



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2015; 1(9): 841-843  
www.allresearchjournal.com  
Received: 24-06-2015  
Accepted: 27-07-2015

**Dr. Homi H Patel**  
3<sup>rd</sup> year Resident, Department  
of Microbiology, SMIMER,  
Surat, India.

**Dr. Rajeev Kumar**  
Associate Professor,  
Department of Microbiology,  
SMIMER, Surat, India.

**Dr. Mannu R Jain**  
Professor & Head, Department  
of Microbiology, SMIMER,  
Surat, India.

**Dr. Pragnesh Bhuv**  
Assistant Professor,  
Department of Microbiology,  
SMIMER, Surat, India.

**Khushbu R Singh**  
M.Sc. M.L.T., Department of  
Microbiology, SMIMER,  
Surat, India.

## Study of various intestinal parasitic infections in HIV sero-positive patients attending antiretroviral treatment (Art) centre of a tertiary care hospital

Homi H Patel, Rajeev Kumar, Mannu R Jain, Pragnesh Bhuv, Khushbu R Singh

### Abstract

**1. Introduction:** Infections with enteric parasites have increased over the years in HIV seropositive patients. The purpose of this study was:

- To determine the prevalence of parasitic infections in HIV seropositive patients.
- To determine the correlation between CD4 T cell counts and the presence of enteric parasites.

**2. Materials and Methods:** The study was conducted on stool samples of 228 HIV sero-positive patients who attended Anti-Retroviral Treatment (ART) centre of SMIMER hospital, Surat. The stool samples were examined for enteric parasites by microscopy.

**3. Results:** Out of 228 HIV positive stool samples, 94 (41.22%) were found positive for parasites. *Cryptosporidium parvum* was the predominant parasite detected in 58 (61.70%) patients followed by *Isoospora belli* in 12 (12.77%) patients, *Taenia spp* in 9 (9.58%) patients, *Strongyloides stercoralis* in 8(8.51%) patients, *Ascaris lumbricoides* in 6 (6.38%) patients and *Hymenolepis nana* in 1(1.06%) patient.

Out of 115 patients with CD4 count <200 cells/ $\mu$ l, parasites were found in 64 (55.65%) patients, while out of 104 patients with CD4 count 200-500 cells/ $\mu$ l, they were found in 29 (27.88%) patients and out of 9 patients with CD4 count > 500 cells/ $\mu$ l, they were found in 1 (11.11%) patient.

**4. Conclusion:** The above study confirmed that there was high prevalence of opportunistic intestinal parasitic infections in HIV sero-positive patients and low CD4 count was significantly associated with it. An early and accurate diagnosis of these infections is important which will help clinicians in the proper management of these patients.

**Keywords:** HIV, Opportunistic infection, CD4 count, Intestinal parasites

### 1. Introduction

Human Immunodeficiency Virus (HIV) is a global pandemic. The number of people infected with HIV are rising rapidly in most parts of the world. Infections with HIV are leading causes of mortality and morbidity worldwide.

In patients with Acquired Immuno Deficiency Syndrome (AIDS), parasitic infections of the gastrointestinal tract are a leading cause of morbidity in developing countries. These intestinal parasites can cause severe chronic diarrhea leading to malabsorption, electrolyte imbalance and profound weight loss. Therefore, orally taken anti-retroviral drugs will be poorly absorbed which in turn will reduce the efficacy of treatment. Thus early detection of these parasites is of utmost importance.

Many studies have been conducted depicting the frequency of various pathogens causing diarrhea in HIV seropositive patients from different parts of India. However, there is paucity of such studies from the southern parts of Gujarat. Thus, this study was conducted to determine the prevalence of enteric parasites in HIV positive individuals and to determine their correlation with CD4 counts in Surat, Gujarat.

### 2. Aims & Objectives

- To determine the prevalence of parasitic infections in HIV patients.
- To determine the correlation between CD4 T cell counts and the presence of enteric parasites.

**Correspondence**  
**Dr. Homi H Patel**  
3<sup>rd</sup> year Resident, Department  
of Microbiology, SMIMER,  
Surat, India.

### 3. Materials and Methods

The study was conducted on stool samples of 228 HIV sero-positive patients who attended Anti-Retroviral Treatment (ART) centre of SMIMER hospital, Surat. The study subjects included patients who were confirmed HIV positive and whose CD4 count was being evaluated. Each patient was asked to fill up a short questionnaire which included demographic data like age, sex and any presenting complaints of diarrhea.

#### 3.1 Stool Examination

Each participant was provided a labeled, leak proof, clean sterile plastic container for collection of stool samples. The stool samples were examined macroscopically for colour, consistency, blood, mucus and adult intestinal helminths. Microscopic examination of these samples was done by direct saline, iodine wet mount preparation and formol ether concentration<sup>16</sup> was done when the stool did not reveal any parasite by direct microscopy. The wet films were first screened under low power (10x) and subsequently under high power (40x) of the microscope. For detection of coccidian parasites, the modified Ziehl Neelsen staining method<sup>16, 17</sup> was used. For CD4 cell count, 5ml blood was taken from all participants and was analyzed by FACS Count System (Becton Dickinson).

#### 3.2 Statistical Method

Statistical analysis was done by open EPI software, using which Chi square and p values were calculated.

### 4. Results

A total of 228 HIV sero-positive patients were included in the study, out of which 134 were males and 94 were females. Highest number of HIV sero-positive patients were in the age group of 20-29 years (38.59%) and lowest were ≥50 years (10.52%) age (age range-20-69 years). Figure I outlines the age and sex distribution of HIV sero-positive patients.

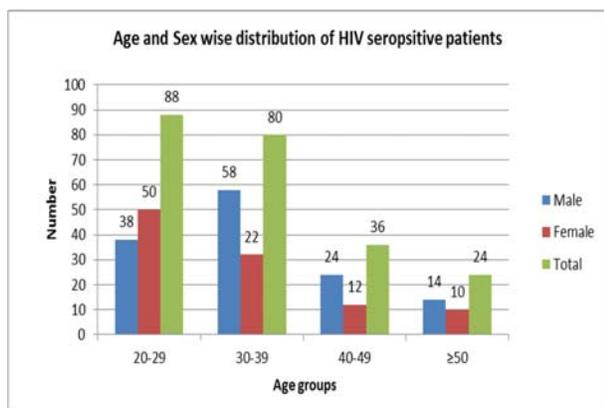


Fig I

Out of 228 HIVpositive stool samples, 94 (41.22%) were found positive for parasites. *Cryptosporidium parvum* was the predominant parasite detected in 58 (61.70%) patients followed by *Isospora belli* in 12 (12.77%) patients, *Taenia spp* in 9 (9.58%) patients, *Strongyloides stercoralis* in 8(8.51%) patients, *Ascaris lumbricoides* in 6 (6.38%) patients and *Hymenolepis nana* in 1(1.06%) patient. Figure II outlines the percentage wise distribution of parasites present in the HIV seropositive stool samples.

Percentage wise distribution of parasites in the HIV sero-positive stool samples

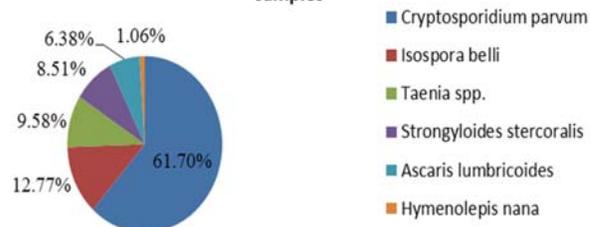


Fig II

Table I shows the presenting symptoms of the patients in our study. Predominantly diarrhea was the main symptom followed by fever, weight loss, pain in abdomen, weakness and cough. The parasite isolation rate was more in patients with diarrhea compared to those without diarrhea.

Table I

Presenting Symptoms among HIV sero-positive patients (n=228)		
Symptom	Frequency	Percentage
Diarrhea	75	(32.89%)
Fever	51	(22.38%)
Weight loss	42	(18.43%)
Pain in abdomen	27	(11.85%)
Weakness	18	(7.89%)
Cough	09	(3.95%)
Breathlessness	03	(1.31%)
Cervical lymphadenopathy	02	(0.87%)
Urethral discharge	01	(0.43%)

As shown in table II, out of 115 patients with CD4 count <200 cells/μl, parasites were found in 64 (55.65%) patients, while out of 104 patients with CD4 count 200-500 cells/μl, they were found in 29 (27.88%) patients and out of 9 patients with CD4 count > 500 cells/μl, they were found in 1 (11.11%) patient. Thus, there was significant association between CD4 counts and parasite isolation (p < 0.001). The maximum parasite isolation was in the group of patients who had CD4+ T cell count below 200 cells/μl. The parasitic isolation rates increased with the decrease in CD4+T cell counts.

Table II

Association between CD4 counts and parasitic infections					
	CD4 +T cell count <200 cells/μl	CD4 +T cell count 200-500 cells/μl	CD4 +T cell count >500 cells/μl	χ <sup>2</sup> (Chi square)	p value*
Parasite present	64	29	1	20.89	< 0.001- highly significant
Parasite absent	51	75	8		
Total	115	104	9		

As shown in table III, out of 115 patients with CD4+T cell count<100 cells/ $\mu$ l, 60 patients had diarrhea while out of 104 patients with CD4 +T cell count 100-200 cells/ $\mu$ l, 13 patients had diarrhea and out of 9 patients with CD4 +T cell count

>200 cells/ $\mu$ l, 2 patients had diarrhea. Thus, there was significant association between CD4 counts and diarrhea ( $p < 0.001$ ). Diarrhea, as a presenting symptom, was common in patients with low CD4+ T cell counts.

Table III

Association between CD4 counts and diarrhea					
	CD4 +T cell count<200 cells/ $\mu$ l	CD4 +T cell count 200-500 cells/ $\mu$ l	CD4 +T cell count >500 cells/ $\mu$ l	$\chi^2$ (Chi square)	p value*
Diarrhea present	60	13	2	39.42	< 0.001- highly significant
Diarrhea absent	55	91	7		
Total	115	104	9		

## 5. Discussion

In HIV positive patients, intestinal parasitic infections usually cause profuse, watery diarrhea which accelerates disease progression. Our study showed that out of total 228 patients, majority were in 20-29 years age group which is similar to findings of K Amruth Rao *et al.* [1]. The present study showed male preponderance in HIV positive cases which is similar to findings of Amatya R *et al.* [2]. In the present study, 94 (41.22%) stool samples were found positive for parasites which is similar to findings of S.V. Kulkarni *et al.* (35%)

*Cryptosporidium parvum* was identified as the most prevalent coccidian parasite (61.70%) in the present study. Several studies have shown similar isolation rates of *Cryptosporidium parvum* in HIV patients [3, 4].

In the present study we also found that diarrhea in HIV patients was usually associated with low CD4+ T-cell counts which is similar to the findings of S Gupta *et al.* [5]. Thus, the present study demonstrates that there is an increased risk of intestinal parasitic infections in HIV sero-positive patients and the risk increases as the CD4 count decreases.

## 6. Conclusion

From the above study we conclude that intestinal parasitic infections are common in HIV sero positive patients. In India, patients usually belong to poor socio-economic background and so they can hardly afford treatment. Therefore, it is suggested that steps should be taken to prevent the occurrence of these diseases in AIDS patients by providing safe drinking water and educating them to maintain good hygienic practices.

Thus stool samples of all HIV sero-positive individuals with CD4 count<200 should be routinely screened for opportunistic parasitic infections. Timely detection and treatment of these infections should be done to avoid serious consequences of HIV infection.

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