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## ABSTRACT

*Objective:* To study the prevalence of *Treponema pallidum* specific antibodies among sexually active attendees of Fereprod Medical Centre, Abuja, Nigeria; and to establish association or lack thereof between anti-T. Pallidum seropositivity and patients' risk factors.

*Methodology and results:* Selected sexually active patients attending Fereprod Medical Centre, Abuja were screened for T. Pallidum specific antibodies with the aim of determining the antibody prevalence. One hundred and fifty patients (all randomly selected: 65 males and 85 females) were screened with ultra rapid assay test kit following blood collection. Of the 150 samples tested, 29(19.3%) were positive for the anti-T pallidum antibodies, giving an overall prevalence of 19.3%. Except gender and history of blood transfusion, other risk factors such as occupation, number of sexual partners, history of STDs and in particular syphilis were statistically associated ( $P < 0.05$ ) with T. Pallidum antibody positivity.

*Conclusion and application of findings:* Based on the results, it was concluded that enlightenment of sexually active people should be intensified regarding STDs, and that prompt and proper treatment of syphilis should be done after diagnosis.

**Key words:** *Treponema pallidum*, Antibodies, STDs, Sexually active, Nigeria,

## INTRODUCTION

Venereal syphilis is a contagious sexually transmitted disease (STD) caused by the spirochete *Treponema pallidum*; a thin helical cell approximately 0.15µm x 6-50µm. T. pallidum enters the body through mucous membranes or

minor breaks or abrasion on the skin. It thereafter migrates to the regional lymph nodes and rapidly spreads throughout the body (Nester et al., 2004). Syphilis is a major cause of morbidity and is associated, like other ulcerative sexually



transmitted infections, with enhanced sexual transmission of human immunodeficiency virus (HIV) (Cohen, 1998). The disease continues to be a tragic and substantial problem in many developing countries, including Nigeria.

Globally, STDs are a major cause of infertility, long-term disability and death with severe medical and psychological consequences for millions of men, women and infants (WHO, 2001). The genital ulcerations and inflammation caused by syphilis are implicated as cofactor making infected individuals three to five times more likely to acquire HIV if exposed to the virus through sexual contact. Unless prompt diagnosis and treatment of syphilis are performed, serious complications including male and female infertility may result, and in pregnancy, adverse outcomes such as still-birth, prenatal death and serious neonatal infection may result (Schmid, 2004).

Pathogenic Treponemes are found in the lesions of those with treponematoses. Saprophytic Treponemes can be found on mucous membranes in the mouth and genital tract, and in the skin ulcers (Cheesbrough, 2000). Man is the only known host and transmission is virtually always by direct contact with infectious lesions, generally through sexual contact. People who engage in unprotected sex, promiscuous sex, prostitution, and intravenous drug use, as well as, females with frequent sex for drug or money are at major risk of contracting the disease. Health workers are at occupational risk (Norbert et al., 2005).

## MATERIALS AND METHODS

**Study area and population:** Abuja is the Federal Capital Territory of Nigeria, located at Latitude 8°25' and longitude 9°20'. The city has a total population of 778,567 according to the United National Population Commission (UNPC) survey in 2006 with a growth rate of 9.3%. About 45% of the inhabitants are civil servants and 25% businessmen, others being vocational workers and students.

**Data collection:** Permission to undertake this study was granted by the management of the hospital; informed consent of each subject was also duly obtained. A total of 150 apparently healthy sexually active patients were randomly selected for *Treponema*

The incidence of syphilis is highest in sexually active people (19-29 years). In African countries, prevalence of syphilis has been reported at 2% in Cotonou, 4% in Kisumu, 6% in Yaounde, and 14% in Ndola women. However, women tend to get infected at an earlier age, i.e. in Ndola 16% of women in ages 15-19 years tested positive, compared to 3% of men in the same age. In Nigeria, in the Federal Medical Center (FMC) Abakaliki, Ebonyi state, a prevalence of syphilis of 3% has been recorded (FMoH, 2001). In University College Hospital, Ibadan, a seroprevalence of 4% was reported. Elimination of transmission in Nigeria is within reach, but this would depend on identifying and treating cases within high risk groups such as prostitutes, promiscuous homosexual men, and jail inmates, and guarding against reintroduction of the disease (Aseffa et al., 2000).

Guaranteed prevention and control of *T. pallidum* infection (syphilis) is better achieved through abstinence. Latex condoms, if properly used, reduce chances of transmission. Other ways of preventing spread include public education, follow-up on sources of infections and contact so that they can be treated, and prophylaxis (Barrier protection) to prevent exposure to syphilis.

This study was carried out to detect *T. pallidum* specific antibodies in sera of sexually active patients with the aim of determining the prevalence among patients and to study patients' risk factors associated with the pathogen.

*pallidum* specific antibodies test. Data about the subjects were collected using questionnaire forms. This included data on age, sex, occupation, number of sexual partners, history of blood transfusion, history of STDS, and history of previous infection with syphilis.

**Specimen collection and preparation:** About 5ml of blood sample was aseptically collected from each subject by venipuncture into sterile anti-coagulant free blood sample tubes. The clotted blood was centrifuged for about 10 minutes at 200 rpm to separate the serum from the blood clot. The sera were stored at 2-8°C until screening for antibodies specific for *T. pallidum*.



**Assay for *T. pallidum* specific antibodies:** Each serum sample was screened for *T. pallidum* specific antibodies at room temperature using syphilis ultra rapid assay test kit [ACON® Laboratories Inc., USA, Lot No: SYP 70800H5]. The test strips were correspondingly labeled prior to the test. The serum was separated from blood clot before dipping the test strip. The syphilis test strip was removed from the pouch, each strip per blood sample (serum), the strip was immersed into the serum vertically for 10-15 seconds, the maximum line on the strip was not exceeded during immersion. Afterwards, the strip was placed on a non absorbent surface, and the test strips were observed for red colour appearance indicating the presence of *T. pallidum* specific antibody in the serum. The result was read immediately after 10 minutes. The result was reported as positive, negative, or invalid

against the appropriate patient's identification number. Care was taken to ensure the test kits used in this study were not expired.

**Interpretation of syphilis test result:** Positive test result was recorded as red colour which appeared both on the control (C) and test (T) bands indicating the presence of anti-*T. pallidum* antibodies in the serum samples. Invalid test result was recorded as no visible colour in the test strip or a red colour at (T) without colour at (C) bands.

**Statistical analysis:** The data generated in this study were presented with descriptive statistics. In addition, statistical association between the risk factors and seropositivity was evaluated with Chi Square statistical test at 5% ( $P < 0.05$ ) level of significance.

**RESULTS AND DISCUSSION**

One hundred and fifty (100.0%) apparently healthy, sexually active patients enrolled in the study; 85 (56.8%) were females and 65 (43.3%) were males; aged 19 to 30 years (mean age = 29 years). No invalid result was observed in the study. Of the 150 subjects screened in this study, 29 tested positive to the *T. Pallidum* specific antibody, giving an overall prevalence rate of 19.3% (Table 1).

Except for gender and history of blood transfusion, other risk factors identified for contracting syphilis were significantly associated ( $P \leq 0.05$ ) with the *T. pallidum* antibody seropositivity. The seroprevalence of 19.3% observed in this study was less than the 30% previously reported in Federal Medical Centre (PMC) Abakaliki, Ebonyi State, Nigeria (FMOH, 2004). This could be due to difference in sample size.

For occupation as a risk factor, subjects whose jobs were other than health work had significantly higher ( $P = 0.05$ ) *T. pallidum* antibody prevalence compared to the health workers. This could be attributed to the fact that the health workers took necessary precautions as they were more enlightened on health related matters. For number of sexual partners as a risk factor, subjects who had multiple partners had significantly higher ( $P = 0.013$ ) *T. pallidum* antibody prevalence compared to those with one partner, the reason for this observation could be due to the fact that the multiple number of sexual partners increased risk of exposure to *T. pallidum*. Those with a history of STDs had significantly higher ( $P = 0.03$ ) *T. pallidum* antibody prevalence than those without previous history of STDs. This could indicate continued presence of the antibodies in their blood or that the initial syphilis was not properly treated.

**Table 1:** Prevalence of *Treponema pallidum* specific antibodies in relation to risk factors in Abuja, Nigeria

Risk factors	No. Tested (%)	No. Positive (%)	P-value
<b>Sex</b>			
males	65(43.3)	10(15.4)	
females	85(56.7)	19(22.4)	
<b>Total</b>	<b>150(100.0)</b>	<b>29(19.3)</b>	0.28
<b>History of blood transfusion</b>			
yes	20(13.3)	3(15.0)	
no	130(86.7)	26(20.0)	0.60
<b>Total</b>	<b>150(100.0)</b>	<b>29(19.3)</b>	
<b>History of sexually transmitted diseases (STDs)</b>			
yes	30(20.0)	10(33.3)	
no	120(80.0)	19(15.8)	0.03*
<b>Total</b>	<b>150(100.0)</b>	<b>29(19.3)</b>	



<b>History of previous syphilis infection</b>			
yes	20(13.3)	10(50.0)	0.001**
no	130(86.7)	19(14.6)	
<b>Total</b>	<b>150(100.0)</b>	<b>29(19.3)</b>	
<b>Number of sexual partner</b>			
one	50(33.3)	4(8.0)	0.013*
more than one	100(66.7)	25(25.0)	
<b>Total</b>	<b>150(100.0)</b>	<b>29(19.3)</b>	
<b>Occupation</b>			
health care workers	30(20.0)	2(6.7)	0.05*
non- health care workers	120(80.0)	27(22.5)	
<b>Total</b>	<b>150(100.0)</b>	<b>29(19.3)</b>	

Key: \* = Significant difference ( $P \leq 0.05$ ); \*\* = highly significant difference ( $P \leq 0.01$ )

In this study, subjects previously infected with syphilis had highly significant ( $P= 0.001$ ) *T. pallidum* antibody prevalence compared to those without previous syphilis infection. However, history of blood transfusion was not significantly ( $P= 0.98$ ) associated with *T. pallidum* antibody positivity. The reason for this observation was that blood transfusion is not significantly associated with *T. pallidum* spread.

From the study, though there was no significant difference ( $P = 0.28$ ) in seropositivity, it was observed that females had higher prevalence rate of 22.4% compared to the males (15.4%). This observation was in conformity with the finding of Hwang et al. (2000) who reported that women had up to 4.5% higher prevalence of *T. pallidum* infection than men. This was

also consistent with the findings of Todd et al. (2001) who also reported higher prevalence of *T. pallidum* in women (9.1%) than in men (7.5%) in a rural African population.

In conclusion, the findings of this study showed that occupation, number of sexual partners, history of STDS and history of previous infection with syphilis were significantly associated ( $P \leq 0.05$ ) with the *T. pallidum* antibody seropositivity among sexually active attendees of Fereprod Medical Centre, Abuja, Nigeria. Therefore, in order to control *T. pallidum* infection, sexually active persons should be well educated, enlightened, screened for *T. pallidum* specific antibody when STDs is suspected, and should be promptly treated if found positive.

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