infected with Entamoeba spp. as represented in Table (1) and the result of this study agreed with (Nasser,2014) who recorded 32% in Basra province, and Al-Azawi (2009) who reported 32.5% in abu-Gharab/ Baghdad. But, it was lowest than the results recorded by Ibrahim *et al.,* (2019) in Baqubah province and Alardi and Jasim (2016) in Al-Diwaniya province who reported 57.33% and 44.8% respectively. Furthermore, the current study findings were higher than the rate of infection in the studies of Salman (2013) in Kirkuk and AL-Mosawi (2016) in Thi-Quar who found 1.68% and 17.5% respectively. In Arabian countries, the prevalence of amoebiasis was 37.24% in Egypt (Naguib *et al.,*2014) and 19.2% in United Arab Emirates by Samie *et al.,* (2012).The prevalence of amoebiasis depends on many risk factors such as, the ignorance, overcrowding, inadequate and contaminated water supplies (quality of water consumed), poor sanitation, toilet habit, low socio-economic status, absence of adequate urban services, place of residence, age, ingestion of raw vegetables (Hamad and Ramzy,2012; Ahmed *et al.,* 2012)

proved that Intestinal parasitic infections are widely prevalent in developing countries due to poor sanitation, and inadequate personal hygiene. The incidence is also closely related to climate and environmental conditions. Additionally the prevalence of Entamoeba spp is high among families who eat together from the same plate, among those who eat with their hands, among those who eat away from home and sanitary workers (Karaman *et al.,*2006).

Table 1. Total rate of infection with *Entamoeba histolytica* among patients by microscopic examination.

Species	No. Exam.	Positive cases	
		No.	%
Human	100	33	33

The results showed that the rate of infection with *Entamoeba histolytica* was higher 21(48.83%) in males than females12 (21.05%), with statistical significant differences (P≤ 0.01) as presented in Table (2).

Table 2. Infection rate of *Entamoeba histolytica* according to the gender by using microscopic examination

Gender	No. of examined patients	No. of infected patients	(%)	P values
Males	43	21	21	0.0027 **
Females	57	12	12	
Total	100	33	33	---
** (P≤0.01)				

The result agreed with Nasser (2014) in Al-Sweara city who recorded infection in the males (44.68%) which was higher than that in the females (15.66%).Ahmed (2010) who recorded the infection in males (20%) and in the females (4%) and Al-Ammash(2015) in Saladin city who recorded that

the infection in the male was (63.64%) and in the female was (36.36%).While Nayyef et al. (2011) study showed that there were non-significant difference (P > 0.05) in the infection rate with *Entamoeba histolytica* prevalence between males 51.42% and females 48.58%. While the study of Ejaz et al. (2011) showed that the infection with Entamoeba spp was more prevalent in females(31.5%) as compared to the males(19.6%).The high prevalence of *Entamoeba histolytica* in males may be due to hormonal in origin, or due to ecological factors such as differential exposure to the pathogens because of the sex-specific behavior, this agrees with Salah *et al.,*(2017) who found that E. histolytica is more common in men than in women, the reason for this, is thought to be hormonal. Zuk and Mckean (2000) thought that sexually mature males are often more susceptible to infection than females because sex steroids specifically androgens in males and estrogens in females modulate several aspects of host immunity.

The results of the current study also showed that the highest infection rate with *Entamoeba histolytica* found in age group (>6-10) years with the percentage of (44.4%), while the lowest occurred in the age group (≥20) years with the percentage (20%). However the statistical analysis showed significant difference (P≤ 0.01) between the percentage of infection between age groups, as represented in Table (3).

Table 3. The infection rate of *Entamoeba histolytica* according to the age groups by microscopic examination.

Age/Years	No. of Examined samples	No. of infection	Percentage (%)	P values
1<6	14	3	3	00065 **
>6-10	27	12	12	
>10-15	21	8	8	
>15-20	18	6	6	
≥20	20	4	4	
Total	100	33	33	
** (P≤0.01).				

The results of the present study agreed with many previous studies such as Alreequi *et al.,*(2017) in Yemen, in which they recorded high prevalence of infection (45.3%) in age of less than ten years compared to lower rate (6.1%) in ages over 41 years. They also reported that children at age 1-10 years were more susceptible to infection with *Entamoeba histolytica* than other ages. *Entamoeba histolytica* infection is more prevalent in younger age groups, this could be explained on the basis of that the children have lower resistance as compared to adults and because many of the crucial defense systems that help to protect adults from diseases are not fully developed in children. They are much more sensitive to parasites than adults, other reasons could be that the children are more exposed to overcrowded conditions (schools, nurseries, playgrounds etc.) (Al-Kaeebi and Al-Difaie,2016). Parasitic infection among school children may be due to poor conditions in schools, they do not take care of their personal hygiene, such as playing in contaminated outdoor environments, in and around disposal sites (which can certainly cause serious health problems), lack of fecal hygiene and lack of washing hands before meals.(Kadir and Naki, 2000).

Entamoeba histolytica was more frequently encountered during childhood since hygienic habits have not been fully developed yet and in

hyper endemic regions the disease was seen in young children while with mild or asymptomatic infection in older children (Gunduz *et al.,* 2005). Nasser (2014) in Basra city recorded low infection rate of 15% in group of 0-10 months and high infection rate of 55% in the age group of 30-40 years.

This study revealed the presence of *Entamoeba histolytica* infection in different areas in Baghdad city; these areas are; Abu Ghraib hospital, medical city hospital, central child hospital, Al Rusafa and Al Karkh laboratories. The highest infection rate was 39.3% (13/33) and recorded in Abu Ghraib hospital, while the lowest was 20% (2/10) and recorded in Al Karkh laboratories, with significant differences (P≤ 0.05),Table (4).

Table 4. The infection rate *Entamoeba histolytica* in patients according to areas by using microscopic examination.

Areas	No. of Examined patients	No. of infected patients	(%)	P value
Abu Ghraib hospital	33	13	13	0.00747 **
Medical city hospital	20	6	6	
Central child hospital	27	9	9	
Laboratories/Al Rusafa	10	3	3	
Laboratories/ Al Karkh	10	2	2	
Total	100	33	33	
** (P≤0.01).				

The differences in prevalence of these intestinal parasites from one study to another may due to different factors such as: environmental, nutritional, socio-economic, geographical conditions, demographic and health-related behaviors as well as number of patients enrolled in the screening study and the diagnostic method used (Prado *et al.,* 2003; Garg *et al.,* 2005; Obaid, 2013).

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