



Prevalence of *Treponema pallidum* Infection among Human Immunodeficiency Virus Seropositive Persons and Their Corresponding CD4 Counts in a Nigerian Cohort

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ABSTRACT

Background: Sexually transmitted infections are a major public health problem especially with the advent of HIV/AIDS. This study was conducted to determine the prevalence of Syphilis among HIV seropositive persons. The study population was seropositive persons accessing antiretroviral therapy (ART) at the Federal Medical Center Keffi.

Methodology: Venous blood (5ml) was collected from each of the 200 consenting participants between February and August 2010. Their syphilis serostatus was determined using Rapid Plasma Reagins test and confirmed by an immunochromatographic rapid syphilis test kit. The CD4 count of the positive sample was also determined.

Results: Of the 200 persons screened, 56 were males and 144 were females. The prevalence of *Treponema pallidum* in this study population was 0.5% (1/200). The HIV-syphilis positive was a married man aged 35 years and with a CD4 cell count of ≥ 200 cells/uL.

Conclusion: This study reported a very low prevalence of syphilis among HIV positive persons. It is recommended that the sexual partner(s) of the study index case should be traced and also treated to prevent reinfection and/or continued spread of the infection. Despite the low prevalence in this study, syphilis screening among those with HIV should be advocated routinely to avoid the complications associated with the dual infection.

Keywords: HIV; *Treponema pallidum*; coinfection; prevalence; Nigeria;

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1. INTRODUCTION

Syphilis is a systemic disease caused by the spirochete *Treponema pallidum*. This disease has been reported as one of the common sexually transmitted infections (STIs) in Nigeria (Obiajuru and Jude, 2007). The route of transmission is almost always sexual contact although there may be vertical transmission, transmission via blood products and via intravenous drug use (Ophori et al., 2010; Tessema et al., 2010; Adegoke et al., 2011). Reports in late 2001 by World Health Organisation (WHO) showed that 12 million people become infected with syphilis each year (Campos et al., 2008). Sexually transmitted infections (STIs) have continued to be a major health problem in sub-Saharan Africa especially with the recent resurgence of syphilis (Adegoke et al., 2011).

With the advent of the Human Immunodeficiency virus (HIV) epidemic, the control of STIs has become an important strategy in the attempt to reduce the HIV scourge. Epidemiological studies have reported that STIs including syphilis are associated with an increased risk for HIV transmission among both homo and heterosexual people (Wesserhelt, 1992; Mahajan et al., 2008; Adegoke et al., 2011). A dual infection of HIV and *Treponema pallidum* apart from increasing morbidity and mortality (Ophori et al., 2010) is known to result in some medical complications like an alteration in the natural history of syphilis, dosage and duration of required treatment for the cure of syphilis (Nnoruka and Ezeoke, 2005; Uneke et al., 2006; Turbadar et al., 2007). Similarly, it can lead to male and female infertility and in 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 30-50% (Wasserhelt, 1992, Centers for Disease Control and Prevention, 1998) while in the presence of STIs an individual is 3-5 times more likely to acquire HIV if exposed to the virus through sexual contact (Mahajan et al., 2008).

There is paucity of published information on studies of HIV-Syphilis infection in Northern Nigeria. This study was therefore carried out to determine the current prevalence of *Treponema pallidum* infection among HIV seropositive persons accessing anti retroviral therapy in Federal Medical Center, Keffi in Northern Nigeria.

2. MATERIALS AND METHODS

The study was hospital based and conducted at Federal Medical Center, Keffi, Nigeria from April 2010 to August 2010. Five millilitres of venous blood was aseptically collected from each of 200 consenting participants. Each sample was placed in a labelled plain tube, left to clot at room temperature and further centrifuged at 1500 rpm for 5 minutes. The resultant sera were separated into new labelled tubes and refrigerated (not more than 2 days). The serum samples and test reagents were always allowed to equilibrate to room temperature before use. All samples were screened using rapid plasma reagent test and positive samples confirmed by syphilis rapid test (Clinotech Laboratories and Pharmaceuticals Canada). Tests were performed and evaluated according to the manufacturers' instructions. The biodata of each participant was obtained.

Ethical approval for the study was obtained from the Ethical and Research Committee of Federal Medical Center Keffi.

3. RESULTS

Of the 200 participants only one serum sample was reactive for *T. pallidum* infection. The study participants were aged < 19 – >50 years. Most of them (91.5%) were in the sexually active age. There were more females (72%) in the study than males (28.0%) (Table 1).

Table 1. Prevalence of *T. pallidum* infection in relation to age and sex in a HIV positive cohort

Age (yrs.)	No. of patients screened	Sex		No of positive cases (%)		Total no positive (%)
		Male	Female	Male	Female	
10-19	11	2	9	0 (0.00)	0 (0.00)	0 (0.00)
20-29	77	18	59	0 (0.00)	0 (0.00)	0 (0.00)
30-39	69	21	48	0 (0.00)	1 (2.08)	1 (1.45)
40-49	37	14	23	0 (0.00)	0 (0.00)	0 (0.00)
≥50	6	0	6	0 (0.00)	0 (0.00)	0 (0.00)
Total	200	55	145	0 (0.00)	1 (0.69)	1 (0.5)

Most of the members of the study cohort were either unmarried (42.5%) or married (39.5%) although there were some divorcees (6.5%) and widows (11.5%). The *T. pallidum* seropositive case was a married woman (Table 2).

Table 2. Prevalence of *T. pallidum* infection in a HIV positive cohort in relation to marital status

Marital status	No. of patients screened	Sex		No of positive cases (%)		Total no. positive (%)
		Male	Female	Male	Female	
Single	85	17	68	0 (0.0)	0 (0.0)	0 (0.0)
Married	79	22	57	0 (0.0)	1 (1.7)	1 (1.3)
Divorced	13	5	8	0 (0.0)	0 (0.0)	0 (0.0)
Widow	23	11	12	0 (0.0)	0 (0.0)	0 (0.0)
Total	200	55	145	0 (0.0)	1 (0.7)	1 (0.5)

In relation to their immune status, 25.0% of them had CD4 counts of ≤ 200 cells/µL while 38.5% had ≤ 201 – 400 cells/µL and 36.0% had ≥ 401 cells/µL (Table 3). The only infected participant had a CD4 of ≤ 200 cells/µL.

Table 3. Prevalence of *T. pallidum* infection in relation to CD4 in a HIV cohort

CD4 cells/ μ L	No. of patients screened	Sex		No. of positive cases (%)		Total no. positive (%)
		Male	Female	Male	Female	
≤ 200	50	17	33	0 (0.00)	1 (3.03)	1 (2.0)
201-400	77	20	57	0 (0.00)	0 (0.00)	0 (0.00)
401-600	53	14	39	0 (0.00)	0 (0.00)	0 (0.00)
601-800	14	3	11	0 (0.00)	0 (0.00)	0 (0.00)
801-1000	3	0	3	0 (0.00)	0 (0.00)	0 (0.00)
≥1000	3	1	2	0 (0.00)	0 (0.00)	0 (0.00)
Total	200	55	145	0 (0.00)	1 (0.69)	1 (0.5)

4. DISCUSSION

In Nigeria the main method of syphilis diagnosis is serology. Different tests are usually used for the initial screening and for the confirmatory test. Using two different serological tests to screen and confirm infection with *T. pallidum* among 200 HIV seropositive participants, a prevalence of 0.5% (1/200) was observed. This is lower than an earlier report of 3.3% among a similar population within the same general area (Forbi et al., 2009). The result of the present study is indicative of a drop in the prevalence of *T. pallidum* infection among HIV seropositives in the study area. The seroprevalence of syphilis was demonstrated by some researchers as highly associated with HIV infection (Moges et al., 2006). This is because sexual behaviours that increase the risk of acquiring HIV also increase the risk of acquiring other STIs. However results from the study contrasts this, more so as it was carried out in an area with a reported HIV prevalence of 38.65% (Pennap et al., 2006) and had been referred to as a "HIV/AIDS hot spot" (Forbi et al., 2009). A similar observation of a decrease in prevalence of *T. pallidum* infection among blood donors has also been reported (Salawu et al., 2010).

This drop in prevalence 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 campaigns seem to be succeeding. Although despite the fact that HIV is incurable for now, other STIs are curable. In this part of Nigeria self medication is common practice especially where it concerns sexually related health challenges and general feeling of unwellness. In fact even the illiterate adults in this study area know about the curative effects of antibiotics. This they use as a reason for self medication although their belief is that it cures all ailments. The general use of antibiotics therefore usually serves as the first line of action in their quest to treat unwellness until proved unsuccessful before they seek proper medical attention. They even have vernacular names for some of the common ones which they purchase at their own discretion. For example, 'Maidamara' is Tetracycline, 'Mai ja da baki' is Ampicillin, 'Buta' is indocide and 'Mainono' is procaine penicillin. Moreover, these antibiotics are hawked at motor parks, inside public buses, on the main roads and in registered and unregistered stores. And you do not need a prescription to buy any of these. This is likely to have contributed immensely to the reduction in the prevalence of syphilis among HIV seropositives in the current study.

The reported 0.5% prevalence in this study was higher than the prevalence of syphilis reported for the sentinel survey of eastern Nigeria where it was 0.3%. However higher values of 1.5% was reported in South South, 1.7% in North East and 1.9% in North West of Nigeria (Nwokedi et al., 2005).

Studies of the prevalence of syphilis in similar populations in Nigeria reported prevalence of 14.0% in Abakiliki (Uneke et al., 2006), 2.1% in Enugu (Nnoruka and Ezeoke, 2005). It was even 2.0% among HIV seronegatives in Abakiliki (Uneke et al., 2006). Among blood donors in Benin the prevalence of infection was 8.0% (Adegoke et al., 2010), 2.93% in 2008 and 1.9% in 2009 (Salawu et al., 2010). Interestingly, some researchers reported 15% among apparently healthy university students (Ophori et al., 2010) and 4.6% in a paramilitary agency (Nwokedi et al., 2005). Higher prevalence of syphilis have also been reported among different groups in other countries. It was 11.3% in HIV seropositives in India (Turbadkar et al., 2007), 10.9% among street dwellers in Ethiopia (Moges et al., 2006) and 1.3% among blood donors in Ethiopia (Tessema et al., 2010).

The only syphilis positive case in this study was a married woman aged 35 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 (Uneke et al., 2006). It is pertinent to screen the sexual partner(s) of this woman and treat them as well so as to prevent reinfection, continued spread or both. It will also be important to follow up on this index case especially in this area where polygamy thrives a lot. This is because if she is in a polygamous marriage the tendency of her other mates serving as reservoirs of infection cannot be ruled out.

The CD4 cell count of this woman was ≤ 200 . Because this was the only case of HIV – syphilis coinfection, the effect of the dual infection in relation to the CD4 count could not be ascertained.

5. CONCLUSION

This study reported a very low prevalence of syphilis among HIV seropositives. Despite this low rate there is still the need to intensify efforts in promoting safe sexual behaviours so as to eradicate syphilis which will also impact positively on the prevalence of HIV. A yearly screening for syphilis among HIV seropositives even in very low prevalence areas is also advocated.

6. LIMITATIONS

The population of those with coinfection was too minimal to ascertain such a factor in relation to the CD4 count. Further studies on a larger population and from time to time will give a true picture of the rate of decline in prevalence of the disease and its relationship with the CD4 counts of those with the dual infection.

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