



## Research Article

# ***Blastocystis hominis*: Is it a cause of diarrhea?**

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**Abstract:** *Blastocystis hominis* can be found in the fecal sample of both healthy individuals without symptoms and those having gastrointestinal problems. Therefore, the pathogenicity and pathophysiology remain controversial. The aim of this study was to determine if *Blastocystis hominis* is a causative agent of diarrhea and investigates its prevalence among patients visiting King Abdulaziz University Hospital, Jeddah, Saudi Arabia from January 2013 till June 2015 and to determine any significant correlation between age, gender, nationality and other parasitic infection in the presence of *Blastocystis hominis*. Data were collected from Parasitology lab, using the database at King Abdulaziz University Hospital, Jeddah, Saudi Arabia and statistical analysis were done by utilizing Statistical package for social science program (SPSS). Out of 3,035 of total stool analysis requested, 157 samples were positive for *B. hominis* (5.2%). 80 (51.6%) were males, and 76 (48.4%) were females. The distribution of *B. hominis* infection was elevated in 31-50 aged groups (25.5%). There was a statistically significant correlation between the presence of *Blastocystis* and diarrhea at  $p < 0.05$  and there was no correlation between age, sex, nationality and other parasites with positivity of *B. hominis*. *Blastocystis* can be considered as a causative agent of diarrhea. Further studies need to be done in order to investigate its role in pathogenicity and more data must be revised to assess the pathogenicity of *Blastocystis* subtypes.

**Keywords:** *Blastocystis hominis*, diarrhea prevalence, Jeddah.

## 1. Introduction

Intestinal parasitic infections are considered a primary public health problem worldwide, especially in developing countries<sup>1-5</sup>. These protozoan infections have relatively a frequent symptom such as diarrhea and gastrointestinal problems, but asymptomatic patient may also be found. *Blastocystis hominis* is a common intestinal parasite that infects humans<sup>6</sup>. Prevalence of *Blastocystis hominis* is variable. Prevalence range between (0.5-60%) have been reported<sup>1-24</sup>. Regardless to other protozoan parasite, diarrhea due to *Blastocystis hominis* in healthy immunocompetent people is usually mild and self-limiting. Nevertheless, in immunosuppressed patients severe and prolonged diarrhea has been reported<sup>6</sup>. Although a few case reports show that *B. hominis* may be pathogenic and can be an opportunistic pathogen in immunocompromised patients. Other studies suggested no pathogenic role of *Blastocystis*<sup>3,11</sup>. An assortment of signs and symptoms of *Blastocystis* ranged from intestinal symptoms to cutaneous disorders. *Blastocystis* were the most frequent parasite present in patients with HIV infection

and AIDS who had chronic diarrhea. Moreover, it was most frequently isolated from patients with cancer. In underdeveloped countries, children with *Blastocystis* have a higher incidence of infection. *Blastocystis* although probably may seem to be a zoonotic infection due to those who are in a relative contact with animals which gives increased risk of acquisition of *Blastocystis*, it was also reported in expatriates with traveler's diarrhea<sup>9,24</sup>.

*Blastocystis* have been reported in (5.67%) of patient with GI symptoms compared to (3.43%) in patients without GI symptoms with a correlation between the presence of this parasite and GI symptoms<sup>3,9,13,19,26</sup>. Abdominal pain and diarrhea are the most frequent symptoms accompanying *Blastocystis* infection<sup>9,13,17,25</sup>. A higher concentration of parasite is more likely to be correlated with symptoms than a lower number of parasite as some studies have suggested while disputed by others<sup>18,26</sup>. Dialysis patients and those with IBS and/or ulcerative colitis should always be considered for *Blastocystis* when GI symptoms are refractory and cannot be released<sup>2,9,11,17,24,27</sup>.

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There are at least 13 subtypes of *Blastocystis*. Some are recovered from human stool while others were recovered from animals<sup>8,11,13,16,26,28-31</sup>. Pathogenicity comparison between subtypes is still controversial. This study was aimed to determine if *Blastocystis hominis* is a causative agent of diarrhea and investigate its prevalence among patients visiting King Abdulaziz University Hospital, Jeddah, Saudi Arabia from January 2013 till June 2015 and to determine any significant correlation between age, gender, nationality and other parasitic infection with the presence of *Blastocystis hominis*.

## 2. Material and method

### 2.1 Sample collection

This was a retrospective study that included data collected and annualized between January 2013 till June 2015 from Parasitology Laboratory at King Abdulaziz University Hospital, Jeddah, Saudi Arabia. Overall, 3,035 total stool analysis were requested between January 2013 till June 2015. Of these, 157 samples were positive for *B. hominis*. Other data variables taken into consideration were age, sex, nationality, occult blood and the presence of other parasite.

### 2.2 Stool analysis

Stool samples were collected in a clean and dry screw top container after giving the instructions of collections to the patient. Samples were analysed using Biosepar<sup>®</sup> ParasiTrap diagnostic system for detection of parasites in faeces according to the manufacturer instructions<sup>32</sup>.

### 2.3 Occult blood

For hidden blood in gastrointestinal bleeding of GI disorders, HEMASURE<sup>®</sup> test were used for qualitative determination of fecal occult blood according to the manufacturer instructions<sup>33</sup>.

### 2.4 Data processing and statistical analysis

Statistical package for social science software (version 16) and Microsoft Excel were used for data processing and statistical analysis.

## 3. Result

One hundred and fifty-seven (5.2%) samples were positive of *B. hominis* as described above. Positive samples were seen in different age groups as shown in Table 1. Among 157 positive *B. hominis* samples, 51.6% of samples were from male patients. Positive samples were from different nationalities as shown in Table 2. Other parasites detected in positive samples and their frequencies are shown in Table 3. Occult blood was positive in few samples. There was a statistically significant correlation between the presence of *Blastocystis* and diarrhea at  $p < 0.05$ . However, there

was no correlation between age, sex, nationality and other parasites with positivity of *B. hominis*.

Table 1. Age groups of patients positive for *Blastocystis hominis*.

Age group	Frequency	Percentage
0-5	2	1.3%
6-15	24	15.3%
16-30	38	24.2%
31-50	40	25.5%
51-70	29	18.5%

Table 2. Nationalities of patients with *Blastocystis hominis* positive samples.

Nationality	Frequency
Saudi	53
Yamani	30
Indian	16
Palestinian	9
Pakistani	8
Egyptian	7
Philippine	7
Sudanese	6
Ethiopian	4
Syrian	4
Somalian	4
Others	9

Table 3. Other parasites detected in *Blastocystis hominis* positive samples.

Other parasites	Frequency
<i>Entamoeba coli</i> cyst	5
<i>Entamoeba histolytica</i> cyst	3
<i>Endolimax nana</i> cyst	2
<i>Giardia lamblia</i> cyst	1
<i>Trichuris trichiura</i> ova	1

## 4. Discussion

Intestinal parasitic infections are considered as primary public health problem worldwide<sup>5</sup>. Diarrhea is the most frequent symptom for intestinal parasitic infections, but asymptomatic individual can also be found. *Blastocystis hominis* is a common intestinal parasite that is found in human fecal samples and has been identified recently in patients with diarrhea, although its role remains controversial due to its presence also in healthy individual<sup>2</sup>.

Among different geographic regions, the diversity of the prevalence rate of *Blastocystis hominis* has been reported. The reported prevalence ranged (2-50%)<sup>3,9</sup>. While other studies revealed a range between (0.5-60%)<sup>4,11-13,16,23</sup>. The present study shows a prevalence of (5.2%) which is within the range of previous studies. Different factors may contribute to the prevalence of intestinal parasitic infections such as sanitation and hygiene. Although, developed countries have a lower prevalence compared to developing countries taking the

variation in different regions of the same country into consideration<sup>9</sup>. Differences in the diagnostic methods used properly, may lead to a significant difference that can be related to the epidemiological setting in reported prevalence. In this regard, the true prevalence of the infection is not known. Therefore, result does not necessarily reflect the population's real prevalence, which is considered one of the limitations of the study.

*Blastocystis hominis* is considered as the most frequently identified parasite in human stool specimens<sup>18</sup>. There was no statistically significant correlation between nationality and *B. hominis* infection. This may be due to the subjectivity of data collection of this study. Therefore, further studies need to be conducted on a wide range to compare the frequency of *B. hominis* infection with other countries.

Moreover, there was no statistically significant correlation between age and *B. hominis* infection. This is an agreement with other studies<sup>6,16,35</sup>. However, epidemiological and diagnostic features of *Blastocystis* infection in symptomatic patients in some studies showed a statistically significant higher frequency of *Blastocystis* infection among 20-29 years group compared to other age groups ( $\chi^2$ : 13.68,  $p = 0.03$ )<sup>13</sup> while in this study *Blastocystis hominis* was predominantly between 31-50 age group. This difference could be due to different lifestyle and hygiene, as well as the specificity of samples that was collected from a hospital, included pediatric and young patients with gastrointestinal symptoms and (15.24%) of these samples n=94 were positive for *Blastocystis*<sup>13</sup>. Another study observed the distribution of *B. hominis* infection was high (34.9%) in 7-13 aged children ( $\chi^2 = 306.8$ ;  $p = 0.001$ )<sup>1</sup>. In contrast to another study which was highly significant among 0-19 age group among other age groups ( $p = 0.039$ )<sup>36</sup>. On the other hand, different study had observed that age was significantly correlated with discrete subtypes with those who had ST1 being younger (27 years) compared to ST3, ST4 and ST7 median ages (60, 54 and 46 years, respectively)<sup>36</sup>.

According to gender, results indicate that there was no statistically significant correlation with *B. hominis* infection and this was in agreement with others<sup>3,6,9,11,15,19,36</sup>. Moreover, our results were in disagreement with a study that observed the relation between *Blastocystis* which occurs 2.34 times more frequently in subjects with IBS than in non IBS subjects ( $p > 0.01$ ). The difference only in males was significant by comparing the prevalence of *Blastocystis* within male and female subgroups either with or without IBS (36.8% for IBS males' vs 4.8% for control males) which was confirmed by the multivariate analysis<sup>26</sup>.

With respect to the association of *Blastocystis* with other parasites, two cases were described with acute dysenteric diarrhea concomitantly with *E. histolytica* in one patient and *G. duodenalis* in the other<sup>2</sup>. On the other hand, and among Iranian population study, *B. hominis* was mostly found with *E. coli* in control group

and *G. lamblia* in case group while in other 21 patients *B. hominis* was detected alone without other parasites (55%). However, they found that there was no significant difference in the distribution of *B. hominis* cohabitation with other intestinal parasites in case compared to control group<sup>3</sup>. Even though there were few other parasites presented with *B. hominis*, our result showed that there was no significant correlation.

This study showed a statistically significant correlation between the presence of *Blastocystis* and diarrhea ( $p < 0.05$ ). This is in agreement with other studies examining the correlation between the presence of *B. hominis*, diarrhea, and abdominal pain<sup>9,13,16,24,26</sup>.

In conclusion, the role of *Blastocystis hominis* has not been obviously defined. However, *Blastocystis* should be taken into consideration, as a causative agent of human disease, particularly when the parasite is present in enormous numbers in fecal specimens while absence of other recognized pathogens. The question of whether there are other factors involve the parasite in its capability to be opportunistic in immunocompromised and immunocompetent individuals has not yet been clearly countered. *Blastocystis* associated symptoms and its ability to produce clinically significant disease remain unexplained. Genetic variability has been notified to play role in the pathogenicity of *Blastocystis* so molecular field should be taken into consideration to determine the source and route of infection.

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