Alexandria Journal of Medicine (2016) **xxx**, xxx–xxx

HOSTED BY

ELSEVIER

Alexandria University Faculty of Medicine

Alexandria Journal of Medicine

http://www.elsevier.com/locate/ajme

Prevalence of intestinal parasites in newly diagnosed HIV/AIDS patients in Ilorin, Nigeria

O.A. Obateru [a], B.J. Bojuwoye [b], A.B. Olokoba [b,*], A. Fadeyi [c], A. Fowotade [d], L.B. Olokoba [e]

[a] *Department of Medicine, Federal Medical Centre, Lokoja, Nigeria*
[b] *Department of Medicine, University of Ilorin Teaching Hospital, Ilorin, Nigeria*
[c] *Department of Microbiology, University of Ilorin Teaching Hospital, Ilorin, Nigeria*
[d] *Department of Microbiology, University College Hospital, Ibadan, Nigeria*
[e] *Department of Ophthalmology, General Hospital, Ilorin, Nigeria*

Received 3 January 2016; revised 11 April 2016; accepted 12 April 2016

KEYWORDS

Intestinal parasites;
HIV/AIDS;
Newly diagnosed;
Treatment naive;
Adults

Abstract *Background:* Human immune-deficiency virus/acquired immune-deficiency syndrome predisposes to opportunistic parasitic infestations of the gastrointestinal tract. This study aimed to determine the prevalence of intestinal parasites in newly diagnosed treatment naïve HIV/AIDS patients.

Methods: This hospital-based cross-sectional study was carried out from December 2010 to June 2011. Questionnaires were administered to 238 HIV/AIDS subjects, and 238 age and sex-matched controls. $CD4^+$ T cell count was carried out on HIV-positive subjects. Stool samples were examined using direct microscopic and modified Ziehl-Neelsen methods. Positivity of intestinal parasites was taken as the presence of worms, oocyst, cyst, ova or larvae in the stool samples.

Results: Ninety males and 148 females were studied for the HIV-positive and HIV-negative controls respectively. Intestinal parasitic infestation in HIV-positive subjects was 68.5%, and was significantly higher than in the HIV-negative controls 49.2% ($P < 0.05$). In HIV-positive subjects, *Cryptosporidium* spp. was the commonest (55.0%) parasite isolated. Others were *Cyclospora cayetanensis* (41.2%), *Isospora belli* (3.0%), *Entamoeba histolytica* (8.4%), *Giardia lamblia* (3.7%), *Ascaris lumbricoides* (2.5%), *Strongyloides stercoralis* (1.7%), *Trichuris trichiura* (0.8%) and *Schistosoma mansoni* (0.4%). HIV-positive patients with $CD4^+$ T cell count of less than 200 cells/ul were more at risk of opportunistic parasites compared to the HIV-negative controls.

Conclusion: The prevalence of intestinal parasites in newly diagnosed HIV/AIDS individuals was high, and its association with $CD4^+$ T cell count was demonstrated. Routine screening for parasitic infestations at diagnosis is indicated to reduce the burden of the disease.

* Corresponding author. Tel.: +234 8038050480.
E-mail address: drabolokoba@yahoo.com (A.B. Olokoba).

Peer review under responsibility of Alexandria University Faculty of Medicine.

http://dx.doi.org/10.1016/j.ajme.2016.04.001

Please cite this article in press as: Obateru OA et al. Prevalence of intestinal parasites in newly diagnosed HIV/AIDS patients in Ilorin, Nigeria, *Alex J Med* (2016), http://dx.doi.org/10.1016/j.ajme.2016.04.001

1. Introduction

Human immune-deficiency virus/acquired immune-deficiency syndrome (HIV/AIDS) is a global public health problem.[1] The disease predisposes individuals to various opportunistic infections of which parasitic infestations of the gastrointestinal (GI) tract are prominent.[2] Several studies have shown that some intestinal parasites such as *Cryptosporidium* spp., *Cyclospora cayetanensis*, *Isospora belli*, *Entamoeba histolytica/dispar*, *Strongyloides stercoralis*, and *Giardia lamblia* are responsible for 60–80% of infestations.[3] Thus infestation of the GI tract by these organisms plays a crucial role in HIV/AIDS pathogenesis, and diarrhoea diseases assume a prominent role reaching up to 50% in developing countries.[2] The decrease in immunity by attack on the immune system especially the cluster of differentiation ($CD4^+$ T cells) component, macrophages, and defect in the production of immunoglobulin A (IgA) increases susceptibility to these parasites.[4] Gut-associated lymphatic tissue (GALT) in the GI tract is an important site for early HIV replication and $CD4^+$ T cell replication.[5]

Helper T cells which are very important in adaptive immunity, activate B cells to secrete antibodies, activate macrophages to destroy ingested microbes, and also activate cytotoxic T cells to kill infected target cells. These functions are impaired in patients with HIV/AIDS.[6] Furthermore, HIV/AIDS decrease the circulating pool of effector, and memory CD8+ T cells which combat viral infections. The end result is immunosuppression.[7] There have been reports of the prevalence of intestinal parasites in HIV/AIDS patients in other parts of Nigeria and the world.[8–14] Ibrahim et al.[8], and Babatunde et al.[9], in North central, Nigeria, found an increase in the prevalence of intestinal parasites in HIV-positive patients compared to HIV-negative controls. Similarly, Akinbo et al.[10], Hailemariam et al.[11], Alemu et al.[12], Jegede et al.[13], and Oyedeji et al.[14] all found an increase in the prevalence and multiple intestinal parasitosis in HIV-positive Nigerian and Ethiopian patients compared with HIV-negative controls. These studies were mostly on patients already on highly active anti-retroviral therapy (HAART). There is a paucity of data on similar studies on treatment naïve HIV/AIDS patients. It is thus important to find out the common intestinal parasites in newly diagnosed treatment naïve adult HIV/AIDS patients in Ilorin, Nigeria, since these parasites play a prominent role in diarrhoeal diseases, and HIV/AIDS pathogenesis.

This study therefore aimed to determine the prevalence of intestinal parasites in newly-diagnosed treatment naive HIV/AIDS patients.

2. Subjects, materials and methods

The study was a hospital-based cross-sectional study carried out over a six-month period (December 2010–June 2011), at the Infectious disease clinic of University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria. A standard structured questionnaire was administered to consecutive 238 newly diagnosed treatment naive adult HIV/AIDS patients, and 238 age and sex-matched HIV-negative controls whose blood and stool samples were tested at first enrolment. Individuals who had taken antibiotics, anthelmintic drugs and steroids prior to enrolment were excluded from the study.

2.1. Specimen collection

Blood sample: Ten millilitres of venous blood samples were collected aseptically into labelled EDTA specimen bottles. Rapid Enzyme-linked immunosorbent assay (ELISA) was carried out to detect antibodies to HIV 1 and 2 using rapid ELISA test kit (AcuuBio Tech Co., Ltd., China). $CD4^+$ T cell count was carried out with Partec 4000 cyflow counter Germany (2006) at the HIV laboratory of UITH.[15] The range of $CD4^+$ T cell count was classified using the 1993 Center for Disease Control and Prevention USA, immunological criteria.[16]

Stool sample: Stool samples were collected into sterile containers, labelled, and analysed within 24 h of collection. Stool samples were examined using direct microscopy for wet preparation, and iodine preparation.[17,18] Modified Ziehl-Neelsen methods, and Faecal concentration technique (using formol ether concentration method) were also used to increase the yield of intestinal parasites. Positivity of intestinal parasites was taken as the presence of worms, ova, trophozoites, oocysts and cysts in the stool samples.[17–19]

Data analysis: Epi-info™ version 3.5.1(CDC, USA 2008) software package was used for analysis. Statistical significance was taken as p-value less than 0.05.

Ethical approval was obtained from the Ethics and Research committee of UITH.

3. Results

There were 90 males (37.8%) and 148 females (62.2%) in both groups, with a male to female ratio of 0.6:1. The age range for both groups (HIV-positive subjects and HIV-negative controls) was from 16 to 65 years. The mean age of respondents was 36.1 ± 9.6 years and 35.9 ± 9.4 years for the HIV-positive subjects and HIV-negative controls respectively. The commonest age group was 26–35 years for both HIV-positive subjects and HIV-negative controls. The mean age of the respondents was similar ($P > 0.05$). Majority of the respondents were married, and secondary school level of education was the highest level of education attained by them. Most of the respondents were of Yoruba ethnic origin, and trading was the major occupation of the HIV-positive subjects, while most of the HIV-negative controls were self-employed (Table 1).

The prevalence of intestinal parasites in HIV-positive subjects and HIV-negative controls was 68.5% and 49.2% respectively. HIV-positive subjects had increased risk of intestinal parasites compared to HIV-negative controls ($P < 0.05$); OR = 2.25 CI (1.52–3.32).

The most frequently detected parasites in the HIV-positive subjects and HIV-negative controls were *Cryptosporidium* spp. and *C. cayetanensis*. These were significantly higher in the HIV-positive subjects than in HIV-negative controls (55% vs 16.8%) ($X^2 = 73.97$: $P < 0.05$) and (41.2% vs 8.4%) ($X^2 = 66.81$; $P < 0.05$) respectively. There were no statistically significant differences in the prevalence of *I. belli* (3.0% vs 0.8%; $X^2 = 1.81$: $P > 0.05$), *E. histolytica* (8.4% vs 8.8%) ($X^2 = 1.0$: $P > 0.05$), *G. lamblia* (3.7% vs 0%), *Hookworm* spp. (0% vs 0.8%), *S. stercoralis* (1.7% vs 0.8%; $P > 0.05$), *Ascaris lumbricoides* (2.5% vs 0%), *Trichuris trichiura* (0.8% vs 0%), *Schistosoma mansoni* (0.4% vs 0%) in both groups (Table 2).

Please cite this article in press as: Obateru OA et al. Prevalence of intestinal parasites in newly diagnosed HIV/AIDS patients in Ilorin, Nigeria, *Alex J Med* (2016), http://dx.doi.org/10.1016/j.ajme.2016.04.001