

Prevalence of Amoebiasis and Other Intestinal Parasites among Children Attending Plateau State Specialist Hospital Jos, Nigeria

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Received: November 22, 2021S

Abstract

Introduction: Amoebiasis is a disease condition caused by the protozoan parasite called *Entamoeba* spp. This disease is a major public health challenge in developing countries, Nigeria for example. The record is alarming to the extent that up to 450 million persons are infected yearly, with up to 50 million incidence, and about 100,000 death tolls. Amoebiasis has a wide spread distribution globally. Poor personal hygiene, poor attitude to environmental sanitation, and overcrowding in addition to ignorance are contributing factors that increase the incidence and prevalence of amoebiasis.

Objective: The study was to determine the prevalence of amoebiasis and other incidental intestinal parasites among children visiting Plateau Hospital.

Methodology: 100 children of age less than 12years were recruited for the study. Stool samples were collected into an adequate container for the study and immediately transported to the laboratory. The study was done using microscopic examination of normal saline and iodine concentration methods for testing the presence of *Entamoeba* spp. and other intestinal parasites.

Result: Out of the 100 samples examined, intestinal parasite were observed in 13 samples giving a prevalence of 13.0%, and that of amoebiasis was 13 (13%) and other non-amoebic infections 23 (23%). Both *Entamoeba coli* 9 (9.0%), *Ascaris lumbricoides*, 9 (9.0%) and Hookworm 8 (8.0%), while 5 (5.0%) *Trichuris trichiura* and *Entamoeba histolytica* 4 (4.0) were the intestinal parasites and their prevalence that were observed using wet preparation. Male were more susceptible than females (24% vs 12% respectively) and participants of age < 4years (14%) were most susceptible followed by those of 4 - 7years (12%).

Conclusion: The study showed a slight significant prevalence of intestinal parasitic infection in general but very low prevalence of amoebiasis among children with males and those with the age 4 - 7yr being the most significantly susceptible groups to intestinal parasitic infection. This calls for improvement in parental care, environmental hygiene, personal hygiene washed and well cooked vegetables, access to clean water and Government interventions like public education and awareness creation and effectiveness of treatments.

Keywords: Amoebiasis; Intestinal Parasites; School Children; Jos

Introduction

Amoebiasis is a parasitic infection caused by an entamoeba spp. which is protozoan parasite like *Entamoeba histolytica*. *Entamoeba histolytica* is the protozoan that causes amoebiasis. It has remained the three topmost parasite causing mortality across the globe [1]. Some species of *Entamoeba*, includes: *E.coli*, *E.dispar*, *E. hartmanni*, *E. moshkovskii*, and *E. polecki* that are infectious humans, though not all are associated with the amoebiasis [2].

The protozoan parasite causing amoebiasis is *Entamoeba histolytica*. The amoebiasis is a major public health challenge in Nigeria and other developing countries of the world. It is on record that up to 450 million people are infected yearly. The incidence of 50 million cases, and 100,000 death tolls are on record. amoebiasis spreads across the world and is more prevalent in West and South-East Africa, Mexico, China, South-East Asia, Western South America, and India [3]. Poor personal hygiene, poor environmental sanitation, and overcrowding with high level of ignorance has contributed to the high incidence and prevalence of amoebiasis. In Nigeria, amoebiasis is highly prevalent and widespread [4]. Reports abound in Nigeria about the challenge posed by amoebiasis as important public health issues especially among pupils and young children [5,6] and equally among the students in higher institution [7]. Some epidemiological studies shows high prevalence of intestinal parasites among Nigerian children [8]. Neonates and Infants of less than 1 year old are rarely infected [4] but gradually increases during childhood progressively to young adults [9]. The affected population have been linked to home/domestic affairs activities in a very poor and dirty environmental [10]. The high prevalence of amoebiasis is directly related to poverty, poor environmental hygiene, poor personal hygiene, and poor health service providers with inadequate supply of drugs. Lack of adequate awareness of the transmission, life-cycle, mechanisms of disease spread of the causative parasites. It is regrettable that children and pregnant women are the most vulnerable to amoebiasis. School children especially those in primary and nursery schools, are good targets for government and agencies mass-treatment programs against intestinal worms due to their age group in association with the infection. Treatment of these school children has shown positive results towards disease reduction in various communities [9].

Amoebiasis is common in children and is associated with diarrhea/dysentery in the endemic countries of the world. The rate of mortality from diarrhea diseases in the world can be decreased by better therapy, interventions that promote sanitary conditions and also education of inhabitants to take part in primary health care activities [11].

Reports from parts of Nigeria also show prevalence of amoebiasis in children [12,13]. Amoebic colitis and liver abscess were also reported in Egypt and South Africa [14].

Low standards of living, diet, hygiene and sanitation, overcrowding, food contamination, unavailability of good water and inadequate disposal of faeces are the risk factors for infection spread with *E. histolytica*. In some cases, up to 50% of study area is affected in areas with very poor sanitary conditions and hygiene [14]. Also, the improper washing and consumption of fruits and vegetables in Jos have implicated the disease [15-17].

The prevalence of symptomatic and asymptomatic amoebiasis vary in geography and population. The differences spread is based on the country's socio-economic conditions. The highest prevalence are in developing countries and regions like Indian subcontinent, Central and South America, and Africa in the tropics [18]. Taking a close look at Nigeria, in Ahmadu Bello University Teaching Hospital Zaria, Kaduna state, report shows 23% *E. histolytica* as an etiology of chronic diarrhoea among children and 8.51% in five rural villages in Kaduna and Zaria [12], while in Ilesa, 80.5% was also reported [13].

In Jos, Plateau State, the prevalence of *E. Histolytica/ E. dispar* among some selected school children in Jos 318 children were each examined for trophozoites in watery stool and for cyst in formed stool on three occasions in 2008 and was discovered that 17% of the children were infected with *E. dispar/E. histolytica*. The highest prevalence was among children who had watery stools (42.9%), followed

by those who fetched water from the streams (31.5%) and then those of ages 2-4 years and nursery School children (36.4%) [19].

The aim of this study is to establish the significance of *Entamoeba histolytica* in diarrhoea conditions of children attending Plateau State Specialist Hospital (PSSH), Jos with the objective to determine the prevalence of *Entamoeba histolytica* infection and other available intestinal parasites in children attending Plateau Specialist Hospital.

Materials and Methods

Study area

The study was conducted in Plateau Specialist Hospital, Jos, Nigeria. Jos North has an area of 291km with a Population of 429,300 as at the 2006 census. The study area is dominated by the school.

Study population

A total of 100 children of school aged 0 - 12 years, who sought treatment at the hospital participate in the study. All stool samples were collected between the month of July and August, 2021.

Collection of samples

Children between 0 months to 12years were recruited into the study. Stool specimens were collected systematically from children presenting with diarrhoea and from children presenting with other diseases like malaria and typhoid (non-diarrhoea), the later served as the control group. Samples were collected into wide, mouthed universal bottles at the hospital, with specific instructions given to the parents/guardians of the children on how to collect it. The samples were labelled and examined in parasitology Laboratory of the hospital were examined. One to two grams (1 - 2g) of each stool sample was fixed in two milliliters (2 mls) of 10% formal saline for examination by microscopy in line with Saeed and Manal, [20].

Examination of stool sample

Microscopic examination (wet preparation) of saline wet mount and iodine wet mount as described by Cheesbrought [21] was used.

Results

The result of the study is presented in tables based on percentages calculation.

Table 1 The prevalence of intestinal parasites among the Children. It also showed the prevalence of amoebiasis 13 (13%) and other non-amoebic infections 23 (23%).

Table 2 The prevalence of amoebiasis and other parasitic infection among the Children. Prevalence of 9 (9.0%) for *Entamoeba coli* was observed among the participants, *Ascaris lumbricoides* 9 (9.0%), followed by Hookworm 8 (8.0%), 6 (6.0%) for *Trichuris trichiura* and *Entamoeba histolytica* 4 (4.0%).

Table 3 the prevalence of intestinal parasitic infection in relation to the participants' gender. The 100 Children comprises of 59 males and 41 females. It showed that the prevalence of intestinal parasite among males and females were 24 (24%) and 12 (12%) respectively.

Table 4 the prevalence of intestinal parasitic infection in relation to the age groups of the Children. It showed 14 (14%) prevalence among participants of < 4yrs, 12 (12%) among participants of 4 - 7yrs and 10 (10%) among participants of 7 - 12yrs.

Parameters	Number of positive (n = 100)	Prevalence (%)
Amoebiasis infections	13	13
Non-amoebiasis (other parasitic) infections	23	23
Total	36	36

Table 1: Prevalence of amoebiasis and other parasitic infection among the Children.

Intestinal parasites	Number of positive (n = 100)	Prevalence (%)
Entamoeba coli	9	9.0
Ascaris lumbricoides	9	9.0
Hookworm	8	8.0
Trichuris trichiura	6	6.0
E.histolytica	4	4.0
Total	36	36

Table 2: Prevalence of various intestinal parasites observed among the Children.

Gender	Number (n) of participants	Number of positive	Prevalence (%)
Male	59	24	24
Female	41	12	12
Total	100	36	36

Table 3: Prevalence of intestinal parasitic infection in relation to the Children gender.

Age (year)	Number of participants (n = 100)	Number of positive	Prevalence (%)
< 4yrs	42	14	14
4-7yrs	27	12	12
7-12yrs	31	10	10
Total	100	36	36

Table 4: Prevalence of intestinal parasitic infection in relation to the age groups of the Children.

Discussion

Amoebiasis and intestinal parasitic infections have been a common public health challenge most especially in developing country like Nigeria and Jos in particular, where children are more commonly infected [22]. World Health Organization (WHO), puts it that up to 270 million pre-school children and over 600 million children have been infected by parasitic diseases and calls for an urgent control interventions [23]. 880 million children and more may need treatment for parasitic infections like amoebiasis, especially the school children, rural dwellers and farmers, who are at a high risk of having intestinal parasitic infections may be due to the poor hygiene and other conditions [24].

In this present study, 100 children of age 12 years and less, were recruited and their stool samples collected and examined for the presence of amoebiasis. The study showed a prevalence of 13% for Amoebiasis and 36% for intestinal parasitic infection. A similar prevalence was reported by in a recent study among 285 school children of age up to 15 years from two different schools of which 33% was recorded as the prevalence of intestinal parasitic infection [25]. In another study [19], the prevalence of amoebiasis was 17% in 2008 and reduced to 13% in 2021 by this study. The difference in prevalence may be due to the improved hygiene and parental care or difference in study area, and sample size.

The prevalence of amoebiasis among the participants in this present study was 13%. Similarly are low prevalence of 2.0% was reported by Dogara, [1] among children aged 0 - 12 years in Health Facilities in Dutse Local Government Area. The low prevalence in this study may be attributed to the awareness of the implication of intestinal parasitic infection, good health facilities, and prompt hygienic practices within the study area. This study also revealed *Entamoebic coli* and *Entamoebic histolytica* as the parasite implicated in amoebiasis in the study with a prevalence of 9.0% and 4.0% respectively. This is strongly supported by Gupta, *et al.*, [25], as *Entamoebic coli* (21.3%) and *Entamoebic histolytica* (23.4%) were reported as the only protozoa responsible for intestinal parasitosis in school children of age up to 15yrs. It is most likely that vegetables consumptions and contacts with house flies must have contributed according to some studies in Jos [16,26].

However, other intestinal parasites were also observed and are helminthes with a prevalence of 23%. They comprise of *Ascaris lumbricoides* (9.0%) and Hookworm (both 8.0%), and *Trichuris trichiuria* (5.0%). This is cognizance with the report of Gadisa and Jote, [27] who recorded also that hookworm were more prevalent (14.4%) over *Trichuris trichiuria* (13.9%). However, the significant low prevalence in this study may be due to differences in topography, geographic, and awareness for the control of intestinal parasites and transmission routes. Moreover, the health education by various healthcare providers could be an important factor influencing individual's attitudes towards the prevention of intestinal parasites and school children care for a healthy family [28].

In addition, intestinal parasitic infection in this study was found to be prevalent in male than female (24% vs 12% respectively). This is in disagreement with the study of Gupta, *et al.* [25] where female were reported to be more susceptible than man (38.1% vs 29.7% respectively). The high prevalence among male may be attributed to the claim that female tends to have strong immune response to infection than the males [29]. Also, the present study showed that participant of age < 4years (14%) were most susceptible followed by those of 4 - 7years (12%). This is in line with the report of Gupta, *et al.* [25] where increase in susceptibility to intestinal parasitic infection increased with decrease in age. This may be as a result of the decrease in child cares by mothers with advance in age of the children. Notably, children motility at 1-4 years exposes them to eating anything they see around them.

Conclusion

The finding of this study showed a slight significant prevalence of intestinal parasitic infection in general but very low prevalence of amoebiasis among children with males and those with the age < 4years being the most significantly susceptible groups to intestinal parasitic infections. This could further be reduced with improved parental care, environmental hygiene, washed and well cooked vegetables, access to clean water and good personal hygiene. It is recommended for Government interventions, public education and awareness creation the effectiveness of treatments of these parasitic infection.

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Volume 9 Issue 3 March 2022

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