

## Intestinal Parasitosis among HIV Sero Positive in Jimma, Ethiopia

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### Abstract

**Background:** Intestinal parasitic infections are among the most common infections in the world, and are especially responsible for considerable morbidity and mortality in Human Immunodeficiency Virus infected patients. In HIV infected patients, the progressive decline in their immunological responses makes them extremely susceptible to a variety of intestinal parasites

**Objectives:** To determine the prevalence of intestinal parasites among HIV positives in Jimma, Ethiopia.

**Methods:** This study employed facility based cross-sectional study. The present study included 397 study participants. The study participants were selected conveniently. Data on socio-demographic characteristics were collected using semi-structured questionnaire, stool samples collected using labeled plastic cups from all study participants, SPSS for windows version 16 was used for data analysis. Differences in proportions tested using Chi-square ( $X^2$ ), Statistical tests were considered significant for  $p$ -value $<0.05$ .

**Results:** Parasitological examination of the stool specimens by; Direct wet mount, Formol-Ether Concentration and Modified Ziehl-Neelson staining was done for the 397 individuals, and intestinal parasites were detected in 147 (37%) of the study participants harboring one or more intestinal parasites. Among the detected intestinal parasite *Ascaris lumbricoides* comprises 58(14.6%), *Trichuris trichiura* 37(9.3%), followed by 26(6.5%) of *Cryptosporidium* spp and the rest parasites accounts for 6.6%.

**Conclusion and recommendation:** The high prevalence of intestinal parasites is an evidence for the need for regular screening and de-worming of HIV patients.

**Keywords:** HIV sero positives; Jimma; Ethiopia

### Introduction

Intestinal parasitic infections are among the most common infections in the world and responsible for considerable morbidity and mortality, especially due to diarrhea, which is a major public health problem, killing 3-4 million individuals each year. Children and immuno-compromised individuals living in developing countries are the most affected groups by diarrhea. Even though in developed countries, diarrhea has fallen considerably, morbidity remains high [1]. Immuno-suppression is usually common among peoples living with Human Immunodeficiency Virus, and according to World Health Organization report, globally a number of people living with HIV at the end of 2010 were 34 million versus 28.6 million in 2001, reflecting the high number of people being infected each year to be significantly high. As most of these people living with the virus are found in sub-Saharan countries, where the burden of intestinal parasite and HIV co-infection, is very high [2].

In Ethiopia, where intestinal parasite is prevalent, an estimate of 1.1 million people is living with HIV, according to report [3]. Hence, intestinal parasite coupled with HIV/AIDS is one of the major public health problems in Ethiopia, severely affecting the productive and reproductive age groups of the society [4].

Thus, the present study aimed at investigating the prevalence of intestinal parasites among HIV sero-positives in Jimma town public health facilities, who were seeking medical care for HIV/AIDS.

### Materials and Methods

#### Study area and period

Jimma is located 352 km southwest of Addis Ababa, and bounded by Kersa Woreda in East, Manna Woreda in West, Manna and Kersa

Woreda in North and Seka Woreda in South. The town is divided in to 3 Woreda/Higher and 13 Kebeles, and has total population of 174,000, according to the data from the towns' municipality 2011. It has an average annual rainfall of 800-2500 mm<sup>3</sup>, and situated 1720-2010 m above sea level, having a latitude and longitude of 7°40' N 36°50' E. It lies in the climatic zone locally known as Woyna Daga.

Jimma is generally characterized by warm climate with a mean annual maximum temperature of 30°C and a mean annual minimum temperature of 14°C. Jimma like many towns in the country has sanitary problems and it is common to see piles of wastes, including human excreta on the streets, riverbanks, besides individual houses and market areas. Regardless of such unsanitary conditions in market areas, it is common to see peoples buying and eating fruits and vegetables that could be easily contaminated with medically important parasites that have fecal-oral transmission routes like *Cryptosporidium*, *Giardia* and other intestinal protozoa and helminthes. Poor housing condition of the town is characterized by lack of toilet, kitchen and proper waste disposal systems also contributes for transmission of intestinal parasites. The present study was conducted between February to March 2012, at one Government Hospital and one Health Center.

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## Source population

Study population was all people known tested sero-positive for HIV during voluntary counseling and testing and already known registered patients at antiretroviral treatment clinics in Jimma town government health facilities who were included in the study.

## Measurement

**Parasitological examination:** Parasitological diagnosis for intestinal parasites was done by obtaining a single stool sample in labeled cap from all consenting patients for the study. Direct saline wet mount, Modified Ziehl Neelson and Formalin-ether concentration techniques were employed. Briefly, a direct saline mount was examined at the collection sites by respective facility laboratory personnel for detection of motile intestinal parasites microscopically. The remaining portion of the sample was brought to Jimma University laboratory school, for the process of Modified Ziehl Neelson staining for the detection of Coccidian.

Modified Ziehl Neelson staining was done by making thin stool smear on microscope slide, air dried overnight, fixed in methanol for 5 minutes, stained with carbol-fuchsin for 30 minutes, decolorized by acid alcohol for 2 minutes, counterstained with methylene blue for 1-3 minutes and each step was followed by washing with distilled water, and finally the dried smear was read at magnification of 1000X under oil immersion. For formalin-ether concentration; 1 gm of stool sample was mixed with 8 ml of 10% formalin and crashed well, then sieved with double layer cotton gauze into 15 ml conical test tube. Three ml of diethyl ether was added and hand-shaken for one minute and then centrifuged for another two minutes at 2000 rpm.

The supernatant was discarded and the sediment was observed for the presence of ova, and/or parasites under the light microscope at a magnification of 100X and 400X. The direct wet mount with saline was repeated and Lugol's iodine staining was done. The wet mount was examined under light microscope at 100X and 400 X magnifications.

## Results

### Socio-demographic description of the study participants

Over a period of two months from February to March 2012, a total of 401 fecal samples were collected from HIV sero-positive individuals visiting ART clinics. Of these 401, complete data were obtained from 397 individuals who were on anti retroviral treatment and anti retroviral treatment naive during the study period, giving a response rate of 99%, and 4 samples were rejected because of insufficient sample volume, except the insufficient sample volume, they have similar socio-demographic characteristics and CD4 count.

Of the study participants, 256 (64, 5%) were female, 55 (13.9%) were rural and 342 (86.1%) were urban residents. The mean age of the study participants were 31.7 years (range: 3-65) (Table 1). Marital status was classified as single 99 (24.9%), Married 189 (47.6%), Divorced 68 (17.1%), Widowed 41 (10.3%) (Table 1). By occupation, majority of them were daily laborer or run their own business 292 (73.6%) and Government employee 50 (12.6%), student 46 (11.6%) and Nongovernmental organizations 9 (2.3%) (Table 1).

Socio-economic status based on monthly income showed only 37 (9.3%) earns more than 1000 Birr, 65 (16.4%) earns 500-1000 Birr and 295 (74.3%) earns less than 500 Birr per month. Majority of the study participants attended formal education, 199 (50.1%) were from grade 1-8, 98 (24.7%) from grade 8-12, Diploma and above 29 (7.3%), and 71 (17.9%) were illiterate (Table 1).

Anti Retroviral Treatment (ART) was initiated for 334 (84.1%) individuals. 63(15.9%) were on follow up and has not started the drug during the data collection. The CD4 cell distribution of the study participants showed majority of them, 199 (52%) were having CD4 count more than 200 cells/mm<sup>3</sup> with the mean count of 393, median 338.5 (range 5-1542) and CD4 value was not obtained for 15 (3.8%) individuals (Table 1).

### Prevalence of diarrhea in the study participants

Among the study participants, diarrhea was noted in 56 (14.1%) individuals during the process of laboratory investigation (Table 2). Of the 56 diarrheic individuals, acute diarrhea (<2 weeks duration) was reported in 43 (76.8%) and chronic diarrhea (>2 weeks) was reported in 13 (23.2%) of the study participants (Table 2). Stool consistency of the study participants were recorded as watery 17 (4.3%), loose 82 (20.7%), soft 230 (57.9%) and formed 68 (17.1%) (Table 2).

Characters		n (%)
Sex	Male	141 (35.5)
	Female	256 (64.5)
Age	1-15 years	32 (8.1)
	16-30 years	164 (41.3)
	31-45 years	167 (42.1)
	>46 years	34 (8.6)
Occupation	Government Employee	50 (12.6)
	Private	292 (73.6)
	NGO	9 (2.3)
	Student	46 (11.6)
Education	Illiterate	71 (17.9)
	1-8	199 (50.1)
	8-12	98 (24.7)
	Diploma and above	29 (7.3)
Marital status	Single	99 (24.9)
	Married	189 (47.6)
	Divorced	68 (17.1)
	Widowed	41 (10.3)
Residential Area	Urban	342 (86.1)
	Rural	55 (13.9)
Income ( Birr)	<500	295 (74.3)
	500-1000	65 (16.4)
	>1000	37 (9.3)
ART Initiation	Yes	334 (84.1)
	No	63 (15.9)
CD4 distribution	<200 cells/mm <sup>3</sup>	85 (22.3)
	201-500 cells/mm <sup>3</sup>	199 (52)
	>501 cells/mm <sup>3</sup>	98 (25.7)

**Table 1:** Socio-demographic characteristics of the study participants (n=397) in Jimma town public health facilities.

Characters		n (%)
Diarrhea, oral response by patient	Yes	56 (14.1)
	No	341 (85.9)
Duration	<2 Week	43 (76.8)
	> 2 Week	13 (23.2)
Stool consistency	Watery diarrhea	17 (4.3)
	Loose	82 (20.7)
	Soft	230 (57.9)
	Formed	68 (17.1)
Clinical sign and symptom	Nausea	21 (27.6)
	Vomiting	11 (14.6)
	Fever	9 (11.8)
	Diarrhea in the laboratory	27 (35.5)
	Flatulence	8 (10.5)

**Table 2:** Diarrhea prevalence, duration, clinical sign and symptom among the study participants (n=397) in Jimma town public health facilities.

Among the most clinical sign and symptom complained by study participants; diarrhea accounts for 27 (35.5%), Nausea 21 (27.6%), and minor clinical presentations noted as low grade fever 9 (11.8%), vomiting 11 (14.5%) and flatulence 8 (10.5%) with no statistical significance (Table 2).

### Prevalence of Giardia, Cryptosporidium spp and other intestinal parasites

Parasitological examination of the stool specimens by Direct wet mount, Formol-Ether Concentration and Modified Ziehl-Neelsen staining was done for the 397 individuals, and intestinal parasites were detected in 147 (37%) of the study participants harboring one or more intestinal parasites. Among the detected intestinal parasite, *Ascaris lumbricoides* comprises 58 (14.6%), *Trichuris trichiura* 37 (9.3%), followed by 26 (6.5%) of *Cryptosporidium* spp. (Table 3).

### Discussion

This study reports the prevalence of intestinal parasites among HIV sero positives visiting Jimma University Specialized Hospital ART clinic and Jimma Town Health Center for follow up of their CD4 status for ART initiation, and the already ART initiated peoples for monthly take of the drug.

Our findings in the present study showed that pathogenic Helminthes, Protozoa and opportunistic intestinal parasites were common among HIV sero-positives in Jimma Town public health facilities, showing high prevalence of *Ascaris lumbricoides* among the Helminth. Among the opportunistic intestinal parasites, *Cryptosporidium* and *Blastocystis hominis* were detected in our study. In the present study area, previous studies reported that intestinal parasitosis due to Protozoa, Helminthes and coccidia are common among HIV patients in Jimma [5-7].

When the former reports of intestinal parasites prevalence in the present study area is compared to the present study, the former finding showed higher prevalence of intestinal parasites, which might be because of difference in study period, scheduled deworming program to people taking ART, and most probably, the peer education towards attitude of risky behavior of getting intestinal parasite and other health education in the current study participants. The present study also reported lower prevalence of intestinal parasites when compared to a Previous report [8,9], which might be due to difference in study area and inclusion of more diarrheic patients in both study reports.

Identified parasite	Total (%)
<b>Helminth (ova and larvae)</b>	n (%)
<i>Ascaris lumbricoides</i>	58 (14.6)
<i>Trichuris trichiura</i>	37 (9.3)
<i>Strongyloides stercoralis</i>	15 (3.8)
<i>Schistosoma mansoni</i>	5 (1.3)
Hookworm spp.	5 (1.3)
<i>H. nana</i>	2 (0.5)
<i>Taenia</i> spp.	7 (1.8)
<b>Protozoa (Cyst, Trophozoite and Oocyst)</b>	
<i>Entamoeba histolytica/dispar</i>	12 (3)
<i>Giardia lamblia</i>	11 (2.8)
<i>Blastocystis hominis</i>	16 (4)
<i>Cryptosporidium</i> (Ziehl-Neelsen staining)	26 (6.5)

**Table 3:** Prevalence of intestinal parasites among the study participants (n=397) in Jimma town public health facilities.

When the present study finding of intestinal parasite prevalence is compared to other studies in African countries, it is higher than a report [10,11] and lower than a report by Berenji et al. [12], which probably due to difference in life style and geographic area. The presence of diarrhea is an important gastrointestinal syndrome in HIV infected patients; a comparison between intestinal parasites prevalence and stool consistency showed no significance difference in parasite positivity, which is inconsistent with the report by Awole et al. [6], Hailemariam et al. [7], Assefa et al. [8], Amatya et al. [13], rather higher rate of parasite was detected in soft stool samples in the present study.

Unlike the report by Awole et al. [6] in the present study, there was no *Isospora belli* and *Cyclospora* detected, which could be explained by the very sensitive nature of these organisms to cotrimoxazol which is supplied with ART drug for the treatment of opportunistic parasites. In our study, *Cryptosporidium* was detected at prevalence rate of 6.5% without any difference between peoples taking ART and ART naïve, which is nearly consistent with a study done by in selected ART centers in Adama, Afar and Dire-Dawa, Ethiopia [9]. But far less from a 20.8% report by Endeshaw et al. [4] among diarrheal patients referred to EHNRI in Ethiopia, which might be due to ART initiation in the current study and less number of diarrheic sample analysis.

### Conclusion and Recommendations

In the present study, high prevalence of intestinal parasites among HIV sero-positives in Jimma public health facilities was observed. Based on the finding, we recommend the importance of regular Deworming of HIV sero-positives in the present study area and nationwide intestinal parasite distribution survey needs to be considered to see the importance of national Deworming.

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