

Intestinal Parasitosis In Human Immunodeficiency Virus (HIV) Infected Adults With Chronic Diarrhoea At Jos University Teaching Hospital, Nigeria.

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Citation

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Abstract

Objective: To determine the prevalence of intestinal parasitosis in HIV infected adults with chronic diarrhoea at Jos University Teaching Hospital, Nigeria.

Method: A total of 101 single stool specimens from adults (≥ 15 years) who tested positive to HIV by double ELISA, confirmed by the Western blot technique and who presented with chronic diarrhoea of over four weeks duration were examined using direct wet mount, formol-ether and modified Ziehl Neelsen techniques. Relevant history and physical examination was carried out on each of the recruited patients and the nutritional status was assessed using the anthropometric measurements (weight and height for age and Biomass Index).

Results: Sixty-seven of the patients were positive for intestinal parasitosis, giving a prevalence of 61.4%, while 13.9% had polyparasitism. The prevalence of the individual parasites were as follows: *Cryptosporidium parvum* (16.83%), *Enterocytozoon bieneusi/Encephalitozoon intestinalis* (8.91%), *Cyclospora cayentanensis* (1.98%), *Isospora belli* (0.99%), *Entamoeba histolytica* (9.90%), *Giardia lamblia* (1.98%), Hookworm (10.98%), *Trichuris trichiura* (5.94%), *Ascaris lumbricoides* (2.97%), *Strongyloides stercoralis* (1.98%), *Schistosoma mansoni* (3.96%) and *Dicrocoelium dendriticum* (4.95%). *Candida* species (a yeast) was detected in 9.90% of the patients without any intestinal parasite. Males recorded a prevalence of 61.4% as against 70.2% in females ($P > 0.05$). The age group of 15-24 years was the most significantly infected ($P < 0.05$) with a prevalence of 83.3%. There was no significant difference in the prevalence of intestinal parasitosis in relation to the occupational status, marital status, duration of diarrhoea and presence of organomegaly ($P > 0.05$). Conversely, there was a significant difference in relation to Biomass Index and frequency of diarrhoea ($P < 0.05$).

Conclusion: This study has shown a very high prevalence of intestinal parasitosis in HIV-infected adults with chronic diarrhoea and that the coccidian parasites which are not routinely searched for in most centres probably accounted for 29.0% of the diarrhoea in the study population.

INTRODUCTION

In general, diarrhoea may result from poorly absorbable osmotically active solutes in the intestinal lumen (osmotic diarrhoea), active ion secretion (secretory diarrhoea), deranged intestinal motility, altered mucosal morphology or loss of absorptive surface or a combination of the above mechanisms (1). Gastrointestinal diseases particularly diarrhoea, is the commonest presentation of Acquired Immune Deficiency Syndrome (AIDS) in Africa. Diarrhoea occurs in nearly 90% of patients with advanced Human

Immunodeficiency Virus (HIV) infection in Central Africa compared with 30% to 60% in developed countries (2).

Chronic diarrhoea is a very common presentation of HIV infection in Nigeria (3,4,5) with a prevalence of 61% (3).

Diarrhoea in patients with HIV infection may be attributable to a number of conditions which include infection with conventional and opportunistic microorganisms (6, 7), enteropathy (8), malignancy and even treatment with various agents. Thus, HIV related chronic diarrhoea has a multi-factorial aetiopathogenesis with enteric parasites possibly

playing a prominent role. Various microorganisms have been isolated from HIV-infected patients with chronic diarrhoea either singly or in combinations. These include bacteria, viruses and parasites, notably protozoa (7, 9,10,11,12,13).

The objective of this study was to determine the prevalence of intestinal parasites and their association with chronic diarrhoea in HIV-infected adult patients at Jos University Teaching Hospital, Nigeria.

PATIENTS AND METHODS

STUDY POPULATION

This was a case controlled hospital based study of intestinal parasites in HIV-infected adults with chronic diarrhoea at Jos University Teaching Hospital, Nigeria from June 2004 to September 2005. The study population consisted of 101 adults (≥ 15 years) who tested positive to HIV by double Enzyme Linked Immunosorbent Assay (ELISA) and were confirmed by the Western blot technique and who presented with chronic diarrhoea of over four weeks duration. Chronic diarrhoea was defined as three or more episodes of loose stool passed daily for more than four weeks.

Patients who were confirmed HIV positive but did not present with chronic diarrhoea; those on specific antihelminthics or who had any treatment for intestinal parasitism in the last two weeks preceding specimen collection and those who had antacid, bismuth salts, laxatives and/or gastrointestinal contrast media in the last two weeks preceding specimen collection were all excluded from the study.

CLINICAL EVALUATION

Relevant history was taken from each recruited patient and physical examination was carried out on each of the patients as well.

SAMPLE COLLECTION AND ANALYSIS

A total of 101 single stool specimens were collected in wide mouth clean plastic containers from the recruited patients. The faecal samples were subjected to direct wet mount and Formol-ether concentration method as modified by Allen and Ridley (14). Smears were also made from each of the samples and stained by the modified Ziehl Neelsen's method (15) for the coccidial parasites.

The results obtained were subjected to Chi-square (χ^2) statistical analysis at a level of significance of $P = 0.05$.

RESULTS

The demographic data and relative prevalence of the intestinal parasites in the patients are shown on Table I. Sixty-seven of the 101 patients were positive, giving a prevalence of 66.3%, while 13.9% had polyparasitism. In relation to gender, males recorded a prevalence of 61.4% while the females had 70.2% ($\chi^2 = 0.6260$; $P > 0.05$). The age group of 15-24 years was the most significantly infected with a prevalence of 83.3%; while 25-34, 35-44, 45-54 and ≥ 55 years recorded 71.1%, 60.0%, 33.3% and 0.0% respectively ($\chi^2 = 89.4169$; $P < 0.05$).

Intestinal Parasitosis In Human Immunodeficiency Virus (HIV) Infected Adults With Chronic Diarrhoea At Jos University Teaching Hospital, Nigeria.

Figure 1

Table 1: Demographic Data and Relative Prevalence of Intestinal Parasites in HIV Adult Patients with Chronic Diarrhoea in Jos University Teaching Hospital, Nigeria.

Character	No. Examined	No. Positive	% Positive
Gender ($\chi^2 = 0.6260; P>0.05$)			
Males	44	27	61.4
Females	57	40	70.2
Age (Years) ($\chi^2 = 89.4169; P<0.05$)			
1.5-24	12	10	83.3
2.5-34	38	27	71.1
3.5-44	40	24	60.0
4.5-54	09	03	33.3
≥ 55	02	0	0.0
Occupation ($\chi^2 = 2.4398; P>0.05$)			
Civil Servants	39	22	56.4
Housewives	30	21	70.0
Artisans & Students	21	17	81.0
Unemployed	04	02	50.0
Medical Workers	04	03	75.0
Long distance drivers	03	02	66.7
Marital Status ($\chi^2 = 0.3703; P>0.05$)			
Married	66	42	63.6
Single	35	25	71.4
BMI (Kg/m²) ($\chi^2 = 4.3172; P<0.05$)			
Underweight	75	45	60.0
Normal weight	26	22	84.6
Frequency of diarrhea/day ($\chi^2 = 9.3061; P<0.05$)			
Low (1-3 times)	07	05	71.4
Moderate (4-6 times)	89	57	64.0
High (≥ 7 times)	05	05	100.0
Duration of diarrhea (months) ($\chi^2 = 4.2141; P>0.05$)			
2	43	27	62.8
3	33	23	69.7
4	23	16	69.6
≥ 5	02	01	50.0
Presence of organomegaly ($\chi^2 = 0.4167; P>0.05$)			
Splenomegaly	13	07	53.8
Hepatomegaly	11	05	45.5
Parasitism present			
Positive	101	67	66.3
Polyparasitism	101	14	13.9

There was no significant difference in the prevalence of intestinal parasitosis in relation to the occupational status of the patients ($\chi^2 = 2.4398; P>0.05$). The artisans and students recorded the highest prevalence of 81.0%, while civil servants, housewives, unemployed, medical workers and long-distance drivers recorded 56.4%, 70.0%, 50.0%, 75.0%

and 66.7% respectively.

In relation to marital status, the unmarried patients had a prevalence of 71.4%, while the married patients recorded 63.6% ($\chi^2 = 0.3703; P>0.05$). There was a significant difference in the prevalence of intestinal parasites in relation to the Body Mass Index (BMI) ($\chi^2 = 4.3172; P<0.05$). The patients with normal weight recorded a higher prevalence of 84.6% compared with 60.0% in underweight patients.

There was a significant difference in the prevalence of intestinal parasites in relation to the frequency of diarrhoea per day ($\chi^2 = 9.3061; P<0.05$). Patients who had a prevalence of ≥ 7 times had a prevalence of 100%, while those with 1-3 times and 4-6 times recorded a prevalence of 71.4% and 64.0% respectively. With respect to the duration of diarrhoea, there was no significant difference ($\chi^2 = 4.2141; P>0.05$). Patients who had been having diarrhoea for 2, 3, 4 and ≥ 5 months recorded a prevalence of 62.8%, 69.7%, 69.6% and 50.0% respectively. There was no significant difference in the prevalence of the intestinal parasites in relation to organomegaly ($\chi^2 = 0.4167; P>0.05$). Those with splenomegaly recorded 53.8% as against 45.5% in those with hepatomegaly.

Table 2 shows the prevalence of the individual parasites.

Figure 2

Table 2: Prevalence of Intestinal Parasites in HIV-Infected Adult Patients (n = 101) with Chronic Diarrhoea at Jos University Teaching Hospital, Nigeria.

Parasite	No. Isolated	Relative %
<i>Cryptosporidium parvum</i>	17	16.83
<i>Enterocytozoon bienersi/</i> <i>Encephalitozoon intestinalis</i>	09	8.91
<i>Cyclospora cayatanensis</i>	02	1.98
<i>Isospora belli</i>	01	0.99
<i>Entamoeba histolytica</i>	10	9.90
<i>Giardia lamblia</i>	02	1.98
Hookworm	11	10.89
<i>Trichuris trichiura</i>	06	5.94
<i>Ascaris lumbricoides</i>	03	2.97
<i>Strongyloides stercoralis</i>	02	1.98
<i>Schistosoma mansoni</i>	04	3.96
<i>Dicrocoelium dendriticum</i>	05	4.95
Polyparasitism	14	13.86
<i>Candida species</i>	10	9.90

Cryptosporidium parvum recorded the highest prevalence of 16.83%. The other parasites and their prevalences are *Enterocytozoon bienersi/Encephalitozoon intestinalis* (8.91%), *Cyclospora cayatanensis* (1.98%), *Isospora belli*

(0.99%), *Entamoeba histolytica* (9.90%), *Giardia lamblia* (1.98%), Hookworm (10.89%), *Trichuris trichiura* (5.94%), *Ascaris lumbricoides* (2.97%), *Strongyloides stercoralis* (1.98%), *Schistosoma mansoni* (3.96%) and *Dicrocoelium dendriticum* (4.95%). *Candida* species (a yeast) was detected in 9.90% of the patients without any intestinal parasite.

DISCUSSION

This study has shown a very high prevalence of intestinal parasitosis in HIV-infected adult patients with chronic diarrhoea at Jos University Teaching Hospital, Nigeria. This prevalence rate of 66.3% is similar to the 50%-80% found by Ramakrishna in Vellore, India (16) and 62.6% found by Tarimo et al (17) in North Eastern Tanzania. The prevalence in this study is higher than that by Merlin et al (18) in Argentina that recorded a prevalence of 52.3% in HIV patients with chronic diarrhoea and the 51.9% obtained by Awole et al (19) in South Western Ethiopia. It is also higher than the 48.2% obtained at the same Jos University Teaching Hospital in 2000 by Keptcheu et al (6).

The 16.83% prevalence of *Cryptosporidium parvum* infection in this study is consistent with the 20% and 22% ranges recorded by Valasquez et al (20) in Argentine AIDS patients with chronic diarrhoea, although a higher prevalence was obtained in studies using jejunal biopsies (21). On the other hand, a few studies in Nigeria (22, 23) did not detect *C. parvum*, and this is surprising as this coccidian parasite has even been found in the faeces of apparently healthy persons by Ikeh et al (24) in their study in North Central Nigeria.

Enterocytozoon bienersi/Encephalitozoon intestinalis infection that had a prevalence of 8.91% has been shown by various authors to be associated with chronic diarrhoea in AIDS patients (11, 20, 25). Also, *C. cayetanensis* infection that recorded a prevalence of 1.98% has been associated with diarrhoea in AIDS patients (26). *Isospora belli* with a prevalence of 0.99% in this study has similarly been associated with chronic diarrhoea in AIDS patients (27). The coccidian parasites (*C. parvum*, *I. belli*, *C. cayetanensis*, *E. bienersi/E. intestinalis*) accounted for 29.0% of chronic diarrhoea in this study and thus, efforts should be made to routinely search for these parasites in this category of patients. Although, cryptosporidiosis and microsporidiosis have been reported in immunocompetent patients, diseases caused by these parasitic agents are much more common in the immunocompromised hosts (24, 28).

The intestinal helminths that were detected in this study are

similar to those that were reported by Keptcheu et al (6) and Nwokediuko et al (23). Both studies had shown that there might not be any relationship between intestinal helminths and diarrhoea in HIV infections. Tarimo et al (17) in Tanzania detected similar spectrum of helminths, but concluded that only the protozoa in that study could have accounted for the chronic diarrhoea.

The eggs of *Dicrocoelium dendriticum* that were detected in the faecal samples were confirmed cases of spurious parasitism due to the frequent consumption of liver diets by the AIDS patients to improve their nutritional status. The detection of large numbers of *Candida* species in the absence of any parasitic intestinal pathogen might be suggestive that *Candida* species is an aetiological agent of diarrhoea in AIDS patients. The proliferation of *Candida* species in the intestinal tract might be due to the frequent use of broad spectrum antibiotics to stop or reduce the recurrent diarrhoea.

The high rate of polyparasitism encountered in the study could be due to the depressed immunity in the patients, coupled with the increased habit of trying to consume vegetables and fruits which may not be adequately washed. Our study has indicated that there is no positive relationship between intestinal parasitosis and gender, occupational status, marital status, duration of diarrhoea and organomegaly ($P>0.05$). On the contrary, there is a significant difference in the prevalence of intestinal parasitosis in relation to the age groups, BMI, and frequency of diarrhoea per day. Patients within the age groups of 15 years to 44 years were more significantly infected. This is expected as this is the sexually active group who are more likely to acquire HIV infection.

Patients with normal BMI were more significantly infected than the underweight patients. This might be attributed to the reason that the patients with normal BMI were still stronger than the underweight patients and so they are more likely to be exposed to these parasites. On the contrary, the underweight patients may be too weak to help themselves and so the care-givers do most of the house chores for them. They are therefore, less exposed to parasitic infections compared to the normal weight patients.

In conclusion, this study has shown that the coccidial parasites, which in most cases, are not routinely searched for in the diarrhoeic faecal samples, were responsible for some of the chronic diarrhoeal cases in HIV infected patients.

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