

Incidence of Gastrointestinal Protozoans causing Diarrhoea amongst Out-patients attending Yobe State Specialist Hospital Damaturu

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ABSTRACT

Gastrointestinal parasitism is extremely common with approximately 70% prevalence worldwide associated with diarrhea. This study was conducted on the incidence of gastrointestinal protozoal parasites responsible for diarrhea amongst out-patients of Yobe State Specialist Hospital Damaturu, Nigeria. The formol-ether concentration technique was used for stool evaluation. Out of the 250 randomly sampled stools examined an overall incidence of 134 (53.6%) were obtained, and the protozoans identified were *Entamoeba coli* 60(44.8%), *Entamoeba histolytica* 55(41.1%) and *Giardia lamblia* 19(41.2%) ($p < 0.05$). Sex-wise, male out-patients were more infected 74(55.2%) than female 60(44.8%) ($p < 0.05$), while age-wise the younger age bracket of 6-18 years had a 72 (53.7%) mean incidence, higher than age bracket of > 18 -60 years with 62 (46.3%) ($p < 0.05$). The microscopic appearance of the protozoan in this study was also recorded. Inference from these findings was that age and sex are competent risk factors in this study area.

Keywords: Incidence, Gastrointestinal, Protozoans, Diarrhoea, Out-patients, Damaturu, Nigeria.

INTRODUCTION

Gastrointestinal parasitism, which is the major cause of diarrhea in man has been reported to be due to a great number of helminths and protozoans that are either specific parasite of man or are zoonotic (Fabiya, 1991). The spectrum of

intestinal protozoal infections can range from asymptomatic to invasive (*Entamoeba histolytica* and *Balantidium coli*) to severe, chronic and protracted diarrhea (giardiasis) (Rayhan-Hashmey *et al*, 1996; Haque, 2003; Tan, 2004). Risk factors for intestinal parasitism are lower

socioeconomic status, migration from areas of high endemicity, institutionalization especially in mentally retarded individuals, and living in communal setting with situations that encourage close human to human contact and unhygienic conditions promote transmission (Stanley, 2003). Gastrointestinal protozoal parasitism has been reported as endemic in tropical and sub tropical countries with more than 600 million people at risk, but prevalence varies from place to place (WHO, 1990; CDC, 2004). General knowledge on the epidemiology of protozoan causes of diarrhea amongst populations of northeastern Nigeria, for the planning of any reliable public health programme is inadequate, hence the need for this study.

MATERIALS AND METHODS

Study area: The study was conducted at the Yobe State Specialist Hospital, Damaturu, the main hospital which serves Damaturu and its environs in the northeast region of Nigeria. Damaturu, the head capital of Yobe State is located between latitudes $11^{\circ} 43-49''N$ and longitude $11^{\circ} 52-59''E$

Patient consent and ethical consideration: Before the commencement of this study, an ethical clearance was obtained from the administrative authority of the

Yobe State Specialist Hospital Damaturu, and patients clearly informed on the objectives, design and merits of their participation.

Sample collection and examination:

A total of 250 fresh stool samples were randomly collected using sterile vacoutainer test tubes from outpatients of the hospital and each was examined using the formol ether concentration technique for diagnosing gastrointestinal parasites. A small portion of each stool about 1 gram was picked using a glass rod and was placed into a mortar and mixed with 7mls of 10% formol saline, sieved to filter, into a centrifuge tube and added 3mls of diethyl ether, shaken vigorously to mix and then centrifuged at 1000g for 1 minute. The sediment was transferred unto a clean grease free slide, and a drop of lugol's iodine was added to it to enhance visual clarity of protozoan cysts. A clean coverslip was mounted on the specimen and examined (within 30 minutes at room temperature to forestall disintegration of trophozoites) at x10 and x40 objectives of the Olympus light microscope and cysts or trophozoites identified as described by Rayhan- Hashmey, (1996).

Statistical analysis: Incidence was presented as percentage and its variation amongst sex, and age of patients determined using the

students "t" test at 5% confidence interval.

RESULTS

Table 1 shows the incidence of intestinal protozoans based on the sex or age bracket of outpatients examined. An overall incidence of 134(53.6%) was recorded, with male outpatients having a higher incidence of 74(55.2%) than for female outpatients, with 60(44.8%) which was statistically significant ($p < 0.05$) Age wise, age bracket within 6 -18 years had a significantly ($p < 0.05$) higher mean incidence 72(53.7%) than the age bracket between 18 - 60 years with 62(46.3%). The protozoans identified were

Entamoeba coli 60 (44.8%), *Entamoeba histolytica* 55(41.1%) and *Giardia lamblia* 19(14.2%) ($p < 0.05$). Table 2 shows the microscopic appearance of isolated protozoan trophozoites. *Entamoeba histolytica* had a single nucleus, had red blood cells in its cytoplasm and a long finger-like pseudopodia and an active movement. *Entamoeba coli* also had a single nucleus, do not have red blood cells in their cytoplasm, do not have finger-like pseudopodia and movement is sluggish. *Giardia lamblia* was binucleated with 4 pairs of flagella, had a tear drop appearance, with a convex dorsal surface and a concave disc on its ventrum. It was actively motile.

Table 1: Incidence of intestinal protozoans based on the sex and age bracket of outpatients examined

Patients Data	No. Examined	No.(%) infected	No.(%) infected with:		
			<i>E. histolytica</i>	<i>E. coli</i>	<i>Giardia lamblia</i>
Overall	250	134(53.6)	55(41.1)	60(44.8)	19(14.2)
Sex:					
Male		74(55.2)	31(41.9)	32(43.2)	11(14.9)
Female		60(44.8)	24(40.0)	28(46.7)	8(13.3)
Age bracket(years):					
6 - 18		72(53.7)	24(33.3)	37(51.4)	11(15.3)
> 18 - 60		62(46.3)	31(50.0)	23(37.1)	8(12.9)

Table 2: Microscopic Morphological description of Isolated Protozoan Trophozoites

Isolated protozoan	Microscopic Description
<i>Giardia lamblia</i>	Binucleated and both nuclei were symmetrically placed Flagellated with 4 pairs that were posteriorly directed Tear-drop shaped with a characteristic face-like appearance Dorsal surface was convex while the ventral surface had a large concave disc Movement was active
<i>Entamoeba histolytica</i>	Haematophagous and contained red blood cells Had a single nucleus Had long finger-like pseudopodia and movement was actively fast
<i>Entamoeba coli</i>	Do not contain red blood cells Had a single nucleus Do not have finger-like pseudopodia and movement was sluggish.

DISCUSSION

This study has revealed an overall incidence of 53.6% for gastrointestinal protozoan infection. This incidence is high and has a similar trend to that of Adeyaba and Akinlabi, (2002); Mbanugo and Abazie (2002); Mbanugo and Onyebuchi, (2002) in Nigeria and Mbuh *et al.*, (2010) for Buea in Cameroun, both of whom suggested that the incidence of gastrointestinal parasitism is active and could be on the rise worldwide. The situations that encourage close human to human contact and unhygienic conditions such as low socio economic status, migration from areas of high endemicity, areas with warm and humid temperatures, poor sanitation, dirty water and substandard and crowded housing (Rayhan-Hashmey *et al.*, 1996; CDC, 2004; Harhay, *et al.*, 2010) promoting transmission abound in

the study area and are enhanced/elaborated by the current security insurgency by the Boko Haram sect that has led to the crisis of internally displaced persons, with massive movement of peoples from the rural areas into the urban areas. Protozoans isolated from this study were *E. coli* and *E. histolytica* both showing the highest incidence and *Giardia lamblia*.

These are reported to be the major cause of parasitic diarrhea worldwide, and outbreaks have been associated with contaminated food and water, with *E. coli* and *E. histolytica* possessing resistance to environment factors enhancing their longevity (Mbuh *et al.*, 2010). Sex wise male outpatients have been found to have a higher and significant incidence than females in this study. This contradict of findings of Mbuh *et al.*, (2010) that females are more engaged in outdoor

activities and could easily come across contamination with promiscuous defaecation and food materials contaminated with cysts of protozoans. However in this study area it may be due to the socio economic disposition of the population as more males are engaged in outdoor activities than females as a result of religious and cultural restrictions (Biu and Adam, 2004).

Age wise, the younger outpatients of 6 -18 years had a significantly higher ($p < 0.05$) mean incidence than the older outpatients aged between >18 to 60 years. This agrees with the findings by Harhay *et al.*, (2010) that while the whole population will be geographically at risk, the young are observed to disproportionately carry the greatest burden of infection. This disproportion has behavioral, biological and environmental bases. Younger people have low or partial immunity, and tend to be more active in the infected environment and rarely employ good sanitary behaviors. Frequently, these potential carriers are crowded together for long periods of time especially in schools, orphanages and slums, thus increasing the likelihood of transmission or environmental contamination with the parasites (Stanley, 2003). Moreso,

gastrointestinal parasites are "masterful immunoregulators" as they are able to elicit a complex and mixed Th_1 and Th_2 response that both wards of and subverts an immune response from the human host for months or even years (Harhay *et al.*, 2010).

In conclusion, the social and economic impact of gastrointestinal parasitism on human development (such as malabsorption, malnutrition, resultant stunting and anaemia) and capacity (such as diminished cognition, missed school and inability to work) can destabilize endemic communities and reinforce local poverty. This consequently hinders national and regional economic development out of poverty.

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