

Prevalence of *Entamoeba histolytica* among Patients Attending Federal Medical Center Birnin Kebbi, Kebbi State, Nigeria

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ABSTRACT: A study to determine the prevalence of *Entamoeba histolytica* was conducted among patients attending Federal Medical Center Birnin Kebbi, Kebbi State. Stool samples were examined for cysts of *E. histolytica* using the formal- ether concentration techniques. Out of the 200 stool samples examined, 33.0% (66/200) was the prevalence recorded for *E. histolytica*. The prevalence with respect to age-group was highest (40.0%) among children aged 1-10 years old, followed by patients aged 11-20 (15.1%) years old and patients aged >20 had no infection. The prevalence of infection with respect to aged-group of patients was significant. The prevalence with respect to sex of patients showed that male (34.3 %) and female (31.63%) had equal chance of being infected ($p > 0.05$). Infection with *Entamoeba histolytica* and educational level of patients is significant, with highest (43.4%) prevalence recorded among patients attending quranic/others and the least was recorded for those in secondary schools (4.7%). There is the need for sensitization programme and health talk on the importance and methods of personal hygiene.

Keywords: Amoebiasis, *Entamoeba histolytica*, Patient, Federal Medical Centre

1. Introduction

Amoebiasis is an invasive protozoal infection caused by *Entamoeba histolytica* (Moises *et al.*, 2018), localized in the large intestine, but which can spread to other visceral organs such as the liver, pleura, lungs, pericardium and spleen, in the skin, brain and genitor-urinary tract. Amoebiasis which is caused by *Entamoeba histolytica* is a global health problem, as it is responsible for more than 100,000 deaths per year and is the third leading cause of global death due to protozoa after malaria (Moises *et al.*, 2018). The protozoan parasite, *Entamoeba histolytica*, is the causative agent of amoebiasis in humans. Approximately 48 million individuals suffer from amoebiasis throughout the world. Amoebiasis is a major problem in developing countries such as Nigeria; this is primarily because of inadequate sanitation and contaminated food and drinking water (Adeomi *et al.*, 2015). The rate of infection by *E. histolytica* differs among countries and is dependent on the socio-economic and sanitary conditions of the populations (Al-Harthi and Jamjoom, 2007). *Entamoeba histolytica* is highly endemic throughout poor and socio-economically deprived communities in the tropics and subtropics. Environmental, socio-economic, demographic, and hygiene-related behaviour is known to influence the transmission and distribution of intestinal parasitic infections (Moises *et al.*, 2018).

Clinical features of amoebiasis range from asymptomatic colonization of amoebic colitis and invasive extra intestinal amoebiasis, which is manifested most commonly in the form of liver abscesses (Adeomi *et al.*, 2015). Global statistics on the prevalence of *E. histolytica* infection indicate that 90% of individuals remain asymptomatic while the other 10% develop clinically overt disease (Salit *et al.*, 2009). Once the parasites invade the intestinal wall, they reach the sub-mucosa and the underlying blood vessels, from there, trophozoites travel in the blood to sites as the liver, lungs or skin. Encystation occurs in the intestinal lumen and cyst formation is complete when four nuclei are present, these infective cysts are passed into the environment in human faeces and are resistant to a variety of physical conditions. *Entamoeba histolytica* is transmitted through the ingestion of food and water that are faecally contaminated with the cysts of the parasites (Amaechi *et al.*, 2014). Studies have identified inadequately treated drinking water, ingestion of raw vegetables and low socio-economic status as risk factors for infection in addition to failure to wash hands before eating (Amaechi *et al.*, 2014).

In Nigeria, amoebiasis is prevalent and widespread which has been attributed to quite a number of multiple environmental sources of transmission (Obadiah *et al.*, 2011). There is a paucity of information regarding amoebiasis of people in Birnin Kebbi. These study intend to fill the knowledge gap and provide data on the prevalence of *Entamoeba histolytica* that will be used in planning intervention strategy.

2. Materials and Method

2.1. Study Area

This research was carried out in Birnin Kebbi town. Birnin Kebbi is the capital of Kebbi State and is located in North-western part of Nigeria. It is located between latitude 10°8'N and longitude 3°30'E and 6°02'E (Lange, 2009). Birnin Kebbi is the head quarter of Gwandu emirate and has a population of 108,164 people (C-GIDD, 2008). It shares boundaries with Sokoto State on the North-Eastern axis, Zamfara State to the Eastern part, Niger State to the Southern part and Benin and Niger republic to the western part (Lange, 2009).. The State has a total land mass of 36,800km². The vegetation in Birnin Kebbi is the grassland type (Sudan savannah) with scattered trees. The climate is characterized by three seasons, warm-wet (mid-June to September); cool dry-harmattan (November to February) and Hot dry season (April to June), October and March are transition months. Federal Medical Centre Birnin Kebbi is the largest and only Federal Health institution in Kebbi State. Large number of patients attends the hospital for medical consultations from different part of the State. Both in and out patients of the hospital are sent to the Parasitological Laboratory Department for stool analysis.

2.2. Study Population

A total of 200 patients visiting Parasitological Laboratory section of Federal Medical Centre, Birnin Kebbi for stool analysis were randomly selected and stool samples were collected from them.

2.3. Ethical Considerations

Informed consent was sought from the patients or their parents. The ethical approval of the study was sought and obtained from the State Ministry of Health and State Ethical Review Committee.

2.4. Collection of Faecal Samples

The stool specimens were collected into clear transparent 20ml sampling bottles which were given to them prior to the day of collection. The index number of each patient was labeled on the universal bottles containing the samples, and was transported to the Zoology laboratory of the Kebbi State University of Science and Technology Aleiro.

2.5. Questionnaire

Structured questionnaires were administered to the patients in order to document information on age and gender, occupation and educational attainment, source of water, etc.

2.6. Sample Analysis

Direct examination of faeces for parasites or eggs and the formal–ether concentration method were used to process all faecal samples (CDC, 2006). About 10 ml of 10% formalin was poured into a centrifuge tube; 1g of the stool sample was picked with an applicator stick and emulsified; the mixture was filtered using a gauze, and the filtrate poured into a new centrifuge tube until 7ml mark was reached; 3ml of ether was added to the mixture and the mixture was centrifuged at 4000 rpm for 1 minute. The supernatant was decanted. Pasteur pipette was used to transfer a drop of the sediment onto a slide, a drop of Lugol's iodine was added and cover slip was placed on the slide. This was examined under the light microscope at x40 magnification. The parasites were identified using the chart of Cheesbrough (2006).

2.7. Statistical Analysis

Prevalence of *Entamoeba histolytica* infection was calculated and expressed as percentage (%). Chi-square was used to determine whether there was any association between the epidemiological factors and *Entamoeba histolytica* infections among the patients attending the Parasitological unit of the Federal Medical Centre, Birnin Kebbi.

3. Results and Discussion

3.1. Results

Out of the 200 faecal samples collected from patients attending the Parasitological Laboratory of the Federal Medical Centre, Birnin Kebbi, 66 (33.0%) were found to be positive for *Entamoeba histolytica* infection (Table 3.1). The prevalence with respect to patient gender shows that male patients had a higher prevalence of *Entamoeba histolytica* (34.3%) when compared to the female (31.63%) patients. The distribution of the infection among both sexes was similar ($p > 0.05$) (Table 3.1). The prevalence of *Entamoeba histolytica* with respect to age group shows that highest prevalence (40%) was observed in the age group 1-10 years old, followed by aged-group 11-20 (15.5%) years old, and aged-group >20 years old with no infection. The prevalence with respect to age-group is significant (Table 3.2). The prevalence of *Entamoeba histolytica* with respect to educational level of patients indicate that patients that attend Qur'anic/others had the highest prevalence (43.1%), followed by patients that attend primary schools (21.4%) and the least (4.7%) prevalence of *Entamoeba histolytica* was recorded for patients in secondary schools. The prevalence of *Entamoeba histolytica* with respect to educational level is significant (Table 3.3). Source of drinking water was not a risk factor for the infection with *Entamoeba histolytica* (Table 3.4).

Table 3.1: Prevalence of *Entamoeba histolytica* with Respect to Gender of Patients Attending Federal Medical Center, Birnin Kebbi

Gender	No. Examined	No. Infected	Percentage	P-value
Male	102	35	34.3	0.687
Female	98	31	31.63	
Total	200	66	33.0	

Table 3.2: Prevalence of *Entamoeba histolytica* with Respect to Age-group of Patients Attending Federal Medical Center, Birnin Kebbi

Age-group	No. Examined	No. Infected	Percentage	P-value
1-10	145	58	40.0	0.003
11-20	53	8	15.1	
>20	2	0	0	
Total	200	66	33.0	

Table 3.3: Prevalence of *Entamoeba histolytica* with Respect to Educational Level of Patients Attending Parasitological Laboratory Section of Federal Medical Center Birnin Kebbi

Educational level	No. Examined	No. Infected	Percentage	P-value
Primary	56	12	21.4	<0.0001
Secondary	21	1	4.7	
Qur'anic/others	123	53	43.1	
Total	200	66	33	

Table 3.4: Prevalence of *Entamoeba histolytica* with Respect to Source of Drinking Water of Patients

Source of water	No. Examined	No. Infected	Percentage	P-value
Well	137	42	30.6	0.171
Borehole	6	4	66.6	
Tap	57	20	35.0	
Total	200	66	33	

3.2. Discussion

A high prevalence of 33.4% of *E. histolytica* obtained in the study Area is in line with some earlier reports of some authors reported in Nigeria. Amoebiasis is a worldwide problem; however, individuals living in developing countries are at greatest risk given poor sanitation and socioeconomic conditions (Prakash and Bhimji, 2017).

Both female and male patients have equal chances of being infected with *Entamoeba histolytica*. This is probably because both genders have equal chances of being exposed to the infectious agents in the society.

In this study the prevalence with *E. histolytica* was related ($P < 0.05$) to age of patients attending Federal Medical Center, Birnin Kebbi, with the highest prevalence (40.0%) found among patients aged 1-10 years old. This could be attributed to the fact that children at this age are always found on the playing ground and most at times practicing geophagy behaviour, at this age children are ignorant of simple health promoting factors. Among the risk factors associated with increased disease severity and mortality as reported by some authors include young age (Stanley, 2003, Wuerz *et al.*, 2012). This could be attributed to the reason why no infection was recorded for patient's aged-group 20 years and above. At this age-group, the patients are matured, and are able to take good care of themselves without much guidance (Sirima *et al.*, 2008).

Educational level of the patients was also a risk factor to the level of infection with *Entamoeba histolytica* ($P < 0.05$). The least infection is found among patients with highest educational level: This could probably be attributed to the fact that formal education directly and indirectly influences the knowledge, attitude and practice of the patients on the infection.

In this study water source was not a factor responsible for infection by *E. histolytica* ($p > 0.05$). Water, irrespective of its source can easily be contaminated during handling, especially where sanitation and personal hygiene are generally poor (Obadiah *et al.*, 2011), this is strengthening with the fact that,

in this study borehole water (66.6%) recorded the highest prevalence and well water (30.6%) recorded the least.

4. Conclusions

From this study, the following conclusions can be obtained.

- (i) Prevalence of *Entamoeba histolytical* among patients attending Federal Medical Centre Birnin Kebbi, Kebbi state is high.
- (ii) Female and male patients have equal chance of been infected
- (iii) Age and educational level of patients are risk factors of infection with *Entamoeba hiistolytical* in the study area.

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