

## Original Research Article

# Intestinal parasitic infections in HIV infected patients

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## ABSTRACT

Diarrhea is the most common complication in HIV infected individual. It occurs in almost 90% of the HIV infected patients. The most commonly parasites causing diarrhea in HIV infected individuals include *Cryptosporidium parvum*, *Isospora belli*, *Microsporidium* spp., *Giardia intestinalis*, *Entamoeba histolytica* and *Strongyloides stercoralis*. The incidence and prevalence of enteric parasitic infection in HIV/AIDS patients differ significantly from region to region. The present study was conducted in with an aim to determine the prevalence of intestinal parasitic infection in HIV infected patients. The HIV infection was common in age group 21-30 years followed by 31-49 years both in male and female subjects. *Cryptosporidium parvum* followed by *Entamoeba histolytica* and *Giardia intestinalis* were the most common intestinal parasites in HIV infected patients presenting with diarrhea. Intestinal parasites are important cause of diarrhea in HIV/AIDS. They can cause symptomatic or asymptomatic infections. Therefore our study highlights the importance of screening of HIV infected patients for presence of intestinal parasites. This will guide appropriate therapy and will be important in reducing morbidity and mortality in HIV/AIDS patients.

## Keywords

*Cryptosporidium parvum*;  
*Entamoeba histolytica*;  
intestinal parasites;  
Human Immuno-deficiency Virus

## Introduction

Acquired Immunodeficiency Syndrome (AIDS) is the most disastrous disease of its time (Tripathi and Agrawal, 2007). In spite of awareness programmes conducted worldwide, the rise in HIV infection still continues in developing countries like Africa and Asia. In Asia highest number of HIV infected individuals belong from India and China (Surendran, 2004). HIV infection is alarming due to unique pathogenesis of the virus. It decreases the

CD4 cells, signaling the emergence of opportunistic infections. The decrease in CD4 cell count below 200 cells/ $\mu$ l leads to irreversible breakdown of immune defense mechanism and the HIV infected individual becomes vulnerable to variety of opportunistic infections (Deorukhkar and Saini, 2012). Opportunistic pathogens may be bacteria, fungi, virus or parasites. Microorganisms causing opportunistic infections cause asymptomatic or mild

symptomatic, usually self limiting infections in immunocompetent individuals (Deorukhkar and Saini, 2012). In HIV opportunistic infections are a common complication necessitating hospitalization and expensive therapies (Srirangaraj and Venkatesha, 2011).

Diarrhea is the most common complication in HIV infected individual (Deorukhkar *et al.*, 2012; Gupta *et al.*, 2013). It occurs in almost 90% of the HIV infected patients (Kumar *et al* 2002). The most commonly parasites causing diarrhea in HIV infected individuals include *Cryptosporidium parvum*, *Isospora belli*, *Microsporidium spp.*, *Giardia intestinalis*, *Entamoeba histolytica* and *Strongyloides stercoralis* (Wiwanitkit, 2001; Deorukhkar *et al.*, 2012; Gupta *et al.*, 2013). The incidence and prevalence of enteric parasitic infection in HIV/AIDS patients differ significantly from region to region (Raytekar *et al.*, 2012). Keeping this in mind the present study was conducted in with an aim to determine the prevalence of intestinal parasitic infection in HIV infected patients.

## Materials and Methods

The present study was conducted in Department of Microbiology, ACPM Medical College, Dhule, Maharashtra. A total of 220 HIV infected patients were enrolled in the study. Out of these, 135 HIV patients were suffering from diarrhea and 85 were non diarrheal individuals. HIV infected non diarrheal subjects were included to analyze the prevalence of asymptomatic infection by intestinal parasites.

The HIV seropositive patients were defined as those who had been tested positive for HIV antibodies by any of the

two tests i.e. ELISA/Rapid/Simple as per the recommendations given by WHO. (UNAIDS/AIDS, 1998). Diarrhea is defined as the passage of abnormal liquid or unformed stool at an increase frequency (Deorukhkar *et al.*, 2011).

## Stool examination

Three consecutive freshly voided stool samples were collected in clean wide mouth container from all subjects enrolled in the study (Deorukhkar *et al.*, 2011; Raytekar *et al.*, 2012). The samples were processed as per WHO standard procedure (WHO, Basic laboratory methods in Medical Parasitology, 1991).

The stool specimens were examined for consistency, color, the presence blood and mucus, adult intestinal helminthes and segment of tapeworm (Deorukhkar *et al.*, 2011). A direct wet mount of stool sample was prepared in 0.85% normal saline and examined microscopically for motile intestinal parasites and trophozoites (Raytekar *et al.*, 2012). The saline mount was also used to differentiate bile stained and non bile stained eggs of helminthes. Lugol's iodine preparation was examined microscopically for detection of cysts. Formalin ether concentration was done when no parasite was demonstrated by direct microscopy (Arora and Arora, 2000). The Modified Ziehl Neelsen (ZN) staining was done for demonstration of coccidian parasites.

## Results and Discussion

Figure.1 shows the age and sex distribution of HIV infected individuals included in the study. Out of 220 subjects, 142 (64.5%) patients were males and 78 (35.5%) patients were females. The HIV infection was common in age group 21-30

years followed by 31-49 years both in male and female subjects. As shown in Figure 2. The number of HIV infected males presenting with diarrhea was more than that of females.

Intestinal parasites were seen in stool of 79 (58.5%) HIV infected subjects presenting with diarrhea. *Cryptosporidium parvum* followed by *Entamoeba histolytica* and *Giardia intestinalis* were the most common intestinal parasites (Figure 3.).

Out of 85 HIV infected non diarrheal subjects, intestinal parasites were demonstrated in 26 (30.5 %) cases. *Entamoeba histolytica* and *Giardia intestinalis* were the most common intestinal parasites (Figure 4.).

Diarrhea is one of the most common manifestation HIV/AIDS. The enteric parasites cause self limiting diarrhea of short duration in healthy individuals but in AIDS patients these causes chronic diarrhea which may sometimes be life threatening (Prasad *et al.*, 2000).

In our study the incidence of HIV infection was more in males as compared to females. This observation was also noted in studies of other researchers (Ayyagari *et al.*, 2000; Deorukhkar and Saini, 2012). HIV infection was found to be more in the age group 21-40 years. This age group is economically productive and due to HIV infection in this group the economic status of the country is negatively affected (Deorukhkar and Saini, 2012).

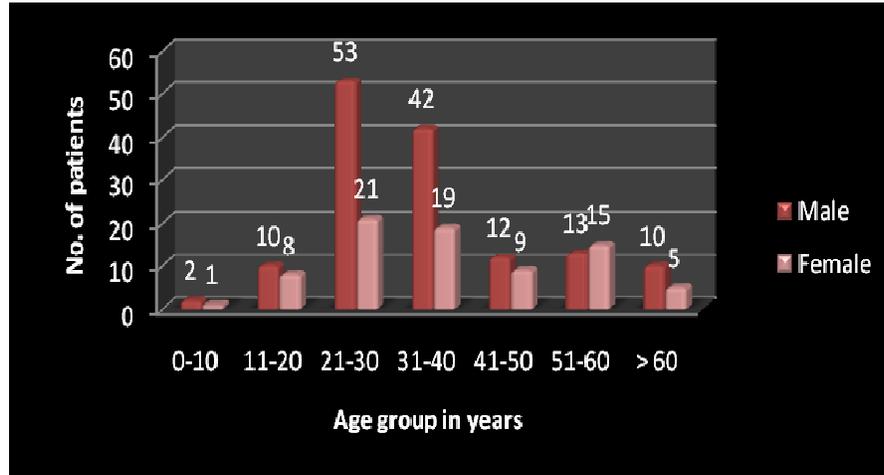
Various studies on intestinal parasitic in HIV infected patients have demonstrated striking geographical variation. In our study the intestinal parasitic infections were seen in 58.5% HIV infected subjects presenting with diarrhea. The most

common coccidian parasite found to be associated with diarrhea in HIV infected patients was *Cryptosporidium parvum*. Our observation is in consistent with that of Mohandas *et al* (Mohandas *et al.*, 2002), Sadraei *et al* (Sadraei *et al.*, 2005) and Deorukhkar *et al* (Deorukhkar *et al.*, 2011). *Cryptosporidium parvum* produces a cholera-like watery or mucus diarrhea in HIV patients. Diarrhea relatively is more severe, profuse and watery with as many as 70 stools per day and loss of body fluids even up to 17 litres/day. The prolonged diarrhea may lead to significant weight loss (Arora and Arora 2000). *Isospora belli* was seen only in HIV infected patients presenting with diarrhea. The coccidian parasites (*Cryptosporidium parvum*, *Isospora belli*, *Cyclospora* spp. and *Microsporidium* spp.) are foremost among the intestinal parasites in HIV infected patients (Deorukhkar *et al.*, 2011). Among non coccidian parasites, *Entamoeba histolytica* was the commonest followed by *Giardia intestinalis*.

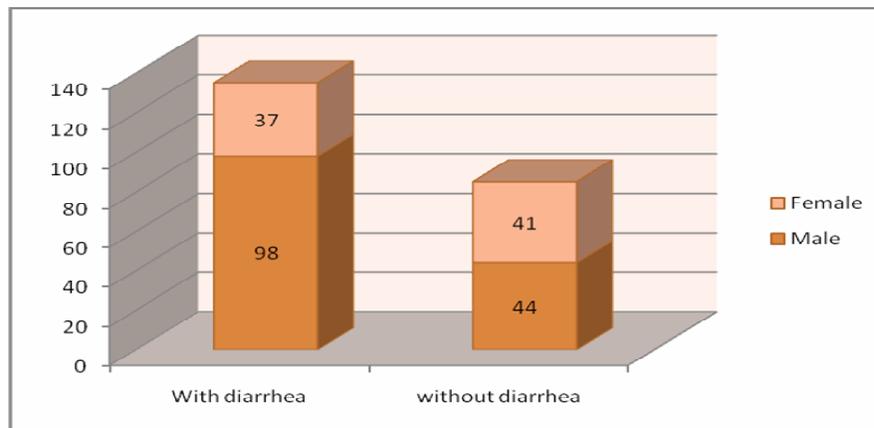
*Entamoeba histolytica* and *Giardia intestinalis* were the common non coccidian protozoan parasites demonstrated in the stool of HIV infected non diarrheal patients. Our observation is similar to that of Deorukhkar *et al* (Deorukhkar *et al.*, 2011) and is in contrast to that of Sethi *et al* (Sethi *et al.*, 2000). These parasites are known to cause asymptomatic and non invasive infections.

Intestinal parasites are important cause of diarrhea in HIV/AIDS. They can cause symptomatic or asymptomatic infections. Therefore our study highlights the importance of screening of HIV infected patients for presence of intestinal parasites. This will guide appropriate therapy and will be important in reducing morbidity and mortality in HIV/AIDS patients.

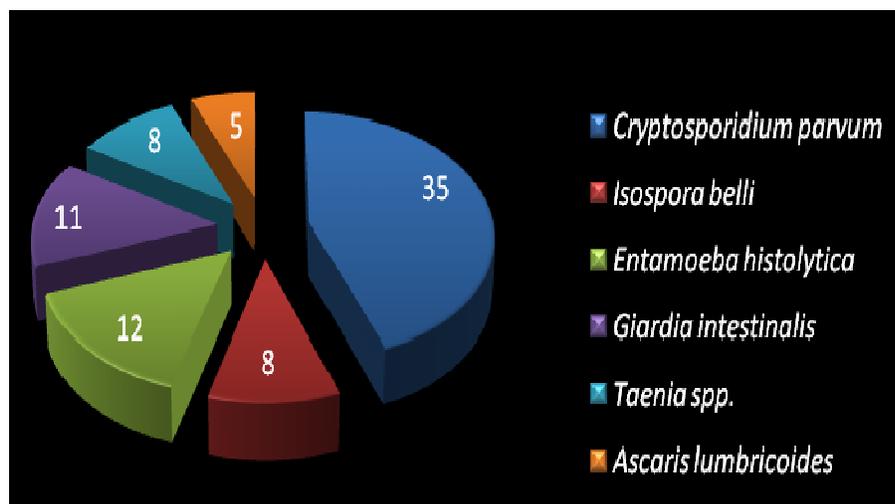
**Figure.1** Age and Sex wise distribution of HIV infection patients



**Figure.2** Sex wise distribution of HIV infected patients with and without diarrhea.



**Figure.3** Intestinal parasites in HIV infected patients with diarrhea.



**Figure.4** Intestinal parasites in HIV infected patients with diarrhea.



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