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*Full Length Research Article*

## **Epidemiological Patterns of Human Immunodeficiency Virus and Herpes Simplex Virus Co-Infection in Ibadan, Nigeria**

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### **ABSTRACT**

There is no doubt that the greatest health problem threatening the human race these times is the HIV/AIDS pandemic. The greatest burden of this scourge is in sub-saharan African. This has undoubtedly increased the incidence of opportunistic infection like herpes simplex virus infection. This study investigated the epidemiological pattern of HIV and HSV co-infection in patients attending the sexually Transmitted Diseases Clinic of University College Hospital, Ibadan. The findings revealed that a total of 63 patients presented classical genital ulceration during the period of study. There was statistical significance between the age group of the patients and their seropositivity status ( $\chi^2= 3.86, P< 0.05$ ). The epidemiological studies also revealed that there was statistical significant difference in development of genital herpetic ulceration and their HIV seropositivity status ( $\chi^2= 39.35, P< 0.05$ ). There was also a significant difference between herpes simplex virus CPE formation from genital lesion and the HIV seropositivity status of the patients ( $\chi^2= 10.96, P< 0.05$ ). Also, there was statistical significant difference in HSV CPE formation from genital lesions of HIV seropositive patients already on antiretroviral therapy ( $\chi^2= 4.06, P< 0.05$ ). Ballooning degeneration of cells indicative of CPE of HSV in vero cell lines were detected within 2-3 days post inoculation. The HIV and HSV Co-infection pattern among patients attending Sexually Transmitted Diseases Clinic in University College Hospital, Ibadan is therefore discussed.  
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**Key words:** HIV, HSV, CPE, Serological status

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## INTRODUCTION

Herpes simplex virus (HSV) causes a variety of clinical infections ranging from inapparent and self-limiting cutaneous lesions to fatal encephalitis. In addition, HSV establishes and maintains a latent state in the peripheral nerve cells of infected animals from which recrudescence infections arise (Lisa *et al.*, 1990). Once infected, the virus stays in skin and nerve cells for life. Most of the time, it is dormant and causes no symptoms but from time to time, it can flare up. This tends to happen when the immune system is weakened, in situations of stress during a cold or on exposure to strong ultraviolet light, even in people without HIV. Such attacks occur more frequently in children and the elderly, since these groups tend to have less efficient immune systems than adult (Warren, 2004).

Genital herpes infection also increases the chances of sexual HIV transmission (Freeman 2004). Herpes lesions often start as numbness, tingling or itching. This feeling indicates that the virus is traveling along the nerve to the skin. The virus can be passed from person to person by contact between these lesion and mucous membranes. Among HIV-positive people, herpes lesions usually also contain large quantities of infections HIV (Grover, 2004).

In people with HIV, herpes recurrences tend to be more frequent, more severe and longer lasting. Sometimes, the lesions can become infected with other bacteria or fungi. An HIV-positive person who has herpes attacks of the skin and/or herpes in the throat of any duration is diagnosed as having AIDS (Gupta, 2004). This study intends to describe the epidemiological pattern of HIV and HSV Co-infections in UCH, Ibadan.

## MATERIALS AND METHODS

**Study Design:** - This study was a cross sectional descriptive experiment conducted in three phases involving: interviewing and cross-examination of patients, genital swab collection

and laboratory analysis using tissue culture technique to observe for HSV CPE formation. Patients attending the sexually transmitted clinic of UCH between the months of December 2003 and October, 2004 presenting various complaints in the genital. Genital swab samples were only collected from patients queried for Herpes Simplex Virus infections by the clinicians. The data collected consist of information on the socio-demographic characteristics of each patient (such as age group, HIV Status and ARV therapy).

**Data Analysis:** The Relationships (age, HIV status, Herpetic ulceration, HSV CPE formation, ARV therapy) of co-infection at  $Pr(X > 0)$ , was done. The critical level for statistical significant was set at  $p = 5\%$  (0.05). The chi-square test was used to assess the relationship between any two categorical variable.

**Sample Collection:** Sterile swab sticks were used to collect specimens from the genital ulcers of patients. Each swab specimen was immediately inserted into sterile bijoux bottles containing 1% (MEM) transport medium and then transported into the laboratory in cold ice-packs.

**Cell Culture:** Vero cells were used. Standard cell culture techniques as outlined by Grist *et al.*, 1979 were used for the cell culture procedures.

**Seeding Of Tissue Culture Tubes:** - After splitting of cells into tubes, each tissue culture tube was seeded with about one million cells per ml. The tubes were then incubated in a slanted position for 24hours until confluent.

**Specimen Inoculation:** The growth medium was poured off from the tissue culture tubes and 0.2ml of the treated specimen was inoculated into the tubes of tissue culture cells. The inoculated tubes each of Hep-2 cells and Vero cells were incubated at 37°C for one hour for virus adsorption. Thereafter, 1ml of growth medium was added to each test tube. The tubes were then incubated at 37°C in a slanted position and observed daily under an Olympus inverted microscope for cytopathic effect (CPE). Between 5 and 10 tubes were inoculated and 0.2ml of PBS was added to the control cells. Both control

and experimental tubes were observed for 8 days after which the cells were discarded. Experimental tubes showing specific CPE was regarded as indicative of the presence of the virus.

**RESULTS**

A total of 63 patients out of 300 clinic attendees queried by the clinician presenting classical genital ulceration for Herpes Simplex Virus infection were recorded during the period of this study. There was statistically significant difference between the age group of the patients and their HIV seropositivity status ( $X^2= 3.86, P<0.05$ ) (Table 1). Also, there was statistical significance in genital herpetic ulceration and HIV seropositivity status of the patients ( $X^2 = 39.35 P<0.05$ ) (Table 2). The relationship between CPE formations of Herpes simplex virus from genital lesions of HIV seropositive patients revealed that there was statistical significant difference. ( $X^2 = 10.96, P < 0.05$ ) (Table 3).

However, there was also statistical significant difference in HSV CPE formation from genital lesion of HIV seropositive patients already on antiretroviral therapy ( $X^2 = 4.06, P < 0.05$ ) (Table 4).

Characteristics ballooning degeneration of cells indicative of Cytopathic Effects (CPE) of HSV in Vero cell lines were detected within 2-3 days post inoculation in this study.

**Table 1:**  
Relationship Between HIV Status and Age of Patients Presenting Genital Ulcerations.

AGE	HIV Positive	HIV Negative	Total
Infants (1-10 yrs)	0	1	1
Adult (11yrs & above)	49	13	62
Total	49	14	63

$df = 1, X^2 = 3.86, P<0.05$

**Table 2:** Relationship between Herpetic Ulcer and HIV Status of Patients

Status	Herptic Ulcer (Present)	Herpetic Ulcer (Absent)	Total
HIV Positive	49(77.8%)	80(33.8%)	129
HIV Negative	14(22.2%)	157(66.2)	171
Total	63	237	300

$df = 1, X^2 = 39.35, P<0.05$

**Table 3:** Relationship between Herpes Simplex Virus (CPE) detection and HIV Status of Patients

Status	CPE	No CPE	Total
Hiv Positive	0	49	49
Hiv Negative	3	11	14
Total	3	60	63

$df = 1, X^2 = 10.96, P<0.05$

**Table 4:** Relationship Between Herpes Simplex Virus (CPE) detection and ARV Therapy

HSV CPE	ARV Therapy		Total
	Yes	No	
Positive	1	2	3
Negative	49	11	60
Total	50	13	63

$df = 1, X^2 = 4.06, P<0.05$

**DISCUSSIONS**

In this study, 63 patients queried by the clinicians presenting classical clinical genital ulceration for herpes simplex virus infection represented 21% of the total number of sexually transmitted clinic attendees in the University College Hospital, Ibadan . This finding is lower than the 67% decline reported in 1993 (Fawole and Asuzu, 1997). There was a rise in 1997 before the current decline. It is interesting to note that factors such as user fees, social strife, and reduced quality of services (as a result of depressed economy) earlier identified in 1993 were still operating in the year 2000, and could serve as plausible explanation for the observed trend.

The fact that most of the patients presenting

classical genital ulceration of HSV infection in relation to their HIV Seropositivity status were in the age range of adults (11yrs & above) is not surprising as this age-range coincides with the period of greatest sexual activity (Table1). The finding is similar to what was reported in the University College Hospital Sexually Transmitted Disease clinic by Akinola and Afolabi (2004).

It is of interest to note that the minimum age recorded in this study was 1 year old. However, the genital swab sample of the patient did not come down with CPE for HSV. Clinical investigation of the mother reported that she had no signs or symptoms of genital HSV lesions at delivery (Data not shown). This finding is in consonance with the report of CPSP (2002) that more than 70% of infants with neonatal HSV infections are born to mothers who had no signs or symptoms of HSV lesions at delivery.

In this study, there was statistical significant difference in genital herpetic ulceration and HIV seropositivity status of the patients. (Table 2) This finding supports the report of Freeman (2004) that there is some evidence that herpes viruses can act as a co-factor in AIDS, activating HIV and making it easier for HIV to infect certain cells. Moreover, the relationship between CPE formations of Herpes simplex virus from genital lesions of HIV seropositive patients revealed that there was statistical significant difference (Table 3) This finding is in consonance with the report of Grover, (2004) that in people with HIV, herpes recurrences tend to be more frequent, more severe and longer lasting.

However, there was statistical significant difference in HSV CPE formation from genital lesions of HIV seropositive patients already on anti-retroviral therapy. (Table 4). This finding is in consonance with the observed trend of the report of Ceballos – sahbrena, (2000) that combination anti- HIV therapy has significantly reduced the isolation of active herpes among people with HIV. Hence effective antiretroviral therapy boosts the immune system and reduces the chances of a herpes outbreak.

Characteristics Cytopathic effects (CPE) of

HSV in Vero cell lines were detected within 2-3 days post inoculation. (Data not shown) This agrees with previous observation of Drew and Rawls (1983) who detected that in general the mean time to detection of CPE should be 2-3 days.

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