
FULL LENGTH RESEARCH ARTICLE

**THE PREVALENCE OF INTESTINAL PROTOZOANS
IN HIV/AIDS PATIENTS IN ABUJA, NIGERIA.**

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ABSTRACT

A study to establish the prevalence of intestinal parasitic protozoans in HIV/AIDS patients was carried out in Abuja, Nigeria between May- December, 2006. 900 persons were examined, among which 700 were HIV/AIDS seropositive while 200 were seronegative. The 200 seronegative were used as control. Of the 700 HIV seropositives, 28.1% had intestinal protozoans while only 7.5% of the HIV seronegative had intestinal protozoans. Of the 9 intestinal parasites found in the HIV seropositive individuals, only 4 (*I. belli*, *C. cayetanensis*, *E. bieneusi* and *B. coli*) were not seen in HIV seronegative individuals. A significant difference ($P < 0.05$) was observed at the rate of infection with intestinal protozoans between the HIV seropositive and HIV seronegative.

KEYWORD: Intestinal protozoan, HIV/AIDS, Prevalence, Abuja-Nigeria.

INTRODUCTION

Intestinal parasitosis is an important health problem affecting people in both developing and developed regions of the world. Although this is usually self-limiting and almost invariably non-fatal, it results in significant morbidity (Stark *et al.*, 2007).

One of the major health problems among HIV seropositive patients in Sub-Saharan Africa is superimposed infection due to suppressed immunity caused by intestinal parasites (Eamsobhana & Boranintra, 1987). It is a major source of disease in tropical countries (Okoduwa *et al.*, 2003) that multiply easily within immunocompromised patients (Chessbrough, 1998). Parasitic infection of the gastrointestinal tract is an important cause of morbidity that contributes to the development of malabsorption, malnutrition and anaemia among Nigerians (James *et al.*, 1988).

Intestinal protozoans are frequently transmitted by unhygienic habits that include direct transfer of ova or cysts to mouth, eating with unwashed hands, eating and drinking of contaminated food and drink and poor sanitary conditions (Okpala *et al.*, 1961, James *et al.*, 1988; Ramakrishnan *et al.*, 2007).

It has been postulated that colonization of the intestinal tract by parasites may be influenced by enteropathy induced by infection with HIV (Sher *et al.*, 1992; Weber *et al.*, 1992) and that the gut of HIV infected individuals may not be a favourable environment for the establishment and or survival of extracellular parasites but intracellular and mucosal dwelling protozoans (Hunter *et al.*, 1992; Weber *et al.*, 1992). In Australia, high rate of enteric protozoans have been documented among HIV-positive homosexuals as against HIV negative homosexuals men (Stark *et al.*, 2007).

This cross sectional work is aimed at documenting the prevalence of intestinal protozoans in HIV/AIDS patients in Abuja, Nigeria.

MATERIALS AND METHODS

The study was conducted between May-December 2006 in 3 secondary health facilities (Asokoro District Hospital, Maitama District Hospital and Wuse General Hospital) and one tertiary health facility (National Hospital) all in Abuja-the Federal Capital Territory of Nigeria located at latitude 9° 4' 60N and longitude 7° 31' 60E. It has an undulating terrain and 3 marked weather conditions of rainy season, dry season and a brief interlude of harmattan. The total annual rainfall ranges between 1100mm and 1600mm. The average annual temperature ranges between 27 °C - 30 °C.

Ethical clearance: The ethical clearance committee of the various centres approved the study: REF/FCDA/HHSS/MDH/GEN/155/I (for Maitama District Hospital); REF/FCTA/HHSS/ADH/GEN/99/Bol.II/263 (for Asokoro District Hospital); REF/FCTA/HHSS/WGH/EST/4/VOL.II (for Wuse General Hospital) and the National Hospital Abuja. Informed consent was obtained from volunteers and questionnaires administered to them according to the various hospital guidelines.

Subject selection and sample collection: 900 persons were studied comprising 700 HIV – seropositive and 200 HIV seronegative patients. Samples from the seronegative patients were used as control. Stool samples were collected from patients within a period of 24 hrs and taken to the laboratory for processing and examination. Specimens that could not be processed immediately were preserved in 10% formalin to prevent bacterial action (Mohandas *et al.*, 2002).

Examination of samples

Amoebae, flagellates and ciliates were identified using the formal-

ether concentration method (Markell *et al.*, 1986). It was specifically done for the identification of amoebae viz: *Blastocystis hominis*, *Entamoeba histolytica*, *Entamoeba coli*, *Giardia lamblia* and *Balantidium coli*.

Euccocidians- Modified Ziehl Neelson (Z-N) staining method was employed for the identification of Euccocidians. It was done for the identification of *Cryptosporidium parvum*, *Cyclospora cayetanensis* and *Isospora belli*.

Microsporidium-were identified using the modified Giemsa stain technique of Markell *et al.* (1986) and specifically used for the detection of *Enterocytozoon bieneusi*.

Statistical Analysis: All data's were analyzed statistically using chi-square.

RESULTS

The distributions of samples according to health facility is displayed on Table 1. Of the 900 persons sampled, 212 (23.56%) were positive to intestinal protozoans. Out of the 700 HIV seropositive patients, 197(28.1%) had intestinal protozoans, while only 15 (7.5%) of 200(22.82%) of the HIV seronegatives were positive with intestinal parasites.

There was no significant difference in the infection rate of sampled patients among the various hospitals ($\chi^2 = 5.84$; $Df=3$; $P > 0.05$) (Table 1). Of the 197 (28.1%) protozoan infected HIV seropositive patients, 67 (9.56%) were from the National hospital while the highest among the HIV seronegatives was 7(3.50%) at the Asokoro district hospital.

Table 2 shows the distribution of intestinal parasites amongst the HIV seropositives and seronegatives. The most prevalent of the intestinal parasites among the seropositives was *E. histolytica* (36.79%), followed by *C. parvum* (30.19%) and the least common being *I. belli* 5(2.36%). *E. histolytica* (2.36%) was also high amongst the seronegatives with many of the other parasites absence. There was a significant difference ($P < 0.05$) in the protozoan infection rate between the HIV seropositives and seronegatives.

Table 2 shows that the *amoebas* group were more commonly encountered, being 111(56.35%) in the HIV seropositives and 14(93.33%) in the seronegatives. This was closely followed by the *euccoccidian* group with 78(39.59%) in the HIV seropositives and only 1(6.67%) in the HIV seronegatives. The *microsporidian* group are rare and uncommon where only *Enterocytozoon bieneusi* was found with 8(4.06%) prevalence in the HIV seropositive group.

TABLE 1. PREVALENCE OF INTESTINAL PROTOZOANS IN STOOL SAMPLES

Hospital	HIV sero +ve		HIV sero -ve	
	No Examined	No (%) protozoan	No examined	No (%) protozoan
National Hospital	200	67(9.56%)	50	2(1.00%)
Asokoro District Hospital	171	43(6.13%)	50	7(3.50)
Wuse General Hospital	186	54(7.70)	50	3(1.50)
Maitama District Hospital	143	33(4.71%)	50	3(1.50)
Total	700	197(28.1%)	200	15(7.50)

($\chi^2 = 5.84$; $df = 3$; $P > 0.05$)

TABLE 2. INTESTINAL PROTOZOANS DETECTED IN INDIVIDUALS.

Intestinal protozoan	No(%) from HIV +ve	No(%) from HIV -ve
AMOEBAS, FLAGELLATES AND CILIATES		
<i>Blastocystis hominis</i>	6(2.83)	2(0.94)
<i>Entamoeba histolytica</i>	78(36.79)	5(2.36)
<i>Entamoeba coli</i>	10(4.72)	3(1.46)
<i>Giardia lamblia</i>	16(7.55)	4(1.89)
<i>Balantidium coli</i>	1(0.1)	0
Total	111(56.35)	14(93.33)
EUCOCCIDIANS		
<i>Cryptosporidium parvum</i>	64(30.19)	1(0.39)
<i>Cyclospora cayetanensis</i>	9(4.25)	0
<i>Isospora belli</i>	5(2.36)	0
Total	78(39.59)	1(6.67)
MICROSPORIIDIUM		
<i>Enterocytozoon bieneusi</i>	8(3.77)	0
Total	197(92.93)	15(7.08)

($\chi^2 = 19.05$; $df = 8$; $P < 0.05$)

DISCUSSION

The study revealed a high prevalence rate of intestinal protozoan amongst the HIV seropositives compared to HIV seronegatives. The result showed that *E. histolytica* was more prevalent 78(36.79%) among HIV seropositives and low 5(2.36%) in the seronegatives. In their studies, Ikeh *et al.*, (2006) also recorded a high prevalence of *E. histolytica* (18.3%) in an urban population in North-central Nigeria. Reports from Asia (Mohandas *et al.*, 2002; Sadraei *et al.*, 2005) found *C. parvum* to be the most common parasite in North India with *Isospora belli* much lower. In South India, higher prevalence of *I. belli* was reported than both *C. parvum* and *E. histolytica* (Mukhopadhyaya *et al.*, 1999; Kumar *et al.*, 2002). The reasons for these differences could be the environmental and behavioural pattern of the people in these regions. In Abuja for instances, the environment which is a tropical region favours the survival of ova of most intestinal helminthes and cysts of protozoans. The people also have a habit of eating with bare hands which might have been contaminated with ova and/or cysts from the environment.

In a separate study of HIV seropositive and seronegative homosexuals in Australia, Stark *et al.*, (2007) observed *Blastocystis hominis* as the most commonly detected parasites in both populations while *Giardia lamblia* was the most prevalent of the pathogenic protozoan detected in the 3 groups. This finding suggests that this pathogen is not spread by the anal-oral route or the faecal-oral route. Such transmission is probably secondary to intermittent, sporadic shedding of cysts and that *Giardia* is predominantly a small bowel pathogen (Ali & Hill, 2003).

In the amoebas, flagellates and ciliates group, Amongst the HIV seropositives, *E. histolytica* 78(36.79%) was more common closely followed by *G. lamblia* 16(7.22%), then *E. coli* 10(4.72%) and the least being *B. coli* 1(0.1%). In a study using new diagnostic test, Stanley (2003) reported a high prevalence of *E. histolytica*. Also, an increasing rate of HIV-seropositive status among amoebic liver abscess patients indicates that HIV-seropositive or AIDS patients are more susceptible to an invasive form of the disease (Shamsuzzaman & Hashiguchi, 2002). Gupta *et al.*, (2008) also reported that among the non-coccidian parasites, *G. lamblia* was the commonest with 7.8% followed by *S. stercoralis* and *E. histomonas* with 2.6% each. That among the 13 stool specimens they examined from HIV negative patients, *G. lamblia* (53%) was the commonest parasite followed by *E. histolytica* (23%), hookworm (7.6%) and *Ascaris lumbricoides* (7.6%). They did not encounter opportunistic coccidian parasite from the stool samples belonging to the HIV negative patients.

In the *eucoccidian* group, *C. parvum* was more prevalent 64(30.19) in the HIV seropositive and rare 1(0.39%) in HIV seronegative. In the present study, both *Cyclospora cayetanensis* 9(4.25%) and *Isospora belli* 5(2.36%) were detected only in the HIV seropositive. This negates the report of Gupta *et al.*, (2008) who observed among the coccidian parasites, a preponderance of *Isospora belli* (50%) followed by *Cryptosporidium spp* (22.6%) and *Cyclospora cayetanensis* (2.6%) and that no opportunistic coccidian parasite was detected from the stool samples of HIV negative patients.

Also in this report, *E. bienensis* was the only *microsporidian* found. This parasite was also reported by Cotte *et al.*, (1993) in France who found 2% infections in HIV patients. *C. cayetanensis*, *I. belli*, *E. bienensi* and *B. coli* were not found in the HIV seronegatives which may be due to differences in immunological profile susceptibility as well as factors

related to sanitation and the environment (Ramakrishnan *et al.*, 2007).

It is concluded that HIV-infected patients in Abuja have high prevalence of opportunistic intestinal parasites. Therefore opportunistic intestinal parasitic infections should be suspected in any HIV-infected patient and incorporated as part of the diagnosis routine. The importance of tropical epidemic non-opportunistic intestinal parasite infections should not be neglected.

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