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Non-Opportunistic Intestinal Parasitic Infections in People Living with HIV Undergoing Antiretroviral Therapy in Brazzaville, Republic of Congo

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Abstract

Introduction: HIV infection remains a major public health problem. It is associated with co-infections, including intestinal parasitic infections. The aim of this study was to investigate intestinal parasitic infections in people living with HIV undergoing antiretroviral therapy. **Materials and methods:** This was a descriptive cross-sectional study conducted from October 2024 to June 2025 in outpatient treatment centers in Brazzaville. It involved PLHIV undergoing antiretroviral therapy, with or without diarrhea, who had given their informed consent. The stool samples collected were subjected to parasitological examination using a concentration technique in the Parasitology Laboratory of the Faculty of Health Sciences. **Results:** The total number of PLHIV included was 261. The median age was 49.0 years (42, 72). The prevalence of intestinal parasitic infections was 19.5% (51/261). They mainly affected women (20.2%, 41/203), with no significant difference (p = 0.617). PLHIV were exclusively carriers of monoparasitism. The intestinal parasites identified were *E. histolytica/dispar* (14.90%), *E. coli* (2.7%), 1 case of *G. intestinalis*, 1 case of *T. intestinalis*, 1 case of *S. stercoralis*, 1 case of *A. lumbricoides*, and 1 case of hookworm. **Conclusion:** Intestinal parasitic infections in PLHIV are dominated by protozoan infections, with the presence of strongyloids and hookworms.

Keywords

PLHIV, Intestinal Parasitic Infections, Protozoan Infections,

Monoparasitism, Brazzaville

1. Introduction

HIV infection remains a major public health problem worldwide. It has caused more than 44.1 million deaths, with 630,000 deaths in 2024. Although diagnostic methods are becoming increasingly sophisticated and treatments increasingly effective, HIV infection continues to affect a large number of people. This infection has become a chronic condition that can be associated with longevity in affected patients [1].

However, whether or not the patient is undergoing treatment, and whether or not they have a satisfactory CD4 count, other diseases may be associated with the infection. This is the case with intestinal parasitic infections. These can cause diarrhea, which can be severe in debilitated individuals, particularly those living with HIV (PLHIV). As HIV is an infection that causes cellular immune depletion, the ability of PLHIV to fight intestinal parasitic infections is reduced [2]. These intestinal parasitic infections can be caused by opportunistic and non-opportunistic parasites [3].

In the case of non-opportunistic intestinal parasitic infections, protozoa and helminths have been identified as etiological agents in PLHIV. However, clinical manifestations vary from asymptomatic cases to severe intestinal damage [4] [5].

This co-infection of HIV and intestinal parasitic infections has been studied in several countries. This is the case in India, where the prevalence of intestinal parasitic infections in PLHIV varied from one region to another. For example, it was 14.86% with hookworms as the predominant parasite according to Namaji MAAS *et al.* [6], and 8.7% for Seema K *et al.* with *A. lumbricoides* as the dominant parasite [7]. In Africa, the prevalence of this co-infection also varied from one region to another, and even within the same region. In Ethiopia, Gedle D *et al.* found a prevalence of intestinal parasitic infections of 31.8%, with *Taenia spp* as the dominant species [8].

In the Central African subregion, in Cameroon and the Democratic Republic of Congo, the prevalence rates were 59.52% and 24.6% respectively [9] [10]. However, in Brazzaville, the Republic of Congo, although HIV is a real public health problem, information on this co-infection is very scarce. We did not find any studies on intestinal parasitic infections or diarrhoea in HIV-immunocompromised individuals that provided information on intestinal parasites. However, a clinical case of strongyloidiasis in an immunocompromised patient was reported by Atipo-Ibara BI *et al.* [11]. This is why we wanted to carry out this study with the aim of investigating intestinal parasitic infections in PLHIV monitored in outpatient treatment centers in Brazzaville.

2. Patients and Method

This was a descriptive cross-sectional study conducted from October 1, 2024, to

June 30, 2025, in outpatient treatment centers for people living with HIV/AIDS (PLWHA) in Brazzaville, notably the Brazzaville University Hospital Center (CHUB) and the Talangaï referral hospital (HRT). It involved all PLHIV patients being monitored, with or without diarrhea, who had not taken antihelminthic treatment in the four weeks prior to the study. Patients were systematically sampled when they arrived at the outpatient treatment center. Patients were informed about the study and were only included in the study if they gave their consent. Patients who had not yet started treatment and who were visiting the center for the first time were not included. The samples were analyzed at the Parasitology Laboratory of the Faculty of Health Sciences at Marien Ngouabi University in Brazzaville. For each patient, socio-demographic information and the results of the analysis of a stool sample collected in a transparent stool container were recorded on a form. Each sample underwent macroscopic examination to assess its consistency and check for the presence of mucus or blood; direct examination of the stool diluted in a physiological saline solution; and examination after performing the modified Ritchie concentration technique using a formalin-ether mixture. The examination under an optical microscope was performed by two microscopists looking for cysts, eggs, and vegetative forms of intestinal parasites.

The data were entered using Microsoft Excel 2010 software and analyzed using IBM SPSS 2025 software. The results were presented as means, medians, frequencies, and proportions.

The study was authorized by the management of the CHUB and HRT hospital HIV care centers.

3. Results

The total number of patients who participated in the study was 261.

Sociodemographic characteristics of PLHIV

Women (203/261) were more represented than men (58/261), with a sex ratio (M/F) of 0.29.

The median age of PLHIV was 49.00 years (42, 72). The extreme ages were 16 and 72 years.

Figure 1 shows the distribution of PLHIV by age group. It shows that the majority of PLHIV belonged to the [46 - 55 years] age group (34.9%), followed by those aged [36 - 46 years] (24.1%) and [56 - 65 years] (20.7%). PLHIV aged [16 - 25] represented the last category of patients with intestinal parasitic infections.

Frequency of non-opportunistic intestinal parasitic infections among PLHIV

Analysis of stool samples from PLHIV revealed a frequency of intestinal parasitic and fungal infections of 42.9% (112/261). Intestinal parasitic infections alone accounted for 19.5% (51/261).

The frequency of non-opportunistic intestinal parasitic infections by age group is shown in Table 1. They were found more frequently in the [36 - 45 years] and [46 - 55 years] age groups, with a non-significant difference ($p = 0.647$).

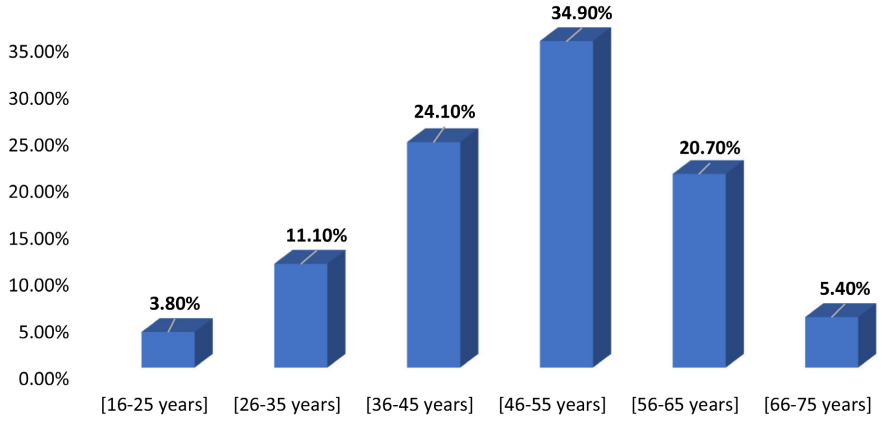

Figure 1. Distribution of people living with HIV by age groups.

Table 1. Distribution of intestinal parasitic infections according to age groups of people living with HIV.

		Non-opportunistic Intestinal parasitosis		
		Negative	**Positive**	
Age groups	[16 - 25 years]	7 (3.3%)	3 (5.9%)	10 (3.8%)
	[26 - 35 years]	25 (11.9%)	4 (7.8%)	29 (11.1%)
	[36 - 45 years]	51 (24.3%)	12 (23.5%)	63 (24.1%)
	[46 - 55 years]	73 (34.8%)	18 (35.3%)	91 (34.9%)
	[56 - 65 years]	45 (21.4%)	9 (17.6%)	54 (20.7%)
	[66 - 75 years]	9 (4.3%)	5 (9.8%)	14 (5.4%)
		210 (80.1)	51 (19.9%)	261 (100%)

PLHIV were carriers of monoparasitism in 35.2% of cases (92/261). Polyparasitism was observed in 7.7% of cases (20/261).

The different parasites that were found are shown in Figure 2. It should be noted that Candida (30.7%; 80/261) was mainly isolated in the stools of PLHIV. Intestinal parasites themselves were mainly represented by protozoa, particularly amoeba cysts (17.6%; 46/261), dominated by *E. histolytica*/dispar cysts (14.90%) and *E. coli* (2.7%; 7/261), one case of *Giardia intestinalis* cysts (0.4%), and one case of *Trichomonas intestinalis* (0.4%). Helminths were found in equal proportions: 1 case of *Strongyloides stercoralis* (0.4%), 1 case of hookworm (0.4%) and 1 case of *Ascaris lumbricoides* (0.4%).

For intestinal parasitic infections, there was no link between the presence of parasites and age groups.

Women living with HIV (20.2%, 41/203) were more affected by intestinal parasitic infections than men (17.2%, 10/58), but without a statistically significant difference ($p = 0.617$). Monoparasitism was also more common in women (80.3%, 41/51) than in men (16.6%, 10/51), but the difference was not significant ($p = 0.674$).

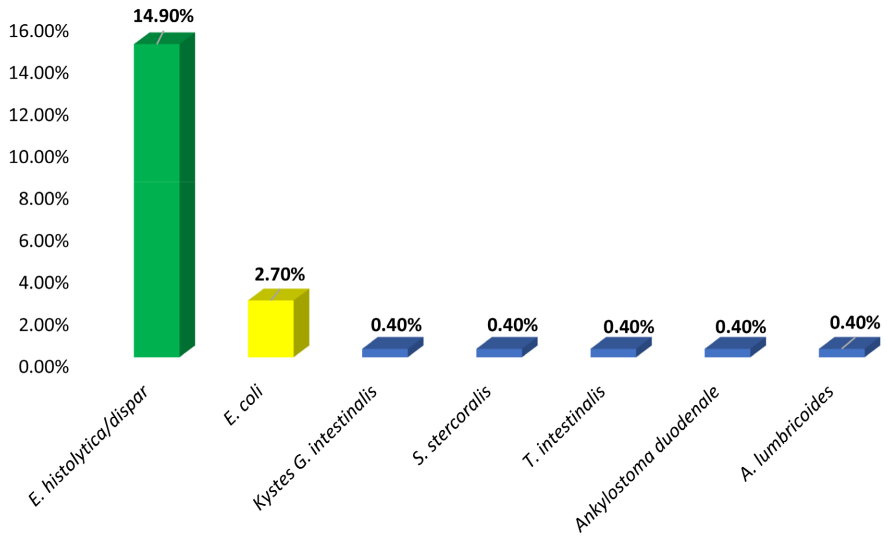

Figure 2. Intestinal parasites detected in PLHIV undergoing treatment and monitored in Brazzaville.

4. Discussion

This study only looked at non-opportunistic intestinal parasitic infections in PLHIV. The viral loads of PLHIV were not investigated. This could be a significant drawback, as it would have been interesting to check the viral load of each patient in order to establish a possible link between intestinal parasitic infections and viral load. However, in a context where intestinal parasitic infections represent a public health problem in developing countries such as Congo [12], understanding the role of these infections in PLHIV is of paramount importance, especially given that some of these diseases can cause serious symptoms in this population group.

The prevalence of intestinal parasitic infections in this study was 19.4%. This prevalence is similar to that reported by Nkenfou NC *et al.* in Dschang, Cameroon [9] [13].

However, it is lower than that found by Vouking MZ in Yaoundé, Lar PM in Vom, and Aliyo A in Guji [14]-[16].

Nevertheless, the frequency of non-opportunistic intestinal parasitic infections in our study was higher than that found by Taheu CN *et al.* in a peri-urban area of Yaoundé [17], by Akinbo FO *et al.* in Benin City [18], and by Namaji MAAS *et al.* in northeast India [6].

This analysis shows that the frequency of intestinal parasitic infections among PLHIV varies from one country to another and from one environment to another within the same country. This can be explained by the fact that the frequency of intestinal parasitic infections may depend on the quality of life of patients, the quality of care provided to PLHIV, and the environment in which PLHIV live.

In this study, the type of parasitism identified was exclusively monoparasitism. Several studies on intestinal parasitic infections in PLHIV have shown that they were carriers of monoparasitism, as we observed [19] [20]. However, some au-

thors report not only the existence of multiparasitism but also its predominance [3].

With regard to the parasites identified, we also note a diversity of parasites. Helminths were not the most commonly observed parasites among PLHIV in Brazzaville. The species identified were *A. lumbricoides*, *S. stercoralis*, and *Ankylostoma duodenale*. In Bobo-Dioulasso, Sangaré I *et al.* also found a predominance of protozoa over helminths [21] [22]. Similarly, Ajayi OT *et al.* in Jos found a predominance of protozoa, with *E. histolytica* as the most commonly observed intestinal parasite [23]. In Laos, however, helminths were the most commonly observed parasites, followed by protozoa. These were *S. stercoralis* (dominant species) followed by hookworms in Laos [24] [25]. In Cape Town, helminths were the most common intestinal parasites, with *A. lumbricoides* being the most dominant [26]. Intestinal parasite ecology is often dependent on species dynamics in a given environment. Thus, PLHIV living in an environment where protozoan infections are dominant due to policies to combat geohelminthiasis through the mass administration of antihelminthics in accordance with World Health Organization strategies are more likely to be affected by protozoan infections [27]. This is the case in our country, where mass screening campaigns against geohelminthiasis have certainly helped to reduce the frequency of these parasites, leaving protozoa, most of which are not eliminated by the molecules used in deworming campaigns, to become more prevalent in the environment. On the other hand, it is important to note the modernisation of the city with the construction of modern latrines, which reduce contact between potential vectors of geohelminthiasis, contaminated soil and humans, thereby reducing the spread of geohelminths. A significant part of this reduction is also attributable to PLHIV's compliance with hygiene rules.

Women were more likely to be carriers of intestinal parasitic infections than men, but without significant difference. The diversity of results in the literature regarding the most affected gender shows that this pathology is not related to gender, although some studies have found a link between the presence of intestinal parasites and gender [7] [28].

5. Conclusion

Intestinal parasitic infections are a real problem among PLHIV. They are dominated by protozoa capable of causing serious damage in this population. Although helminth infections are relatively rare, emphasis must be placed on all these conditions in order to ensure comprehensive and integrated care for PLHIV.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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