

Original Research Article

## Frequency of Intestinal Parasites in Baghdad

Israa Mohammad Abd AL-Khaliq<sup>1\*</sup>

<sup>1</sup>HLA Typing Unit, Al-Kindy College of Medicine, Baghdad University, Baghdad, Iraq

\*Corresponding Author: Israa Mohammad Abd AL-Khaliq  
HLA Typing Unit, Al-Kindy College of Medicine, Baghdad University, Baghdad, Iraq

Email: [israaalhasan@yahoo.com](mailto:israaalhasan@yahoo.com)

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**Abstract:** Parasitic diseases including amoebiasis, blastocystosis, giardiasis, trichomoniasis, and schistosomiasis, are all globally wide spread with harmful consequences. The present study was carried out to provide information of the prevalence of these diseases in some regions of Baghdad. Objectives: to detect the prevalence of human pathogenic parasites in some regions of Baghdad in stool samples and urine samples, and to determine the most common age group affected. Methods: Data were collected from Al-Kindy Teaching Hospital and Medical City Teaching Hospital, in the lab of parasitology from November 2018 to May 2019. The present study included (400) sample, which were collected from patients at different ages of both genders, samples of the study were selected randomly, divided them into equal number of stool samples and urine samples. Results: The results of epidemiological study showed that the total number infected with *Entamoeba Histolytica* parasite was (168) positive samples with total percentage of (84%) in both of Al-Kindy Teaching Hospital and Medical City Teaching Hospital with a percentage of (100%, and 68%) respectively, followed by *Blastocystis Hominis* with total number of (22) positive samples and a percentage of (11%), and then *Giardia lamblia* with total number of (10) positive samples and a percentage of (5%). Males showed higher number and percentage of infection with *E. histolytica*, (97) case with percentage of (48.5%), while females were (71) case with percentage of (35.5%), while number and percentage of infection with *B. hominis* in males were (17) case with percentage of (8.5%), and females were (5) case with percentage of (2.5%), finally number and percentage of infection with *G. lamblia* in male (5) case with percentage of (2.5%), equal females were (5) case with percentage of (2.5%). The highest percentage of infection occurred among age group (20-29) years with percentage of (36%), while the lowest percentage of infection occurred among age group (1-9) years, and age group (60-69) years with percentage (1%), were detected in Medical City Teaching Hospital. Urine examination showed there were no parasites in urine samples. In conclusions *Entamoeba Histolytica* was the most prevalent parasite in our study, followed by *Blastocystis Hominis*, while *Giardia lamblia* was the least prevalent one. Also males were more affected than females to parasitic infections, and the most common age group affected was (20-29) years. While urine examination showed there were no parasitic infections in our study. The current study recommend using permanent stains, also making more studies including increasing in number of samples.

**Keywords:** Intestinal parasites, amoebiasis, blastocystosis, giardiasis, Frequency.

## 1. INTRODUCTION

Parasitic disease is a type of infectious disease caused by parasites in human body such as protozoa, and worms, It is prevails in warm and humid areas of tropical, subtropical and temperate regions. Particularly in developing countries, the prevalence of parasitic disease constitutes a threat to human life and health [1].

Parasitic disease is a public health issue across the world. In some developed countries, some parasitic diseases also prevail. In China, the large area is geographically across the frigid, temperate and tropical zones, with greatly diverse natural conditions. In the National Guideline for Agricultural Development (1956–1967), five major parasitic diseases were proposed to be eliminated, including schistosomiasis, malaria, filariasis, black fever and ancylostomiasis, with death in thousands of people [2].

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Currently, parasitic disease is still prevalent and threats to human health. With the social development, the environment and life style have been changing accordingly. In addition to improved traffic conditions and increased personnel mobility, the prevalence of parasitic disease shows according changes. Furthermore, due to increased organ transplantation, increased occurrence of cancer and AIDS as well as increased use of immunosuppressor, the population with immunodeficiency or compromised immunity is increasingly large. Therefore, opportunistic parasites are increasingly important pathogens. The changes of natural conditions also contribute to the distribution and prevalence of some parasites [3].

During clinical management of parasitic disease, accurate diagnosis is of great importance and the first step to relieve the sufferings. Intestinal parasitic infection is a major health problem in many developing countries. By increasing standards of health and controlling the carriers or intermediate hosts, most industrialized countries have successfully decreased the rates of infestation. In developing countries, however, geographic and socioeconomic factors as well as unpredictable factors such as natural disasters contribute to the problem [4].

These countries are mainly located in warm or hot and relatively humid areas that, combined with poverty, malnutrition, high population density, unavailability of potable water and low health status, provide optimum conditions for the growth and transmission of intestinal parasites [5]. Insufficient research into infectious and parasitic diseases, lack of attention in developing countries to the problem and lack of follow-up treatment are also barriers to decreasing the rates of parasitic infestation [6].

According to World Health Organization (WHO) more than 3.5 billion people around the world are affected by intestinal parasitic infections, besides causing morbidity, intestinal parasites have been associated with malnutrition, growth retardation, physical weakness and school performance among school children. Foodborne disease are an important public health problem worldwide, no precise and consistent global information exists on most agents or pathogens transmitted by contaminated food [7]. The objectives of this study is to detect the prevalence of human pathogenic parasites in some regions of Baghdad in stool samples and urine samples and to determine the most common age group affected.

## **2. MATERIALS AND METHODS**

### **2.1 PATIENTS**

The present study included (200) stool samples and (200) urine samples, were collected from patients of both sexes at different ages. Ages of patients for stool samples (1-70 year), were carried out during the period from November (2018) till May (2019). All patients were symptomatic, obtained from those who had been admitted to / or attended the laboratories of parasitology of the following health institutions (Al-Kindy Teaching Hospital and Medical City Teaching Hospital). Patients of Medical City Teaching Hospital were divided into (9) groups: (1-9) years, (10-19) years, (20-29) years, (30-39) years, (40-49) years, (50-59) years, (60-69) years, (70-79) years, and (80-89) years.

### **2.2 Collection of stool sample**

Stool samples were collected in sterile, clean, and dry plastic containers with tight lids specially made for this purpose. Each container was given number representing the patient. A questionnaire sheet was filled out for each individual studied. Each stool sample was examined by general stool examination (GSE), and parasites were detected.

### **2.3 General Stool Examinations (GSE)**

#### **2.3.1 Macroscopic Examination**

Which included examination of stool samples with the naked eye for detection the physiological characters (color, consistency, odor, blood, mucus and to see the adult worms if present).

#### **2.3.2 Microscopic Examination (Wet Mount method)**

This examination based on using wet mounts method of stool sample exam. The examination was done by taking small part of stool with wooden stick and put on slide which have a drop of normal saline on one side of the slide, and drop of iodine on the other side of the slide, after mixing stool sample well with normal saline, and mixing stool sample well with iodine, cover slide was putted carefully to provide the formation of air bubbles, then examined under microscope by low power (10x) and high power (40x) [8].

### **2.4 Statistical analysis**

Statistical analysis was performed by using SPSS version 23 software.

### 3. RESULTS

#### 3.1 Epidemiological study

##### 3.1.1 Prevalence of Intestinal Parasitic Infection

The present study included (200) stool samples, were collected from patients of both genders at different ages (1-70 year), were carried out during the period from November (2018) till May (2019). All patients were symptomatic, obtained from those who had been admitted to / or attended the laboratories of Parasitology of the following health institutions in Baghdad (Al-Kindy Teaching Hospital and Medical City Teaching Hospital).

The results of epidemiological study showed that the most common detected parasite was *Entamoeba Histolytica*, the total number infected with *E. histolytica* was (168) positive samples with total percentage of (84%) in both of Al-Kindy Teaching Hospital and Medical City Teaching Hospital, Percentage of infective cases with this parasite in the two hospitals, were (100%,and 68%) respectively (Table 1). The second detected parasite was *Blastocystis Hominis*. The total number infected with this parasite was (22) positive samples and the total percentage of infection was (11%), Percentage of infective cases with this parasite in the two hospitals, were (0%, and 22%) respectively, (Table 2).

The third detected parasite was *Giardia lamblia* with least number of (10) positive samples and total percentage of (5%), the percentage of infective cases with this parasite in the two hospitals, were ( 0%, and 10%) respectively (Table 3).

**Table 1: Numbers and percentages of patients infected with *Entamoeba Histolytica* within Al-Kindy Teaching Hospital and Medical City Teaching Hospital**

Hospital	Total number of patients	Number and percentages of infected patients with <i>Entamoeba Histolytica</i>
Al-Kindy Teaching Hospital	100	100 (100%)
Medical City Teaching Hospital	100	68 (68%)
Total	200	168 (84 %)

**Table 2: Numbers and percentages of patients infected with *Blastocystis Hominis* within Al-Kindy Teaching Hospital and Medical City Teaching Hospital**

Hospital	Total number of patients	Number and percentages of infected patients with <i>Blastocystis Hominis</i>
Al-Kindy Teaching Hospital	100	0 (0%)
Medical City Teaching Hospital	100	22 (22%)
Total	200	11 (11%)

**Table 3: Numbers and percentages of patients infected with *Giardia lamblia* within Al-Kindy Teaching Hospital and Medical City Teaching Hospital**

Hospital	Total number of patients	Number and percentages of infected patients with <i>Giardia lamblia</i>
Al-Kindy Teaching Hospital	100	0 (0%)
Medical City Teaching Hospital	100	10 (10%)
Tota	200	5 (5%)

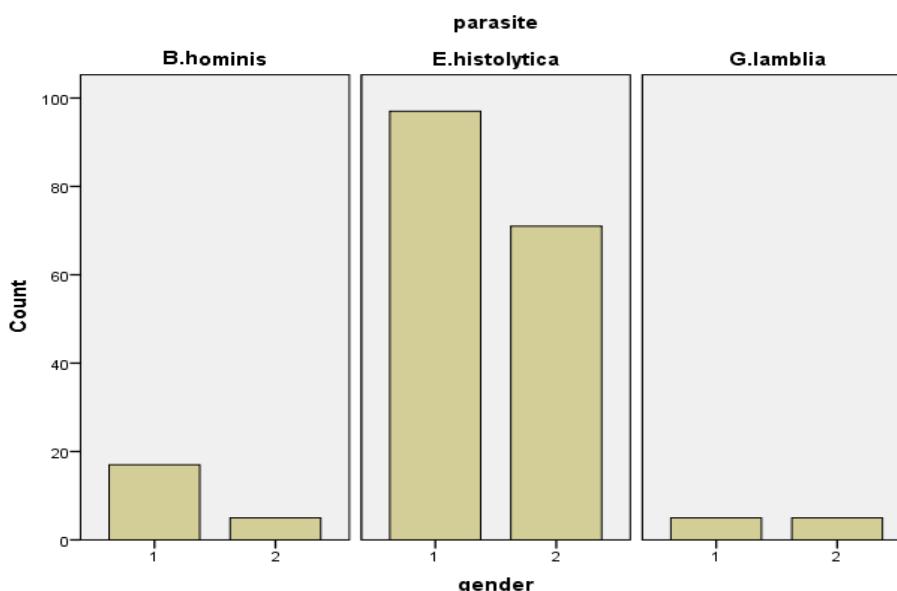
##### 3.1.2 The Distribution of Intestinal Parasitic Infection According to the Gender

The relationships between the detected intestinal parasites and genders were listed in (Table 4) and (Figure 1). Males showed higher number and percentage of infection with *E. histolytica*, (97) case with percentage of (48.5%), while females were (71) case with percentage of (35.5%), and number and percentage of infection with *B. hominis* in males, (17) case with percentage of (8.5%), while females were (5) case with percentage of (2.5%), and finally number and percentage of infection with *G. lamblia* in males, (5) case with percentage of (2.5%), equal females were (5) case with percentage of (2.5%).

**Table 4: Numbers and percentages of intestinal parasites between genders**

Gender			Parasite		
			<i>E.histolytica</i>	<i>B.hominis</i>	<i>G.lamblia</i>
Gender	1	Count	97	17	5
		% within parasite	48.5%	8.5%	2.5%
	2	Count	71	5	5
		% within parasite	35.5%	2.5%	2.5%
Total Count (200) % within parasite			168 (84%)	22 (11%)	10 (5%)

\*Gender 1= Male \*Gender 2= Female



**Figure 1: Distribution of intestinal parasites between genders**

**3.1.3 The Distribution of Intestinal Parasitic Infection According to the Age Groups**

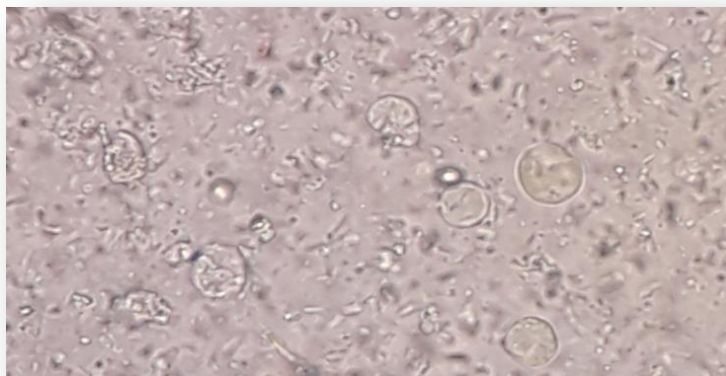
The results of the current study have shown that the highest incidence of intestinal parasitic infections occur in the age group (20-29) years with percentage of (36%), while the lowest percentage of infection occurred among age group (1-9) years, and age group (60-69) years with percentage (1%), were detected in Medical City Teaching Hospital, as shown in (Table 5).

**Table 5: Percentage of intestinal parasites among different age groups in Medical City Teaching Hospital**

Age group (years)	No. of the infected patients	%	Valid Percentage
1-9	1	1.0	1.0
10-19	8	8.0	8.0
20-29	36	36.0	36.0
30-39	17	17.0	17.0
40-49	19	19.0	19.0
50-59	12	12.0	12.0
60-69	1	1.0	1.0
70-79	3	3.0	3.0
80-89	3	3.0	3.0
Total	100	100	100

**3.2 Macroscopic appearance and microscopic examination of stool samples**

The most clinical signs and symptoms for amoebic dysentery in the current study includes abdominal pain, fatigue, nausea, vomiting, painful passing of stools, malodorous watery diarrhea, which contain blood, mucus, or pus. Wet mount method by using normal saline, and iodine has been the most commonly method used for the diagnosis amoebic dysentery in microscopic examination, cyst stage present large, with thick cyst wall, and few nuclei appear (Figure 2).



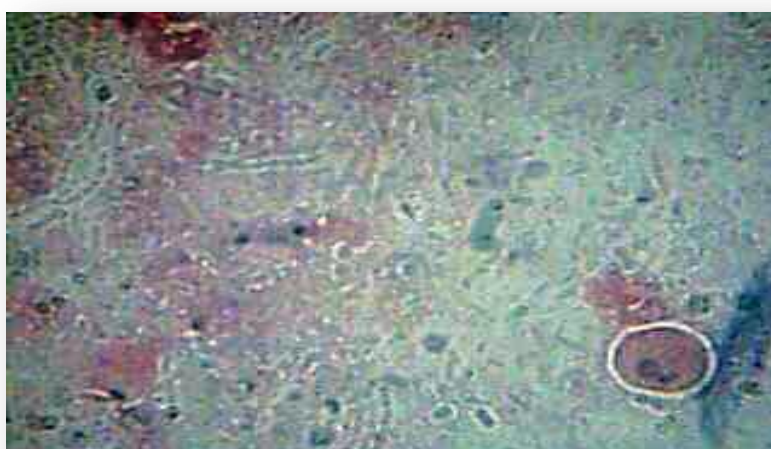
**Figure 2: *Entamoeba Histolytica* (cyst stage),with normal saline (40x)**

While the most clinical signs and symptoms for Blastocystosis in this study includes abdominal pain and stool consistency ranging from liquid and semi liquid, with normal odor of stool rarely found mucous

or blood. By using temporary stains, vacuole of the parasite appear to occupy most of the cell vacuolar form, cell membrane obvious and the presence of peripheral nuclei is clear (Figure 3 & 4).



**Figure 3: *Blastocystis Hominis* (vacuolar form) with normal saline (40x)**



**Figure 4: *Blastocystis Hominis* (vacuolar form) with iodine (40x)**



The clinical signs and symptoms of giardiasis included malaise, weakness, flatulence, abdominal cramps, anorexia, nausea, and stool consistency ranging from diarrhea and malodorous greasy stools. In microscopic examination, trophozoite appeared with pear shape and has flagellum, while cyst stage present ovoid with thick cyst wall.

#### 4. DISCUSSION

As shown in the results, the detected parasites in this study in Al-Kindy Teaching hospital and Medical City Teaching Hospital, were *Entamoeba Histolytica*, *Blastocystis Hominis* and *Giardia lamblia*, with a percentage of (84%, 11%, and 5%) respectively.

*Entamoeba Histolytica* was the most prevalent parasite in this study, and this may be due to the resistant of its cysts in the environmental conditions and seasonal diversity, and can survive for days to weeks in the external environment [9]. This finding was agreed with another study done in Iraq by Al-Naemy *et al.*, 2012 [10], who was found that the most prevalent parasites was *Entamoeba Histolytica*, followed by *Giardia lamblia*, and result agreed with AL-Sabbawi in his study in Iraq (2012), he showed that the total infection of *Entamoeba Histolytica* was (9.8%), and *Giardia lamblia* was (1.77%) of total (1520) stool samples [11], also agreed with Fotedar *et al.*, (2007) in Western Sydney [12], also result agreed with Lakhani in his study on children in India [13].

But result disagreed with Al-Mussawi [14], who reported that *G. lamblia* was the most prevalence parasite followed by *Entamoeba Histolytica*, and disagreed with Mahdi who found high prevalence of *Giardia lamblia* infection in THI-QAR, southern Iraq, in fecal sample were collected from (396) children, *G. lamblia* were present in feces of 94 children with percentage of (23.7%) [15].

Also study disagreed with Attia *et al.*, (2012), in his study in Egypt, he found that *G. lamblia* was the most prevalent intestinal parasite among children [16], and disagreed with Adedayo and Nasirro in their study in Jordan [17]. The prevalence of *Blastocystis Hominis* in the positive cases (22) from total number of patients (200) was (11%). This finding disagreed with the finding of Raof and Abdul-Rahman (2011), who reported the percentage of *Blastocystis Hominis* were (24.6%) in Baghdad city after examined (250) watery and loose stool samples from patients live in Al-Ameen, Al-Mashtal, Al-Baladiyat and Al-Nahrawan [18], and disagreed with (AL-Kaissi and AL-Magdi, 2009) who reported high percentage of this parasite (41%) in Baghdad from (200) stool samples of adult patients [19]. Also Mahdi and Ali (2002) reported high prevalence rate of *Blastocystis Hominis* (36%) in Basrah city among patients with sickle-cell anemia [20], while in Duhok Governorate, Adel *et al.*, (2013) reported a prevalence of (31.5%) was described among patients complained from gastroenteritis caused by *Blastocystis Hominis* [21].

In a Turkish university hospital Ozcaker *et al.*, (2007) found a prevalence of *B. hominis* was (12.2%) when (770) stool samples of patients was examined [22], while Duda *et al.*, (2015) recorded a prevalence of *B. hominis* among Polish military personnel returning from peacekeeping missions in Iraq and Afghanistan, was (15.3%) [23].

Gender was important and significant factor affecting the prevalence of *Entamoeba Histolytica* infection in our study, which showed that males infected more than females with a percentage of (48.5%) from (97) males, and (35.5%) from (71) females. Results matched with Fotedar *et al.*, [12]. Males were most affected with parasitic infection in our study and this was matched with AL-Taie (2009) in Baghdad city [24], also matched with Alshawi *et al.*, [25]. In Baghdad city researchers mentioned that parasitic infections affect males more than females [26]. These differences are usually attributed to ecological (sociological in humans), for example, male may work in farms and get infected by animal feces and other jobs that put males at high risk of getting infection. The relationships of *B. hominis* infection and gender were showed there were no significant differences observed between genders. From (17) males, the percentage were (8.5%) and females (2.5%) from (5). The result of the present study was in agreement with the previous studies carried out in Baghdad by AL-Kaissi and AL-Magdi (2009) and Raof and Abdul-Rahman (2011).

The study was disagreed with result recorded by Rahif and AL-Saadi (2001) where higher rates of infection with this parasite detected among males compared to females in a study done in Baghdad city (60). Several studies have also reported a significantly higher prevalence among male's patients. In a study made in Jordan by Nimri (1993) reported that the infection ratio of male to female was (2:1) [27]. Finally percentage of infection with *Giardia lamblia* was equal in both genders (2.5%), and this result agreed with Lakhani, who collected a total of (667) stool sample [13].

The result of present study revealed a highest incidence of these infections was recorded in the age group (20-29) years with percentage of (36%). This might be due to deterioration of the standard of personal hygiene and sanitary conditions in these groups, or because of the use of human feces as soil fertilizers which increase the chance of spreading infection, and horticulture practice, most of whom are of this age group (male and female), furthermore the rural regions which could be due to problem of food and drinking water contamination by fecal rodents, dogs, cats, and sheep that act as reservoirs for these parasites and water contamination is a great important in this respect, because

chlorinated tap water is not available in most of the area and infected people using contaminated water supplies, together with suitable environmental factors such as moisture and temperature that facilitate spreading and completion of the life cycle of these parasites, while the lowest incidence of intestinal parasitic infections occurred in the age groups (1-9) years, and (60-69) with percentage of (1%) of each. Result agreed with Fotedar *et al.*, [12], and Cable [28], but disagreed with Lakhani [13], who found the most age group affected was (9-12) years of age.

Regarding urine examination, results showed there were no parasitic infections in our study of urine samples, this result not matched with study done by Ali and AL-Mussable about prevalence of schistosomiasis in Babylon, show only two infected of total (592) samples [29].

Another study done by Hani *et al.*, (2013) about the prevalence of schistosomiasis among children in Yemen, they found (31.8%) were positive for schistosomiasis and (23.8%) were infected with *s. haematobium* and (9.3%) were infected with *S. mansoni* [30]. This result also not matched with Kimberly *et al.*, who detected *Schistosoma Haematobium* in his study in Zimbabwe on children (9-16) years of age from three primary schools [31]. Our result may be indicated to the clearance of Baghdad from schistosomiasis.

## RECOMMENDATIONS

Using permanent stains for detection of parasites in the teaching hospitals, as well as private laboratories, and making more studies of parasitic infections in other more hospitals.

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