

Seroprevalence of herpes simplex virus type-2 among patients attending the Sexually Transmitted Infections Clinic in Jos, Nigeria

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Abstract

Background: 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. There is little information on the prevalence of HSV-2 in Nigeria.

Methodology: Specimens were collected from 162 volunteers attending Jos University Teaching Hospital and tested for HSV-2 antibodies using HSV-2 Type specific IgG EIA test kit (Globalemed LLC Alexandria VA, USA). Data were analyzed using SPSS version 13.0. P values ≤ 0.05 were considered significant.

Results: Out of the 162 individuals tested, 141 (87.0%) were HSV-2 positive. Infected individuals were more likely to be male than female (92.8% versus 86.4%; $P > 0.05$). 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 not significantly associated with increasing age, sex, marital status, occupation, educational status, and number of sex partners ($P > 0.05$).

Conclusions: The results highlight the potential public health impact of HSV-2 in Nigeria where anti-HSV-2 testing is not generally performed in all populations, especially considering the risk of neonatal transmission and the attendant complications at birth.

Key words: Herpes Simplex Virus Type-2, antibodies, patients, Nigeria

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Introduction

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 [1]. 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 [2].

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 [3].

Prevalence in the adult general population in sub-Saharan Africa ranges from 30% to 80% in women

and from 10% to 50% in men [4]. The first documented isolation of HSV-2 in Nigeria was done in Ibadan [5]. The HSV-2 seroprevalence rate among female sex workers in Lagos, Nigeria, was 59% [6]. Higher HSV-2 seroprevalence was reported in a multi-centre study of sex workers in four sub-Saharan African cities [7].

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 [8]. Since genital herpes is not routinely diagnosed in the laboratory in Jos, 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

Table 1. Age and Sex Distribution of Herpes Simplex Virus Type-2 Infection

Age (Years)	Total No. Tested/ (%)Positive	Males		Females	
		No. Tested	No. (%) Positive	No. Tested	No. (%) Positive
11-20	14(85.7)	0	0(0.00)	14	12(85.7)
21-30	81(82.7)	3	2(66.6)	78	65(83.3)
31-40	52(92.3)	10	10(100.0)	42	38(90.4)
41-50	12(91.6)	1	1(100.0)	11	10(90.9)
51-60	3(100.0)	0	0(0.00)	3	3(100.0)
Total	162	14	13(92.8)	148	128(86.4)

P > 0.05

one way to estimate the prevalence of genital herpes in a population [3]. The present study aimed to determine the prevalence of HSV-2 antibodies and identify probable risk factors among STI patients.

Methodology

Study Design

Sera specimens were obtained with informed consent and ethical committee approval from Jos University Teaching Hospital (JUTH) from 162 individuals aged 14 or older who were attending the Sexually Transmitted Infections Clinic within JUTH. All sera were maintained at -20°C until they were retrieved for this study. A structured questionnaire was used to obtain demographic and behavioral information from each patient.

Description of Assay

Sera samples were tested for anti-HSV-2 using a second-generation enzyme immunoassay (EIA) kit with purified HSV-2 antigen coated on the surface of microwells (Globalemed LLC Alexandria, VA, USA). All steps were performed according to the manufacturer's instructions.

Statistical Analysis

Data were subjected to statistical analysis using the software SPSS version 13.0 (SPSS Inc, Chicago, USA). Multivariate logistic regression analysis was performed at 95% confidence interval. P values < 0.05 were considered statistically significant.

Results

Of the 162 specimens tested, 141 (87.0%) were seropositive for Herpes Simplex Virus Type-2 IgG antibodies. Specimens were collected from 14 (8.6%) males and 148 (91.3%) females (Table 1). The prevalence of HSV-2 was 13 out of 14 (92.8%) and 128 out of 148 (86.4%) among males and females respectively (Table 1). The prevalence of the

infection appeared to have increased with age among both males and females (Table 1). The prevalence of the infection was found to be higher among civil servants (94.0%) and the unemployed (100%) (Table 2). Also, the prevalence of the infection was found to be highest among those with secondary education (91.8%) and lowest among those with no formal education (80.0%). Of the 116 (71.6%) married individuals tested, 86.2% were positive and of the 46 (28.3%) singles tested, 89.1% were positive (Figure 1). The prevalence of the HSV-2 infection was higher among those with two sex partners (100%) than among those with one sex partner (Figure 2). Of the 162 cases analyzed using multivariate logistic regression analysis, the full model was non-significantly reliable ($\chi^2 = 9.76$; DF = 9; P > 0.05). Multivariate logistic regression analysis showed that HSV-2 prevalence was not significantly associated with age, sex, marital status, occupation, educational status, and number of sex partners (P > 0.05).

Table 2. Sero-prevalence of Herpes Simplex Virus Type-2 in relation to Occupational Status

Occupational Status	No. Tested	No. (%) Positive
Traders	39	36(92.3)
Students	32	26(81.0)
Housewives	38	30(78.0)
Civil Servants	36	34(94.0)
Farmers	6	5(83.0)
Sportsmen	1	0(0.00)
Unemployed	10	10(100.0)
Total	162	141(87.0)

Discussion

Serological testing showed that the prevalence of HSV-2 was 87.0%, although all cases were devoid of clinical signs and symptoms. This result is consistent with 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,

Table 3. Sero-prevalence of HSV-2 infection in relation to educational status

Occupational Status	No. Tested	No. (%) Positive
Traders	39	36(92.3)
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Civil Servants	36	34(94.0)
Farmers	6	5(83.0)
Sportsmen	1	0(0.00)
Unemployed	10	10(100.0)
Total	162	141(87.0)

Cameroun; 93.9% in Kisumu, Kenya; and 87.7% in Ndola, Zambia, as of June 1997 to March 1998 [4]. Our findings further confirm the high prevalence of HSV-2 infection in Nigeria as earlier reports showed a prevalence of 59.0% among commercial sex workers [6]. The trend of a higher prevalence of HSV-2 infection with increasing age (though, not statistically significant) is substantiated by similar reports in Sweden and Lagos [9,6], which suggests that increasing age is a possible risk factor for HSV-2 infection and that HSV-2 infection is a lifelong infection with a high rate of transmission [4]. However, a higher prevalence reported among men than women (92.8% versus 86.4% respectively) contrasts previous reports [9,4], probably because of the difference in sample size between males, 14 (8.6%) and females 148 (91.3%) recruited in this study. It is interesting to note that there was a consistently high prevalence of HSV-2 infection irrespective of educational status. This agrees with a review conducted in 2004 which showed that there is a common finding among sero-epidemiological

Figure 1. Seroprevalence of HSV-2 in relation to marital status of parents attending sexually transmitted infections clinic

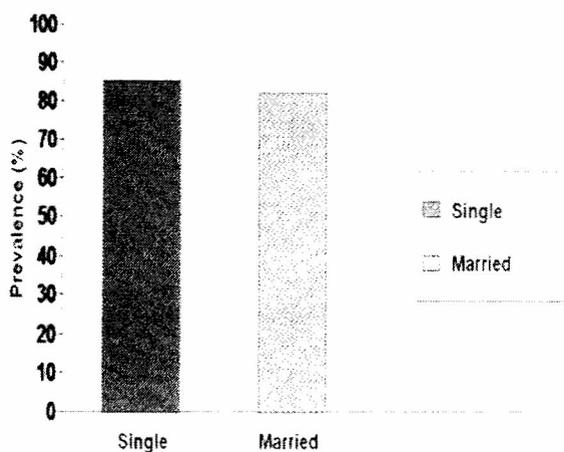
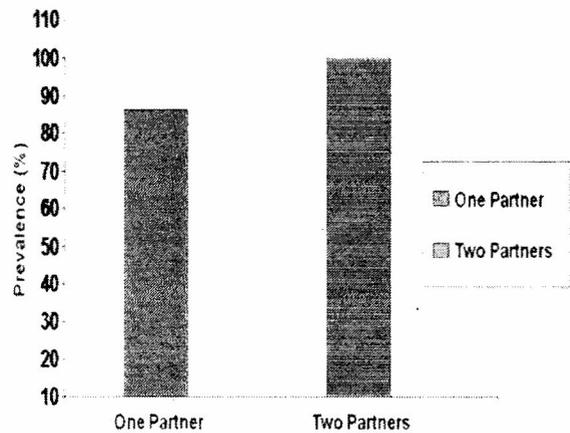
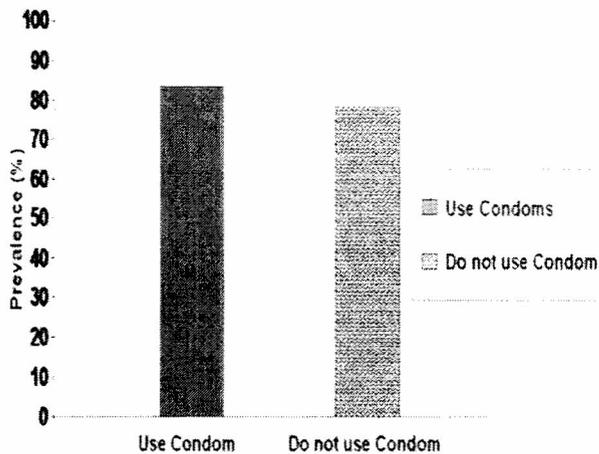


Figure 2. Seroprevalence of HSV-2 in relation to number of sex partners of patients attending sexual transmitted infections clinic Jos University Teaching Hospital



surveys that socio-economic, religious and educational status have no significant effect on the prevalence of HSV-2 infection [4]. Also, in this study, there was a higher prevalence of HSV-2 infection among singles compared to married individuals which contradicts previous reports. This can likely be attributed to the impact of other determinants, such as contact with commercial sex workers, early age of first sexual activity with HSV-2 seropositive persons and presence of other STIs [10, 11]. The report also indicated that there was a higher prevalence of infection among patients with more than one sex partner, which is in line with other reports [12]. However, the fact that the high prevalence of the infection did not attain statistical significance underlines the urgent need for education and counselling to discourage unprotected sexual contact and reduce the number of sexual partners, especially in the general population. The results highlight the potential public health impact of HSV-2 in Nigeria where anti-HSV-2 testing is not generally performed in all populations, especially considering the risk of neonatal transmission and the attendant complications at birth as well as the synergy between HIV and HSV-2 transmission [6]. Considering the risk of neonatal herpes, testing of pregnant women should be conducted as part of routine antenatal care and appropriate therapy with acyclovir employed. Identifying, testing and counseling those at risk should have a major impact on reducing the incidence of the infection. Thus this report underlines some public health concerns when placed in the context of recent biological studies which show that mucosal HSV-2 ulcerations, whether symptomatic or

Figure 3. Sero-prevalence of HSV-2 in relation to condom use among patients attending STI Clinic Jos University Teaching Hospital



asymptomatic, are associated with influx of CD4⁺ T cells, which are easily infected with HIV [13].

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References

1. WHO (2001) Herpes Simplex Virus type-2 pragmatic research priorities in developing countries: Geneva: Report of a WHO/UNAIDS/LSHTM Workshop. London p. 1-20.
2. Wald A and Link K (2002) Risk of human immunodeficiency virus infection in herpes simplex virus type-2 seropositive persons: a meta-analysis. *J Infect Dis* 185: 45-52.
3. Kroon S (1994) Limiting the continued spread of genital herpes. Recommendations from IHMF Management Strategies. Workshop PPs Europe.
4. Weiss H (2004) Epidemiology of herpes Simplex Virus Type-2 infections in the developing world. *Herpes* 11: 24A-35A.
5. Oni AA, Adu FD, Ekweozor CC (1994) Isolation of herpes simplex virus from sexually transmitted disease patients in Ibadan, Nigeria. *Sex Transm Dis* 21: 187- 90.
6. Dada AJ, Ajayi AO, Diamondstone L (1998) A sero-survey of *Haemophilis ducreyi*, Syphilis, and herpes Simplex Virus type-2 and their association with HIV among female sex workers in Lagos, Nigeria. *Sex Transm Dis* 25: 237-42.
7. Lagarde E, Auvert B, Chege J (2001) Condom use and its association with HIV/STDs in four urban communities in sub-Saharan Africa. *AIDS* 15: 571-578.
8. Brown ZA, Benedetti JK, Ashley R, Burchett S, Selke S, Vontver LA (1991) Neonatal herpes Simplex Virus Infection in relation to asymptomatic maternal infection at time of labour. *New Eng J of Med* 167: 942-946.
9. Christenson B, Bottiger M, Swensson A, Jeansson S (1992) A 15-year surveillance study of antibodies to herpes simplex virus 1 and 2 in a cohort of young girls. *J Infect* 25: 147- 54.
10. Weiss H, Buve A, Robinson NJ, Van Dyck E (2001) Epidemiology of HSV-2 infection and its association with HIV infection in four African Urban Populations. *AIDS* 4: 597-608.
11. Auvert B and Buve AF (2001) Ecological and Individual level analysis of risk factors for HIV infection in four urban populations in sub-Saharan Africa with different levels of HIV infection. *AIDS* 154: 515-530.
12. Mehta SD, Moses S, Agot K, Agingu W, Parker C, Ndinya-Achola JO, Bailey RC (2008) Herpes simplex virus type 2 infection among young uncircumcised men in Kisumu, Kenya. *Sexually Transm Inf* 84: 42-48.
13. Koelle M, Wald A (2000) Herpes Simplex Virus: the importance of asymptomatic shedding. *J Antimicrob Chemother* 45: 1- 8.

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