

**MICROSPORA INFILTRATION OF GASTROINTESTINAL EPITHELIUM AMONG HIV/AIDS PATIENTS IN KEFFI, NIGERIA.**

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**ABSTRACT**

The infiltration of *Microsporidium* species in HIV/AIDS patients was subjected to parasitological examination of stool specimens at the Federal Medical Centre, Keffi. Of the total number 200/93 (46.50%) were positive for *Microsporidium* species. Giemsa method was used and High infection rate was observed in both sexes (50.00%) and Civil servants (50.00%) were most vulnerable to *microsporidium* infection. The species, *Enterocyto zoonbieneusi* and *Encephalito zoonintestinalis* (21.50%) got infiltrated in the gastrointestinal epithelium of of HIV/AIDS patients with a significant association of *microsporidium* and HIV virus ( $\chi^2 = 3.288 < 7.815$ ,  $df = 3$ ). However, diarrhoea was frequent in the ages of 21 and 40 years (3 – 10 times bowel/day). This condition was considered a significant cause of death and accelerates the patient's illness with dehydration and emaciation seen among patients. This calls for strict hygienic conditions to avoid infection with microsporidia spores contaminated in water or food.

**Keywords:** *Microspora*. *Spores*. *infiltration*. *Epithelium*. *HIV/AIDS*.

## INTRODUCTION

Microspodia is a microscopic organism and Eukaryotic parasites found in a wide range of host and that must live within other host cells in which they can produce infective spores. These spores causes microsporidiosis which are primarily found in patients with compromised immune systems such as those infected with HIV or who have undergone organ transplant, microsporidia causes gastrointestinal diseases, renal diseases, sinusitis, keratoconjunctivitis and keratitis in AIDS patients. Microsporidia, have not been studied extensively as agent of diseases because they are small, stains poorly, evokes little inflammation and is difficult to diagnose in the absence of electron microscope. Since the advent of AIDS, investigation had markedly increased leading to the identification of new species and reclassification of old ones. Microsporidiosis is been considered in AIDS patients with chronic diarrhoea, sinusitis and keratitis or renal failure (Franzen *et al.*, 1997; Cali *et al.*, 1993).

Microsporidia is increasingly being recognized as pathogens in human. They are ubiquitous in the environment and can infect a whole range of vertebrates and invertebrates hosts, including insects, birds, fish and mammals. The spores vary in size, but those that infect human are typically oval and up to 2 micrometer (mm) in diameter (Didier *et al.*, 2006). Reports of human infected with microsporidia were truly rare before the AIDS epidemic. Microsporidia are significant pathogens in the immunocompromised host and associated with human disease which includes annalia, enterocytozoon, encephalitozoon (septata), Pleistophora infections commonly have occurred in the immunocompromised host (Wolk *et al.*, 2002., Weber *et al.*, 1994).

Humans can be infected through organ transplants, water and also bone marrow transplant. Opportunistic infections like microsporidiosis, African trypanosomiasis, leishmaniasis, and malaria can cause central nervous system (CNS) infection (Wolk *et al.*, 2002). Since the beginning of AIDS epidemic, opportunistic infections have been recognized as common complications in HIV patients. The spectrum of opportunistic infections in HIV patients varies from one region to another (Vajpayee *et al.*, 2003). Discrepancy in findings may be attributed to geographical variations and if not for AIDS far less will be known of microsporidia. The aim is to establish the infiltration and infiltration of spores (microsporidia) in the gastrointestinal epithelium of HIV patients at the Federal Medical Centre, Keffi.

## MATERIALS AND METHOD

The research study was carried out at the Federal Medical Centre (FMC), Keffi, Nasarawa State which lies between latitude 7°.45' and 9°.25' N of the equator and between 7° and 9°.37' E. A total of 200 stool specimens were collected from HIV/AIDS patients who are in hospital admission and care was taken as it was transported to the laboratory for an immediate preparation of samples.

Parasitological examinations, using 0.5g of faecal matter was homogenized in 10ml of 10% formalin and stirred using applicator spoon. This was filtered through mesh gauze of 90, 60, 30 and centrifuge 200g at 100rpm for 10 minutes. The top layer of the sample was dropped onto a slide and the smear was allowed to dry and which was later fixed with methanol for 1 minute and allowed to air dry. Giemsa stain of one or two drops was added on the smear for 30 to 1 hour, and then it was washed with distilled water or running tap and allowed to dry. Oil immersion was used to view the slides using a light microscope x100 with less standard error minimized (Weber *et al.*, 1992). The nuclei of the spores were visible given a dark brown colour varying in size. Chi square ( $\chi^2$ ) was used to established statistical significance of spores infiltration in relation to sex, age and occupational status among patients.

## RESULTS AND DISCUSSION

The proliferations and infiltration of spores (microsporidium) in the entire gastrointestinal tract identified in faecal matter of individuals with HIV/AIDS were mainly species of enterocytozoon and encephalitozoon (septata) with chronic diarrhea. Opportunistic infection like microsporidiosis is reported in Table 1. Out of 200 total stool examined, 93 (46.50%) were clinically captured with microsporidium against 107 (53.50%) without microsporidia spore and there was a significant relationship among patients without microsporidia infection ( $\chi^2 = 2.87 < 7.815$ ,  $df = 3$ ), and significant in HIV patients with spore infiltration ( $\chi^2 = 3.29 < 7.815$ ,  $df = 3$ ).

Through increased and improved diagnosis, microsporidiosis is now been identified in a broader range of human populations (Table 2), the infiltration of microspiridia spores in gastrointestinal tract of HIV/AIDS patients, indicative in males 97/38(39.18%) were recorded and considered less severe among the males from the first and the third examination of specimen of HIV patients. Spores rate in females 103/55(53.40) was high and considered most vulnerable with severity of illness giving that, the overall rate of spore proliferation was determined in both sexes of HIV patients suffering from

microsporidiosis with significance in the infection rate among sexes ( $\chi^2 = 3.29 < 7.815$ ,  $df = 3$ ).

Age and spore infiltration varies and was seriously considered a factor in the immunocompromised patients. In table 3, the rate of spore proliferations (48.48%) was among age 21 and 40 year olds with the least passing out mild diarrhoea and emaciation (33.33%). Among this age group, the vulnerability was significant in relation to the rate of infection ( $\chi^2 = 1.36 < 11.07$ ,  $df = 4$ ). Though, children <10 year olds were all without spores, asymptomatic and without diarrhoea.

Occupation type (Table 4), showed a greater relationship in spore proliferations of microsporidium and the occupational status of patients. From the report of occupation of HIV patients, spore infiltration was high (50.00%) among civil servants who are the working force, occupying the economic position of power. This showed also a high level of sexual tendencies among businessmen/women 28 (70.00%) who by virtue of their occupation, they interact with greater accessibility to a wider spectrum of members of the society. However, there was a close relationship in the lead of infection among patients with varied occupational status ( $\chi^2 = 8.45 < 9.48$ ,  $df = 4$ ).

Table 1: Spores infiltration detected in gastrointestinal epithelium of HIV- positive patients.

Specie of organism	Spores indicator	Total	%	P- value
<i>Microsporidium</i> Spp. (+)	7 18 35 33	93	46.50	$P < 7.815$
<i>Microsporidium</i> Spp. (-)	18 12 55 42	107	53.50	$P < 7.815$
Total	25 30 70 75	200	100.00	

Legend:  
 += Positive - = Negative Spp = Specie < = Less than %= Percentage

Table 2: Sex distribution of Microsporidia spores among HIV/AIDS patients at Federal Medical Centre

Sex	No. examined	No. positive	Percentage(%)
Male	97	38	39.18
Female	103	55	53.40
Total	200	93	46.50

Legend:  
 No.=Number %=Percentage

Table 3: Age distribution of Microsporidia spores in HIV/AIDS patients at Federal Medical Centre

Age Group	1-10	11-20	21-30	31-40	41-50	≥ 60	Total
No. examined	-	30	66	60	33	11	200
No. positive	-	10	32	30	16	5	93
Percentage (%)	-	33.33	48.48	50.00	48.48	45.45	46.50

Legend:  
 %=Percentage ≥=Greater or equal

Table 4: Occupation and Microsporidia spores proliferation in HIV/AIDS patients at Federal Medical Centre.

Occupation	Student	Civil servants	Famers	Businessmen	Others	Total (%) /women
No. examined	3	60	34	40	30	200
No. Positive	10	30	14	28	11	93
(%)	27.78	50.00	41.18	70.00	36.67	46.50

Legend;  
 %=Percentage Others=With no defined occupational status.  
 No=Number

Species collected from HIV patients were *Eaterocyto zoonbieneusi* and *Encephalito zoonintestinalis*. Spore infiltrations of individual with HIV/AIDS were sparsely distributed in 46.50% of patients suffering from the illness. This was with clinical relevance of pathogenesis and agreed with the previous report in man who first was diagnosed with microsporidia spore (Canning and Hollister, 1997). The overall proliferation of spores of microsporidium was relative hence, the complexity of HIV seen with persistent diarrhoea of 3-10 bowels/day loose to watery stool. Similarly, 21.50% were cases diagnosed of *Encephalito zoonintestinalis* with enteritis. Coyles *et al.* (1996) observed cases of enteritis among immunosuppressed individuals with colicky abdominal pain as a pointer to *E. intestinalis*.

Among sexes, spores of *Enterocyto zoonbieneusi* and *Encephalito zoonintestinalis* were sporadically detected in stool specimens of HIV-patients. Spores of *E.bieneusi* was observed to be more prevalent (53.40%) in females than in males. With relevant clinical significance, the spore of *E. intestinalis* were sparsely distributed but expressed more in females who were slow in weight loss and emaciation, this condition was considered a threat to life. However, Canning and Hollister, (1997) observed that, the diarrhoea caused by this species is debilitating and life threatening with as many as ten episode each day and does not respond satisfactorily to therapy, must therefore be considered a significant cause of death in HIV patients.

Similarly, in a 36 year old homosexual HIV-1 patient, it was observed that, six months later (from the time he was screened for HIV), developed chronic diarrhoea from one to three liquid stools/day (Burgereet *al.*, 2000; Cali *et al.*, 1993; Field *et al.*, 1993). Importantly, this infection among individuals affects the labour force that gradually were seen deteriorating in their condition and debility to do work with a decline in work places and in some from attending schools and absence in commercial business centers irrespective of sex.

The prevalent rate (46.50%), age was depended on each other significantly, among age 21 and 70 years old were more or less susceptible to the infection with disease significance in 48.48% with less or more pathogenic strain in children probably

born of HIV parents. Both sexes were associated with diarrhoea. Reynaud *et al.*, (1998) described infections in adult and travellers with chronic diarrhoea. This pathogen *E. intestinalis* (Formerly called, *Septata intestinalis*) was found in patient with chronic diarrhoea (Orenstein *et al.*, 1992). In other case of disseminated microsporidiosis and from human infecting enterocytes, macrophages were associated with diarrhoea in the small intestine and incidence of diarrhoea was 0.13 episodes observed in seronegative children born to HIV infected, or high risk women at the age 7.3+/- 5.7 months (Shadduck *et al.*, 1998; Orenstein, 1992). It cannot however, be ruled out that, by an oral fecal route infection, the pathogens can be transferred from close association of animals to human irrespective of age.

Of the entire occupational group examined, civil servants were most affected with the microsporidia spore. This was observed under prolific measures with 50% of the infected population due to negligence to effective hygiene. Moreso, business men/woman were 70% a reflection of HIV individual who engage in some semi-manual jobs, eats food in an open place and drinking of water contaminated

with the spore of microsporidia. Observe also were farmers who relatively have access to the soil that harbors spores of microsporidia and can survive a long period of time in the soil as high as 4°C of temperature. After the days farming work, swimming in a running stream was contributable to microsporidia infection in HIV patients. These patterns of intestinal infection correspond with the report that, infection not only infects the enterocytes of man but also cells in the lamina propria including fibroblasts, microphages, and endothelial cells (Weber *et al.*, 1994). However, data to support effective preventive measures are quite limited. The attention to meticulous hand washing and other personal hygienic measure be adhered to strictly, patients should be advised that, sexual transmission of microsporidiosis cannot be excluded and patient should be offered screening for microsporidiosis regardless of their HIV status.

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