Intestinal parasitic infection is a common entity in patients infected with human immunodeficiency virus (HIV). Diarrhoea is a common complication of infection with HIV leading to weight loss and cachexia. Cryptosporidium parvum is a major cause of diarrhoea in developing countries, mainly affecting children and HIV infected individuals with low CD4 counts. The infection is self limiting in immunocompetent hosts but can be severe and persist in the immunocompromised and malnourished individuals. Objectives: To identify oocysts of Cryptosporidium parvum, Cyclospora caytenensis and Isospora belli in stool sample of HIV positive patients and its correlation with CD4 count of patient. Material and Methods: Prospective study was conducted in which stool samples from 62 HIV positive patients were collected and routine microscopy was performed and for coccidian parasites modified acid fast staining (Kinyoun method) was used. The CD4 count of each patient was done by BD FACS machine with flow cytometry technique. Results: Out of 62 stool sample, 36 patients were symptomatic while 26 were asymptomatic. Total 40 patients were positive for all enteric parasite out of these 35 patients were positive for Cryptosporidium parvum, 8 for Cyclospora caytenensis and 3 for Isospora belli. Enteric parasites were detected in 67.5% HIV-infected patients with CD4 count <200 cells/μl in which Cryptosporidium parvum (56.45%) was the most common parasite with CD4 count <200 cells/μl, followed by Cyclospora Species (12.9%) and Isospora belli (4.8%). Conclusion: In a developing country like India it is very easy to prevent all of these parasitic diseases which were commonly seen in AIDS patient. This can be done by drinking pure water, avoiding contact with contaminated soil and also by giving education about practicing personal hygiene, proper food preparation, private good sanitation facility and taking timely and appropriate prophylactic measures.

**ABSTRACT**

Intestinal parasitic infection is a common entity in patients infected with human immunodeficiency virus (HIV), Diarrhoea is a common complication of infection with HIV leading to weight loss and cachexia. Cryptosporidium parvum is a major cause of diarrhoea in developing countries, mainly affecting children and HIV infected individuals with low CD4 counts. The infection is self limiting in immunocompetent hosts but can be severe and persist in the immunocompromised and malnourished individuals.

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Conclusion: In a developing country like India it is very easy to prevent all of these parasitic diseases which were commonly seen in AIDS patient. This can be done by drinking pure water, avoiding contact with contaminated soil and also by giving education about practicing personal hygiene, proper food preparation, private good sanitation facility and taking timely and appropriate prophylactic measures.
Control Organisation (NACO) recommended algorithm. HIV-infected patients were defined as those who had tested positive for HIV antibodies by two sequential ELISA/rapid tests as per the recommendations given by the WHO. Five ml of blood sample was collected in an EDTA bulb from each enrolled patients. Serum samples were used for HIV CD4 cell count. CD4 cell counts were measured by using a FACS count system (Becton Dickinson, Singapore BD). Sixty two stool samples from HIV positive patients were included in our study. The patients were provided a wide mouthed, clean, dry, properly labeled plastic and advised to collect freshly passed stool in the container. These samples were transported to laboratory within one hour of collection for identification of parasites.

**Stool examination:** Iodine and saline wet mount preparation of stool samples were made and examined under microscope. Samples were screened for oocysts of coccidian parasites by wet mount and iodine mount preparations. 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.

**Results:**

Out of total 62 stool samples collected from HIV positive patients, 36 patients presented with diarrhoea and 26 without diarrhoea.

Total of 40 patients were positive for all enteric parasite out of these, 35 patients positive for *cryptosporidium parvum*, 8 were positive for *cyclospora caytenesis* and 3 were positive for *Isospora belli*. Among these forty patients, 8 patients had mix infection out of which 7 had *cryptosporidium & cyclospora* infection and 1 patient was with *isospora & cyclospora* infection.

**Table 1: Percentage of Parasite in Stool Samples**

<table>
<thead>
<tr>
<th>Total stool samples collected</th>
<th>62</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptosporidium parvum</td>
<td>35</td>
<td>56.45%</td>
</tr>
<tr>
<td>Cyclospora caytenesis</td>
<td>8</td>
<td>12.90%</td>
</tr>
<tr>
<td>Isospora belli</td>
<td>3</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

*Cryptosporidium parvum* (56.45%) was the most common parasite with CD4 count <200 cells/μl, followed by *Cyclospora Species* (12.9%) and *Isospora belli* (4.8%).

Enteric parasites were detected in 67.5% HIV-infected patients with CD4 count <200 cells/μl as compared with 32.5% in patients with CD4 count >200 cells/μl.

**Table 2: Correlation of CD4 Count with number of patients**

<table>
<thead>
<tr>
<th>CD4 count</th>
<th>No patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4 count &lt; 200 cells/μl</td>
<td>27</td>
<td>67.5 %</td>
</tr>
<tr>
<td>CD4 count &gt; 200 cells/μl</td>
<td>13</td>
<td>32.5 %</td>
</tr>
</tbody>
</table>

**Discussion:**

In the HIV/AIDS era, the infections by opportunistic agents are on the rise. Opportunistic infections of the gastrointestinal tract are one of the major causes of morbidity and mortality in HIV positive individuals worldwide. The coccidian parasites (*Cryptosporidium spp.*, *Isospora belli*, *cyclospora spp.* and *Micro-...*)
observed in other studies but lower than a study which is 12.90% in present study which was higher than the prevalence reported in Africa and Haiti 10 but it was higher than the prevalence reported from Shrihari narayan et al5, Rina das et al8 and Kulkarni et al9. It has been observed that prevalence of cryptosporidiosis ranges from 8.5 to 81% in India12. The prevalence of Cyclospora cyetensis was observed as 12.90% in present study which was higher than the prevalence observed in other studies 6-8 but lower than a study which is performed by Tuli et al10. The prevalence of Isospora belli is 4.80% in present study which was similar to the study performed by Basak et al12. The reported prevalence rates of Isospora belli from various studies in India are 2.5%, 13.7%, 16%, 17%, 18%, and 31% 13. The lower prevalence of both parasites in this study might be due to that our study participants are in the ART care who were taking ART and/or treatment for opportunistic infection. The other reason might be due to difference in immunity, diarrheic status, environmental and personal hygiene of the study participants and also geographical distribution4.

In present study, eight patients showed mix infection amongst which cryptosporidium and cyclospora mix infection was observed in seven patients. Amaty et al10 also found the mix infection with more than two parasites in which cryptosporidium and cyclospora infection was second most common cause of mixed infection. Whereas in a study conducted by Gupta et al13 found that the mix infection caused by Isospora and cryptosporidium were more common.

In present study it was observed that coccidial parasitic infections were common with low CD4 count (<200cells/µL) and the similar finding were observed in Shrihari narayan et al14, Rina das et al8, Kulkarni et al9, S Gupta et al13, Amaty et al9.

**Conclusion:** The prevalence of intestinal parasites was higher among those HIV infected individuals with diarrhea, low CD4 count. The coccidial parasites are significantly more frequently seen in the stool of HIV positive patients. Among these coccidial parasites Cryptosporidium parvum is a most common parasite which can cause life threatening diarrhea. The routine screening of the stool samples of HIV seropositive patients with diarrhoea should be done for prompt patient care, to prevent the fulminant form of the disease. Timely detection and treatment would avoid the serious consequences of infection and also prevent the transmission. As most of the opportunistic parasitic infections occur through the faecal oral route, they can be prevented by using safe drinking water and food, also by giving education about practicing personal hygiene, proper food preparation, private good sanitation facility and taking timely and appropriate prophylactic measures.

**REFERENCE**