

# Intestinal Parasitic Infections among Children with Different Immune Status in Suleja, Niger State, Nigeria

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**Abstract:** Parasitic infection which is one of the basic public health problems in tropical region is not uncommon among both immune-competent and immune-suppressed children. These infections have been reported to be more frequent and severe among HIV infected children than their adult counterparts. This study was conducted to determine whether specific parasites are associated with HIV/AIDS infected children attending Suleja General Hospital, Niger State, North central Nigeria. Stool specimens from HIV/AIDS patients and HIV uninfected children (control group) were screened and intestinal parasites were identified using Kato-Katz thick smear technique. Out of 100 participants recruited among patient consulting at the hospital, 50 (50%) were HIV-infected and 50 (50%) were the control group. Out of the 50 HIV/AIDS patients, 18% (9/50) were positive for intestinal parasitic infection while only 26% (13/50) of their HIV negative counterpart was infected with intestinal parasites. The most common parasites identified among HIV-infected children include *Ascaris lumbricoides* (28%), *Entamoeba histolytica* (28%), *Giardia lamblia* (12%), *Trichuris trichiura* (4%), *cryptosporidium* species (20%) and *Schistosoma mansoni* (8%) compare with *Ascaris lumbricoides* (14%), *Entamoeba histolytica* (20%), *Trichuris trichiura* (2%) and *Schistosoma mansoni* (8%) which was found among HIV uninfected children. Intestinal parasitic infection was significantly higher among participants with CD4 count lower than 200 $\mu$ l/cell with 39% prevalence rate of which most of them were asymptomatic. *Cryptosporidium* species which is the only identified opportunistic parasite was observed majorly among children with lower CD4 counts and its prevalence was significant at p value of less than 0.05. The prevalence of intestinal parasitosis among HIV infected children in Minna was high and opportunistic and non-opportunistic parasites were identified at varied rates. This seeks a greater attention by health care giver and routine examination of stool samples will greatly reduce the morbidity and mortality rate.

**Keywords:** HIV, Seropositive, Parasitosis, Children and Infection

## INTRODUCTION

About 3.5 billion people are infected with parasite globally, out of whom; 450 million are suffering from its illness (Moffenson *et al.*, 2009). The prevalence of parasitic infection is high in Sub-Saharan Africa, where the majority of HIV/AIDS cases are from (Holmes *et al.*, 2005). Intestinal parasitic infection is common among HIV-infected patients and more severe among HIV-infected children than their HIV-infected adult counterparts. Immunosuppression among HIV infected patients is main feature that make HIV infected patients to be more susceptible to parasitic infection. The infection rate in developing countries is relatively higher because of an overlap between high prevalence of HIV, bacterial and parasitic infection. Moreover in the tropics, there is a consistent association between HIV infection and other diseases including malaria, *Mycobacterium tuberculosis* and intestinal parasitosis (Moffenson *et al.*, 2009). The incidence of parasitic infections was up to 50% in developed countries while the prevalence can reached 95% in developing countries (CDC, 2011). Intestinal parasites are the one of the main cause of severe chronic diarrhoea among HIV infected and uninfected children (Garrib *et al.*, 2006). *Coccidia* (*Cryptosporidium parvum*, *Isospora belli*, *Cyclospora* sp) and amoebae (*Entamoeba histolytica*, etc.) are the etiologic agents commonly responsible for the genesis of these intestinal protozoans in HIV-positive persons in many parts of the world (Fetuga *et al.*, 2012). This study was therefore aimed at determining the prevalence of parasitic infections among HIV infected children with the ultimate goal of was to provide guidance on the prevention and control

## METHOD

The study population include children attending paediatric out-patient department of general hospital Minna, Niger State and the participants were between the ages of two and sixteen years. Ethical clearance for this study was obtained from the Hospital Management Board Research Ethics Committee, Niger State and informed consent was also taken from the parents of the participants since the participants were children. Stool samples were collected in a clean, wide opened mouth and tight covered container from each of the participants. The stool samples were analysed for parasitic infection and its density was determined using the Kato-Katz thick smear technique (Cheesebrough, 2009a). Data were analyzed with Statistical Package for Social for the Science (SPSS) version 11.0 statistical software. Chi square ( $\chi^2$ ) test allowed us to compare the prevalence of intestinal parasites according to age and sex.

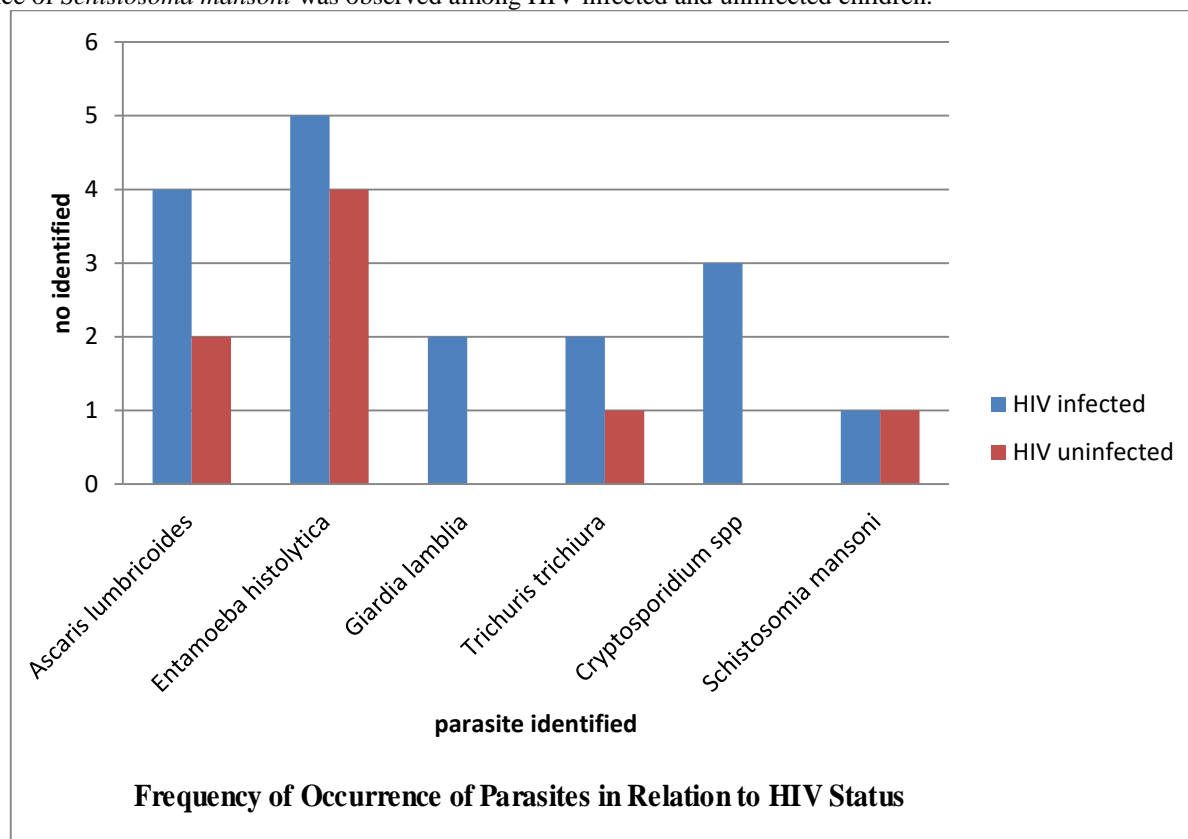
## RESULTS PRESENTATION

Prevalence of intestinal parasitic infection in relation to HIV status as shown in Table1 revealed that male participants has higher prevalence of intestinal parasitic infections than the female participants. Considering the HIV serological status, we had among the HIV negative patients 7.8% (8/103) and among HIV positive 21.8% (17/78) parasite prevalence. The table also summarized that HIV infected patients were more likely to be infected with intestinal parasites than HIV non-infected patients ( $P < 0.0001$ ). With respect to sex (table1), we had 17/112 males infected with intestinal parasites while 8/69 females were infected. Males were more likely to be infected than their female's counterpart with a P value of 0.05.

**Table 1: Prevalence of intestinal parasitic infection in Relation to HIV Status.**

Age (Year s)	HIV Infected						HIV Uninfected					
	Male			Female			Male			Female		
	No. Examin ed	No. Positi ve	% Positi ve	No. Examin ed	No. Positi ve	% Positi ve	No. Examin ed	No. Positi ve	% Positi ve	No. Examin ed	No. Positi ve	% Positi ve
2 – 3	2	0	0.00	9	1	11.11	13	2	6.50	11	0	0.00
4 – 5	5	3	60.00	2	1	50.00	7	0	0.00	7	1	14.29
6 – 7	5	2	40.00	1	0	0.00	12	0	0.00	8	0	0.00
8 – 9	7	1	14.29	5	0	0.00	6	2	33.33	1	0	0.00
10 – 11	11	0	0.00	6	1	16.67	14	0	25.00	2	0	0.00
12 – 13	6	1	16.67	8	2	25.50	8	2	66.67	2	1	50.00
14 – 16	7	4	57.14	4	1	25.00	10	0	0.00	3	0	0.00
Total	43	11	25.58	35	6	23.81	69	6	25.71	34	2	13.33

Figure 1 shows that HIV-infected children had higher prevalence of parasites than the HIV uninfected children with the exception of *Giardia lamblia* and *Cryptosporidium* species which were only identified among HIV infected children. Equal percentage prevalence of *Schistosoma mansoni* was observed among HIV infected and uninfected children.

**Figure 1: Frequency of Occurrence of Parasites in Relation to HIV Status**

The prevalence of intestinal parasites in relation to CD4 count among HIV-infected children as shown in table 2 shows that HIV-infected children with CD4 count lower than 100 cells/ $\mu$ l were at higher risk of having intestinal parasitic infections than those with higher CD4 counts.

**Table 2: Prevalence of Intestinal Parasites in Relation to CD4 Count among HIV-Infected Children.**

CD4 Count cell/ $\mu$ l	No. Examined	No. Positive	% Positive
<100	5	3	60.00
100 - 200	13	4	30.77
201 - 400	9	2	22.22
401 - 600	10	3	30.00
> 600	41	5	8.20
Total	78	17	21.8

## DISCUSSION OF RESULT.

Intestinal parasitic infection is one of the major causes of morbidity and mortality in HIV positive patients (Garrib *et al.*, 2006). The older HIV-uninfected participants were shown to be infected with intestinal parasitic infections than their HIV-infected counterpart and that the younger participants are more likely to have intestinal parasitic infection. This could partly be as a result of greater exposure to the parasites due to increase in domestic activities, outdoor activities and school activities because this age group is considered as school age children. The higher frequency of occurrence of intestinal parasitic infections among younger HIV-infected participants could also be as a result of compromised immune system among the studied age group.

Several species of protozoa and other intestinal parasites have been associated with acute and chronic diarrhoea and even weight loss in HIV/AIDS patients. In this study, *Entamoeba histolytica* was the most frequently observed parasite among HIV-infected and un-infected participants and this implies that the mode of infection could probably be through contamination of food, fruits and vegetable by faecal contaminants. Therefore inadequate sanitation, unhygienic practices and indiscriminate use of toilet could contribute to increase in infection rate. *Giardia lamblia* and *Cryptosporidium spp* was not identified in among HIV-uninfected participants only one case was identified. *Cryptosporidium spp* is found to be more predominant among HIV infected children. *Cryptosporidium spp* was regarded as opportunistic parasites which can only be found to be pathogenic among immune-compromised individual. The association between opportunistic parasitic infection and HIV is widely reported by Holmes *et al.*, in 2005 and Karp *et al.*, in 2007. However, in this study, most of the parasites identified were non-opportunistic. The relationship between non-opportunistic parasite and HIV was not well established. Even though the defence against them might be damaged by HIV, the exposure to this parasites are likely to occur independent of HIV infection but heavier parasitic load might accumulate as well as experience of delayed clearance of parasite in individual with concurrent HIV induced immune-suppression (Brown *et al.*, 2005, Butungwanayo *et al.*, 1990).

The prevalence of intestinal parasites was highly significant among those study participants with CD4 count less than 200 cells/ $\mu$ l in this study. This is consistent with other studies (CDC, 2005, CDC, 2010). The correlation of CD<sub>4</sub> count with opportunistic parasites could not be assessed because of small number of individuals infected with *Cryptosporidium* species. However, the association of these two parasites with HIV positive persons, who have CD4 count less than 200 cells/ $\mu$ l, is reported in other studies (ATN, 1994). *Cryptosporidium* species can cause severe chronic diarrhoea leading to electrolyte imbalance, mal-absorption, and profound weight loss among immune-compromised individual.

Among the known opportunistic intestinal parasites, *Cryptosporidium spp* was encountered with the frequency of 20% in HIV infected patients while only 0% was encountered in HIV negative group.

The male to female ratio of intestinal parasitic infection shows that HIV infected and uninfected male participants are at higher risk of intestinal parasitic infection than female participants. This could be as a result of increase in outdoor activities among male participants than their female counterparts. This could as well increase their exposure to most of these parasites as most of the identified parasites enter their host through faecal-oral route.

## CONCLUSION

The overall prevalence of intestinal parasites was 13.8% but increased to 21.8% in HIV infected patients. HIV positive individuals are more susceptible to co-infections with *Cryptosporidium spp.* (20%) and *Gardia lamblia* than HIV negative children (0%). A high index of suspicion would therefore help in making early diagnosis and a management plan not only for the children but also for their parents and the entire family. This study also recalls that governments should continue their efforts in providing their population with good quality water and proper personal hygiene should be encouraged. It is also recommended that awareness on adequate sanitation, hand washing and personal hygiene should be increased among the age group four to thirteen years. This is because this age group was found to be more vulnerable to parasitic infections.

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