Patterns of intestinal parasitic infections in hiv aids

INTRODUCTION

HIV/AIDS continues to be a major public health problem with far reaching consequences on the development and the national security of several African countries. Although only 11% of the world's populations live in Africa, an estimated 23. 5 million people living with HIV representing 69% of the global HIV/AIDS burden reside in sub-Saharan Africa, [1-4]. About 90-92% of all pregnant women and children living with HIV are also found in sub-Saharan Africa [3, 4]. The prevalence of the disease in Ghana is estimated to be 2. 9% [3]. Recent estimates show that 225, 478 persons are living with HIV in Ghana with 15, 263 AIDS deaths and 12, 077 new infections [3, 4]. By the end of 2011, 59, 007 people were on anti-retroviral treatment representing 57. 9% of eligible persons [4].

The advent of HIV/AIDS brought alongside high prevalence of gastrointestinal infections including diarrhea associated parasitosis [5-7]. The progressive decline of the mucosal immunologic defense mechanisms in HIV/AIDS patients predisposes them to precocious, intermediary, or late gastrointestinal symptoms [8]. During the progression of AIDS, there is modulation of the immune system which results in the skewing of immune response toward T helper-2 response [9]. This has been shown to be responsible for the increasing host susceptibility to a myriad of intestinal opportunistic agents, such as *Cryptosporidium parvum* , *Isospora belli* and *Microsporidia* species [10, 11]. Diarrhea is a major gastrointestinal symptom associated with HIV infection, it affect as much as 90% of patients increasing in frequency even as the disease progresses [12, 13]. Intestinal parasitic infections (both protozoa and helminthes) are known to cause diarrhea in

patients [14]. Studies conducted in most African countries and elsewhere have shown that the presence of opportunistic intestinal parasites is associated with severe diarrhoea in HIV/AIDS patients [15]. It is also known that helminthes cause T- cell dysfunction thereby worsening already compromised immune system of HIV patients [16]. Diarrhea thus, has been cited as one of the most common causes of morbidity and mortality among HIV patients [16]. Nationally, data on the prevalence of intestinal parasitic infections in HIV/AIDS patients is virtually nonexistent since there are no specific guidelines that require standard investigation and diagnosis of intestinal parasitic infections in HIV patients. The objective of the study was to determine the patterns of intestinal parasitic infections in people living with HIV/AIDS and its association to diarrhea at different CD4T- cell levels.

Materials and methods

This study was based on two cross-sectional surveys conducted at two hospitals in the Ashanti region of Ghana. The surveys were conducted at HIV/AIDS voluntary counseling and testing centers (VCT) at the two hospitals. The Nyinahin Government hospital was located in a rural area and St. Patrick’s Hospital at Offinso was located in a peri-urban area. The study was carried out between April and July, 2011.

The Study area

Nyinahin is a district capital of the Atwima Mponua District located in the Western part of Ashanti Region. The district lies between longitude It lies between longitude 2 º 00’W and 2 º 32’W and latitude 6 º 32’N and 6 º 75’N. It lies within the wet-semi equatorial zone and has a double maxima rainfall.

About 92% of the people reside in the rural countryside, with only about 8% living within an ‘ urban’ settlement [17]. The second study site, Offinso Municipality on the other hand is located in the extreme north-western part of Ashanti. It is about 40 km away from the regional capital of Kumasi. It lies between longitude 1 ^{o} 65W and 1 ^{o} 45E and latitudes 6 ^{o} 45N and 7 ^{o} 25 S. The District covers an area of 1255km ^{2} . The high population growth rate in these localities can be attributed to high immigration and the spillover population from the Kumasi metropolis giving rise to about 40% of the populace in urban dwellings. With more than 40% of the settlements in the district being urban, the district predominantly depicts a peri-urban settlement [17].

Study participants

Participants aged between 8 to 72 years of either gender, previously enrolled in the Antiretroviral Therapy (ART) clinic and all other new patients who were admitted to the clinic upon a Voluntary Counseling and Testing (VCT) together with others accessing out-patient services were solicited for consent and participation. A total of 341 with HIV (seropositives) patients consented to the study. A control group (n= 331) who were HIV seronegative were randomly selected from the out-patient department (OPD). All Individuals who consented to the study were asked to provide two stool samples on 2 consecutive days during their scheduled visit. The stool samples were examined for ova, larvae and cyst of parasites regardless of the presence of diarrhea. For each participant, demographic data and antiretroviral drug usage information were obtained. About 1g of two (2)

consecutive stool samples produced in the morning was obtained from participants in clean screw-capped containers. For all seropositives, blood specimens were also taken for $CD4^{+}$ T-cell counts.

HIV screening and confirmation

First Response HIV Card Test (PMC Ltd, Shree Indl Estate, INDIA), was used, following manufacturer’s instructions. Briefly, 10µl of serum was added to the sample well and 35µl of assay diluent was added to it. The results were read and interpreted within 5-15minutes. The presence of only one band in the result window at the control line region indicated a negative result. However, two-color bands, one control and the other for HIV-1 indicated reactivity for antibodies to HIV-1. Two-color bands, one control and the other for HIV-2 indicated reactivity for antibodies to HIV-2. All three color bands indicated reactivity for antibodies to HIV-1 and Qualitative immunoassay confirmation based on the HIV-1/2 Oral Quick Rapid Test (OraSure Technologies, Inc., Bethlehem, PA 18015, USA) was used to confirm HIV status. The rapid test device was carefully removed from its pouch and the pad-end was used to swab upper and lower gums of all participants. The pad-end of the rapid test device was inserted into the buffer vial, and the test result was read and interpreted after 20 minutes.

Stool examination

A total of 1, 334 stool samples were obtained from 672 participants. These were subjected to routine stool examination, which included saline and iodine mount to screen for helminthes ova and larvae, protozoan cyst, and trophozoites. Direct wet mount of a stool sample in normal saline (0. 85%

NaCl) was prepared immediately upon arrival in the laboratory and examined for the presence of vegetative forms, larvae, and ova of helminths under light microscopy (x10 and x 40 objectives). Field’s stain and Lugol’s iodine staining was used to detect *G. lamblia* flagellates and cysts of protozoa, respectively. The Formol ether concentration technique was employed to concentrate stool samples for further confirmatory microscopic examination. Examination of fecal smears after special staining (Modified Zhiel Neelsen and Modified Field’s staining techniques for the detection of *Cryptosporidium* , *Isospora belli* , *Cyclospora cayetanensis* and Microsporidia spores respectively) were done according to *Chessbrough* [18].