



## Trends of *Entamoeba histolytica* Infections in a Tertiary Care Hospital of South India - A Three Year Perspective Study

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### Abstract

**Background:** Amoebiasis is still a leading cause of intestinal parasitic infections in the world. It can be asymptomatic or manifest a wide variety of presentation and hence its diagnosis of the pathogenic from the non-pathogenic is quite challenging.

**Methodology:** However, a changing pattern has been observed over the years with this pathogen. This study tried to explore the changing trends in patients infected with this pathogen over a period of 3 years.

**Results:** *E. histolytica* microscopy was positive in 55 cases with no gender predisposition. Most of the patients presented with mild abdominal pain associated with diarrhea. In this study we found that there is a decrease in prevalence of infection caused by various *Entamoeba* species. The overall positivity of infection was 3% during the study period, which could most probably be due to improper sanitation favouring the transmission of the disease.

**Conclusion:** There has been increasing trend towards the non-pathogenic ones being recovered from the patients. This observation is especially applicable in light of the fact that expanding significance has been given to generally nonpathogenic species such as *E. dispar* and *E. moshkovskii*, since invasive amoebiasis has been exhibited to be related with these species. All things considered, the determinants of invasive amoebiasis are complicated and furthermore include different host factors.

**Keywords:** Amoebiasis; Microscopy; Trends; *Entamoeba histolytica*

### Introduction

Amoebiasis is caused by pseudopod-forming, non-flagellated protozoan parasite *Entamoeba histolytica*. It is considered globally as a leading parasitic cause of human mortality and morbidity [1-3]. The disease manifestation is predominantly seen in developing countries affecting both the young and the old, malnourished individuals and pregnant women [4,5]. It very well may be asymptomatic or can prompt the advancement of amoebic liver ulcer, and amoebic colitis which is an unusual complication, however is related with high mortality, and on normal more than 50% [6]. Furthermore, *E. histolytica* is one of the most widely recognized reasons for diarrhoea among travelers coming back from endemic

areas [7]. National Institute of Allergy and Infectious Diseases (NI-AID) has characterized *E. histolytica* as a class B priority biodefense organism due to its minimal infectious dose, ability to show resistance to chlorine, and natural steadiness which can represent a danger of simple dispersal through pollution of food and water supplies [8].

The diagnosis and conclusion of *E. histolytica* infection is difficult, and current techniques lack sensitivity. In most of the developing countries, diagnosis of *Entamoeba* infection is made by microscopic examination which is usually subjective with low sensitivity and specificity and also associated with high false positive

outcomes owing from the nearness of *E. dispar* or *E. moshkovskii*. In this manner more explicit and more sensitive analytic methods have been created which incorporate enzyme immunoassays (ELISA) for the quick discovery of the adhesin of *E. histolytica* in human fecal samples and Polymerase Chain Reaction (PCR)- that permits to separate between *E. histolytica* and *E. dispar* infection which prompted a re-evaluation of the illness burden [9,10].

Molecular test might be valuable as an extra to microscopic examination and can recognize pathogenic and non-pathogenic organism [11-13]. *E. histolytica* usually shows its most noteworthy tops in the wet season and step by step diminishes with the appearance of dry season. In an examination in Bangladesh, it was indicated that wet condition isn't the main factor that influences the detection curve of *E. histolytica*, however anti-carbohydrate recognition Domain IgA level in the gut is another deciding component for its event in that population [4]. In any case, *E. histolytica* infection usually follows a specific seasonality and pattern. The purpose of this study is to evaluate the factors influencing the occurrence of *Entamoeba histolytica* infection.

**Materials and Methods**

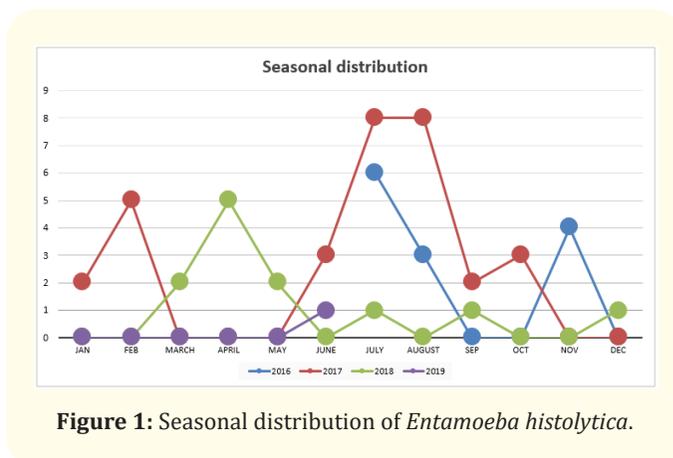
Our study was a cross sectional study which was carried out in a tertiary care hospital in south India from July, 2016 to June, 2019. Stool samples were collected from 1795 patients from various departments like medicine, surgery, paediatrics, pulmonary medicine, gynecology etc. suspected of having infection and the sample was screened microscopically for Entamoebae using saline wet mount and Lugol's iodine and was further subjected to formalin-ether concentration technique for visualization of cyst and trophozoite for *Entamoeba* [19].

**Results**

The whole study was carried out from July -2016 to June 2019. Total study population during the period of three years was found to be 1795 (Table 1). *E. histolytica* microscopy was positive in 55 cases. Male female ratio is 1:1 and there was no gender predisposition. Most of the positive cases (20 cases) were from medicine wards. Of the total positives, 12 cases were from pediatric age group. It was also observed that 42 out of 55 positive cases were from rural setup. Most of the patients presented with mild abdominal pain associated with diarrhea. All the positive samples have cyst forms with 5 samples showing trophozoite forms as well. The seasonal distribution was shown in figure 1. However, no seasonality was observed in our study.

Year	Total sample	Positive by stool microscopy
2016( July - Dec)	275	13
2017( Jan - Dec )	650	31
2018 (Jan - Dec)	621	10
2019 (Jan - June)	249	1

**Table 1:** Distribution of samples and positivity of *Entamoeba* spp. per year.



**Figure 1:** Seasonal distribution of *Entamoeba histolytica*.

The population studied is situated in a sociodemographic and ecological settings which is portrayed by deficiencies in proper cleaning. However, over the time period of our study, it slowly improved from 50% open defecation to building and using closed toilets in their homes. This is more so in cases of patients coming from rural areas. All together our finding shows that there in decreasing prevalence of infection caused by *Entamoeba* complex.

**Discussion and Conclusion**

The current study is done to estimate the frequency, epidemiology and other related components of *Entamoeba histolytica* infections. We performed a survey in a tertiary care hospital in south India from July 2016 to June 2019 by procuring the socio-demographic data from these patients. Stool samples were collected and microscopic examination was done. The overall positivity of infection was 3% during the study period, which could most probably be due to improper sanitation favouring the transmission of the disease.

Amoebiasis, a disease by protozoa *E. histolytica* is evaluated as the third driving parasitic reason for human mortality after malaria

and schistosomiasis, making 40,000 to 100,000 deaths yearly [15]. The worldwide significance of amoebiasis is across the board, with the most noteworthy weight of amoebiasis borne by those living in developing nations, especially the tropics and subtropics, where there is lack of cleanliness and access to proper sanitation [5]. Numerous individuals are infected with *E. histolytica*, making amoebic colitis as a main cause of diarrhoea. Amoebiasis is endemic in developing countries of central and South America, Africa, and Asia. In developing nations, the burden of amoebiasis is hard to measure, and reports can be influenced by geographic locale, study configuration, test size, manifestation seriousness, and the sensitivity of the demonstrative methodology used [5]. A key issue for understanding the morbidity related with amoebiasis is to characterize the extent of diseases related with the pathogenic species *E. histolytica*. Strikingly, concentrations in various districts have indicated that numerous subjects infected with indistinguishable *E. histolytica*/*E. dispar*/*E. moshkovskii* complex and *E. hartmanni* parasites really harbor low-pathogenicity species such as *E. dispar*, *E. moshkovskii*, or even *E. hartmanni* [16]. In any case, this distinction requires detailed examination of the nuclear structures, which requires preparation of permanent smear, a visual micrometer and an exceptionally skilled parasitologist. These standards are difficult to meet for some labs [12]. The same findings were also observed in our study where microscopy fails to distinguish between them. Subsequently, routine parasitological strategies are not appropriate for separating these organisms. This impediment can prompt a critical number of patients being treated with anti-parasitic medications, for example, metronidazole, who are not really infected with *E. histolytica*. This perception is especially applicable in light of the fact that expanding significance has been given to customarily nonpathogenic species such as *E. dispar* and *E. moshkovskii*, since invasive amoebiasis has been exhibited to be related with these species [14]. Almost certainly, the determinants of invasive amoebiasis are complicated and furthermore include different host factors.

These asymptomatic infections found in our study gave off an impression that most of them are caused by transcendently non-pathogenic species or parasites with low pathogenic potential, however *E. histolytica* was likewise observed. In an urban quarter of Dhaka, Bangladesh, 11% of children had amoebic loose stools in the primary year of life [5]. By cross-sectional study, *E. histolytica* was identified in 13.7% of fecal samples in upper east states of In-

dia [5]. According to the reports from other tropical nations, particularly in Bangladesh, which is topographically nearest to Kolkata, *E. histolytica* as a rule shows its most noteworthy peak in the wet season and step by step diminishes with appearance of dry season [20]. No seasonality was observed in our study (Figure 1).

The renaming of *E. histolytica* into Entamoeba complex including pathogenic *E. histolytica* and nonpathogenic *E. dispar* and *E. moshkovskii* has additionally added to the multifaceted nature of amoebiasis finding and epidemiology [17]. Fecal microscopy, the most commonly utilized clinical method for a long time; especially in asset restricted settings can't separate these three species with the exception of in uncommon invasive situations, where fecal examples much of the time found to contain hematophagous trophozoites. It was evaluated that on a normal just 1% of all out *E. histolytica* diseases develop into obtrusive structure and rest stay asymptomatic [15]. In like manner, stool culture based demonstrative strategies are time consuming, difficult and regularly unrewarding, with sensitivity of just about half. Other than microscopy and stool culture, ELISA based techniques are among the different other approaches followed for explicit identification and location of *E. histolytica* in fecal samples. Few studies have however shown that, direct examination of the faecal samples have poor sensitivity and specificity due to cross contaminations with different parasites [11].

Studies from various geological zones of the world showed that the force of intestinal parasitic diseases (IPDs) including *E. histolytica* was fundamentally higher among children [18]. This is in contrast to our findings where majority of the positive cases were from adults. However, our outcomes didn't show any critical distinction in the predominance of *E. histolytica* disease when looked between gender. Our study findings were in line with other studies from different parts of the globe [5]. In contrast, most emergency clinic based examinations revealed sexual orientation subordinate *E. histolytica* infection [2]. Geographical location and country foundation of patients was additionally connected with *E. histolytica* disease, as appeared by different past examinations [4]. Our investigation further affirmed a higher danger of *E. histolytica* disease among the rural population, where prevailing poverty, no introduction to wellbeing instruction program, poor financial status, low norms of sanitation and cleanliness are the related components that added to the high pace of infection.

We tried to evaluate the socio-demographic and parasitic profile of *E. histolytica* cases attending our tertiary care hospital. Many cases were from rural setup. Our overall positivity rate was around 3% which is lesser than other parts of the country. The decreasing trend is seen in the number of cases since last year. These could be due to increased awareness about the spread of this infection or a combination of methods is needed for it. The exact burden of infection can be calculated by incorporating antigen detection and molecular assays.

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