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CRYPTOSPORIDIUM INFECTION IN UNDERNOURISHED CHILDREN WITH HIV/AIDS IN JOS, NIGERIA

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Abstract
Background: AIDS and Protein energy malnutrition (PEM) severely impair the immune system *Cryptosporidium* has over the last two decades emerged as a life threatening disease. The study attempts to determine the prevalence of *Cryptosporidium* infection in malnourished children with HIV/AIDS.
Method: Blood and stool samples of 52 HIV-seropositive children and another 52 HIV-sero-negative children aged 0-5 years were collected and screened for HIV and *Cryptosporidium* oocysts respectively. The sera were screened by double ELISA and the stool by the modified Ziehl-Neelsen method.
Results: Out of the 52 HIV-seropositive undernourished, under-five children, none (0%) excreted *Cryptosporidium* oocyst in their stools while 2 (3.8%) of the control group excreted the oocyst.
Conclusion: *Cryptosporidium* infection seems to be uncommon among undernourished under five children with HIV/AIDS in Jos.

Key words: Cryptosporidium, children, HIV/AIDS, undernutrition

Introduction

Protein energy malnutrition (PEM) and acquired immunodeficiency syndrome (AIDS) are important causes of acquired immune incompetence in African Children. [1,2] *Cryptosporidium*, a common enteric protozoan has since 1907 been known to parasitize a wide range of animals. [3, 4] It has been widely reported as ubiquitous and significant enteropathogen of immuno-compromised patients. [4] Since 1983 cryptosporidiosis has emerged, along with AIDS, as a life threatening disease. [5] The synergistic impairment of the immune system when AIDS and PEM operate in concert is well known. [6, 7] *Cryptosporidium* has a higher prevalence in young children. [8] These, coupled with the fact that, no such work has been done in our environment (to our knowledge), prompted us to look at the situation in undernourished children less than five years with HIV/AIDS in Jos.

Materials and Methods

Study area and population

This prospective study was hospital based. It involved 52 consecutive HIV sero-positive undernourished children aged 0-5 years. Another 52 consecutive HIV sero-negative undernourished children aged 0-5 years served as control. The study population was attending the paediatric services of the Jos University Teaching Hospital, Plateau Specialist Hospital and Our Lady of Apostle (OLA) Hospital. All located in Jos metropolis. The study was over a period of 9 months.

The Wellcome party classification [9] was used to classify the malnutrition. Consent was obtained before recruitment into the study. Ethical clearance was given by the JUTH ethical committee. The details of personal and clinical information were obtained using a questionnaire.

Sample collection

Serum: Blood samples were collected aseptically by venipuncture of the cubital or femoral veins as the case may be. The area was cleaned using 70% isopropyl alcohol in water with 1% iodine for at least 1 minute and allowed to dry. With precautions to avoid touching and re-contamination, the needle was inserted and 4-5 mls of blood was obtained. This was then dispensed into clean plastic containers (Z-10 tubes). The blood was allowed to clot and serum separated by centrifuging at 1,800 rpm. The serum thus obtained was used for HIV serology by the ELISA method using genelavia kits. Absorbance was read with EL_X80 micro-plate Reader (Bio-Tek instrument INC.USA). Another separate sample was obtained from seropositive patients and a re-run for HIV antibodies (double ELISA) was carried out. Ninety-Five percent (95%) sensitivity of the ELISA method had been documented from our center. [10]

Stool: Whenever possible, stools were collected

into clean, wide mouthed, grease-free, screw capped and numbered glass containers, provided for each child. These were returned to the laboratory immediately. The stool samples were processed each day within 4hours of collection. Appearance and consistency were noted for each stool sample. The demonstration of Cryptosporidium oocyst was by microscopical examination of smears made after formol-ether concentration of stools and stained by the modified Ziehl-Neelsen (Z-N) technique as given by the WHO [11] and examined with the oil immersion objective of a light microscope. Cryptosporidium positive slides, which served as control, were obtained from Veterinary public Health department Ahmadu Bello University Zaria.

Results

The age and sex distribution of the 52 HIV sero-positive under-nourished, under five children shows that 61.5% were males and 38.5% were females (ratio M: F=1.6:1) mostly aged 0 to 20 months (Table 1.)

None of the 52 HIV sero-positive undernourished, under-five children excreted *Cryptosporidium* oocyst in their stools. Out of the 52 HIV sero-negative group 2 (3.8%) excreted *Cryptosporidium* oocyst in their stool. (Table 2). Both were females aged 12 and 17 months.

Table 1: Age and sex of undernourished, under-five children with HIV/AIDS in Jos

Age (months)	Sex		Total
	M	F	
0 – 10	12	8	20
11 – 20	16	8	24
21 – 30	4	0	4
31 – 40	0	4	4
41+	0	0	0
Total (%)	32 (61.5)	20 (38.5)	52 (100)

Table 2: HIV status and C*ryptosporidium* infection in undernourished under-five children in Jos

HIV status	Cryptosporidium oocyst in stool		Total
	Positive (%)	Negative (%)	
Negative	2 (3.8)	50 (96.2)	52
Positive	-	52 (100)	52

Discussion

Cryptosporidium is present in 1-3 % of immunocompetent patients with diarrhoea in industrialized countries and 7-10% in developing Countries. [5,12-14] The prevalence is much higher in patients with HIV infection. In USA, Europe and Asia, 8-30% excreted *Cryptosporidium* oocysts in various series. [13,15,16] This figure is 15-50% in developing countries, [17,18] making it one of the most common entero-pathogens.

The overall prevalence in this study is low (0% in HIV/AIDS patients and 3.8% in the control group) and contrasts with the above findings and other reports from Nigeria[19, 20]. Although a similarly low prevalence had been reported in immunocompetent patients in Nigeria[21] and elsewhere[22]. The variation of this finding with reports from the Industrialized countries could be due to; differences in the study population and their use of more sensitive diagnostic techniques e.g. Polymerase chain reaction, Fluorescent assay using monoclonal antibody etc. Also only single stool specimens were examined in this study and only 30% sensitivity of single stool specimen has been reported. [23]

Geographical, social and ethnic differences could explain the variation of our findings with reports from Nigeria and other developing countries. For instance children recruited into this study were on absolute breast feeding, as all the Hospitals are baby friendly Hospitals. Wolfson[22] recorded no case of cryptosporidiosis in infants and attributed it to the protective role of breast-milk. Moreover, this study was hospital based as opposed to other reports in Nigeria[19], which were community based, where the intimacy with animals is common.

Although an incidental finding is not impossible, the low prevalence concurs with the declining number of cryptosporidiosis among HIV patients largely because of immune reconstitution with highly active anti-retroviral therapy. [24]

In this report, *Cryptosporidium* infection seems to be uncommon among undernourished under five children with HIV/AIDS in Jos.

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