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Prevalence of Syphilis and Associated Risk Factors in HIV Patients at a Tertiary Hospital in South - South zone, Nigeria: A Cross-Sectional Study

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Abstract

Background: Syphilis and human immunodeficiency virus (HIV) are both sexually transmitted and can both be contracted in a single unprotected intercourse, having a co-infection can have potential adverse effects on clinical outcomes and HIV care.
Methods: This hospital-based cross-sectional study was conducted among HIV patients attending the HIV clinic at a tertiary hospital in the south south senatorial district. Sociodemographic, behavioral, and clinical data were collected using a structured interviewer questionnaire and medical records review. Blood samples were screened for syphilis using rapid plasma reagin and confirmed with Treponema pallidum hemagglutination assay. Data were analyzed using descriptive statistics, bivariate tests, and multivariable logistic regression.
Results: A total of 400 HIV positive patients were enrolled; 274 (68.5%) were female,126(31.5%) were males, the mean age was 43.6 ± 1 0.1 years. Syphilis was detected in 10 participants; one male had a penile ulcer, giving an overall prevalence of 2.5% (95% CI: 1.36%-4.54%). Prevalence was significantly higher among males than females and was associated with educational level and number of sexual partners in bivariate analysis. On multivariable analysis, male sex remained the only independent predictor of syphilis
Conclusion: Syphilis prevalence was low in the patients. Male sex was the only independent risk factor identified, there is a need for routine syphilis screening within HIV care, particularly among men.

Keywords: HIV, Syphilis, Prevalence, Risk Factors, Nigeria

INTRODUCTION

Syphilis is a sexually transmitted infection caused by Treponema pallidum and remains an important disease of public health concern worldwide[1,2,21,23,24]. Its clinical importance is magnified in people living with HIV because the infections are both sexually transmitted and may interact biologically and clinically [5,6,8,25]. In HIV positive patients, syphilis may present atypically, may be associated with worse outcomes, and can complicate diagnosis and treatment [6,7,26,27].

In Nigeria, previous studies have shown variable prevalence rates of syphilis among HIV positive patients [9,10]. These differences may reflect local population characteristics, risk behavior, access to testing, and differences in clinical practice[11,12,14,17,18]. Hospital-specific prevalence data are therefore useful for guiding screening policy and clinical care[13,21,22]. major tertiary health facilities provide HIV services, making them relevant settings for local epidemiologic assessment[12,21].

This study aimed to determine the prevalence of syphilis and identify associated risk factors among HIV positive patients attending a tertiary hospital in the south south senatorial zone of Nigeria[12,13].

METHODS

Study design and setting: This was a hospital-based cross-sectional study conducted among HIV positive adults attending the HIV clinic a tertiary hospital in the south south senatorial zone of, Nigeria [12,21].

Study population and sampling: Adults aged 18 years and above, whether they were on antiretroviral therapy or not, were recruited using systematic random sampling[12,17,18].

- **Data Collection:** Data were obtained using a structured interviewer-administered questionnaire and medical records reviewed. Variables included were age, sex, marital status, educational level, sexual partners, sexual orientation, condom use, blood transfusion history, duration since HIV diagnosis, ART status, CD4 count, and HIV viral load[12,13,17,18].
- **Laboratory Methods:** Venous blood samples were collected aseptically and tested for syphilis using rapid plasma reagin and Treponema pallidum hemagglutination assay[9,10,13,14]. Participants reactive on both tests were considered to have active syphilis infection[9,10,14].
- **Statistical Analysis:** Data were analyzed using descriptive statistics[12,13]. Associations between syphilis and explanatory variables were examined using chi-square or Fisher's exact test as appropriate[12,13]. Variables significant in bivariate analysis were entered into multivariable logistic regression[12,13]. Statistical significance was set at $p < 0.05$[12,13].
- **Ethical Considerations:** Ethical approval was obtained from the appropriate institutional review board, and informed consent was obtained from all participants.

RESULTS

Table 1: Baseline characteristics of human immunodeficiency virus-infected patients with syphilis infection attending the HAART clinic

Characteristic	Total n (%)	Syphilis positive n (%)	P value
Sex			0.005
Female	274 (68.5)	2 (0.7)	
Male	126 (31.5)	8(6.3)	

Age group (years)			0.61
≤30	32 (8.0)	0 (0.0)	
31–40	134 (33.5)	3 (2.2)	
41–50	140 (35.0)	3 (2.1)	
>50	94 (23.5)	4 (4.3)	
Marital status			0.11
Single	66 (16.5)	0 (0.0)	
Married	263 (65.8)	4 (1.5)	
Divorced	11 (2.8)	1 (9.1)	
Separated	4 (1.0)	0 (0.0)	
Widowed	56 (14.0)	2 (3.6)	
Educational level			0.04
None	13 (3.6)	0 (0.0)	
Primary	58 (14.5)	3 (5.2)	
Secondary	182 (45.5)	0 (0.0)	
Tertiary	147 (36.8)	4 (2.7)	
On ART			0.5
Yes	366 (91.5)	7 (1.9)	
No	34 (8.5)	0 (0.0)	
Sexual partners			0.043
None	90	1 (1.1)	
1	300	5 (1.7)	
>1	10	1 (10)	
Sexual orientation			0.85
Heterosexual	392 (99.5)	7 (1.8)	
Homosexual	8 (0.5)	0 (0.0)	
Condom use			0.45
Yes	202 (50.5)	5 (2.5)	

Characteristic	Total n (%)	Syphilis positive n (%)	P value
No	198 (49.5)	2 (1.0)	
Blood transfusion			1.0

Yes	68 (17.0)	1 (1.5)	
No	332 (83.0)	6 (1.8)	
Time since HIV diagnosis (years)			0.45
≤6	188 (48.5)	2 (1.1)	
>6	200 (51.5)	5 (2.)	
CD4 count (cells/mm³)			0.22
≤200	68 (18.0)	0 (0.0)	
201-350	64 (17.0)	3 (4.7)	
351-500	86 (22.8)	2 (2.3)	
>500	167 (42.2)	2 (1.2)	
HIV viral load			0.44
Detectable	265 (68.8)	6 (2.3)	
Undetectable	120 (31.2)	1 (0.8)	

HIV=Human Immunodeficiency Virus, ART = Antiretroviral Therapy

Fig 1: Patient with penile ulcer

Photo credit : Dr Onuoha-ojeamiren Gloria Olomiekido (taken with patient's consent)

Results

A total of 400 HIV-infected patients were recruited into the study. Females accounted for 274 participants (68.5%), while males were 126 (31 .5%). The mean age was 43.6 ± 1 0.1 years, and the largest age group was 41-50 years, comprising 140 participants (35.0%).

Most participants were married (263, 65.8%), and 147 (36.8%) had tertiary education.

Syphilis was detected in 10 participants, giving an overall prevalence of 2.5% (95% CI: 0.5%-3.2%). The prevalence was 0.7% among females and 6.3% among males, and this difference was statistically significant. Participants with syphilis were older on average than those without syphilis, but the difference was not statistically significant.

In bivariate analysis, syphilis was significantly associated with sex, educational level, and number of sexual partners. The prevalence was highest among participants with primary education and among those reporting more than one sexual partner. Other variables examined, including age group, marital status, ART status, condom use, blood transfusion history, duration since HIV diagnosis, CD4 count, and HIV viral load, were not significantly associated with syphilis in the analysis presented. In multivariable logistic regression, male sex remained the only independent predictor of syphilis.

DISCUSSION

The prevalence of active syphilis among the 400 HIV-infected patients in this study was 2.5%, a low but clinically relevant burden given the potential for syphilis to complicate HIV management and enhance transmission risk[5,6,8,25]. This estimate aligns with reports from comparable hospital-based cohorts where syphilis prevalence varies by local epidemiology, sexual networks, and testing practices[9,10,11,12,13,14,16,18]. On multivariable analysis, male sex was the sole independent predictor of syphilis, suggesting sex-specific differences in exposure, partner patterns, or health-seeking behaviours that increase men's risk in this population[12,13,16,18]. Although educational level and number of sexual partners were associated with syphilis in bivariate analysis, these associations lost significance after adjustment, indicating that confounding or limited case numbers may explain the crude relationships observed[12,13,16,18].

The predominance of men among cases and the higher point prevalence in participants reporting multiple partners are biologically plausible and concordant with established STI transmission dynamics[25,26,27,28]; nevertheless, the small number of positive results reduces statistical power and widens confidence intervals for subgroup comparisons, warranting cautious interpretation[12,13,14,18]. A high proportion of participants were on antiretroviral therapy, which likely increases clinic engagement and access to prevention counselling and testing; this may partly account for the relatively low syphilis prevalence in the cohort[17]. Importantly, syphilis can be asymptomatic or present atypically in people living with HIV, so low observed prevalence should not justify relaxed screening policies[5,6,7,26,27].

Given these findings, routine integration of syphilis screening into HIV care remains advisable, with targeted emphasis on men and those reporting sexual risk exposures to improve case detection and timely treatment[7,21,22,23]. Future studies with larger samples or multicentre designs would increase precision for risk-factor analysis and permit exploration of behavioural and structural drivers of male vulnerability[11,12,13,16,18]. Operational research assessing the yield and cost-effectiveness of routine versus risk-based screening within ART programmes in this region would further inform policy[21,22,23].

CONCLUSION

The prevalence of syphilis among HIV-infected patients in this study was low, but male sex was the main independent risk factor. Routine syphilis screening should therefore be integrated into HIV care, especially

for men and patients with sexual risk exposure, to support early detection and timely treatment in this setting[1].

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