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Seroprevalence of syphilis among human immunodeficiency virus seropositive clients in Ndagiri, Gwagwalada Abuja Nigeria

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Abstract

Syphilis facilitates both HIV transmission and acquisition, reflecting the complex interplay between the two infections. Scarce information exists regarding syphilis epidemiology in Nigeria. Thus, this study determined the sero-prevalence of syphilis among people attending ART Clinic Ndagiri primary health care centre Gwagwalada area of Federal Capital Territory Abuja Nigeria. A cross-sectional study was conducted from July to September, 2019. 290 HIV-infected participants were studied; but individuals under 20 years of age and above 60 years were excluded. Structured questionnaires were used to collect data on socio-demography. Moreover, blood samples were collected from all participants and screened for syphilis using rapid test kit, and those found sero-positive were confirmed using Polymerase Chain Reaction assay (PCR). Out of 290 samples collected and analyzed, result shows the general prevalence of 0.35% among ART patients in UATH. In regards to sex, 0.52% prevalence was recorded with a significant P-value of 0.04. 0.65% prevalence was however recorded among age group 31-40 with an insignificant P-value 0.09. A higher prevalence was found among singles with 1.24% which was still insignificant with a P-value of 0.095. Conclusively, despite this low prevalence recorded, awareness campaigns, Syphilis screening and testing service with HIV/AIDS care is critically needed which could limit the clinical consequences of untreated Syphilis as well as its adverse impact on HIV transmission.

Keywords: Seroprevalence; Syphilis; Human; Immunodeficiency; Seropositive; Antiretroviral

1. Introduction

Syphilis is caused by bacteria known as Spirochete *Treponema Pallidum* (*Sub-species Pallidum*) and is frequently asymptomatic in its early- most infectious stages. If un-treated, it can cause serious long term complication, including cardiovascular and neurological diseases. As the syphilis and HIV epidemics often affect the same risk groups, the epidemics frequently intersect.

The global efforts to combat syphilis mostly focus on screening and treatment of pregnant women. However, this strategy has difficulty to be implemented in resource-constrained countries where access to health services is limited. Lack of intervention measures for syphilis in turn makes those areas be a breeding ground for them to gain significant public and clinical impacts (WHO, 2007). Mainly as a result of shared transmission routes and due to their adverse interaction, syphilis – *Human immunodeficiency virus* (HIV) co-infection has been a public health problem. More specifically, syphilis causes genital ulcer and facilitates HIV entry and shading. Besides, it induces immune activation and favor viral replication, which in turn accelerate HIV transmissibility (Hole *et al*, 2011, Kassutto, 2003).

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Syphilis has re-emerged as a global public health concern with recent reports highlighting substantial increases in the diagnosis of infectious syphilis, particularly among high-risk groups such as gay, bisexual and other men who have sex with men (MSM). Worldwide, MSM are also one of the key populations disproportionately affected by HIV infection.

The interplay between HIV and syphilis infection has important implications for the prevention and treatment of HIV, as well as STI control via HIV-care based screening. HIV and *Treponema pallidum*, the causative agent of syphilis, share similar routes of transmission. Syphilis coinfection has been shown to negatively impact HIV prognosis; syphilis infection was associated with increase in HIV viral load and decrease in CD4 cell count. HIV may, in turn, adversely affect the clinical course of syphilis, such as conferring an increased risk of developing neurosyphilis, treatment failure and relapse of infection. The diagnosis of syphilis in HIV-infected patients can be complicated as HIV infection can lead to much higher false-positive rates of serologic results for *T. pallidum*. The rate of asymptomatic syphilis infection may be higher in HIV-infected patients, with studies reporting a range from 33% to 51%.⁸ Hence, effective prevention; early diagnosis and prompt treatment of syphilis in HIV-infected persons are of paramount importance in comprehensive HIV care.

Syphilis is ulceration Sexually Transmitted Infection (STI) that remains a major global public health problem. In 2008, the World Health Organization (WHO) estimated that 36.4 million people were infected with Syphilis worldwide. It is estimated that there are more than 12, million new Syphilis infections every year in the world of which 90% of cases are found in resource limited. The WHO, reported that the annual new cases of Syphilis in Africa region among adults aged 15 – 49 was 3.4 million. Syphilis infection remains an important STI due to its prevalence, infectiveness and toll on both infected individuals and health system.

Before the discovery of *Treponema pallidum* as the etiologic agent, the origins of Syphilis have been the subject of several debates. Syphilis is a sexually transmitted disease caused by *Treponema Pallidum* a bacterium classified under Spirochaetes phylum, Spirochaetes order, Spirochaetaceae family, but there are at least three more known species causing human *treponema* diseases such as *Treponema pertenue* that causes yaws, *Treponema carateum* causing pinta and *treponema, pallidumendemicum* – responsible for bejel or endemic syphilis. Of the aforementioned bacteria, syphilis is the sole sexually transmitted treponemal diseases, as the other conditions are transmitted via direct contact with an infected individual (De melo *et al*, 2010)

From the very beginning, syphilis has been a stigmatized, disgraceful disease; each country whose population was affected by the infection blamed the neighboring (and sometimes enemy) countries for the outbreak. So, the inhabitants of today's Italy, Germany and United Kingdom named syphilis "the French disease", the French named; the neapolitan disease", the Russians assigned the name of Polish disease", the Polish called it "the German disease", the Danish, the Portuguese and the inhabitants of Northern Africa named it "the Spanish/cortillian disease" and the Turks coined the term Christian disease. Moreover, in Northern India, the Muslims blamed the Hindu for the outbreak of the affliction.

However, the Hindu blamed the Muslim and in the end everyone blamed the Europeans (Roths Child, 2005). In the 16th century, Jean Fernelius, a Parisian teacher whose work and interest were channeled into the mercury treatment of the condition, coined the term "luesvenera" ("venereal pest") in his treatise devoted to the affliction (Forrai, 2011).

Therefore, the term syphilis was introduced by Girolamo Fracastoro, a poet and medical personality in Verona. His work "syphilis sive Morbus Gallius (1530) encompassed three books and present a character named syphilis, who was shepherd leading the flocks of king Alcithous, a character from Greek mythology. In Fracastoro's tale, syphilis, mad at Apollo for parching the trees and consuming the springs that fed the shepherd's flocks, vowed not to worship Apollo, but his king. Apollo gets offended and curses people with a hideous disease named syphilis, after the shepherd's name. The affliction spread to the whole population, including king Alcithous. The nymph America counseled the inhabitants to offer Apollo further sacrifices, one of which was syphilis himself, and also to sacrifice to Juno and Tellus, the latter offering the people the tree of Guaiac (Guaiacum officinale), a very used therapeutic medicine in times of Fracastoro (Waugnn, 1982). A co-infection of HIV and *Treponema pallidum* (*T. pallidum*) apart from increasing morbidity and mortality is known as a result of some medical complications like an ulceration in the natural history of Syphilis, dosage and duration of required treatment for the cure of Syphilis (Osital *et al* 2001). Similarly, it can lead to male and female infertility and pregnant women; it may result in still birth, prenatal death and serious neonatal infection (Schmid 2004). The risk of acquiring Syphilis from an infected partner ranges from 30 – 60% STIs an individual is 3 – 5 times more likely to acquire HIV if exposed to this virus through sexual contact (Pennap *et al*, 2011).

Aim of the study

The prevalence of *T. Pallidum* infection among HIV Seropositive persons accessing retroviral therapy in ART Clinic Ndagiri primary health care centre Gwagwalada area of Federal Capital Territory Abuja Nigeria, according marital status.

2. Material and methods

2.1. Study Area

This study was conducted at ART Clinic Ndagiri primary health care centre Gwagwalada area of Federal Capital Territory Abuja Nigeria, June 2019. The hospital is among the largest public hospitals in Nigeria and provides HIV voluntary counseling and testing (VCT) as a routine service. Clients who are tested HIV positive are registered at the anti-retroviral therapy (ART) clinic and assesses for their disease status.

2.2. Research Design

The research was carried out among HIV Seropositive individuals attending Anti-retroviral Therapy Clinic between July 2019 – August 2019 in ART Clinic Ndagiri primary health care centre Gwagwalada area of Federal Capital Territory Abuja Nigeria . However, the research was strictly conducted among HIV Seropositive patients recruited for ART between the ages of 20years and above Across gender, and marital status.

2.3. Study Population

The study population consisted of HIV seropositive clients attending ART Clinic Ndagiri primary health care centre Gwagwalada area of Federal Capital Territory Abuja Nigeria during the study period. Clients with less than 20 years of age and above 60 years of age during requirement were excluded.

2.4. Determination of Sample Size

The minimum sample size is given by the equation.

$$N = \frac{(c)^2 p \exp(1-p \exp)}{d^2}$$

Where:

C= confidence limit (1.96)

P= exp = expectual prevalence 0.9 (David et al, 2016)

D= degree of accuracy required (0.05)

N= minimum number of samples?

But in attempt to endurance the statistical power of detecting rate differences by exposure status, I investigated a total 290 consecutive patients.

2.5. Data Analysis Techniques

Data was analyzed using SPSS version 16 and results were summarized using descriptive statistics. Odds ratio (OR) was used as a measure of the strength of association, and a P value <0.05 was considered to be statistically significant

2.6. Method

Materials used for blood collection were plain sample bottles, Alcohol Swab, Needle and syringe, marker for labeling specimen bottles, cotton wood and tourniquet. A tourniquet is tide at upper arm of the patient and cubital Forsa of the arm is swabbed with alcohol swab. 3 ml of blood was collected from the cubital vein and suspend in the plain bottles, the blood sample were allowed to settle clot at room temperature and spin at 10,000 round per minutes for five minutes.

The blood plasma was separated and screened for Syphilis using the non-treponema Serologic test. Laboratory testing was carried out according to the directions of the manufactures and all tests were run against the positive and negative controls

2.7. Instrument for Data Collection

Participants were interviewed using well-structured questionnaires on demographic data such as age, gender and marital status.

2.8. Data Collection

After providing written informed consent, participants answered a questionnaire that includes questions like; The Age, Sex, marital Status. In addition, HIV result and (ART) status were also obtained from their follow – up chart.

2.9. Ethical Consideration

The study was reviewed and approved by the ethical clearance committee of Ndagiri primary health care centre Gwagwalada area of Federal Capital Territory Abuja Nigeria, FCT Abuja. Informed consent was obtained from all individual participants included in the study.

3. Results

Of the 290 participants only 1(0.35%) serum sample was reactive for *T. pallidum* infection and 289(99.65%) were negative. There were more females 191(65.86%) in the study than males 99(34.14%) (Table 2). The study participants were aged 20– >50 years. Most of them (53.45%) were in the sexually active age. (Table 3). Most of the members of the study cohort were either married (60.7%) or unmarried (27.9%) although there were some widows (11.4%) and no divorcees (0.0%). The *T. pallidum* seropositive case was a single lady (Table 4).

3.1. Presentation and Analysis of Data

Table 1 Seroprevalence of syphilis among HIV Seropositive individuals attending ART Clinic

No. Examine	No. Positive (%)	No. Negative (%)	Total (%)
290	1(0.35)	289(99.65)	290(100)

Table 2 Seroprevalence of syphilis among HIV Seropositive individuals attending ART clinic according to gender

Sex	NO. Examine	No. Positive (%)	NO. Negative (%)	P. value
Male	99	0 (0.0)	99(34.14)	0.04
Female	191	1(0.52)	190(65.86)	
Total	290	1(0.52)	289(100.0)	

Table 3 Sero Prevalence of syphilis among HIV Seropositive individuals attending ART clinic according to age

Age	No. Examine	NO Positive (%)	NO. Negative (%)	P. value
20 – 30	45	(0)	45(15.52)	
31 – 40	155	1(0.65)	154(53.45)	
41 – 50	82	0(0)	82(28.28)	0.09
51 – 60	8	0(0)	8(2.76)	
Total	290	1(0.65)	289(100.0)	

Table 4 Seroprevalence of syphilis among Seropositive HIV individuals attending ART clinic according to marital status

Marital Status	N0.Examine	N0. Positive %	N0. Negative	P. value
Single	81	1(1.24)	80(27.9)	
Married	176	0(0.0)	176(60.7)	
Widows	33	0(0.0)	33(11.4)	0.095
Divorcees	0	0(0.0)	0(0.0)	
Total	290	1(0.35)	289(100.0)	

4. Discussion

In Nigeria, the main method of syphilis diagnoses is Serology. Different tests are usually used for the initial screening and confirmatory test. Using serological test and polymerase chain reaction (PCR) to screen and confirm infections with *T. Pallidum* among 290 HIV seropositive participants, a prevalence of 0.35% was observed. This prevalence is lower than earlier reported of 4.8% among a similar population within the same study population. The result of the present study is indicative of a drop in the prevalence of *T. pallidum* among HIV seropositive in the study area. Researchers demonstrated that *T. Pallidum* infection is high among HIV Seropositive individuals (Pennap *et al*, 2011). This is because sexual behaviors that increase the risk of acquiring HIV also increase the risk of acquiring other STIs.

However, the result of the study is in agreement with (0.5%) recoded by (Osita *et al*, 2011) among HIV positive individual. This drop in the present might not be unconnected with the general change in attitude to risky practices that expose people to STIs especially with the HIV scourge. The ongoing awareness campaign, self-medication and sex education seem to be succeeding. This is likely to have contributed immensely to the reduction in the prevalence of syphilis among HIV seropositive in the current studies.

The reported (0.35) prevalence in this study was slightly higher than the prevalence of syphilis reported in eastern Nigeria where it was 0.3%. However, higher values of 1.5% in South-South, 1.7% in north east and 1.9% in north-west of Nigeria (Nwokedi *et al*, 2005). Higher prevalence of syphilis has also been reported among different groups in other countries. It was 11.3% in HIV Seropositive in India (Turbadkar *et al*, 2007), 10.9% among street duelers in Ethiopia (Moges *et al*, 2006) and 1.3% among blood donors in Ethiopia (Tessema *et al*, 2010).

The only syphilis case in this study was a single lady of 37 years. In Nigeria individuals in their third decade of life are usually known to exhibit the highest rate of infections associated with sexual activities. This is because the group falls within the most sexually active age category (Pennap *et al*, 2011). Previous reports indicated that seroprevalence of syphilis increased with age (Moges *et al* 2006, Eticha *et al* 2013, Uneke *et al* 2006) and complement the current higher rate of infection among participant 30 years of age. This is perhaps due to the risk of exposure to syphilis increased with time. The preponderance of syphilis among women compared to men in our study was concordant with findings reported in heterosexual population elsewhere (Pennap *et al*, 2011).

5. Conclusion

This study showed very low prevalence of syphilis among HIV Seropositive. Despite this low rate, there is still the need to intensify efforts in promoting safe sexual behaviors so as to eradicate syphilis which will also impact positively on the prevalence of syphilis.

Recommendations

As part of this effort integrating syphilis screening and testing service with HIV/AIDs care is critically needed and could limit the clinical consequences of untreated syphilis as well as its adverse impact on HIV transmission.

Compliance with ethical standards

Disclosure of conflict of interest:

No conflict of interest to be disclosed.

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