Intestinal parasites in hiv aids patients

DISCUSSION

The introduction of antiretroviral therapy has lessened the prevalence of gastrointestinal infections in HIV patients, this notwithstanding, several people with HIV infection still suffer from intestinal parasitosis [20]. Co-infections of intestinal parasitosis found among HIV patients from low income countries has been anything from 18% to 50% [5-7]. In the current study, an overall prevalence of intestinal parasite among the study population was 19. 3%. However, the prevalence of intestinal parasites in the HIV seropositive group was significantly higher (25%) than that observed in the HIV seronegative group (13. 3%). The observed prevalence in this study is similar to others carried out in Zambia which reported 25% prevalence among HIV-infected cohort [21]. Other reports from India, Ethiopia and Tanzania were comparably higher ranging from 30% and above [22, 23]. However, much lower prevalence of 10. 6% among HIV patients have also been reported elsewhere [24]. The occurrence of intestinal parasitic infection did not differ in respect of rural or peri-urban setting. However, infections with *Cryptosporidium* in this study were significantly associated with the rural cohort. Cryptosporidiosis causes prolonged bulky and sporadic diarrhea in AIDS patients, with liquid non-bloody stools, together with pains and abdominal colic, and concomitant weight loss [25]. Contaminated drinking water, foodstuffs and contact with infected animals are risk factors for the transmission of intestinal parasitosis; the fact that coccidian parasites were significantly higher within the rural cohort may be attributed to unfavorable socioeconomic conditions, lifestyle as well as relatively poor sanitation that is endemic in the rural dwellings. These may be the same risk factors

sustaining intestinal parasitosis at high prevalence in the developing world. It was also observed that opportunistic parasitic infections mainly the coccidian parasites occurred exclusively in HIV/AIDS patients with a corresponding depletion of CD4 $^{+}$ T- cell count. This has been attributed to the modulation of immune response in the advance stages of the disease [8]. The highest prevalence of parasitosis was observed among participants in the CD4 $^{+}$ T-cell level ≤50 cells/µl. This category forms 56. 5% of participants in the advanced stage of the disease. The most predominant parasites recovered among this group of participants belonged to the coccidian groups (47. 8%) which are well known as opportunistic parasites in HIV disease. With the exception of one participant, all participants that had mixed parasitic infections had CD4 $^{+}$ T-lymphocyte count of less than 200cells/µl. This observation has been echoed by other studies [6, 26]. Typically, the dynamics of HIV-1 infection is known to follow a familiar pattern where there is the acute phase in which, there is massive depletion of CD4 $^{+}$ T cells of the gastrointestinal tract [27], after which there is the chronic phase, where there is a gradual reduction in CD4 $^{+}$ T cells which results in heightened risk of opportunistic infections and then AIDS sets in. Recently it has been found that there is significant preferential loss of Th17 cells in the GI tract of HIV-infected patients [28] which is as a result of microbial translocation after the initial structural and immunological disruption of the gut mucosa in the acute phase [29].

The prevalence of *G. lamblia* was the highest and most common parasite among the participants. Its occurrence *,* among both HIV seropositive (11. 4%) and seronegative (11. 8%) was similar. Previous studies have

demonstrated that although infection with *Giardia lamblia* and HIV correlated with enteritis or enterocolitis, its incidence does not differ amongst HIV-positive and negative patient populations [30, 31]. This underscores the non opportunistic nature of the *G. lamblia* reviewed by Cimerman *et al.* [32].

The helminthes observed in this study were *A. lumbricoides* , *E. vermiculari* s, Hookworm and *S. stercoralis* . Helminthes infections generally were low among the study groups when compared to findings of similar studies elsewhere reporting prevalence of 37. 04% [33]. However, *S. stercoralis* was only associated with HIV seropositive individuals where mixed infections of *S. stercoralis* and Hookworm infections were higher. Modjarrad *et al.* (2005) reported relatively higher prevalence of intestinal helminthes (24. 9%) with *A. lumbricoides* and hookworm being prevalent among HIV-1 patients in an urban African setting [34]. Apart from *S. stercoralis* , other helminthes had lower prevalence in our study when compared to others carried out in similar developing countries [22]; this may be due to the widespread administration of anti-helminthes and cotri-moxazole among the study participants.

Studies have shown that, reconstitution of the immune system following ART administration alone resolves *Cryptosporidium* infections without specific treatment for the parasite [22, 35, 36]. This is because ART acts against the aspartyl-protease of the parasite depriving the parasite of an essential protein [35, 36]. More than 56% of participants were already on ART at the time of stool collection. It is likely that as patients CD4 T-cell level increases with the administration of ART, opportunistic infections are not established even if they are exposed to infection.

Diarrhea is a life threatening complication often associated with HIV causing severe weight loss; both of which are independent predictors of mortality in HIV/AIDS [13, 37]. The incidence of diarrhea among HIV seropositives was significantly higher, where 32. 7% of them had diarrhea irrespective of parasitosis (Table 5). Diarrhea among HIV participants increased with decreasing CD4 T-cell count with the highest number of diarrhea participants (78. 3%) occurring at the CD4 T-cell count < 50cells/µl and the lowest (2%) was found in participants with CD4 T-cell count of ≥500cells/µl (Table 5). *G. lamblia* , *I. belli* , *Cryptosporidium* , and *S. stercoralis* were associated with diarrheal stools of HIV seropositive patients (Table 4). Among the opportunistic coccidian parasites in HIV seropositives *I. belli* (3. 5%) was predominant followed by *Cryptosporidium* (2. 1%). Microsporidia and *C. cayetanensis* had a prevalence of 0. 9% and 0. 3% respectively occurring exclusively among HIV seropositives. All participants with *I. belli* infections presented with diarrhea. This strong association with diarrhea may be associated with patients who were ART naïve who presented very late to the hospitals with wasting, general weakness and diarrhea. *Cyclospora cayetanensis;* an emerging parasite, was found in only one participant with diarrhea.

The presence of diarrhea without parasites in stool could be from bacteria etiology, lactose intolerance or insufficient sensitivity of the diagnostic procedure [38, 39]. It has been shown however, that no etiological agent is found in 15-50% of HIV patients with chronic diarrhea [38, 39]. Munnink *et al.,* (2014), observed that unexplained diarrhea in HIV- infected patients were not due to novel pathogens [immunodeficiency-associated stool virus

(IASvirus)] [40] or previously unknown pathogens, but may be due to HIV-1 itself having a “ virotoxic” effect on the enterocytes that results in intestinal mucosal abnormalities leading to diarrhea [39]. These factors may explain the significantly higher prevalence of diarrhea in HIV seropositive participants. It is thus conceivable to state that the interpretation of diarrhea associated with parasitic infections must be made cautiously.

In spite of the high prevalence (25%) of intestinal parasitosis in HIV patients, there are currently no clear guidelines that require its diagnosis. Moreover, the high burden of intestinal parasitosis results in diarrhea and weight loss which are independent predictors of mortality in HIV patients. In order for HIV patients to obtain comprehensive healthcare, it is recommended that efforts are made towards diagnosing intestinal parasites in HIV patients especially those with $CD4^{+}$ T cell counts less than 50cells/µl.