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Study of Intestinal Parasitic Infections in Immunocompromised Subjects Attending at Tertiary Care Setup of Tripura, North East India

Tapan Majumdar*, Uma Debbarma, Rajesh Debbarma

Department of Microbiology, Agartala Government Medical College, India

ABSTRACT

Introduction: *Intestinal parasites continue to be a significant health problem among immunocompromised patients with HIV AIDS in both developed and developing countries. The infestations cause a variety of clinical conditions ranging from asymptomatic to life-threatening situations.*

Aims: *The present study was undertaken to determine the frequency of intestinal parasitic infection among immunocompromised subjects attending a tertiary health care setup in Tripura.*

Material and Methods: *A cross-sectional study was carried out from November 2015 to October 2017 among the immunocompromised subjects attending the Medicine Department, and allied clinics, and appropriate preparation and examination were done to detect trophozoites, ova, and cysts. Data were analyzed using IBM SPSS 15.0*

Result: *Out of 380 stool samples, 64.21% belong to males. The majority of the patients were between 31 and 40 years old. Intestinal parasites were detected in 6.31% of immunocompromised subjects of which ascaris lumbricoides, ancylostoma duodenale, giardia lamblia, strongyloidiasis stercoralis, enterobius vermicularis endolimax nana, cryptosporidium parvum, and isospora belli were found. This study also shows the maximum number of parasites detected in HIV/AIDS patients followed by malignancy, diabetes mellitus, and others.*

Conclusion: *The present study concluded that every 1/10th of immunocompromised patients had intestinal parasitic infections whereas males are more predominantly infested. Non-tribal are more prone to intestinal parasitic infections. The detection of parasites was highest among HIV/AIDS patients and Ascaris lumbricoides was the most common parasite detected.*

Key words: Intestinal parasites, Immunocompromised, Concentration technique, Gastrointestinal symptoms.

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Corresponding author: Tapan Majumder
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INTRODUCTION

Parasites are living organism which receives nourishment and shelter from another organism where it lives and which causes harm to the host [1]. Parasitic diseases are one of the major causes of morbidity and mortality, with more than 3 billion people infected worldwide. Many of these infections occur in the developing world, where improved measures to prevent infection require considerable investments in the public health infrastructure. Parasitic infections are found to be higher among immunocompromised subjects [2]. Parasitic infections generally are asymptomatic in otherwise healthy individuals; however, their manifestations in immunocompromised individuals are more severe and devastating. In any parasitic infection in an immunosuppressed host, certain organisms tend to produce greater pathological sequelae in these patients [3]. The most important immunodeficiency in humans is HIV/ AIDS. In addition to the AIDS pandemic, there are other cases of immunodeficiencies such as malignancies, the cytotoxic effects of radiation, prolonged corticosteroid therapy, and diabetes mellitus. Patients whose immune systems are weakened for any of these reasons become infected with certain parasites

[4]. The intracellular intestinal protozoa like Cryptosporidium parvum, Cyclospora cayetanensis, Isospora belli and Blastocystis hominis are the major causes of uncontrollable debilitating diarrhoea in developing countries specially among immunocompromised subjects [5]. Other kinds of parasites, such as Entamoeba histolytica, Giardia lamblia, Trichuris trichiura, Ascaris lumbricoides, Strongyloides stercoralis, and Ancylostoma duodenale are also frequently encountered in developing countries [6]. Intestinal parasitic infestations cause a variety of clinical conditions, ranging from asymptomatic infestations to life-threatening situations. The majority of the symptoms are related to the Gastrointestinal (GI) tract [7]. The parasitic infections is self-limiting in immunocompetent hosts who readily clear the parasites but it may cause persistent diarrhoea and severe malabsorption in immunodeficient hosts [8]. As per WHO estimates Ascaris lumbricoides infects over 1 billion people, Trichuris trichiura 795 million and hookworms 740 million worldwide [9]. In developing countries, gastrointestinal parasitic infections are mostly due to poverty characterised by poor hygienic habits, absence of potable and clean water, absence of a good faecal disposal system and poor nutrition. The spectrum of parasitic infection varies and the pathogen responsible for causing diarrhoea in different geographical locations. Therefore, laboratory diagnostic evaluations are required to determine their prevalence in each population to provide guidelines for therapy and necessary data for the planning and evaluation of these patients' care and management [10]. In India, as per published literature, intestinal parasites vary from 11.3% to 90% [11]. However, to date, there was no such data regarding the burden of parasitic infection among immunocompromised subjects in Tripura. Hence, the present study was initiated to determine the frequency of intestinal parasitic infection among immunocompromised subjects with ethnic variation between tribal and non-tribal populations attending a tertiary care setup.

Material and Methods

A cross-sectional study was conducted at the Department of Microbiology, Agartala Government Medical College, Agartala, Tripura, from November 2015 to October 2017 following approval of the Institutional Ethics Committee. Stool samples from immunocompromised subjects attending the Medicine department, Antiretroviral Treatment Centre, Diabetic clinic, Cancer ward, Paediatrics ward, Obstetrics and Gynaecology ward were collected. Patients with HIV/AIDS, Diabetes mellitus, Malignancies, Pregnancy and Malnourished children with abdominal symptoms suggestive of parasitic infection were included in the study. The patients suffering from diarrhoea with immunocompetent subjects were excluded from the study. A sample size of 380 was calculated at a 5% margin of error at a 95% confidence interval with a 5% non-response rate. The eligible cases were included on a convenient basis. The detailed demographics such as age, sex, and ethnicity were recorded in a predesigned proforma. The stool sample was collected in a sterile wide-mouth plastic capped container. Patients were instructed to avoid contamination of the stool specimen with urine or water and transported to the microbiology laboratory within 2-6 hours, labelled properly and processed. Macroscopic examination of the stool sample was done for colour, odour, nature, pH, consistency, presence or absence of mucous, visible blood or any intestinal adult worm, or segment of tapeworm. Saline and lugol's iodine preparation was carried out to detect trophozoites, ova, and cysts. Formol-ether concentration techniques were employed for all specimens for the concentration of the parasitic, ova and cysts [12]. Kinyoun's acid-fast stain was modified to detect oocysts of coccidian parasites such as Isospora belli, Cryptosporidium parvum and Cyclospora cayetenensis [13]. Data entry and analysis were performed using Microsoft Excel and SPSS version 17 software. Descriptive statistics were presented in mean, standard deviation, frequency and percentage. Informed consent was obtained from all participants.

RESULT

A total of 380 stool samples were collected from immunocompromised subjects with abdominal symptoms suggestive of parasitic infection as per inclusion criteria. Among them, 64.21% (244/380) are male (Table 1). The age distribution shows 18.94% (72/380) belong to 1 to 10 years, 8.94% (34/380) 11 to 20 years 21.05% (80/380) 21 to 30 years, 23.16%

(88/380) 31 to 40 years 15.27%, (58/380) 41 to 50 years followed by 12.64% (48/380) 50-60 years (Figure 1) with a mean age 38.7 ± 6.2 years. Out of 380 stool samples, 6.31% (24/380) were found to have an intestinal parasitic infection with a male preponderance (Figure 2). The predominant age group was 31-40 years 9.09% (8/88) followed by 41-50 years 8.62% (5/58) (Figure 3). Out of 380 samples, 47.37% (180/380) are tribal and 52.63% (200/380) are non-tribal with regards to stool positivity 9% (18/200) are non-tribal and 3.33% (6/180) are tribal (p-value .021). Among immunocompromised subjects, HIV/AIDS were 32.90% (125/380) followed by malignancy - 25.26% (96/380), malnourished child - 21.05%, (80/380) Diabetes mellitus - 15.52% (59/380) and pregnancy - 5.27% (20/380) (Table 2). Common intestinal parasites were Ascaris lumbricoides 1.31% (5/24) (Figure 4), followed by Giardia lamblia 1.05% (4/24) (Figure 5), Strongyloides stercoralis 1.05% (4/24) (Figure 6), Ancylostoma duodenale

Table 1: Distribution of the cases by sex (N=380).

SEX	FREQUENCY	PERCENTAGE (%)
Male	244	64.21%
Female	136	35.79%

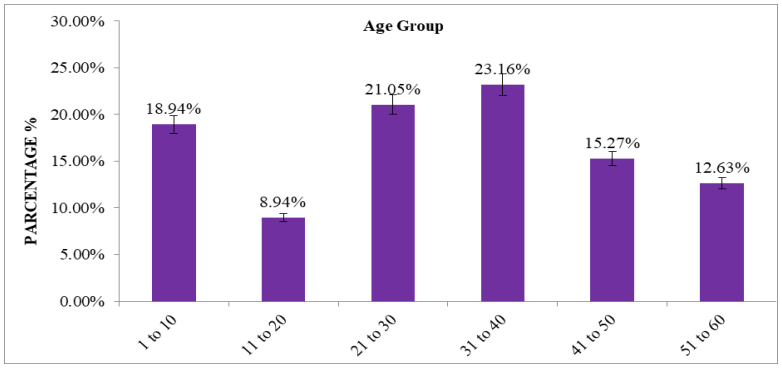

Figure 1: Age distribution (N=380).

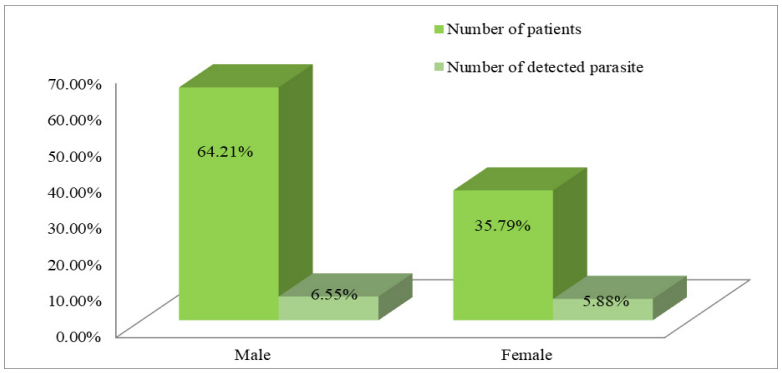

Figure 2: Proportion of parasites detected in both males and female.

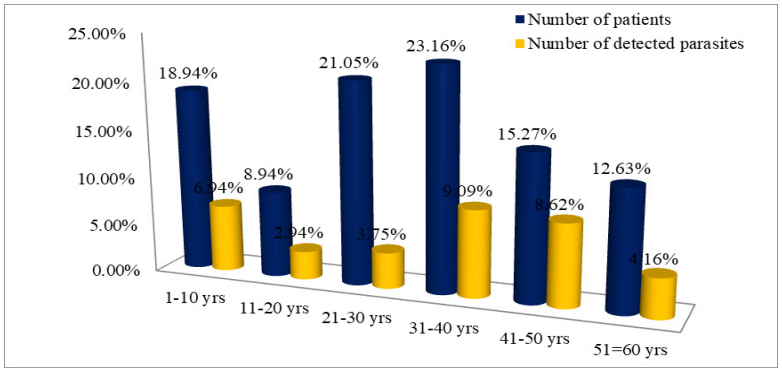

Figure 3: Number of detected parasites in different age groups (N=380).

Table 2: Distribution of immunocompromised patients (N=380).

IMMUNOCOMPROMISED PATIENTS	NUMBER OF PATIENTS	PERCENTAGE (%)
HIV/AIDS	125	32.90%
Malignancy	96	25.26%
Diabetes mellitus	59	15.52%
Malnourished child	80	21.05%
Pregnancy	20	5.27%

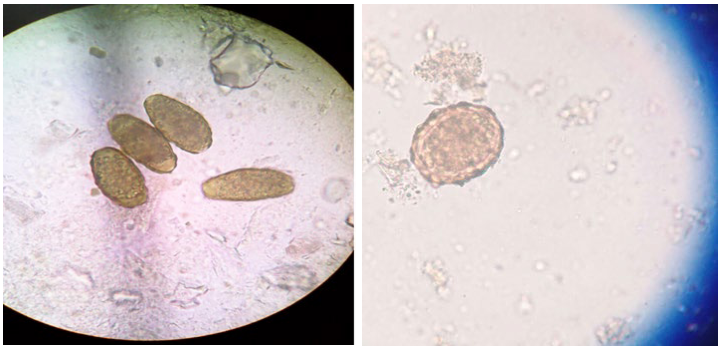

Figure 4: Unfertilized and fertilized egg of Ascaris lumbricoides. (40X magnification).

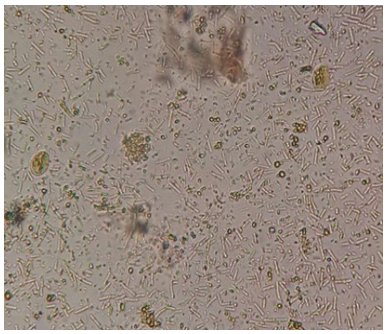

Figure 5: Cyst of Giardia lamblia.(40X magni).

Figure 6: Rhabditiform Larvae of Strongyloides stercorali.

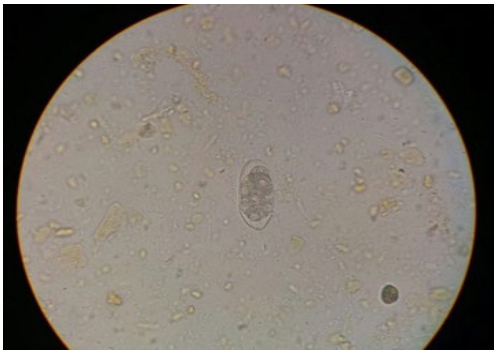

Figure 7: Ova of Ancylostoma duodenale.

0.79% (3/24) (Figure 7), Trichuris trichiura 0.26% (1/24) (Figure 8), Endolimax nana 0.26% (1/24) (Figure 9). Enterobius vermicularis 0.26% (1/24) (Figure 10), Cryptosporidium parvum 0.79% (3/24) and Isospora belli 0.53% (2/24) (Figure 11) (Figure 12).

Figure 8: Egg of Trichuris Trichuria.

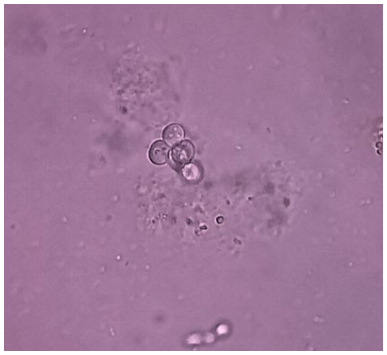

Figure 9: Cyst of Endolimaxnana.

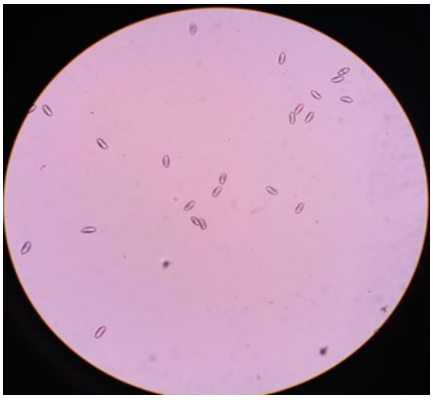

Figure 10: Ova of Enterobius vermicularis.

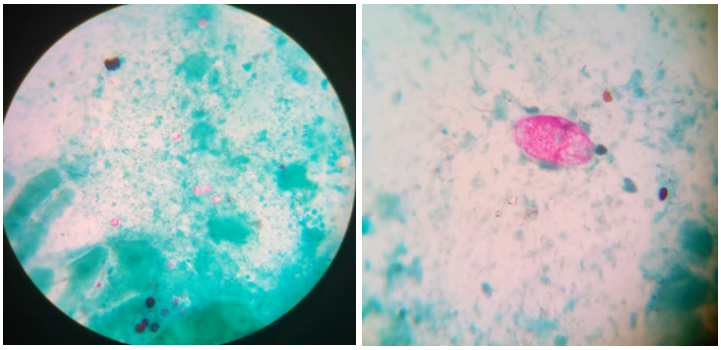

Figure 11: Oocysts of Cryptosporidium parvum and Isospora belii in modified Ziehl-Neelsen stain (Kinyoun method). (100 X magnification).

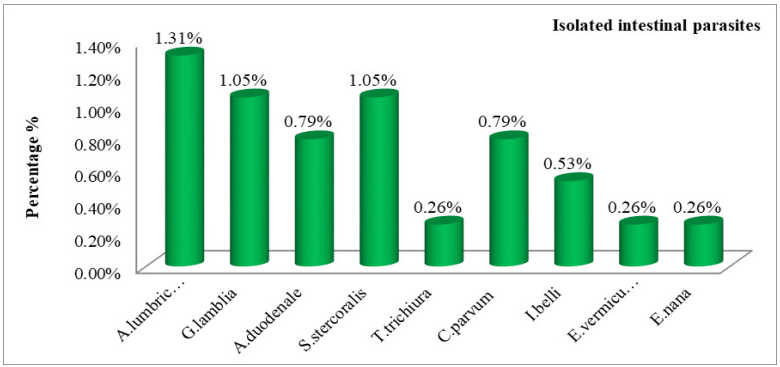

Figure 12: Frequency of isolated parasites among immunocompromised subjects (N=380).

DISCUSSION

With the increase in Immunocompromised patients, the burden of parasitic infections is also rising in day-to-day clinical practice [14, 15]. It was observed in the present study that a male predominance of 66.66% in comparison to females of 33.33%, which is very similar to studies carried out. The majority of the patients belonged to the age group between 31 to 40 years, an increase in the infectivity rate in this age group may be owing to the cumulative effect of factors such as exposure to outdoor life, poor socioeconomic and poor sanitary conditions, which is similar to studies carried out [16]. This study also shows ethnic variation between tribal and non-tribal populations of which 75% of the non-tribal population were infected with intestinal parasites compared to 25% tribal population (p-value .021) [17-19]. However, in previous literature, no significant differences were found in ethnicity [20, 21]. Intestinal parasites were detected in 6.31% of immunocompromised subjects of which Ascaris lumbricoides, Ancylostoma duodenale, Giardia lamblia, Strongyloides stercoralis, Enterobius vermicularis, Endolimax nana, Cryptosporidium parvum, Isospora belli were found. The prevalence rate in this setting is similar to many of the articles reported in India [22-26].

This study also shows the maximum number of parasites detected from HIV/AIDS patients followed by Malignancy, Diabetes mellitus and other patients. Hence, this study shows that immunocompromised patients, especially HIV/ AIDS patients whether or not they were suffering from diarrhoea, can still harbour intestinal parasites which were similar to studies carried out by [27,28] . However, a survey shows a high prevalence of intestinal parasites of 40.4% which is much higher than our study finding [29]. The prevalence was 18.82% respectively [30]. The difference in frequency of intestinal parasitic infestations may be due to extensive de-worming programmes in Tripura, differences in the geographical distribution of parasites, personal hygiene and sanitary habits.

CONCLUSION

The present study concluded that every 1/10th of immunocompromised patients had intestinal parasitic infections whereas males are more predominantly infested. The most commonly involved age group was between 31 to 40 years. Non-tribal are more prone to intestinal parasitic infections. The detection of parasites was highest among HIV/AIDS patients and Ascaris lumbricoides was the most common parasite detected.

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