



CYSTOISOSPORIASIS IN HIV-POSITIVE PATIENTS IN OTA, OGUN STATE, NIGERIA

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ABSTRACT

Cystoisospora belli infection is common in HIV positive patients and, for this study, was diagnosed using concentration techniques. The researcher processed 50 samples from HIV-positive patients and 50 samples from HIV-negative persons. The findings showed that the overall coccidian prevalence was 34% in HIV-positive patients. The study also found the infection to be more common in girls (22%) than in boys (12%). *C. belli* infection is common in General Hospital Ota, Ogun State, Nigeria, according to this study, which could increase the burden on HIV-infected patients.

Keywords: Cystoisosporiasis, Ota, *C. belli*, Ogun State, General Hospital.

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Introduction

Cystoisosporiasis is caused by the protozoan *Cystoisospora belli*. Cryptosporidium, Cyclospora, and Toxoplasma are all closely related to the genus Cystoisospora. *Cystoisospora belli* infection, on the other hand, is less common than Cryptosporidium and Toxoplasma infections [1]. The only known hosts of *C. belli* are humans and are mostly found in the epithelial cells of the small intestine and grow in the cytoplasm of the cells. The parasite is majorly found in tropical regions like the Caribbean, Central America, and South America. India, Africa, and Southeast Asia and is commonly connected with HIV infection in the United States [2]. Cystoisosporiasis is common among immune-compromised individuals, particularly in patients with the Human Immunodeficiency Virus (HIV) or Acquired Immunodeficiency Syndrome (AIDS). Its first case was found in 1915 in the United States [3]. The etiological agent belonged to the genus Isospora until 2005. It was assigned to the genus Cystoisospora in 2005. These genera are divided into several families. Isospora belongs to the Eimeriidae family, while Cystoisospora belongs to the Sarcocystidae family. Both families are members of the Eimeriorina suborder (order Eucoccidiorida of the phylum Apicomplexa) [4].

C. belli, a protozoan belonging to the subclass Coccidia in the phylum Apicomplexa, is the pathogen that causes cystoisosporiasis [5]. The faecal-oral method of transmission for Cystoisosporiasis is food or water contaminated with human feces. *C. belli* infection causes a self-limited diarrheal disease in immunocompetent people [6]. It can induce chronic, life-threatening Diarrhoea and dehydration in people with weakened immune systems.

According to one study, up to 15% of AIDS-infected Haitians had cystoisosporiasis. Also, infected people account for close to 40% of AIDS patients in poor countries. Cystoisosporiasis is the first AIDS-defining infection. Also, cystoisosporiasis is seen in 10% of AIDS patients from South America who has persistent diarrhea [7].

Cystoisosporiasis affects 20% of AIDS patients from Haiti and Africa who have persistent diarrhea. *C. belli* infection affects people of all ages, although it is particularly dangerous in infants and small children, presumably due to the population's risk of dehydration [8]. In babies, *C. belli* can cause severe diarrhoea. Apart from the gender distribution of patients with AIDS and the risk factor most usually connected with this disease, a gender propensity for infection has been

observed. Except for the racial distribution of patients with AIDS in the United States, no racial preference for Cystoisosporiasis has been recorded [9].

Malaria is a common disease in Sub-Saharan Africa nations and Asia. Globally, 3.4 billion individuals are at risk of new malaria infections, with one million people dying each year (WHO) [10]. *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae*, *Plasmodium ovale*, and *Plasmodium knowlesi* parasites infect humans under normal conditions, with *Plasmodium falciparum* and *Plasmodium vivax* being the most common species that cause morbidity and mortality in children under the age of five, pregnant women, and travelers from non- malaria areas [11].

The Anopheles mosquito's resistance to insecticides plus poor socio-economic situation makes malaria control difficult in Sub- Saharan Africa [12]. Limited understanding of the underlying cellular and molecular mechanisms of host-parasite interactions during co-infection and polyparasitism stymies medication discovery and vaccine development. Communities residing in poor parts of developing countries bear the greatest burden of malaria infections, according to epidemiological studies [13]. Co-infections, multi-parasitism, and poly- parasitism are all possible outcomes [14].

Over 40 million individuals worldwide are infected with HIV/AIDS, with the majority (over 25 million) living in Sub-Saharan Africa. In 2005, up to 2.4 million deaths were reported worldwide [15], [16]. Chronic diarrhoea and wasting related to enteric infection are the most common clinical manifestations in HIV-positive patients [17]. As a result, the goal of this study was to look at cystoisosporiasis and its relationship in HIV-infected malaria patients in Ota, Ogun state.

Methods

The study was done at Ota, Ogun state which is located in South West Nigeria region [18]. A total of 100 samples were examined, comprising 50 HIV-infected malaria patients and 50 non-HIV-infected individuals [17].

Each participant had their blood sample taken using a dry, sterile syringe and needle, and blood was pulled from a suitable vein in the arm with little stasis. The blood was gently discharged

and thoroughly mixed into an ethylene diamine tetra-acetic acid (EDTA) container [15]. Clean, wide-mouthed containers were used to collect stools. The patients' consent was received.

Blood Sample Analyses

Screening for HIV

The patients' HIV status was confirmed using the HIV/AIDS test strip method for detecting HIV 1 and HIV 2 antibodies in whole blood. On the sample pad, a volume of 50 mL of sample (precision pipette) was applied. After one minute, one drop of buffer was put to the sample pad. After a minimum of 15 min, the result was read [17].

Data Analyses

The information gathered was organized into a table.

Prevalence of *Cystoisospora belli* Infection among HIV/AIDS Patients in General Hospital, Ota

According to table 4.1, 34 (68%) of the 50 HIV patient samples tested positive for *Cystoisospora belli*. A total of 50 non HIV/AIDS subjects were also tested and all of them tested negative for *Cystoisospora belli* infection. As a result, the prevalence of *Cystoisospora belli* was 68% among HIV patients and 0% among non-HIV patients respectively.

Prevalence of *Cystoisospora belli* Infection among Sex Group in HIV/AIDS Patients in General Hospital, Ota

Table 4.2 showed that 12 of the 23 male samples tested were positive, while 22 of the 27 female samples tested were positive. As a result, among HIV/AIDS patients, the prevalence of *Cystoisospora belli* infection is 12% for males and 22% for females, respectively.

Table 4.1: Prevalence of *Cystoisospora belli* infection in HIV/AIDS patients in General Hospital, Ota

Samples	No. Examined	No. Positive (%)
HIV/AIDS +ve	50	34 (68)
HIV/AIDS –ve	50	0 (0.00)
Total	100	34 (68)

Table 4.2: Prevalence of *Cystoisospora belli* infection among Sex Group in HIV/AIDS Patients in General Hospital, Ota

Sex	No. Examined	No. Positive (%)
Male	23	12 (35)
Female	27	22 (65)
Total	50	34 (100)

DISCUSSION

The 34% prevalence rate is higher than that seen in several previous studies. In Edo state, Akinbo et al. [15] found a prevalence rate of 3%. In Benin City, Edo State, Oguntibeju, Akinbo et al. [20] found a prevalence rate of 8%. In Lesotho, South Africa, Assefa et al. [21] found a prevalence rate of 3%. In Gujarat, India, [22] found a prevalence rate of 8%. This increment may be due to low or no HIV drugs and treatment.

CONCLUSION

This study found that *Cystoisospora belli* infection is common in General Hospital Ota, Ogun State, Nigeria, with a 34% prevalence rate, potentially increasing the burden on HIV-positive patients. The study also found the infection to be more common in girls than in boys. The research also raises awareness of the common opportunistic parasite and restricts comprehensive evaluation and nonspecific treatment of diarrhoea in HIV patients. Early and correct diagnosis of infection will benefit not only in the implementation of specialized treatment and prophylaxis (chemoprophylaxis as needed) to avoid infection relapse/recurrence in HIV patients, but also in the implementation of different preventative measures. This will not only extend HIV-infected people's lives, but will also improve their quality of life.

RECOMMENDATIONS

In many tertiary hospitals, routine investigation of *Cystoisospora belli* infection should be recommended in order to improve the management of HIV-infected patients. To prevent and

minimize the rate of protozoan infection, a public education program on personal cleanliness, correct toilet use, and improved sanitation should be offered. Treatment is also indicated. It is recommended that a more thorough examination employing the real- time PCR method be carried out to determine the advanced detection of *Cystoisospora belli* in the area.

CONSENT AND ETHICAL APPROVAL

This study was approved by the ethics committee of the general hospital in Ota, Ogun State. Participants' or subjects' verbal informed consent was collected and used in this investigation.

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