

The Prevalence Study of *Blastocystis hominis* Isolated from Irritable Bowel Syndrome (IBS) in Diwanyiah City of Iraq

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Abstract

Blastocystis hominis is the most common intestinal parasite association with Irritable bowel syndrome (IBS) in Humans. The aim of this study was to evaluate the epidemiology distribution of *Blastocystis hominis* in Diwanyah city of Iraq during (March to December 2022), a total 380 stool samples which divided into 280 samples from patients who severe from digestive complaints, severe abdominal pain and diarrhea, and another 100 samples were collected from apparently healthy individuals (asymptomatic) from Diwanyah Teaching Hospital and private clinics in Diwanyah. The samples were investigated by microscopically by the direct method. The result show that 167 (59.6%) was positive microscopically to *Blastocystis hominis* in patients with irritable bowel syndrome while only 30 (30.0%) was positive microscopically to *Blastocystis hominis* in healthy carriers (asymptomatic). The association between light microscope finding and demographic characteristics is shown in table (1). The mean age of patients with positive light microscopic was 41.27 ± 11.48 and that of patients with negative light microscopic was 38.42 ± 11.52 years and there was significant difference between patients with positive and negative light microscopic in mean age ($P = 0.043$). There was non-significant association between gender and light microscopic positivity for parasite. The study included 94 (56.3 %) male patients and 73 (43.7 %) female in patients with positive light microscopic. The present study showed that the male was higher prevalence of infection with *Blastocystis hominis* than female (there was statistically non-significant association between male and female P value = 0.246, this result cleared in table (1). According to residency, also the present study was showed significant difference between patients with positive and negative light microscopic in prevalence rate of Urban and rural region (P value = 0.521). In conclusion , the present study was showed there was association between light microscope finding and some demographic characteristics especially in median age group of study.

Keywords: *Blastocystis hominis, Microscopically examination, Irritable bowel syndrome.*

1. INTRODUCTION

Blastocystis hominis is a type of intestinal parasite that infects humans and other animals. It was discovered by a Russian physician in 1870, and its pathological significance has remained unknown since then [1]. Cystic donors can infect both toddlers and adults, and

their geographical distribution appears to be global; in parasitic surveys, they are often the most isolated primary organisms [2]. *Blastocystis hominis* was previously overlooked as a disease due to its relationship with minor gastrointestinal symptoms and several asymptomatic illnesses [3]. The cystic

donor is common in various nations across the world. Almost all of the world's countries were classed as either industrialized countries, with a moderate prevalence (10-15%), or poor countries, with a high prevalence (55-70%), based on hygiene levels and contact with contaminated animals, water, and food, according to most epidemiological research [4-5].

Blastocystis hominis is a parasite that is regularly discovered in stool samples and is one of the most common parasites identified in the human colon. It has four stages: vascular, granular, amoebic, and cystic. The next phase is the most common in the environment (soil and water), hence it serves as a route of parasite transmission to the host [6]. To prevent the spread of parasites in underdeveloped countries, health care standards, rubbish management, and food and water contamination must all be improved [5]. *Blastocystis hominis* is a zoonotic parasite that has no known hosts. [7-8]. Cystic donors are transmitted mostly by feces, which is aggravated in unsanitary environments [9]. Nausea, anorexia, abdominal pain, bloating, and severe or chronic diarrhea are some of the symptoms associated with *Blastocystis hominis* infections. [10-11].

Irritable bowel syndrome (IBS) is a digestive illness marked by recurrent stomach pain, constipation, diarrhea, or bloating [12]. Irritable bowel syndrome is caused by bacteria, parasites, fungus, and perhaps viruses, according to new investigations. Microbial damage (particularly parasite infections) is one of the strongest risk factors for the development of IBS, according to research [13-14]. Therefore, the current study was aimed of this study was to evaluate the epidemiology distribution of *Blastocystis hominis* in in Diwanyah city of Iraq.

2. Materials and Methods

2.1. Stool Samples Collection

The samples were included 380 stool samples which divided into 280 samples from patients who severe from digestive complaints, severe abdominal pain and diarrhea, and another 100 samples were collected from apparently healthy individuals who underwent a normal or mandatory health examination (asymptomatic) from Diwanyah Teaching Hospital and private clinics in Diwanyah City from (March to December 2022). The stool samples were placed in clean plastic containers. The patients names, ages, sex and collection dates also recorded. The characterization stool samples is also recorded such as texture, mucus, fatty blood as well as color, for example, yellow, brown, semi-brown and green mucus, and blood that confirms the condition of the disease.

2.2. Stool Examination

All stool samples were examined microscopically by the direct method using low power objective lens (10 X); suspected parasites were examined using the high objective lens (40 X) for identification of *B. hominis* and for the presence of other intestinal parasites. Two types of direct stool wet smears were done for each specimen at the same time, one with normal saline (0.85 %) and the second with Lugol's iodine (5%). The detected oocysts of *Blastocyst hominis* were identified according to their Morphological descriptions [15].

3. Results and Discussion

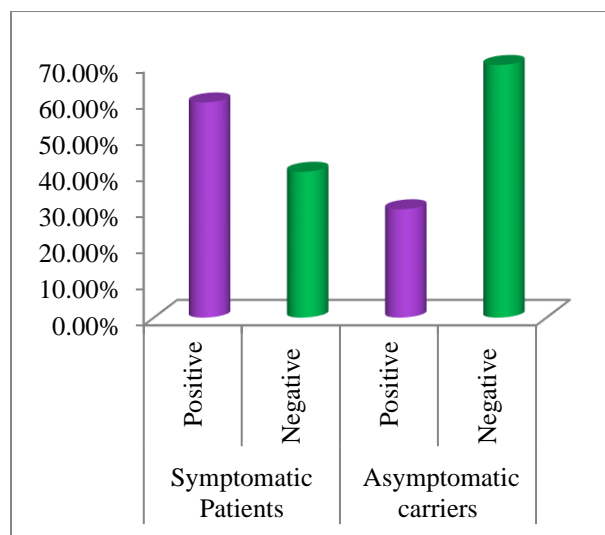
The current study included 380 stool samples were collected from patients with irritable bowel syndrome and healthy carriers (asymptomatic). General stool examination (wet mount, concentration method) were done to all samples investigated under light microscope. The result show that 167 (59.6%) was positive microscopically to *Blastocystis*

hominis in patients with irritable bowel syndrome while only 30 (30.0%) was positive microscopically to *Blastocystis hominis* in healthy carriers (asymptomatic), figure (1) and figure (2).

Figure 1. Microscopic image of direct wet mount test which showed the stool sample infected by the vacuolar forms of *Blastocystis hominis* at (Magnification field 400X).



Figure 2. Microscopic examination results of patients with irritable bowel syndrome and healthy carriers (asymptomatic).



The association between light microscope finding and demographic characteristics is shown in table (1). The mean age of patients with positive light microscopic was 41.27 ± 11.48 and that of patients with negative light microscopic was 38.42 ± 11.52 years and there was significant difference between patients with positive and negative light microscopic in mean age ($P = 0.043$). There was non-significant association between gender and light microscopic positivity for parasite. The study included 94 (56.3 %) male patients and 73 (43.7 %) female in patients with positive light microscopic.

The present study showed that the male was higher prevalence of infection with *Blastocystis hominis* than female (there was statistically non-significant association between male and female P value = 0.246, this result cleared in table (1). According to residency, also the present study was showed significant difference between patients with positive and negative light microscopic in prevalence rate of Urban and rural region (P value = 0.521).

Table 1. Association between Blastocystis hominis finding in light microscope and demographic characteristics.

Characteristic	Positive results n = 167	Negative results n = 113	P
Age			
mean ± SD (years)	41.27 ± 11.48	38.42 ± 11.52	0.043 † S
Gender			
Male, n (%)	94 (56.3 %)	56 (49.6 %)	0.246
Female, n (%)	73 (43.7 %)	57 (50.4 %)	¥ NS
Residency			
Urban, n (%)	100 (59.9 %)	64 (56.6%)	0.521
Rural, n (%)	67 (40.1 %)	49 (43.4 %)	¥ NS

n: number of cases; SD: standard deviation; †: Independent samples t-test; ¥: Chi-square test; NS: not significant at $P > 0.05$; S: significant at $P \leq 0.05$; HS: highly significant at $P \leq 0.01$

The direct investigation of Blastocystis hominis by light microscope was found that the total prevalence rate was 167 (59.6%) of Blastocystis hominis in patients with irritable bowel syndrome compared to total prevalence rate 30 (30.0%) of Blastocystis hominis in asymptomatic healthy carriers. The prevalence rates results of Blastocystis hominis infection in the current study were found consistent with many other studies in different regions of Iraq and worldwide countries. The study in Kirkuk by [16] who record the prevalence rate of infection with Blastocystis hominis was IBS patients at about (51.95%). The study in Hamdan (Iran) by [17] who was reported in 37 at (45.67 %) of the patients group and 18 at (22.22 %) of the control group using the fecal transplant technique as a gold standard. Another study was in disagreement with our findings, a study by [18] in the Wasit Province of Iraq who recorded higher prevalence raters of Blastocystis hominis parasite was found 103 (70.55 %). The overall high rate of Blastocystis hominis in irritable bowel syndrome patients were reflecting a high degree of environmental contamination with the cystic stage of this parasite, low levels of sanitation, and poor hygienic conditions [19].

While it was less than those recorded by [20] (16.93 %) in Dohuk and [21] in Suleimani(22.15%) . This may be attributed to the differences in geographical distributions, the number of samples, age group used, immunologic status and personal hygiene, differences in temperature at different seasons and close contact with animals.

The present study was showed there was association between light microscope finding and some demographic characteristics. The mean age of IBS patients with positive light microscopic was 41.27 ± 11.48 and that of patients with negative light microscopic was 38.42 ± 11.52 years and there was significant difference between patients with positive and negative light microscopic in mean age ($P = 0.043$). However, The study by [17]who explained relationship between Blastocystis hominis infection and Irritable Bowel Syndrome (IBS) related mean age was (33.33%) infection rate. Another study was agreement with our finding, who showed that Thirty-five out of 72 (48.6%) were men and median age of participants was 34 (IQR 29–49) years. There was non-significant association between gender and light microscopic positivity for parasite. The study included 94 (56.3 %) male patients and 73

(43.7 %) female in patients with positive light microscopic. These results was compatible with another study by [18] who found greatest parasite infections in positive sample stool with *Blastocystis hominis* were 87 (59.59 %) cases in male were 59(40.41) cases in female. And study by [17] included 43 women (53%) and 38 men (47%). However, the prevalence of *Blastocystis hominis* was reported by Hegazy . In males, was higher than in females (60.5 %) compared to (39.5%) [22].

According to residency, also the present study was showed non-significant difference between patients with positive and negative light microscopic in prevalence rate of Urban and rural region (P value = 0.521). However, another studies were showed not compatible with our finding. The prevalence rate of infection with *Blastocystis hominis* in rural area was lower than in the urban area [23] who found a relationship between urban and rural places in the infection rates with *Blastocystis hominis*. In conclusion , the present study was showed there was association between light microscope finding and some demographic characteristics especially in median age group of study.

Conclusion

In the study, 94 (56.3%) males and 73 (43.7%) women had a positive light microscopic. In this study, *Blastocystis hominis* infection was higher in men than women (although the difference was not statistically significant; see table) (1). This study found that patients with positive and negative light microscopy have significantly different prevalence rates in urban and rural locations (P = 0.521), which may affect residency decisions. In conclusion, light microscope findings correlated with demographic characteristics, including the research population's median age.

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