
Blastocystosis in Dakhalia Province, Egypt

Argaia Mohammed Abdul Qader,* Syed Ahmed M. Al-Tantawy,* Atef M. El-Shazly,** Shadia F. Hamada,* Mahmoud A. Abdul Hamid* and Abdul Hafeez Khan,***

Abstract:

A total of 1768 stools samples were collected from random population (Mansoura, Talkha, Belqas and Aga) of Dakhalia Province of Egypt. All the stool specimens were examined by direct wet, formalin concentration and diphagic culture method for the detection of *Blastocystis hominis* infection. Prevalence rates of 6.95%, 9.56% and 11.71% were found by direct wet, formalin concentration and culture method respectively. A questionnaire of information about health status and other relevant informations were filled out for each one. Abdominal pain was the common complaint (35.74%) among symptomatic blastocystosis individuals. There was significant difference in the proportion of submitted specimens positive for *Blastocystis* between asymptomatic and symptomatic individuals (64.73% vs 35.2%, $P = 0.03$). The highest prevalence of this organism was in the group aged 6 to 20 years.

Introduction:

Blastocystis spp. are common in a range of mammalian, avian, reptilian hosts including domestic animals, pets and other animals in close contact with human.^{1,2} Zaman and Khan³ suggested that cockroaches may act as vectors of blastocystosis.

Blastocystis hominis is an intestinal protozoan parasite that is frequently not diagnosed in laboratories in human stool specimens because its clinical relevance remains controversial.^{4,5} *B. hominis* may cause symptoms like abdominal pain, diarrhea, vomiting and nausea when present in large numbers in the stools.⁶⁻⁹ Symptom less blastocystosis infections are also common and no doubt are frequently undetected as clinicians or pathology laboratories have regarded *B. hominis* as harmless commensal and hence infections are over looked and consider that symptoms may have been attributed to other causes.

The main aim of the present work was to find out the blastocystosis population of Dakhalia Province in Egypt, and also to investigate morbidity due to *B. hominis*.

Materials and Methods:

Collection of stool specimens: The present study was carried out at four centers (Mansoura, Talkha, Belqas and Aga), population of Dakhalia Province of Egypt. Stool samples were collected from 1768

random individuals, aged less than 5 to more than 40 years old during across sectional study for 7 months in 2009 and 2010 in closed plastic tubes.

Examination of stool specimens: Direct saline and iodine wet preparations for each sample were made according to the standard parasitological method for the detection of parasites in stool smears.

Faecal concentration for parasites, present in stools as made by formalin sedimentation technique as described by Cheesbrough.¹⁰ Modified Ziehl-Neelsen staining technique was used for the detection of *Cryptosporidium* oocysts.

Culture method: All collected stool samples were cultured in Boeck and Drobhlav's diphagic medium described previously.¹¹

Results:

Table 1 shows the prevalence of *Blastocystis hominis* among Mansoura, Talkha, Belqas and Aga, population by direct smear, concentration and culture method. In -vitro culture method appeared to be more sensitive than direct smear and concentration of stools for the detection of *B. hominis*.

Co-existing of *B. hominis* with other intestinal parasites were reported among seventeen symptomatic (8.21%) cases.

*) Department of Parasitology, Faculty of Science, Mansoura University, Egypt.

**) Department of Parasitology, Faculty of Medicine, Mansoura University, Egypt.

***) Department of Parasitology, Faculty of Medicine, Sebha University, Libya.

Giardia lamblia and *Crypto sporidium* (n=6), *Entamoeba histolytica* + *G.lamblia* (n=7) and *E.histolytica* + *G. lamblia* and *Cryptosporidium* (n=4).

There was significant difference in the proportion of submitted stool specimens positive for *B.hominis* between asymptomatic and symptomatic individuals (P=0.03).

Out of 207 *Blastocystis* positive individuals 74 (35.74%) were complaining of abdominal pain,

51 (24.63%) people were complaining of diarrhea, 47 (22.70%) individuals were complaining of nausea and 35 (16.90%) cases were complaining of vomiting.

The agewise distribution of *B.hominis* is shown in Table 2. Prevalence rate showed the detection rate significantly higher in 6 to 20 years old age group than other aged groups.

Table 1. Distribution of Blastocystosis among population of Dakhalia Province.

Locality	Number examined	Detection Methods		
		Direct smear	Concentration	Culture*
Mansoura	442	39 (8.82)	52 (11.76)	64 (14.48)
Talkha	663	34 (5.13)	49 (7.39)	61 (9.20)
Belqas	294	28 (9.52)	35 (11.90)	43 (14.65)
Aga	369	22 (5.68)	33 (14.65)	39 (10.10)
Total	1768	123 (6.95)	169 (9.56)	207 (11.71)

Figures in parentheses indicate percentages.

*P<0.05.

Table 2. Distribution of *B.hominis* among population from different age groups.

Age group (years)	Detection Methods		
	Direct smear	Concentration	Culture
Up to 5	10 (8.13)	16 (9.47)	19 (9.18)
6 – 20*	56 (45.52)	68 (40.24)	93 (44.93)
21 - 40	39 (31.70)	59 (34.91)	63 (30.43)
> 41	18 (14.63)	26 (15.38)	32 (15.46)
Total	123 (6.95)	169 (9.55)	207 (11.70)

Figures in parentheses indicate percentages.

*P<0.02

Discussion:

Generally, detection of *Blastocystis hominis* in stool specimens is based on direct smear microscopy of fresh faecal samples. Culture methods remain controversial for the detection of *B.hominis* in stools (4). Kukoschke et al¹² stated that in-vitro culture had no advantages over light microscopy for the detection of *B.hominis* in fresh stool specimens. In the present study, however, short-term cultivation significantly increased the detection of *B.hominis* in stool samples. A similar report was found by others.^{4,11,14} The increased in the detection efficacy of culture method than direct smear, and concentration methods is probably attributed to the parasite increased in numbers and size by cultivation and possible transformation of unusual forms of the *B.hominis* to vacuolar and granular forms which are easily recognized by light microscopy.^{2,4,11} Absence of other forms than

vacuolar and granular in cultures may be due to the possible development of these forms especially cyst from into the vacuolar and granular form from the vacuolar form.^{13,14} Also cysts and multivacuolar forms are very small in size (2-5 um), hence they can be easily undetected or unrecognized in direct smear microscopy.

In the present study, among 1768 random individuals, the overall prevalence rate of *B.hominis* was 11.70%. A similar prevalence rate (10%) was reported by El-Shazly et al.⁸ among individuals from six villages and a city in Talkha Center, Dakhalia Governate, Egypt. Al most similar prevalence of *B. hominis* is also reported in other parts of the world.¹⁵⁻¹⁷ Significantly higher positivity rate of *B. hominis* was found among 6 to 20 years old age group. Higher prevalence in adults than in

children has been found in a number of studies.^{1,11,18,19} However, Zuckerman *et al.*²⁰ found that *B. hominis* was more common in older persons as a source of agent. The prevalence rates between males and females were 44.93% and 55.07% respectively. The difference was not statistically significant ($P>0.05$). Several reports indicate that males were more infected than females with *B. hominis*.^{11,21,22}

In the present study, *B. hominis* was found both in asymptomatic and symptomatic individuals. El-Shazly *et al.*⁸ also reported that *B. hominis* was found in stool samples of both asymptomatic and symptomatic individuals in Dakhalia Governorate, Egypt. Shilm *et al.*²³ and Leder *et al.*⁵ also reported that no correlation

between clinical symptoms and presence of *B. hominis* in stools of immunocompetent individuals and detected the organism during both asymptomatic and symptomatic periods.

The most common complaint in symptomatic patient of blastocystosis was cramping abdominal pain. Similar results are reported by other,^{9,23-25} who found abdominal pain was significantly associated with presence of *B. hominis* in stool samples of patients.

Based on these observations, false negative faecal specimens in direct smear microscopy should not be regarded as negative and did not considered as insignificant for *B. hominis*, and also beneficial when dealing with clinical cases in the laboratory.

References:

1. Doyle PW; Helgason MMM; Mathias RG; Proctor EM. Epidemiology and pathogenicity of *Blastocystis hominis*. J. Clin. Microbiol. 1990; 28:116-121.
2. Stenzel DJ; Broeham PFL. *Blastocystis hominis* revisited Clin. Microbiol. Rev. 1996; 9: 563-584.
3. Zaman V; Khan KZ. A comparison of direct microscopy with culture for the diagnosis of *Blastocystis hominis*. Southeast Asian J. Trop. Med. Pub. Health. 1994; 25: 792-793.
4. Leelayoova S; Tamasri P; Rangsin R; Naaglor T; Thathasiong U; Mungthin M. In-vitro cultivation: a sensitive method for detecting *Blastocystis hominis* Ann. Trop. Med. Parasitol. 2002; 96:803-807.
5. Leder K; Margaret EH; Martha IS; Christopher KF; Rory W. No correlation between clinical symptoms and *Blastocystis hominis* in immunocompetent individuals. J. Gastroenterol. Hepatol. 2005; 20: 1390-1394.
6. Zierdt CH. *Blastocystis hominis* : past and future. Clin. Microbiol. Rev. 1991; 4:61-69.
7. Suresh K; Smith H. comparison of methods for detecting *Blastocystis hominis*. Eur. J. Microbiol. Infect. Dis. 2004; 23:509-511.
8. El-Shazly AM; Abdel Magied AA; El-Behbishi SN; El-Nahas HA; Fouad MA; Monib MS. *Blastocystis hominis* among symptomatic individuals in Talkha Centre, Dakhalia Governorate, Egypt. J. Egypt. Soc. Parasitol. 2005;35: 653-666.
9. Khan AH Clinical significance of *Blastocystis hominis*. Jamahiriya Med. J. 2009; 9:311 (letter).
10. Cheesbrough M. District laboratory practice in Tropical countries. 2ed. Cambridge University Press.2004; 191-199.
11. Argia M.A; Yosef K; Khan AH; Naji Moussa L. A study of *Blastocystis hominis* in Sebha, Libya. Sebha Med. J. 2008;7:34-41.
12. Kukoschke KG; Necker A; Muller HE. Detection of *Blastocystis hominis* by direct microscopy and culture. Eur. J. Clin. Microbiol. Infect. Dis. 1990;9:305-307.
13. Mol KY; Singh M; Howe J; HOLC; Tan SW; Chen XO; Yap EH. Development of *Blastocystis hominis* cysts into vacuolar forms in vitro. Parasitol. Res. 1999; 85: 103-108.
14. Dunn LA variation among cultured stocks of *Blastocystis hominis* (Brumpt 1912). Ph. D. thesis. The University of Queensland, Brisbane, Australia. 1992.
15. Garcia LS; Bruckner DA; Clancy MN. Clinical relevance of *Blastocystis hominis*. Lancet. 1984; 1233-1234 (letter).
16. Sheehan DJ; Raucher B.G; Mckitrick JC. Association of *Blastocystis hominis* with signs and symptoms of human disease. J. Clin. Microbiol. 1986; 24:548-550.
17. Kain KC; Noble MA; Freeman HJ; Barteluk RL. Epidemiology and clinical features associated with *Blastocystis hominis* infection. Diagnostic Microbiol. Infect. Dis. 1987; 8: 235-244.
18. Sanad MM; Darwish RM; Yosef SM; Nasef NE. *Blastocystis hominis*; laboratory identification and clinical relevance J.Trop. Med. 1991;1:61-70.

19. Logar J; Andlovic A; Pljsak PM. Incidence of *Blastocystis hominis* in patients with diarrhea. J. Infect. 1994; 28:151-154.
20. Zuckerman MJ. HoH; Hooper L; Anderson B; Polly SM. Frequency of recovery of *Blastocystis hominis* in clinical practice. J. Gastroenterol. 1990; 12: 525-532.
21. Wang KX; Li CP, Wang J; Cui YB. Epidemiological survey of *Blastocystis hominis* in Huainan city, Anhui province, China. World J. Gastroenterol 2002;8:928-932.
22. Eleonor TB; Vincente YB; Winifreda UD; Hyun HK; Dong C. infection status of intestinal parasites in children living in residential institution in Metro Manila, Philippine. Korean J. Parasitol. 2004;42:67-70.
23. Shilm DR; Hoge CW; Rajah R; Rabold JG; Echeveria P. Is *Blastocystis hominis* a cause of diarrhea in travelers? A prospective controlled study in Nepal. Clin. Infect. Dis. 1995; 21: 97- 101.
24. Barahona RL; Maguina VC; Naquire VC; Terashima IA; Tello R. Human blastocystosis; Prospective study symptomatology and associated epidemiological factors. Rev. Gastroenterol. Peru. 2003; 23:29-35.
25. Minvielle MC; Pezzani BC; Cordoba MA, Deluca MM; Apeztequina MC; Basualdo JA: Epidemiological survey of *Giardia* spp and *Blastocystis hominis* in an Argentinian rural community. Korean J.Parasitol. 2004; 42:121-127.