

# Prevalence of Intestinal Parasites and Associated Factors among HIV Patients who had Follow up at Debre Markos Referral Hospital, Northwest Ethiopia, from 2015-2019.

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## Research note

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## Abstract

**Objective** To assess prevalence of intestinal parasite and associated factors among patients with human immune deficiency virus (HIV)/ acquired immune deficiency syndrome (AIDS) in Debre markos referral hospital, Amhara region, Ethiopia from 2015-2019

**RESULTS** This study revealed that, out of 380 patients, the prevalence of intestinal parasites was found to be 24.2% with 95% CI (18.9, 28.4). The most predominant parasite was both forms of *Entamoeba histolytica* 11.3% followed by *G.lambilia* 8.9%, *Strongyloides stercoralis* 2.4%, but *A.lumbricoid* 0.8% and *H.worm* 0.8% were the least detected. ART status had significant association with prevalence of intestinal parasites (AOR =3.566, CI: 1.882, 6.758).

## Introduction

Intestinal parasitic infections cause severe diarrhea especially in immune-compromised people worldwide. The incidence of Intestinal parasitic infections is approximately 50% and 95% in developed and developing countries respectively (1).

Globally about 3.5 billion people are infected with intestinal parasite. The prevalence of intestinal parasitic infection is high in Sub-Saharan Africa, where the majority of human immune deficiency virus (HIV)/ acquired immune deficiency syndrome (AIDS) cases are found (1, 2). Parasites are common infections among HIV/AIDS patients (3). Intestinal parasitic infection has been a major source of morbidity in tropical countries especially among HIV patients (3, 4). Almost 80% of AIDS patients die from AIDS-related infections including intestinal parasites rather than HIV infection itself (5).

Initiating treatment and laboratory monitoring of HIV/AIDS patients involve series of laboratory investigations, such as CD4 count, hematology and biochemistry. However, in Antiretroviral Treatment (ART) programs information on the intestinal parasitic status of HIV patients is not readily available despite its clinical importance (3).

Previous studies revealed that in developing countries about 90% of HIV/AIDS patients affected by diarrheal diseases. Most identified causes were opportunistic infections caused by species such as *Cryptosporidium* spp and *I. belli*. Other Non-opportunistic parasites identified were parasites such as *Entamoeba histolytica* and *Giardia lamblia* (6).

In short Parasites such as *Cryptosporidium* species, *Isospora belli*, and *E. histolytica* are the most frequently identified parasites which cause diarrhea among HIV/AIDS patients (7). Although there has been an improvement in the survival of patients, parasitic infections pose a serious challenge with regard to reducing the morbidity and mortality of these individuals. Antiretroviral treatment (ART) increases the length and quality of life and productivity of patients by improving survival and decreasing the incidence of opportunistic infections in people with HIV through reduction of the viral load and increasing the level of CD4 cells. Nevertheless, in Ethiopia, few studies have tried to investigate the extent of intestinal parasitic infections in relation to ART experiences and CD4 count (4, 8). A few studies have been carried out on the prevalence of intestinal parasitic infections among individuals living with HIV/AIDS in relation to ART in Ethiopia (6, 7). Particularly like Debre Markos referral hospital. This study is planned to assess the prevalence of intestinal parasitic infections in relation to socio-demographic and clinical factors in individuals living with HIV/AIDS at Debre markos referral hospital, in the northwest of Ethiopia and findings will be important evidence to know burden of the problem to develop management & preventive measures.

An institution based retrospective follow up study was done. The document review of patients with HIV/AIDS was conducted from March to April 2019. The study was conducted at ART center of Debre Markos Referral Hospital. The Hospital is located on the southern part of Debre Markos town. ART clinic serves total of 5977 RVI patients of which 3724 are on ART in DMRH.

The source populations were all client with HIV at Debre markos referral hospital while All HIV patients who had follow up at Debre Markos referral Hospital from March 2015 to 2019 were a study population.

The sample size is determined using single population proportion formula taking the prevalence 45.0 % (considering a study conducted in south west Ethiopia) with 5% marginal error and 95% of confidence interval (CI) of certainty ( $\alpha = 0.05$ ) (9). Therefore the minimum sample size is 380. Data was collected by semi- structured checklist from patients' cards that were stored to assess the socio demographic characteristics, ART status & stool result of HIV/AIDS patients.

First card number/ medical recording number were taken from registration book in ART room by investigator. After card number of the patients' cards identified from registration books (logbooks); the selected charts was taken from card office/medical recording room by data collectors. Finally, documents from patient cards/patient folders were entered in to English version semi- structured check list format by the investigator.

Prevalence of Intestinal parasites was a dependent variable while Age, Marital status, Sex, Occupation, Residence, ART status and Educational status was taken as independent factors.

Data were entered to SPSS version 20 statistical packages for analysis. Descriptive statistics (frequency and percentage) was used to describe socio-demographic and intestinal parasite prevalence. The prevalence of intestinal parasites was determined in relation to different variables and results was expressed graphically and summarized in dummy tables. Binary logistic regression was performed to assess the association of each independent variable with outcome variable. The strength of association was measured by odds ratios (OR) and 95% confidence interval (CI). P-value <0.05 was considered as statistically significant.

## Results And Discussion

Socio-demographic and other characteristics of the study: A total of 380 charts of individuals living with HIV/AIDS were recruited into this study. Among them 44.7% were males and the majority, 55% were married. In terms of location of residence, the majority were live in urban (72.4%). From occupation, primarily 22.4% of them were house wives (Table 1).

Table 1: The socio-demographic characteristics of HIV/AIDS patients who had follow up at Debre Markos hospital ART clinic, northwest Ethiopia, 2015–2019.

Variables		Frequency	Percent
Sex	male	170	44.7
	Female	210	55.3
Age group	4-14	9	2.4
	15-24	52	13.7
	25-34	129	33.9
	35-44	121	31.8
	45-54	54	14.2
	55-64	11	2.9
	65+	4	1.1
Residence	urban	275	72.4
	Rural	105	27.6
Marital status	single	76	20.0
	Married	209	55.0
	Divorced	66	17.4
	Widowed	29	7.6
Educational level	illiterate	130	34.2
	Primary level	131	34.5
	Secondary level	82	21.6
	Tertiary level	37	9.7
Occupation	government employer	52	13.7
	Merchant	57	15.0
	Farmer	41	10.8
	Student	29	7.6
	House wife	85	22.4
	daily worker	53	13.9
	others	63	16.6
ART status	pre-ART	62	16.3
	ART	318	83.7

*Prevalence of intestinal parasites:* In this study prevalence of intestinal parasitosis among HIV/AIDS patients was 24.2% (95% CI 18.9, 28.4). The most predominant parasites detected were *E.histolitica* and *giardia lamblia* (11.6% and 8.9%) respectively.

From marital status, the prevalence was commonly seen in single individuals (26.3%) & least common on divorced (13.6). The total figures for each parasite were shown on table (2).

Table 2: The prevalence of different types of intestinal parasites among HIV/AIDS patients who had follow up at Debre Markos hospital, northwest Ethiopia, 2015–2019.

Type of parasite	Frequency	Percent (%)
Giardia trophozoite	26	6.8
Giardia cyst	8	2.1
E.histolitica trophozoite	21	5.5
E.histolitica cyst	22	5.8
Ascaris lumbricoid	3	0.8
Hook worm	3	0.8
Strongyloides sterocoralis	9	2.4
Overall prevalence	92	24.2

*Prevalence of parasitosis among pre-ART and ART patients:* The prevalence of intestinal parasitic infections was 41.9 % among pre-ART and 20.1% among ART patients.

Table 3: shows multi-variable logistic regression results of the prevalence of intestinal parasitosis and associated factors among HIV/AIDS patients at Debre Markos hospital northwest Ethiopia, 2015–2019.

Variables	Stool result		COR(95%CI)	P-value	AOR(95%CI)	P-value
	+	-				
Sex						
male	35	135	0.731(0.451,1.184)	.202	1.556(0.892,2.715)	0.119
Female	55	155				
Residence						
rural	24	81	1.066(0.625,1.816)	0.815	1.193(0.625,2.278)	0.592
urban	66	109				
Marital status						
single	20	56	1.025(0.564,1.863)	0.935	0.715(0.219,2.335)	0.579
Married	54	155				
Divorced	9	57	2.262(0.949,5.393)	0.066	0.539(0.197,1.472)	0.228
Widowed	7	22	1.122(0.416,3.027)	0.819	1.498(0.462,4.849)	0.501
ART status						
Pre-ART	26	36	2.866(1.614,5.089)	0.000	3.566(1.882,6.758)	0.000
ART	64	254				
Education						
illiterate	35	95	1.488(0.834,2.653)	0.178	0.476(0.129,1.763)	0.267
Primary	26	105				
Secondary	24	58	0.890(0.482,1.645)	0.711	0.821(0.225,3.000)	0.765
Tertiary	5	32	2.358(0.851,6.533)	0.099	0.465(0.138,1.570)	0.217
Occupation						
gov't employee	8	44	0.682(0.254,1.828)	0.447	2.323(0.742,7.279)	0.148
merchant	12	45				
Farmer	7	34	0.883(0.291,2.676)	0.826	1.968(0.803,4.825)	0.139
Student	9	20	0.404(0.136,1.201)	0.103	2.514(0.783,8.071)	0.121
House wife	22	63	0.521(0.213,1.276)	0.153	0.744(0.236,2.344)	0.613
Daily laborer	13	40	0.559(0.210,1.490)	0.245	1.849(.786,4.354)	0.159
Others	19	44	0.421(0.167,1.063)	0.067	1.582(0.644,3.884)	0.317

In this study the prevalence of intestinal parasites among HIV/AIDS clients was 24.2% with 95%CI (18.9, 28.4). It is somewhat with studies done in China (23.2% protozoa, 4.3% helminthes)(10), Brazil (27%)(11) and Cameron (27.8%)(5). But it is less than that of studies done in Addis Ababa Zewditu hospital (34.3%)(6), and Jimma (39.56%)(7). More or less, it is higher than study done in Nepal (12.3%)(12). The possible explanation for this difference might be due to study methodologies and presence or absence of better follow up.

*In this study the prevalence of opportunistic infections such as S.stercoralis (2.4%) is lower than the findings of various previous studies in Gondar, Ethiopia 7.5%(13) and 12% in Brazil(11). The possible justification for this disparities could be better interventions were being carried out in Debre Markos referral hospital.*

In this study the prevalence of intestinal parasitosis among pre-ART and ART clients was 41.9% and 20.1% respectively.

The odds of developing parasitosis among patients on ART was 3.56 times (AOR = 3.566, CI: 1.882, 6.758) lower than that of pre-ART clients. This result is similar with findings of study done in Dessie(9) (39%, 17.6%), Gondar(13) (43.5%, 24.3%) and Brazil(14) (63.9%, 24%). This result may show that the success of early initiation of ART in reducing the significant number of opportunistic and other intestinal parasitic infections in the specified high risk group. In this study factors such as age category, sex, level of education, occupation, residence and marital status & no association seen between these variables with outcome variable. This finding is supported with study done at Gondar, but study at Cameroon showed that, poor educational level had association with Intestinal Parasite prevalence. Generally, in this study, only one variable (ART status) has association with Intestinal parasite infection among HIV/AIDS

patients. This may be because of limited number of variables (only of socio-demographic characteristics) used & pertinent variables are not included in this study due to scarcity of resource.

## Conclusions

The prevalence of IP at DMRH among HIV/AIDS patients was 24.2%. Intestinal parasitic infections had not gone away and they are still common health problems among HIV positive patients in the study area. In this study ART status was a variable which showed significant association with intestinal parasitosis

## Limitation Of The Study

Since the data source for this analysis is a secondary data, some pertinent variables potentially associated with prevalence of intestinal parasites among HIV/AIDS patients. Stool was done through simple wet technique, so it might not show true prevalence of IP.

## List Of Abbreviations

AIDS Acquired Immune Deficient Syndrome

ART Anti Retro-viral Therapy

AOR Adjusted Odds Ratio

CI Confidence Interval

COR Crude Odds Ratio

CSA- Central Statistics Agency

EDHS Ethiopian Health and Demographic Health Survey

FGD Focus Group Discussion

FMoH Federal Ministry of Health

HIV Human Immunodeficiency Virus

OR- Odds Ratio

SPSS Statistical Package for Social Science

WHO World Health Organization

## Declarations

### *Ethics approval and consent to participate*

The study was conducted after ethical approval was obtained from the institutional ethical review committee of Debremarkos University. Official letter was written to Debremarkos referral hospital from the college of public health for permission and support. Informed, voluntary, written and signed consent was obtained from the head of DMRH. After reasons why the research conducted was explained, permission was obtained from ART clinic and card room. Confidentiality of the information collected from cards was respected and no personal identifier was taken.

### *Consent for publication*

It is not applicable because this manuscript does not contain data from any individual person.

### *Availability of data and material*

The datasets used and/or analyzed during this study are available from the corresponding author on reasonable request.

### *Competing interests*

The authors declare that they have no competing interests.

### *Funding*

No funding source to undertake this study.

### *Authors' contributions*

All the three authors participate in proposal development, data collection tool preparation, and data analysis and manuscript preparation. More over both authors read and approved the final manuscript.

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## References

1. Okodua M, Adeyeba OA, Tatfeng YM, Okpala H. Age and Sex Distribution of Intestinal Parasitic Infection among HIV Infected Subjects in Abeokuta, Nigeria. *Online J Heal Allied Sci.* 2003; 2(4):1–5.
2. UNAIDS (2012). *Global Report: UNAIDS Report on the Global AIDS Epidemic 2012.* GenevaSwitzerland.[http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/20121120\\_UNAIDS\\_Global\\_Report\\_2](http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/20121120_UNAIDS_Global_Report_2)
3. Goodgame RW. Understanding intestinal spore-forming protozoa: cryptosporidium, microsporidia, Isospora, and Cyclospora. *Ann Intern Med.* 1996; 124(4):429–41.
4. S. R. Framm, R. Soave, Agents of diarrhea *Med Clin North Am*, 81 (1997), pp. 427–447
5. Basnet A, Sherchan JB, Rijal B, Sharma S, Khadga P. Detection of coccidian parasites and their clinical manifestation, treatment and prophylaxis in HIV-infected patients in Tribhuvan University Teaching Hospital *Sci World.* 2010;8:51–5.
6. Yared M, Sanders R, Tibebu S, Priya E. Equity and access to ART in Ethiopia. Washington, DC: Futures Group, Health Policy Initiative, Task Order 1; 2010.
7. Teklemariam Z, Abate D, Mitiku H, Dessie Y. Prevalence of intestinal parasitic infection among HIV positive persons who are naive and on antiretroviral treatment in Hiwot Fana Specialized University Hospital, eastern Ethiopia. *ISRN AIDS 2013; 2013: ID 324329.*
8. Kaplan JE, Hu DJ, Holmes KK, Jaffe HW, Masur H, De Cock KM. Preventing opportunistic infections in human immunodeficiency virus-infected persons: implications for the developing world. *Am J Trop Med Hyg.* 1996; 55(1):1–11.
9. Awole M, Gebre-Selassie S, Kassa T, and Kibru G, Prevalence of intestinal parasites in adult HIV infected patients in South West Ethiopia, *Ethiopian Journal of Health Development* 2003;17(1):71–78
10. Nissapatorn V, Sawangjaroen N. Parasitic infections in HIV infected individuals: diagnostic and therapeutic challenges. *Indian J Med Res.* 2011;134:589–92.
11. Dwivedi KK, Prasad G, Saini S, Mahajan S, Lal S, Baveja UK. Enteric opportunistic parasites among HIV-infected individuals: associated risk factors and immune status. *Jpn J Infect Dis.* 2007;60:76–89.
12. Da Silva CV, Ferreira MS, Borges AS, and Costa-Cruz JM, Intestinal parasitic infections in HIV/AIDS patients: Experience at a teaching hospital in central Brazil, *Scandinavian Journal of Infectious Diseases* 2005; 37: 211–215
13. Amatya R, Shrestha R, Poudyal N, and Bhandari S, Opportunistic intestinal parasites and CD4 count in HIV infected people, *Journal of Pathology of Nepal* 2011; 1: 118 –121
14. Babatunde SK, Salami AK, Fabiyi JP, Agbede OO, and Desalu OO, Prevalence of intestinal parasitic infestation in HIV seropositive and seronegative patients in Ilorin, Nigeria, *Annals of African Medicine* 2010; 9(3):123–128