

# The Seroprevalence of Herpes Simplex Virus2 among HIV infected adults attending antiretroviral clinic in Specialist Hospital Sokoto, Nigeria

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**Abstract:** Infection with Herpes Simplex Virus Type-2 (HSV-2) is the primary cause of genital herpes and the most common cause of genital ulcer disease (GUD) worldwide. The aim of this study is to assess the seroprevalence of HSV-2 infections among HIV infected adults attending antiretroviral clinic in Specialist Hospital Sokoto; and to verify the association between HSV-2 infection and HIV-status, age, level of education and positive history of painful genital ulcers. Specimens (blood sample) were collected from one hundred (100) volunteers attending Antiretroviral Clinic in Specialist Hospital Sokoto and tested for HSV-2 antibodies using a one-step cassette style HSV-II IgG which work based on the principle of immunoassay combined with conjugated colloid gold technology. Data were analyzed using SPSS version 18.0. P values  $\leq 0.05$  were considered significant. Out of the 100 individuals tested, 17 (17.0%) were HSV-2 positive. Infected individuals were more likely to be female than male (12% versus 5%;  $P > 0.05$ ). There were high rates of infection in all age groups, and the prevalence increased with age. However, multivariate logistic regression analysis showed that HSV-2 prevalence was significantly associated with occupation, educational status, and number of sex partners and sexual behaviors ( $P > 0.05$ ) and not significant with age, marital status, tribe, religion,  $p > 0.05$ . The results highlight the potential public health impact of HSV-2 in Nigeria where anti-HSV-2 testing is not generally done in all populations.

**Keywords:** Herpes Simplex Virus, HIV, HSV-2, Specialist Hospital Sokoto.

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## I. INTRODUCTION

Herpes simplex virus type 2 (HSV-2) is a sexually transmitted virus that is the most common cause of genital ulceration worldwide (9). Transmission is facilitated by the frequent recurrence of infectious episodes of subclinical viral shedding (9). Undiagnosed and untreated genital herpes virus infection in pregnant women can lead to vertical transmission from mother to newborn, causing infant morbidity and mortality (9). Moreover, there is increasing evidence that HSV-2 infection could significantly enhance the rates of sexual transmission and acquisition of human immunodeficiency virus (HIV) in developing countries (10). The seroprevalence of HSV-2 antibodies varies considerably by population, and it has been shown that the prevalence of HSV-2 antibodies in both developed and developing countries has increased markedly over the past few years (6) Herpes Simplex Virus Type-2 (HSV-2) is a sexually transmitted infection (STI) that is chronic, widespread, and infectious during both its symptomatic and asymptomatic periods (13). The infection is a significant factor for increased risk of acquisition and transmission of human immunodeficiency virus (HIV). A meta-analysis of studies of HSV-2 found that infection with HSV-2 doubled the risk of becoming infected with HIV through transmission during sexual activity (11). Herpes Simplex Virus Type-2 is the primary cause of genital herpes. It is highly prevalent in human populations in many parts of the world and it is the most common cause of genital ulcer disease (GUD) worldwide (4). Prevalence in the adult general population in sub-Saharan Africa ranges from 30% to 80% in women and from 10% to 50% in Men (12). The first documented isolation of HSV-2 in Nigeria was done in Ibadan (7). The HSV-2 seroprevalence rate among female sex workers in Lagos, Nigeria, was 59% (3). Higher HSV-2 seroprevalence was reported in a multi-center study of sex workers in four sub-Saharan African cities (5).

Newborns of women known to be infected with genital herpes are at risk of neonatal transmission; hence delivery of these babies by caesarean section is desirable. Furthermore, newborns at greatest risk were born to women exhibiting genital herpes for the first time during the time of delivery (1). Since genital herpes is not routinely diagnosed in the laboratory in Sokoto and specialist Sokoto in particular, there is no data to guide HSV-2 prevention efforts like that available for other common sexually transmitted infections (STIs). Testing for seroprevalence of antibodies to HSV-2 is one way to estimate the prevalence of genital herpes in a population (4).

## II. MATERIALS AND METHOD

### Study Area:

The study area is antiretroviral therapy (ART) clinic in specialist hospital Sokoto state, Nigeria.

### Study Population:

The study includes HIV positive individuals attending antiretroviral clinic in specialist Sokoto state. Only adult between the ages of 15 and 75 and both males and females were included

### Eligibility Criteria:

The study excludes those that are HIV negative, and also it excludes children below the age of 15 and adults that are above the age of 75.

### Sampling Technique:

The sampling technique employed in this research is random methods of sampling. It is done by selecting each patient by using three as an interval. The first person that comes is enrolled into the research and the fifth person and it goes like that. E.g. 1, 5, 9, 13 etc.

### Study Design:

The study was designed as a cross-sectional comparative study.

### Data Collection and Analysis:

The socio-demographic data and test results of each participant were obtained using a self-administered questionnaire and Laboratory investigations, and subsequently the data were subjected to statistical analysis using the software SPSS version 18.0 (SPSS Inc., Chicago, USA). Multivariate logistic regression analysis was performed at 95% confidence interval. P values  $\leq 0.05$  was considered statistically significant.

### Ethical Consideration:

Ethical clearance for the study was sought and obtained from ethical committee of specialist Hospital Sokoto (SHS). HIV patients consent was also obtained. All data and information generated in the study shall remain confidential except only for the purpose of this research.

### Laboratory Technique:

#### Specimen Collection and Processing:

Three (3 mls) of blood was collected using a monovette Vacutainer syringe in to a labeled plain Vacutainer tube. The samples were centrifuged at 3000rpm for 5 minutes and sera were separated into a separating container and were stored at 4°C until assayed. And the specimens were brought to room temperature before been tested,

#### Serological Test and Procedures:

Sera samples were tested for anti-HSV-2 using a one-step cassette style HSV-II IgG which work based on the principle of immunoassay combined with conjugated colloid gold technology. The HSV-II test is a diagnostic device for qualitative detection of anti HSV-II IgG in human serum (plasma) specimen. The procedure was as follows;

1. The pouch containing the cassette was opened, the test kit from the pouch was removed and was placed horizontally on the working desk
2. The cassette were labeled using pencil for each of the samples.
3. The measuring of serum by dilution at 1:50 was done by taking 20ul of the serum directly into the dilution fluid commercially provided with the pouch.
4. The result was read after 10 minutes,

**Interpretation of Result:**

**Negative:** only one pink band appears on the control region of the cassette. This indicates that there is no detectable anti HSV-II antibody in the specimen.

**Positive:** Two pink bands appear on test region of the cassette. This indicates that the specimen contains detectable amount of anti HVS-II anti body.

**Invalid:** If without colored band appears on the test region, this is an indication of a possible error in performing the test. The test should be repeated using a new device.

**III. RESULT**

One hundred HIV infected male and female adults were recruited into the study. Socio –Demographic characteristics of the participants were collected using self-administered questionnaire and sample collected was analyzed in the laboratory using standard laboratory procedures instructed by the manufacturer of the reagent kit. The results obtained are presented in tables 1 to 9 .Table 1 shows the distribution of HSV among the sex of the recruited subject, table 2 shows distribution of HSV among tribes table 3 shows Distribution of HSV and Knowledge of the virus Existence table 4 Shows Distribution of HSV with respect to educational status, table 5 shows distribution of HSV with respect to marital status table 6 shows distribution of HSV with respect to sexual behavior table 7 shows distribution of HSV among various age groups.

Among the 100 samples that were analyzed 17 were found to be seropositive for Herpes Simplex Virus accounting for 17.0% of the overall sample population (P<0.05) and 83 were found to be seronegative for HSV accounting for 83%. Female have high number of positive with 12 females out of 58 females that were analyzed and 5 males were positive out of 42 males that were used in the study.

**TABLES SHOWING RESULTS:**

**TABLE 1 SHOWS THE SEX DESTRUCTION OF HVS RESULT**

HVS RESULT	SEX OF SUBJECTS		
	MALE	FEMALE	TOTAL
Positive	5	12	17
Negative	37	46	83
Total	42	58	100

**TABLE 2: SHOWS THE DISTRIBUTION OF HVS AND TRIBES**

HVS RESULT	Tribes					
	Hausa	Igbo	Yoruba	Fulani	Others	Total
Positive	10	2	1	2	2	17
Negative	55	3	5	7	13	83
Total	65	5	6	9	15	100

**TABLE 3: SHOWS DISTRIBUTION OF HVS AND KNOWLEDGE OF THE VIRUS EXISTENCE**

HVS RESULT	History of HSV			
	Yes	No	Not aware	Total
Positive	2	14	1	17
Negative	6	75	2	83
Total	8	89	3	100

**TABLE 4: SHOW DISTRIBUTED OF HSV WITH RESPECT TO EDUCATIONAL STATE**

HVS RESULT	Educational Status				
	No Formal Education	Primary Educatio	Secondary Education	Tertiary Education	Total
Positive	5	4	3	5	
Negative	27	19	16	21	83
Total	32	23	19	26	100

**TABLE 5: SHOWS DISTRIBUTION OF HSV WITH RESPECT TO MARITAL STATUS**

HVS RESULT	Marital Status				
	Single	Married	Divorced	Widowed	Total
Positive	4	8	1	4	17
Negative	14	44	9	16	83
Total	18	52	10	20	100

**TABLE 6: SHOWS DISTRIBUTION OF HSV WITH RESPECT TO SEXUAL BEHAVIOUR**

HVS RESULT	Sexual Behavior				Total
	Use Protection	Doesn't Protect	Use Protection sometimes	Never had sex before	
Positive	3	8	6	0	17
Negative	15	43	22	3	83
Total	18	51	28	3	100

**TABLE 7: SHOWS DISTRIBUTION OF HSV WITH RESPECT TO AGE OF SUBJECT**

HVS RESULT	Age						Total
	15-25	26-35	36-46	46-55	56-65	66-75	
Positive	5	7	4	1	0	0	17
Negative	15	34	21	9	3	1	83
Total	20	41	25	10	3	1	100

#### IV. DISCUSSION

The prevalence of Herpes Simplex Virus among adults infected with HIV in specialist hospital Sokoto was found to be 17%. With women having 12% and men having 5%, it was also found to be higher among age group 26-35 years having 7%, 15-25 have 5%, 36-45 with 4%, 46-55 with 1% and 56-65 and 66-75 each having 0%. The result also shows that sexual behavior is a contributing factor to HSV infection because those subjects that does not use protection during sex have the highest percentage of 8% which is followed by 6% among those that often use protection and 3% among those that uses protection all the time, it is however not found in those that have not started sexual relationship. The result also shows significance of educational level to HSV infection in which out of the 17% that are positive 8% has no formal education, 4% has only primary education, 3% has secondary education and 2% has Tertiary education. The result also shows that out of the 17% that are positive 3% are house wife, 2% are civil servant, 1% is student, 11% have other occupation, and also knowledge of existence of the virus was also considered in which 2% have knowledge, 14% are not aware of the virus but never tested and 1% is not aware at all.

The result is in consistence with other results which shows lower HSV-2 seroprevalence findings of 20.7%, and 26% were, however, found among pregnant women in Tanzania and Senegal, all of sub-Saharan Africa region. (2). When compared to other settings, the value in this study is much higher than the HSV-2 seroprevalences of 7.5% and 9% reported among pregnant women in India and USA respectively (8) the result is lower than the result of (14)who reported 87% among patients attending the Sexually Transmitted Infections Clinic in Jos, . Nigeria, it is also lower than the result of HSV-2 prevalence reported in a multi-centre study in four sub-Saharan Africa cities: 90.0% in Cotonu, Benin Republic; 84.1% in Yaounde, Cameroun; 93.9% in Kisumu, Kenya; and 87.7% in Ndola, Zambia, as of June 1997 to March 1998 (12). My findings further conflict the high prevalence of HSV-2 infection in Nigeria as earlier reports showed a prevalence of 59.0% among commercial sex workers (3).

#### V. CONCLUSION

The seroprevalence of HSV-2 infections among HIV infected adults attending antiretroviral clinic in specialist hospital Sokoto was found to be 17.0%. The factors that were found to be significantly associated with occurrence of HSV-2 infection were age, marital status and Sexual behavior.

Most HIV infected persons are also infected with HSV-2, although HSV infections are often mild or asymptomatic. Symptomatic and asymptomatic HSV reactivations are common among HIV infected persons and can be a cause of

significant morbidity. Antiviral medications given for episodic outbreaks or as long-term suppressive treatment provide important clinical benefits to patients. Given the apparent epidemiologic synergy between HSV-2 and HIV, promoting awareness of HSV-2 treatment for the purpose of decreasing HIV transmission and disease progression may have substantial public health benefits.

## VI. RECOMMENDATIONS

- There is an urgent need to recognize HSV-2 infection among populations at risk, especially the young, and to provide treatment and counseling of condom use. Results from a recent study have shown that condoms can effectively reduce HSV-2 transmission.
- Identification of new HSV-2 infection in pregnancy may indirectly impact on mother-to-child transmission of HIV-1.
- There is a need to integrate HSV-2 and HIV-1 prevention efforts in all countries at risk of increasing HIV-1 infections.
- Intensive efforts and funding are currently invested in the development of an HIV-1 vaccine. This study has shown that equally, there is an urgent need to develop an HSV-2 vaccine in order to curb the spread of both HIV-1 and HSV-2.

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