

Research Article

Enteric parasites in HIV/AIDS patients: Study of the prevalence and risk factors

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Abstract

HIV/AIDS ranks amongst the most dreaded diseases afflicting mankind, causing dysfunction of the immune system, resulting in overwhelming and fatal opportunistic infections. Diarrhoea is the most common presenting symptom in HIV positive patients and etiological agents are highly variable depending on various risk factors: contaminated drinking water, using public toilets etc.

The present study seeks to determine the prevalence of parasitic infections in HIV positive patients and the associated risk factors. *Isospora belli* was the most common parasite (11%) followed by *Cryptosporidium* species (2%) and *Cyclospora* species (1%). Parasitic infections were significantly high in public toilet users (P value<0.01). Contact with pets and animals, chronic diarrhoea were also important factors in acquiring parasitic infections (P value<0.05). Access to clean, hygienic toilets, precautions while handling pets would reduce the risk of parasitic infections in HIV positive patients.

Keywords: parasitic infections, HIV, *Isospora*, risk factors

1. Introduction

Diarrhoea is one of the most common presenting complaints in HIV infected patients. Coccidian parasites like *Isospora*, *Cryptosporidium*, and *Cyclospora* have emerged as major pathogens causing significant morbidity and mortality in HIV positive patients. Infection with the coccidian parasites is considered a WHO stage 4 AIDS defining illness warranting antiretroviral therapy irrespective of CD 4 counts even in resource limited countries like India. Most of these patients are from poor socioeconomic backgrounds and do not have access to clean drinking water, toilets. Lack of expertise and facilities particularly at the primary level delays the diagnosis and there is a need to screen stool samples of all patients suffering from chronic diarrhoea for coccidian parasites to identify and initiate appropriate therapy. A few studies were carried out both in India^{1,2,3} and abroad^{4,5,6} to determine the prevalence of parasitic infections in HIV patients and to study their association with various risk factors. The present study was undertaken to determine the prevalence of enteric parasitic infections in HIV/AIDS patients attending the ART centre in Gandhi Hospital and evaluate the role of various risk factors in acquiring parasitic infections.

2. Material and Methods

Single stool samples from 100 HIV positive patients with diarrhea (cases) and 50 HIV positive patients without diarrhea (controls) attending the ART centre in Gandhi hospital between 2008 and 2009 were collected. After taking written

consent, each patient was interviewed using a questionnaire to collect clinical information such as age, sex, type of illness and clinical symptoms.

2.1 Samples were screened for ova, cysts, motile trophozoites and oocysts of coccidian parasites by wet mount and Iodine mount preparations.

2.2 Smears were stained by Modified acid fast method and examined under 1000x for red coloured acid fast oocysts of *Cryptosporidium*, *Isospora* and *Cyclospora* with their typical morphological features.

2.3 Modified Safranin method⁷ was used to screen reddish orange oocysts of *Cyclospora*, 8-10µm in size with a crinkled cyst wall.

2.4 Chromotrope staining was used to screen for Microsporidial spores.

2.5 All the samples were subjected to Formalin ethyl acetate concentration method and the sediment was screened for the parasites by the above methods.

Statistical analysis was done using SPSS software and P value <0.05 was considered significant.

3. Results

A total of 15 parasites were isolated from 14 patients (7 male and 7 female) in the study group. *Isospora belli* was the most common parasite seen in 11% of the study group followed by *Cryptosporidium* species (2%) and *Cyclospora* species (1%). One case of mixed infection with *Isospora belli* and *Blastocystis hominis* was noted. No parasites were detected in the HIV positive patients without diarrhoea. Modified acid fast staining procedure was more useful in the identification of all the coccidian parasites when compared with other staining techniques.

Table 1. Distribution of enteric parasites in HIV positive patients with and without diarrhoea on the basis of different characteristics

Characteristic		Patients with Diarrhoea (n=100)	Patients without Diarrhoea (n=50)
Sex	Male	7/71 (9.85)	30
	Female	7/29 (24.13)	20
Age (Years)	0-15	1/9 (11.11)	4
	16-30	6/39 (15.38)	19
	31-45	7/45 (15.55)	24
	46-60	0/7 (0)	3
Residence	Urban	5/55 (9.09)	23
	Rural	4/26 (15.3)	12
	Slum	5/19 (26.3)	15
Diarrhoea	Acute	5/70 (7.14)	-
	Chronic*	9/30 (30)	-
Pets and animals	Yes*	4/12 (33.3)	7
	No	10/88 (11.36)	43
Toilets	In house	5/69 (7.24)	35
	Open field	2/16 (12.5)	13
	Public*	7/15 (46.6)	2
Source of drinking water	Hand pump	5/33 (15.15)	7
	Water tanker	1/8 (12.5)	11
	Tap water	8/59 (13.5)	32
Risk group	Heterosexual	14/99	50
	Homosexual	-	-
	Transfusion recipient	0/1	-

Table 1 shows the distribution of enteric parasites in HIV positive patients with and without diarrhoea on the basis of different characteristics. Most of the study group patients resided in urban areas (55%) followed by rural areas (26%) and slums (19%). 69 patients had a toilet in their own house, 16 of them were defecating in the open while the rest of them were using public toilets. High proportion of public toilet users were harboring intestinal parasites (46.6%) while the prevalence of enteric parasites in home toilet users and those defecating in the open fields was 7.24% and 12.5% respectively. Out of the 12 patients with pets in their homes, 4 of them (33.3%) had enteric parasites. 26.6% of slum dwellers had parasitic infections followed by 15.3% of those living in rural areas and 9.09% of urban dwellers.

Gender, age, area of residence, and source of drinking water were not significantly associated with enteric parasitic infections. For the purpose of statistical analysis, patients were divided into Public toilet users and home toilet users + open field defecators.

Association between usage of public toilets and isolation of coccidian parasites was statistically significant (P value<0.01). Contact with pets and animals also emerged as a significant factor (P value<0.05). The prevalence of intestinal parasites was significantly higher in patients with chronic diarrhoea than in those without (P value<0.05).

4. Discussion

The reported prevalence rates of *Isospora belli* from various studies in India are 2.5%⁸, 13.7%⁹, 16%³, 17%¹⁰, 18%¹¹, and 31%¹² which are similar to the present study. *Cryptosporidium* species and *Cyclospora cayentanensis* were found in 2% and 1% patients respectively which is low compared to the reported prevalence rates of *Cryptosporidium* -from 6% to 37%. However Zali et al¹³ in their study found that 1.5% of HIV positive patients were harboring *Cryptosporidium* species.

In the present study, no parasites were isolated in HIV positive patients without diarrhoea which correlates with the observations made by Zali et al¹³, Mohandas et al⁸, Mukhopadhyaya et al¹¹ that intestinal parasites were more common in HIV positive patients with diarrhoea than in those without.

Isospora belli was the only parasite detected in patients with chronic diarrhoea. *Cryptosporidium* and *Cyclospora* were associated with acute diarrhoea. Similar observation was made by Kumar et al⁹. A contradictory finding was revealed by Certad et al¹⁴ who noted that a significant proportion of patients with Isosporiasis had acute diarrhoea. Gupta et al¹⁵ found *Isospora belli* in 41.1% of chronic diarrhoea cases while it was 30% in the present study. It was found in the present study that the prevalence of intestinal parasites was significantly higher in patients with chronic diarrhoea than in those with acute diarrhoea (P<0.05) in agreement with Tarimo et al¹⁶ in 1996. Wiwanitkit et al⁴ in their study of intestinal opportunistic infections among Thai HIV infected patients found that there was no association between opportunistic intestinal parasitic infections and mode of sexual intercourse (p value > 0.05) which agrees with the present study.

In a similar study by Dwivedi et al² in 2007, significant risk factors found were: residence in a slum, exposure to pets and animals, use of public toilets, and practice of unsafe homosexual activity. But a study by Rao Ajjampur et al¹ in the same year in Vellore, found that the association between area of residence: rural or urban, water source and contact with animals and acquisition of Cryptosporidiosis was statistically insignificant. Glaser et al⁶ found that pets are not a major risk factor for acquisition of cryptosporidiosis in HIV infected individuals. In the present study one patient (50%) with Cryptosporidiosis had history of contact with cows and contact with pets and animals (P<0.05), use of public toilets (P<0.01), and chronic diarrhoea (P<0.05) emerged as significant risk factors for acquiring parasitic infestations.

Modified acid fast staining is a simple technique which can be used to screen stool samples of all HIV positive patients with diarrhoea even in resource limited settings. An early diagnosis and treatment would greatly help in improving the quality of life and prevent further deterioration of the immune system. All chronic diarrhoea cases need to be investigated for coccidian infections and screened for HIV infection de novo as majority of the coccidian parasites are associated with chronic diarrhoea with diarrhoea being the presenting symptom of HIV in many cases. Adequate precautions while handling pets and animals and access to clean, hygienic toilets can reduce the risk of acquiring enteric parasitic infections in HIV positive patients.

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