

Original Article

Intestinal Parasitic Infections in HIV/AIDS and HIV Seronegative Individuals in a Teaching Hospital, Ethiopia

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SUMMARY: The magnitude of intestinal parasitic infection in human immunodeficiency virus (HIV)/AIDS patients requires careful consideration in the developing world. However, there have been very few studies addressing this issue in Ethiopia. This study was conducted to determine the prevalence of intestinal parasitic infection in HIV/AIDS patients at Jimma Hospital, Southwest Ethiopia, between January and February 2002. Stool specimens from HIV/AIDS patients and control groups were screened for intestinal parasitic infections using direct and formalin-ether sedimentation concentration methods. Out of 78 HIV/AIDS patients, 52.6% (41/78), and out of 26 HIV-negative individuals, 42.3% (11/26), were infected with one or more types of intestinal protozoa and/or helminthes. The parasites detected among HIV/AIDS patients included *Ascaris lumbricoides* (30.8%), *Blastocystis* spp. (14.1%), *Entamoeba histolytica* (10.3%), *Trichuris trichiura* (6.4%), *Strongyloides stercoralis* (5.1%), *Giardia lamblia* (3.8%), *Schistosoma mansoni* (2.5%), hookworm species (2.5%), and *Taenia* spp. (1.3%). Multiple infections were more common among HIV/AIDS patients. *Blastocystis* spp. were found to be significantly higher in HIV/AIDS patients than in controls ($P < 0.05$). The magnitude of intestinal parasitic infection was high both in HIV/AIDS patients and in controls. Routine examinations of stool samples for parasites would significantly benefit the HIV- infected and uninfected individuals by contributing to reduce morbidity.

INTRODUCTION

Intestinal parasitic infections are amongst the most widespread of all chronic human infections worldwide. The rate of infection is remarkably high in sub-Saharan Africa, where the majority of human immunodeficiency virus (HIV) and AIDS cases are concentrated (1,2). In Ethiopia too, the ecology of intestinal parasitism is very wide (3). Further, it was estimated that over two million people were infected and living with the HIV virus at the end of the year 2002 (2).

Diarrhea, defined the passage of loose or watery stools at least three times in 24 h, is one of the clinical manifestations of HIV infection and usually tends to be chronic (4). In tropical countries, an episode of chronic diarrhea that begins acutely and lasts for more than 4 weeks (4), is associated with weight loss and is often the presenting illness of HIV-infected individuals. This diarrhea wasting syndrome, in association with a positive HIV serology test, is an AIDS-defining illness in the World Health Organization (WHO)'s classification (5).

There are very few reports detailing the interaction between HIV and parasites in Ethiopia (6-9). Thus, this study aimed at determining the prevalence of intestinal parasitic infections among HIV/AIDS patients from a referral hospital in Southwest Ethiopia.

MATERIALS AND METHODS

This cross-sectional study was conducted in January and February 2002 at Jimma Hospital, a tertiary level teaching and central referral hospital in Southwestern Ethiopia. The study was ethically approved by the Research and Publications Office of Jimma University. After providing their informed consent, subjects presenting with diarrhea and manifesting clinical signs of AIDS as defined by WHO (5) were selected as study participants. Controls were diarrhea patients without clinical signs of HIV infection and AIDS. A structured questionnaire was used to collect socio-demographic characteristics.

Stool specimens were collected according to WHO standard procedure and examined microscopically following direct and formalin-ether concentration methods (10). In brief, stool samples were collected in labeled, leak-proof, and clean plastic stool cups and brought to the laboratory immediately. Direct microscopy of the smears in saline (0.85% NaCl solution) and Lugol's iodine was performed for the detection of ova, larvae, trophozoites, and cysts of intestinal parasites. In addition, a concentration procedure was employed that involved mixing the stool samples with formalin, treating with ether, and centrifuging. The layers of ether, formalin, and debris were discarded, and the residues were used to investigate for the presence of intestinal parasites (10).

HIV serostatus was studied from plasma using an enzyme linked immunosorbent assay (Vironostica HIV Uni-Form II plus O, Organon Teknika, Boxtel, the Netherlands).

The data was entered and analyzed using the SPSS version 10 statistical package. A comparison of the frequency

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of parasites between cases and controls was performed by chi-square test. Subsequently, the Wilcoxon Rank Sum test was used to compare multiple parasitic infections in cases and controls. P value <0.05 was considered significant.

RESULTS

A total of 104 individuals were enrolled in the study. Seventy-eight (75%) were clinically and laboratory confirmed HIV/AIDS patients with a mean age of 29 years. Of these, 42 (53.8%) were males and 36 (46.2%) were females (Table 1). The HIV seronegative control group included 26 subjects (Table 1). There were no statistically significant differences between males and females in the HIV/AIDS group on the HIV seronegative control group ($P > 0.05$). However, a significant number of the study participants were in the age range of 25 to 44 years ($P < 0.05$).

Intestinal parasites were detected in 52.6% of the HIV/AIDS patients and in 42.3% of the controls. Table 2 shows the prevalence of intestinal parasites detected in the study subjects. No statistically significant difference in prevalence of individual parasite species was detected between cases and controls excepting that of *Blastocystis* spp., which were significantly higher in HIV/AIDS patients ($P < 0.05$). Helminthic intestinal parasites were more common than protozoans both in HIV/AIDS patients (48.7% versus 28.2%) and in controls (42.3% versus 7.8%) (Table 2), $P < 0.05$.

Table 3 shows the magnitude of single and multiple parasitic infections in HIV/AIDS patients and in controls. Multiple parasitic infections were observed in a total of 15 HIV/AIDS and 2 HIV-negative controls. This difference was

Table 3. Single and multiple parasitic infections in HIV/AIDS patients and controls at Jimma Hospital, Jimma, 2002

Subjects	Parasites detected			
	One No. (%)	Two No. (%)	Three No. (%)	Four No. (%)
HIV/AIDS patients $n = 41$	26 (63.4)	12 (29.3)	2 (4.8)	1 (2.4)
Controls $n = 11$	9 (81.8)	2 (18.2)	0 (0.0)	0 (0.0)

significantly higher in HIV/AIDS patients than in controls ($P < 0.05$). The pattern of parasite combinations in HIV/AIDS patients was 2, 3, and 4 in 12 (29.3%), 2 (4.8%), and 1 (2.4%) patients, respectively. In the HIV-seronegative subjects, however, only 2 (18.2%) were each found to have a combination of 2 parasites. The species of parasites most frequently seen in multiple infection in HIV/AIDS patients were *Ascaris lumbricoides* and *Blastocystis* spp.

DISCUSSION

HIV infection is now a major threat to peoples in sub-Saharan Africa (2). It has also been associated with chronic diarrhea in a considerable number of infected adults (11). This emphasizes the importance of taking HIV infection into account when addressing the problem of chronic diarrhea in Africa, and probably in other parts of the world, in addition to that of the diarrheagenic intestinal parasites. Intestinal parasitic infections are among the leading causes of morbidity and mortality in patients infected with HIV. Chronic infection with helminthes illustrates best some of the elements of chronic immune activation that may also be found in HIV infection (12). This type of immune activation has been suggested as a major factor for the increased susceptibility and progression of HIV infection in Africa and other developing countries (13). Clearly, there is a need to clarify the magnitude of the problem and develop a plan for intervention, particularly considering the terrible menace of the HIV pandemic.

In this study, no significant association between HIV/AIDS and the common intestinal parasites was evident. Only *Blastocystis* spp. was more prevalent in HIV/AIDS patients than in controls, as has been reported in other studies (5,14). This indicates that the organism might be a possible pathogenic agent among immunocompromised patients, though its role has yet to be fully explained. It is interesting to note that helminthic intestinal parasites were more prevalent than protozoan in the study participants, as was reported previously from Ethiopia (6-9).

Our finding of a remarkable proportion of intestinal parasites in HIV/AIDS patients and HIV-uninfected controls is in agreement with findings in previous reports from Ethiopia and other developing countries of the world (6-9,14-20). The detection of such common intestinal parasites in both patients and controls could be a reflection of the poor environmental sanitation and personal hygienic practices, which emphasize the need for intervention measures at the community level to reduce the risk factors of acquiring intestinal parasites. It was also evident that multiple parasitic infections were more common in HIV/AIDS patients than in HIV seronegative controls, which strongly indicates the facilitated establishment of parasites in immunocompromised patients. It is very important to target these common infections while treating

Table 1. Age and sex distribution of HIV/AIDS patients and controls at Jimma Hospital, Jimma, 2002

Age	AIDS patients		Controls	
	Male No. (%)	Female No. (%)	Male No. (%)	Female No. (%)
1- 5 years	3 (3.9)	7 (8.9)	1 (3.8)	1 (3.8)
15-24 years	7 (8.9)	6 (7.7)	3 (11.5)	0 (0.0)
25-44 years	27 (34.6)	21 (26.9)	10 (38.5)	9 (34.6)
> 45 years	5 (6.4)	2 (2.6)	2 (7.7)	0 (0.0)
Total	42 (53.8)	36 (46.2)	16 (61.5)	10 (38.5)

Table 2. Prevalence of intestinal parasites in HIV/AIDS patients and controls in Jimma Hospital, Jimma, 2002

Parasite species	AIDS patients $n = 78$	Controls $n = 26$
	No. (%)	No. (%)
<i>Ascaris lumbricoides</i>	24 (30.8)	6 (23.1)
<i>Strongyloides stercoralis</i>	4 (5.1)	1 (3.8)
<i>Blastocystis</i> spp.	11 (14.1) ¹⁾	0 (0.0)
<i>Entamoeba histolytica</i>	8 (10.3)	1 (3.8)
<i>Trichuris trichiura</i>	5 (6.4)	2 (7.7)
<i>Giardia lamblia</i>	3 (3.8)	1 (3.8)
<i>Schistosoma mansoni</i>	2 (2.5)	1 (3.8)
Hookworm	2 (2.5)	1 (3.8)
<i>Taenia saginata</i>	1 (1.3)	0 (0.0)
All helminths	38 (48.7)	11 (42.3)
All protozoa	22 (28.2)	2 (7.8)
Total infected	41 (52.6)	11 (42.3)

¹⁾: $P < 0.05$.

HIV sero-positive patients for opportunistic infections in developing countries like Ethiopia, considering the implication that chronic helminthes infection facilitates the progression of HIV infection to clinical AIDS (13).

In conclusion, the magnitude of intestinal parasitic infection was high both in HIV/AIDS patients and controls. Routine examination of stool samples for parasites could significantly benefit the HIV-infected and -uninfected individuals by contributing to reduce morbidity and improved quality of life.

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