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Prevalence of opportunistic intestinal parasitic infection among HIV infected patients who are taking antiretroviral treatment at Jimma Health Center, Jimma, Ethiopia

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Abstract. – BACKGROUND: One of the major health problems among HIV sero-positive patients are superimposed infections due to the deficient immunity. Furthermore, intestinal parasitic (IP) infections, which are also one of the basic health problems in tropical regions, are common in these patients. Infection by opportunistic pathogens, including various forms of intestinal parasites has been the hall mark of HIV since the beginning of the epidemic.

AIM: To study the prevalence of opportunistic intestinal parasitic infection among HIV patients who are taking antiretroviral treatment (ART) in Jimma, Ethiopia.

MATERIALS AND METHODS: Patient samples were diagnosed by examination of single stool specimen which was examined as fresh wet mounts, formal-ether concentration technique and modified Ziehl-Neelsen staining technique. Data was obtained from 91 study subjects selected by convenience sampling method.

RESULTS: The overall prevalence of intestinal parasitic infections was found to be 39.56%. Eight types of intestinal parasites was identified, the most dominant being, Ascaris lumbricoides, 21.67%, Entamoeba histolytica, 15% and Cryptosporidium parvum 13.33%. The prevalence of opportunistic parasite was 15.38%, the prevalence of non-opportunistic parasite was 20.87% and the prevalence of both opportunistic and non opportunistic was 3.29%.

CONCLUSIONS: The study indicated that intestinal parasites were still a problem in the study area. Data also showed that among the predisposing factors, habit of hand washing before meal, usage of latrine and duration after treatment was statistically associated with intestinal parasitic infections.

Key Words:
HIV, Opportunistic parasites, Diarrhea, Helminthes.

Introduction

HIV infection is a serious problem throughout the world. HIV appeared to have been introduced to Ethiopia in 1984, at the time when HIV had already assumed epidemic proportions in other sub-Saharan African countries[1]. Full blown HIV manifests itself by infection with opportunistic organisms such as parasites, fungi, bacteria and viruses[2]. The prevalence of intestinal pathogens among HIV infected individuals has dramatically decreased in countries where antiretroviral agents are widely available[3]. However, in most African countries, where few patients have access to antiretroviral treatment (ART), intestinal pathogens still represent a frequent cause of diarrhea, wasting and weight loss.

Among those opportunistic pathogens, *Isospora belli, Cryptosporidium (C.) parvum, Cyclospora cayetanensis* and *Microsporidia species* are being increasingly reported as causes of enteritis and as opportunistic pathogens in immune compromised individuals[3]. Sub Saharan Africa is the most affected part of the world where more than two third of all people are living with HIV. Intestinal helminthes are ubiquitous in low income countries with prevalence of 50-80% for *Ascaris (A.), Trichuris* and *Hook worm* infections in large population. These parasites are common in tropics and subtropics, severe infections are common in immuno deficient or immune suppressed individuals like those with HIV infection[3]. The parasitic infections are mainly due to unsanitary conditions. Several species of protozoa have been associated with acute and chronic diarrhea in HIV patients. This includes *C. parvum, Isospora belli, Microsporidia* species, *Giardia (G.) lamblia,*

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Entamoeba (E.) histolytica, Cyclospora species, *Blastocystis (B.) hominis,* and *Dientamoeba (D.)* species etc[3].

Some parasites, such as *Toxoplasma* cause serious infections in some immune deficient individuals. Cerebral nervous system (CNS) toxoplasmosis is quite common in HIV patients with clinical presentation of loss of consciousness[4]. In addition to opportunistic parasites, non-opportunistic parasitic infections are still an important problem in HIV infected patients at any immunity level with or without symptom of diarrhea[5]. Several species of protozoa have been associated with acute and chronic diarrhea in HIV disease, but convincing evidence is lacking as to the causality of *B. hominis and D. fragilis*. Beside this *Strongyloides stercoralis* can cause diarrhea and hyper infections in patients with variety of immunosuppressive disorders including HIV[6]. Opportunistic intestinal parasitic infections showed a highest prevalence in patients with a low immune level (CD4 < 200/μL) and diarrhea. There was no significant predominance of non-opportunistic IP at any immune level. A study carried out to determine the parasitic profile on Ethiopia HIV positive patients shows that the incidence of IP infection like *A. lumbricoides, E. histolytica, G. lamblia, Taenia saginata,* was higher in HIV positive than HIV negative, and the difference increases with increasing level of immunodeficiency[7]. This study was tried to determine the magnitude of opportunistic *intestinal parasites (IP)* among HIV patients who are taking ART drugs.

Materials and Methods

A cross-sectional study was conducted on HIV patients who are taking ART at Jimma Health Center, Ethiopia. The study was conducted in November 8-19, 2011, at Jimma Health Center. A convenience sampling technique was employed on HIV patients who came for ART during study period. Sample size depends on the number of HIV infected patients who came for ART within the study period. Ethical issues were considered in all stages of research process. All the volunteers were filled the questionnaires. The patients were provided with appropriate specimen container and applicator sticks to bring sufficient amount of stool specimen. Then the stool was examined macroscopically before and microscopically after and before concentration by wet mount/normal saline preparation and stain with modified Ziehl-Neelsen staining techniques for the detection of different stage of parasites. The completeness of all information on the questioners was checked. The data of each patient was tallied on tally sheet.

For statistical analysis, all data were entered to computer and analyzed using IBM – Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) version 20.0.0. Chi square and *p*-value were used for comparisons. Data having *p*-value <0.05 were considered to be statistically significant.

Results

In this cross-sectional study a total of 91 subjects from Jimma Health Center ART Clinic were included. From these 91 patients 51 (56.04%) were males and 40 (43.96%) were females. From the study participants, the prevalence of intestinal opportunistic parasitic parasites were 14 (15.38%), non-opportunistic parasites were 19 (20.87%) and the prevalence of both opportunistic and non opportunistic were 3 (3.29%). Generally out of 91 patients included in this study 36 (39. 56%) were positive for parasitological examination and the rest 55 (60.44%) were negative. Out of 36 individuals whose stool samples were positive 15 (16.48%) males and 21 (23.08%) females were infected with one or more intestinal parasite. Out of 91 study participant the highest prevalence of (the most infected) of with intestinal parasites were seen in the age groups 5-64 years 66 (72.52%) followed by the age group in 5-14 years, i.e. 16 (17.58%) and the least infected were 1-4 years. Also from this data there has no statistical association between age's groups of individuals and intestinal parasitic infection among HIV patients taking ART drug in the study. Out of 91 patients whose stool sample was examined 27 (29.67%) were diarrheic and watery, 64 (70.33%) were formed and loosen samples. From these 27 diarrheic and watery samples 12 (44.44%) were with persistent diarrhea (>1 month) and 15 (55.56%) were with acute diarrhea (< 1 month) from these 27 patients 8 (29.63%) does not take treatment (antibiotics) for the diarrhea. A total of eight types of species of intestinal parasite was identified of which *A. lumbricoides* 13 (21.67%), *E. histolytica* 9 (15%) and *C. parvum* 8 (13.33%) respectively are the most prevalent among HIV infected patients who are taking ART drug (Table I).

Table I. Prevalence of intestinal parasites among HIV infected patients who are taking ART at JHC, ART clinic, November 8-19, 2011.

S. N°	Parasite species	Number	%
1	*Ascaris lumbricoides*	13	21.67
2	*Entamoeba histolytica*	9	15
3	*Cryptosporidium parvum*	8	13.33
4	*Giardia lamblia*	8	13.33
5	*Isospora belli*	6	10
6	*Strongyloides stercoralis*	6	10
7	*Hymenolepis nana*	6	10
8	Trichuris trichuria	4	6.67
Total		**60**	**100**

Discussion

In this cross sectional study on HIV infected patients who are taking antiretroviral treatment the overall prevalence of intestinal parasites in stool sample was 39.56%. The overall prevalence is smaller than the previous studies reported on HIV patients conducted in Jimma (62%)[8]. Thailand (50%)[9] and Delhi, India (62.7%)[10]. It is almost similar with the result of study conducted in Cameroon (33%)[11]. From identified intestinal parasites *C. parvum*, the most known causative for majority of enteritis and diarrhea is the most prevalent among opportunistic parasites. Its prevalence (13.33%) is smaller than similar study conducted in Delhi, India (28.7%)[12] and Turkey (39%)[13]. Difference in finding might be due to different sample size, location of study and study population. Second most prevalent opportunistic parasite *I. belli,* also known by its causative agent for enteritis and diarrhea in HIV patients, its prevalence (10%) is smaller than similar study conducted in Chennai (18.6%) and in northern India (31%). It is greater than similar study conducted among HIV patients in Thailand (5%)[13]. This might be due to different sample size and different diagnostic technique employed (for example, study carried in Thailand used Trichrome stain to identify parasites). Besides opportunistic parasite *A. lumbricoides* (21.67%) were found some what similar study conducted in Jimma Hospital South-West Ethiopia (30.8%) and lower than similar study conducted in Thailand (13.33%)[13]. In this study the number of patient infected with multiple parasitic infections (30.56%) were greater than similar studies conducted in Jimma and India (4.8%) and (15.9%) respectively. The difference might be raised from different sample size and diagnostic technique difference. Opportunistic intestinal parasitic infection was showed highest prevalence in HIV patient who used ART within last six months than those used ART above six month. Therefore, the prevalence of parasitic infections and duration of ART has significant association ($p < 0.05$).This could be because of ART lead to a robust immunological response as measured by CD4 cell count as a result diminish the likelihood of HIV related opportunistic infection possibly as a result of maximal viral suppression. Besides opportunistic parasitic infection presence of chronic diarrhea (> 1 month) and duration of usage for ART has significant association ($p < 0.05$). Based on the above finding the prevalence of *C. parvum* and *I. belli* were higher among opportunistic intestinal parasites and the prevalence of *A. lumbricoides* and *E. histolytica* were higher among non-opportunistic parasites. This was somewhat similar study conducted on HIV patients in Jimma and India[14]. In this study there is a clear statistical significance association exists between prevalence of opportunistic intestinal parasites and duration of HIV patients who are taking ART ($p < 0.05$).

Conclusions

The wide distribution of ART dramatically decreases prevalence of opportunistic intestinal infection, even though non-opportunistic parasitic infections are still important problems in HIV patients of any immunity level with or with out symptom of diarrhea. The overall prevalence of intestinal parasite on HIV patients was generally smaller in ART users than those non users of ART. Opportunistic parasites among ART users were still the cause of morbidity for patients came with diarrhea. But the importance of non-opportunistic intestinal parasitic infections should not be neglected.

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