

# Absence of Opportunistic Parasitic Infestations in Children Living with HIV/AIDS in Children's Homes in Jamaica: Pilot Investigations

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## ABSTRACT

**Background:** Many children living with HIV/AIDS in developing countries are infected with intestinal parasites. These infections add unnecessary morbidity to children already suffering the clinical insult of living with HIV/AIDS.

**Objective:** To determine the prevalence and potential risk factors for intestinal parasitic infections in HIV-infected children living in two institutions in Jamaica.

**Methods:** A total of 82 faecal specimens were collected from 41 HIV-infected children (age range 2–14 years) who resided in two Children's Homes. A structured 42-item questionnaire was administered to caregivers to obtain clinical and demographic data on each child. Faecal specimens from each patient were examined using standard microbiological techniques and *Cryptosporidium* antigen detection was conducted using a commercially available enzyme immunoassay (EIA).

**Results:** No opportunistic intestinal parasites were identified in this study. Non-opportunistic parasites diagnosed included *Giardia lamblia* (12.2%) and *Ascaris lumbricoides* (2.4%) while the commensals *Endolimax nana* and *Entamoeba hartmanni* were found in 4.9% and 2.4% of children, respectively.

**Conclusion:** Children living with HIV/AIDS in institutions in Jamaica that are closely supervised do not appear to be at substantial risk for intestinal parasites. This may be due to the strict clinical monitoring of the children and personal and environmental hygiene practices.

# Ausencia de Infecciones Parasitarias Oportunistas en Niños que Viven con VIH/SIDA en los Hogares para Niños en Jamaica: Investigaciones Pilotos

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## RESUMEN

**Antecedentes:** Muchos niños que viven VIH/SIDA en los países en vías de desarrollo, están infectados con parásitos intestinales. Estas infecciones añaden una innecesaria morbilidad a los niños que ya sufren el insulto clínico de vivir con el VIH/SIDA.

**Objetivo:** Determinar la prevalencia y los factores de riesgo potencial por infecciones parasitarias intestinales en niños infectados por VIH que viven en dos instituciones en Jamaica.

**Métodos:** Un total de 82 especímenes fecales fueron tomados de 41 niños infectados con VIH (rango de la edad 2–14 años) que residían en dos Hogares para Niños. Un cuestionario estructurado de 42 ítem fue administrado entre los encargados del cuidado de los niños, a fin de obtener datos clínicos y demográficos en cada niño. Los especímenes fecales de cada paciente fueron examinados usando técnicas microbiológicas estándar y se llevo a cabo la detección del antígeno de *Cryptosporidium*, usando inmunoensayos por enzimas (EIA) comercialmente disponibles.

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Abstracted in the 16<sup>th</sup> International HIV/AIDS Conference, Toronto, Canada, Aug 13–16, 2006, *E-Journal of the International AIDS Society*, Abstract: CDB 0227.

Funded in part by Scotia Bank Jamaica Foundation; the CHASE Fund; the Commonwealth Health Research Council; an Elizabeth Glaser Paediatric

AIDS Foundation International Leadership Award (1-ILA-11-01) and a Pfizer Foundation Fellowship (to CDCC); The Global Fund for AIDS, Tuberculosis and Malaria, the University of the West Indies and also the Ministry of Health, Jamaica.

Submitted in partial fulfillment of a MPhil degree from the University of the West Indies.

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**Resultados:** No se identificaron parásitos intestinales oportunistas en este estudio. Los parásitos no oportunistas diagnosticados incluyeron *Giardia lamblia* (12.2%) y *Ascaris lumbricoides* (2.4%) mientras que los comensales *Endolimax nana* y *Entamoeba hartmanni*, fueron hallados en 4.9% y 2.4% de los niños, respectivamente.

**Conclusión:** Los niños que viven con VIH/SIDA en instituciones de Jamaica estrechamente supervisadas, no parecen correr serio riesgo alguno de parásitos intestinales. Esto puede deberse al monitoreo clínico estricto de los niños y a las prácticas de higiene personal y ambiental.

## INTRODUCTION

The Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that at the end of December 2007, there were 230 000 people living with HIV/AIDS in the Caribbean and that the region continued to be second to Sub-Saharan Africa in prevalence of infection with HIV (1). Currently, there are approximately 22 000 persons living with HIV/AIDS in Jamaica. During January to June of 2007, a total of 13 new paediatric (children under the age of 10 years) AIDS cases were reported in Jamaica. There were three paediatric AIDS-related deaths between January and June of 2007, compared to four in the same period of the previous year (2).

As the epidemic continues, more children will be placed in the care of the state or private charities as they become orphaned by the disease or abandoned due to stigma and fear. In Jamaica, several of these children have become the wards of Children's Homes which are run either by the state or charities. These institutions, like daycare centres, are likely to be the site of high rates of transmission of infectious diseases including the intestinal parasites *Giardia lamblia* and *Cryptosporidium sp* (3, 4). Furthermore, there is a range of helminth parasites including *Ascaris lumbricoides* and *Trichuris trichuria* which, although not opportunistic, may cause unnecessary morbidity in children already living with HIV but may also affect progression of the disease (5, 6). Heavy infections with these parasites are associated with anaemia, growth retardation, poor cognitive development and school performance in children (7–10). The risk of infection with intestinal parasites was 1.5 times higher among children at a day care centre in Aracaju, Brazil, than among those who were not part of this group setting (11). The most frequently encountered parasites in children in institutions are *G lamblia* and *Cryptosporidium* (12). In a study conducted in Brazil, 53.4% of children in day care centres were infected with intestinal parasites with 27% harbouring *G lamblia* infections (12). Similarly, children in day care centres in the USA and Thailand were found with *G lamblia* infection rates of 11% and 20%, respectively (13, 14).

The Caribbean region has few studies on the epidemiology of opportunistic intestinal parasitic infections in persons living with HIV/AIDS. Furthermore, there have been no reports on institutionalized children living with HIV/AIDS in the region. In Haiti, 30% and 11% of adults living with HIV/AIDS had cryptosporidiosis and cyclo-

poriasis, respectively (15). A hospital-based study in Jamaica reported *Cryptosporidium sp* from about 4% of the general population while another, in malnourished children, reported 4.9% prevalence of the parasite (16, 17). To date, there have been no reports of *Cyclospora* or microsporidia on the island.

In Jamaica, the importance of intestinal parasitic infections in residents living with HIV/AIDS in Children's Homes has not been studied. This study was conducted to determine the prevalence of intestinal parasitic infections in HIV-infected children who are residents of these institutions in Jamaica.

## SUBJECTS AND METHODS

Faecal samples were collected from the residents of two Children's Homes operated by a Christian charity dedicated to the care of children infected with HIV. One institution (Home 1) provided care for 30 children and the other (Home 2) for 15 children ranging in ages from one to 13 years. The care offered to the children in these homes focussed on their developmental and psychosocial needs.

Children in need of medical treatment were provided with antiretroviral (ARV) therapy and caregivers ensured that there was full adherence to treatment. CD4/CD8 ratio is done twice per year on each child who receives ARVs.

This cross-sectional study was conducted over a six-week period. Written informed consent was obtained from the caregiver of each child who participated in the study. A 42-item questionnaire was administered to caregivers in order to obtain sociodemographic and clinical data of each child.

Caregivers were requested to submit two fresh faecal specimens in sterile plastic containers from each child. Specimens were collected and transported to the Department of Microbiology at The University of the West Indies, Kingston, Jamaica, for parasitological analyses.

In the laboratory, specimens were examined using formalin-ether concentration and Zeil Nielsen staining. *Cryptosporidium* antigen detection was conducted using enzyme immunoassay (TECHLAB® Blacksburg, VA).

Data were analyzed using SPSS 11.5 for Windows® (SPSS Inc, Chicago, Illinois, USA).

The study was approved by the Ethics Committee of The University of the West Indies/University Hospital of the West Indies.

## RESULTS

Eighty-two faecal specimens were collected from 41 HIV-infected children. Twelve (29.3%) children were from Home 1 and the remaining 29 (70.7%) were from Home 2. There were 18 (43.9%) males and 23 (56.1%) females. The median age of children on enrolment was 7.0 years (range 2 to 14; mean 6.8 years, SD 3.5). Figure 1 shows children's age distribution by gender.

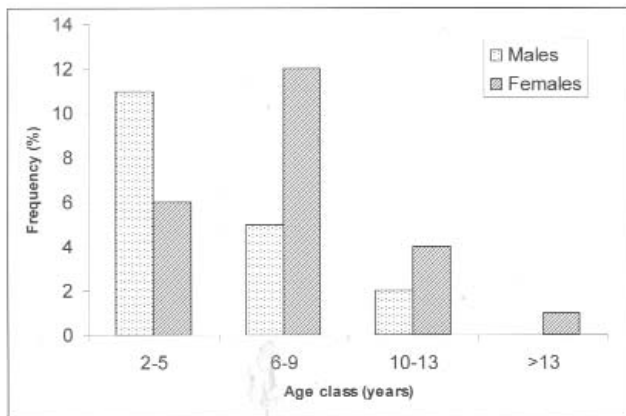


Figure: Age distribution of children gender

No opportunistic parasites were identified in this study. Non-opportunistic parasites (shown in Table 1) were identified in six (14.3%) of the children.

Table: Prevalence of intestinal parasites among study participants

Parasite infection	Prevalence (%)	Institution
<i>Giardia lamblia</i>	12.2	Home 2
<i>Entamoeba hartmanni</i>	2.4	Home 1
<i>Endolimax nana</i>	4.9	Home 1
<i>Ascaris lumbricoides</i>	2.4	Home 1

Among these were *G lamblia*, 12.2% and *A lumbricoides*, 2.4%. The commensals *Endolimax nana* and *Entamoeba hartmanni* were found in 4.9% and 2.4% of children, respectively. There were no cases of multi-parasitic infection. No child in the study presented with diarrhoea or other intestinal symptoms.

Among the study participants, 31 (75.6%) were being treated with ARV of which 28 (68.3%) were on first-line ARV therapy (lamivudine, zidovudine and nevirapine regimen). Patients who were not on ARVs had relatively high CD4 counts (> 500 cells/mm<sup>3</sup>). Almost all of the patients (97.6%) were receiving cotrimoxazole as prophylaxis against *Pneumocystis jirovecii* including all of the children diagnosed with intestinal parasites. Children diagnosed with intestinal helminths were treated with albendazole and those diagnosed with giardiasis were treated with metronidazole by a clinician who was not a part of the study team.

## DISCUSSION

During the study, no opportunistic intestinal parasitic infections were diagnosed while non-opportunistic intestinal parasites were found in 14.3% of institutionalized children. This result was in contrast to several studies (3, 4) which reported *Cryptosporidium* (prevalence of 10.0% and 15.5%) in children attending daycare centres. It is especially important to note that the parasite may be common among children who are living in institutions but who are not immunocompromised. In this study, five cases of giardiasis were diagnosed in one Home with 15 resident children. It is very likely that the parasite was spread clonally within this institution. Whilst *G lamblia* is highly contagious, it was found at low prevalence. In addition, the commensals *Endolimax nana* and *Entamoeba hartmanni* and the non-opportunistic roundworm *A lumbricoides* were all found at low prevalence. This suggests that the risk of transmission of intestinal parasites in these institutions is very low. Therefore, intestinal parasites are not significant contributors to morbidity among these institutionalized children. In contrast, older studies have found that the prevalence of *A lumbricoides* in Jamaican school-age children ranged from 15.4% to 19.4% and 38.3% to 45% for *Trichuris trichuria* (8, 9). Low prevalence of intestinal parasitic infection in institutionalized children may be related to the scrupulous hygienic practices followed by the staff at both institutions. These include routine hand washing and the daily cleansing of tables and chairs.

These findings are also indicative of the benefits of care given to these children by The Kingston Paediatric and Perinatal HIV/AIDS Programme. Facilitators of this programme embarked on a targeted intervention to improve the quality of life of children infected with HIV/AIDS (18). Careful clinical monitoring each week by paediatricians and nurses from the University Hospital of the West Indies through the programme may have also contributed to low infection prevalence in these institutions. Although de-worming is not routinely done, this surveillance has allowed for prompt diagnosis and treatment that would likely assist in preventing the spread of pathogens among these children. This protocol for care should be adopted by other institutions in developing countries for children living with HIV/AIDS.

The findings of this pilot study show that such children's homes can be made safe from opportunistic parasites once they are closely monitored clinically and efforts are made to reduce the probability of transmission by environmental and personal hygiene intervention. Ongoing surveillance and routine de-worming is recommended to ensure that parasitic infection is rapidly detected and treated.

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