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Full Length Research Paper

Prevalence of *Entamoeba histolytica* among Primary School children in Ukwa West Local Government Area, Abia State, South East, Nigeria.

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ABSTRACT
Amoebiasis is a cosmopolitan infection caused by *Entamoeba histolytica* and ranks third among parasitic infections that lead to death especially in children. Epidemiological data in most rural communities about this infection is scanty. Three hundred (300) children aged 0-14 years were sampled for *E. histolytica* infection in five rural communities in Ukwa West Local Government Area, Abia State, South East Nigeria. The stool samples were examined for cysts of *E. histolytica* using saline and iodine preparations. The prevalence rate of 16.0 % was recorded. The prevalence by sex showed a higher infection rate in males (18.7 %) than females (13.3 %) which was significantly different (X^2, $p<0.05$). This showed an association between sex and the prevalence of *E. histolytica*. There was also a slight association observed among the different age groups. The highest prevalence of 21.7 % was recorded in children from Umuelechi community, although there was no significant difference among the communities (X^2, $p>0.05$). There is therefore an urgent need for improved sanitation, personal hygiene and a proper deworming scheme amongst school children in the study areas to alleviate the scourge.
Key words: *Entamoeba histolytica*, Prevalence, Children, rural communities, Abia State.

INTRODUCTION
Amoebiasis is an infection with protozoan parasite *Entamoeba histolytica* of the class Sarcodina with or without the presence of clinical symptoms. It ranks third among parasitic diseases that results to death worldwide; being second to malaria as a protozoan cause of death (Schmidt and Roberts, 2000). About 500 million people are believed to be infected at any one time, and up to 100,000 deaths occur per year (Haque and Petri, 2006). Although cosmopolitan in distribution, it mainly occurs in the tropics and sub tropics and other places especially in areas where there is low level of sanitation and very poor personal hygiene (Oyerinde, 1999).It parasitizes man causing amoebic dysentery, amoebic hepatitis, and pulmonary amoebiasis. *E. histolytica* inhabits the large intestine of man, but can also establish itself in the liver, lungs, brain and other organs where secondary lesions are produced. Amoebiasis remains an important health problem in Nigeria due to inadequacies in sanitation infrastructure and health care facilities (Udonsi, 1999). Clinical features of amoebiasis range from asymptomatic colonization of amoebic colitis (dysentery or diarrhea) and invasive extraintestinal amoebiasis, which is manifested most commonly in the form of liver abscesses (Fotedar *et al*.,2007).Global statistics on

the prevalence of *E.histolytica* infection indicate that 90 % of individuals remain asymptomatic while the other 10 % develop clinically overt disease (Haque *et al*.,1999). Once the parasites invade the intestinal wall, they reach the submucosa and the underlying blood vessels. From there, trophozoites travel in the blood to sites such 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. On some occasions, trophozoites may exist in the stool, but cannot survive outside the human host (Smith, 1999). *E. histolytica* is basically transmitted through the ingestion of food and water that are faecally contaminated with the cysts of the parasite (Ibrahim, 2008). In Nigeria, amoebiasis is prevalent and widespread which has been attributed to quite a number of multiple environmental sources of transmission (Oyerinde, 1999; Ajero *et al.*, 2008). Several reports have recognized amoebiasis as an important health problem especially among young growing children of school age. The several surveys have indicated a high prevalence of intestinal parasitic infections among Nigerian children in different localities (Ogbe and Isichei, 2002; Ukpai and Ugwu, 2003; Agbolade *et al.*, 2004).Surprisingly, there is paucity on the epidemiology of amoebiasis in Ukwa West LGA, especially rural communities in the area. This study therefore aims at filling the information gap on the prevalence of amoebiasis in some rural communities using primary school children in the area.

MATERIALS AND METHODS

Study area

The study was conducted in Ukwa West LGA of Abia State, South Eastern Nigeria. The various communities in Ukwa West LGA include Owaza, Uzuaku, Umuokwor, Umuorie, Obuzo, Umuelechi, Umukalu and Obokwe. The headquarters is at Okeikpe. Ukwa West is a heavy rainforest region and is located between latitude $4^{0}56^{1}$N and longitude $7^{0}29^{1}$E (Echebiri and Mbanasor, 2003). The total population of the study area is 88,555 (NPC, 2006). The climate is tropical and an average daily maximum and minimum temperature of 28^{0}C and 23^{0}C respectively. Ukwa West has an average rainfall of about 2400 mm and has two seasons in the year. The rainy season which is usually between March-October and the dry season which is between November-February. The average humidity is 90 %. The study area consists of low-lying land with ferrallitic soils of the coastal plain. The chief occupation of the people is farming. They are noted for the production of cassava, maize, yam, plantain, banana, melon, cocoyam and several vegetable crops and legumes. Their sources of drinking water include nearby streams where they bathe, wash and also fetch water for domestic purposes. Quite a few rely on borehole for their source of water. Bushes around the streams are mostly used for defecating purposes by those who come to bathe and wash.

Study Population

Children aged 0-14 years constituted the study population. Five primary schools namely Central Primary School Obuzor, Community Primary School Owaza , Central Primary School Umuelechi, Migrant Primary School Obokwe, and Central Primary School Umukalu were used for the study. The total population in the five primary school was 486 pupils (210 males and 276 females). A total of 300 pupils were randomly selected for the study where 60 pupils were selected from each school based on the willingness of the pupil to participate in the study. An average of 10 pupils from each class (Basic 1 to 6) formed the proposed sampled population in the five schools. The different communities studied were Obuzor, Umuelechi, Umukalu, Owaza and Obokwe. The communities all share common boundaries.

Study Design

A cross sectional survey was conducted to ascertain the prevalence of *E. histolytica* in the children sampled. For school age children, the class lists of the different classes in the different schools were used to determine age and sex which the pupils later reconfirmed. For younger children who were not yet in school, demographic information were gotten from parents and guardian. A sample size of 300 was worked on based on WHO (1995) guidelines of 200-250 individuals to adequately evaluate the prevalence of amoebiasis. The communities sampled in the study were based on the fact that they all had similar prevailing ecological factors.

Ethical consideration

Ethical clearance was obtained from Abia State Ministry of Heaith. Informed consent was obtained from Abia State primary School Management Board, Head teachers, parents/ guardians and the pupils themselves. Participation was voluntary and refusal to participate did not attract any penalty with regards to the benefit of the study. The participants were given the priviledge to ask questions before the commencement of the study.

Data Analysis

Chi-square test was used to evaluate the level of association between the different parameters studied. The analysis was done using Statistical Package for Social Sciences (SPSS) version 17.

Laboratory assessment

Preparation of faecal smears and identification of parasite

Well labeled specimen bottles that had names, age and sex of the participants were given out for the collection of their stool samples. The stool samples were collected and preserved in 10 % formol ether and immediately taken to the laboratory for microscopy. For the microscopic examination, both saline and iodine preparations of the stool were examined. The former was used for the identification of the trophozoites while the later was used for the identification of cysts.

Wet preparation using 3 % iodine was the method used. This is because iodine stains the nucleus of *E.histolytica* properly, thus allowing for easy identification of the cyst. A little portion of the formed stool specimen was collected and mixed with the 3 % iodine solution to form a smear. This was covered with a cover slip and viewed under the microscope using x10 objective for examination and x40 for identification of the parasite (Aribodor *et al*., 2012).

Another stool specimen was also prepared using a drop of physiological saline. A cover slip is applied before examining the preparation microscopically. The presence of ingested red blood cells and the characteristic directional movement are diagnostic of *E.histolytica*. The cyst of *E. histolytica* was identified with the diagnostic features as described by Cheesbrough, 1998.

RESULTS

Of the 300 school children sampled, 48 (16.0 %) were found to be positive for *Entamoeba histolytica* infection (Table 1). The prevalence recorded by individual communities were as follows; Obokwe 10 %, Umukalu 13.3 %, Obuzor 15.0 %, Owaza 20 % and Umuelechi 21.7 % (Table 1) There was no association between the communities sampled and the prevalence of *E. histolytica* infection($P>0.05$)

The result also revealed a prevalence rate of 18.7 % for males and 13.3 % for females (Table 2). There was an association between sex and prevalence of *E. histolytica* ($P<0.05$)

The age group 11-14years showed the least prevalence of 6.0 %. This was followed by the age group 0-5 years which showed 18.3 %. The highest prevalence of 21.4 % was observed in the age group 6-10

years (Table 3).There was however no association among the different age groups(P>0.05).

Table1. Prevalence of *E. histolytica* infection in children 0-14 years in Ukwa West L.G.A, Abia State, Southeast, Nigeria.

Community	No sampled	No Positive	Percentage Prevalence
Obuzor	60	9	15.0
Umuelechi	60	13	21.7
Umukalu	60	8	13.3
Owaza	60	12	20.0
Obokwe	60	6	10.0
Total	**300**	**48**	**16.0**

Table 2: Prevalence of *E.histolytica* infection by sex in Ukwa West L.G.A, Abia State, Nigeria

Sex	No sampled	No Positive	Percentage Prevalence
Male	150	28	18.7
Female	150	20	13.3
Total	**300**	**48**	**16.0**

Table 3: Prevalence of *Entamoeba histolytica* infection by age in Ukwa West LGA, Abia State, Southeast, Nigeria.

Age(years)	No sampled	No Positive	Percentage Prevalence
0-5	104	19	18.3
6-10	112	24	21.4
11-14	84	5	6.0
Total	**300**	**48**	**16.0**

DISCUSSION

Generally, amoebiasis is a common occurrence in developing countries, with school age children carrying the heaviest burden of the associated morbidity (Nematian *et al*., 2004; Oninla *et al*., 2007). A total prevalence rate of 16.0 % was recorded for all the communities surveyed in this study which is consistent with the report of Ibrahim,2008 in Kano Northern Nigeria and Aribodor *et al* .2012 in Anambra, South east Nigeria respectively.

The comparative high prevalence of *E. histolytica* infection observed in this study could be attributed to such predisposing factors which are prevailing in the study communities such as ignorance, unhealthy socio-cultural practices, poor drainage system, unhygienic methods of disposing human faeces and refuse, poverty, inadequate health care facilities as well as low standard of personal hygiene and general clealiness in the communities studied from where the subjects were drawn. A closer and more practical look at the rural environments studied lends credence to this observation. The difference observed among the five communities was not statistically significant. This is attributable to the fact that the populace of the different communities studied shared common boundaries and had the same way of life which influenced that practices significantly. Habits such as defecating in nearby bushes that were close to the streams and rivers which were sources of water to the inhabitants was a common phenomenon among the people of the different communities studied. Umuelechi community had the highest prevalence rate which may associated with the very high level of poverty noticed in that community. This led to overcrowding and poor housing in the community which are predisposing factors to the spread of the infection (Rufai and Awi, 2006). The comparatively low prevalence recorded in Obokwe may be associated with the high rate of development in the community. This has resulted in many homes owning a water closet in their individual homes thereby reducing the spread of the infection. Also, most of the populace in this community patronizes the public borehole as their source of water.

The significantly high prevalence of infection observed among male children may be attributed to the fact that they are

more adventurous than their female counterparts and have a greater tendency of indulging in outdoor activities (Inabo *et al.,* 2000; Ukpai and Ugwu, 2003). It could also be maintained that males engage more in activities that predisposes them to the infections such as farming, fishing, and hunting. These activities necessitated more contact and exposure to the infections. On the other hand, female children are more pre occupied with domestic activities which limits their level of exposure to the possible sources of infection (Aribodor *et al.,* 2012).This is however contrary to the report of Nyenke *et al*. 2008 in Degema and environs where they reported that females were more infected than males.

The result reveals a high prevalence of 21.4 % among children between age group 6-10. This could be attributed to the fact that children within this age group are found to be playing on the sand with little or no care. They tend to be ignorant of the gains associated with general cleanliness and high level of personal hygiene. The age group 11-14 recorded the least level of infection. This could be attested to the fact that they are quite matured and are so conscious of the need to take personal hygiene more seriously as compared to the other age group. This agrees with the findings of Ukpai and Ugwu, 2003 and Reuben *et al*., 2013.

Similarities in the findings of this study with that reported by other researches lay claims to the fact those rural communities often lack basic social amenities, which have negatively impacted on the young ones. These communities lack basic health care services, limited access to good and healthy toilet facilities, lack of pipe borne water and a host of limited access. The prevailing deplorable state of infrastructure in the communities surveyed has supported the transmission of *E. histolytica* and affecting mostly the growing children.

CONCLUSION

Amoebiasis a neglected tropical disease that affects most rural communities in developing countries has posed great challenges on human development. This has an adverse effect on school age children who are the hardest hit. Government at all levels must intensify efforts at reaching the grassroots through the integration of regular mass deworming program. Efforts should also be geared at creating awareness through health education especially in schools to alleviate the scourge.

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