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Occurrence of Syphilis among Seropositive HIV Patients and Apparently Healthy Individuals at Ladoke Akintola Teaching Hospital in Osogbo, Nigeria

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Abstract

Syphilis can be life-threatening when it gets to tertiary stage causing blindness, mental illness and memory loss. The study was carried out to determine the prevalence of syphilis among Seropositive HIV patients and apparently healthy individuals in Osogbo metropolis. Blood samples were collected from HIV seropositive patients and apparently healthy individuals. *Treponema pallidum*, the causative agent of syphilis was tested for by using screening test and confirmatory test. The experiment lasted for 6 months and the results obtained were expressed in percentages. Out of a total of 228 HIV seropositive patients used for the study: 80(35%) were male, while 148 were females (65%), two subjects were positive for syphilis. Among 100 blood samples from apparently healthy individuals, 50 males and 50 females, 19 were positive for syphilis: eleven (58%) were females while eight (42%) were males. The occurrence of syphilis was higher among apparently healthy individuals, this may be due to the fact that HIV patients have been placed on various drug treatments which prevented the growth and transmission of *Treponema pallidum*. Hence, it was recommended that people should do regular syphilis screening to know their health status.

Keywords: Seropositive HIV, *Treponema pallidum*, males, females, healthy individuals.

Introduction

Infection with HIV occurs through blood transfusion, semen, vaginal fluid, pre-ejaculate, or breast milk. The majority of HIV infections are acquired through

unprotected sexual relations (Boily *et al.*, 2009). Presence of genital ulcer disease facilitates human immunodeficiency virus (HIV) transmission and their diagnosis is essential for the proper management. Epidemiologic studies demonstrate that

history of an HIV disease is associated with an increased risk of STD including syphilis, among gay men that is Men having sex with Men (MSM) and heterosexuals. The sexual behaviours that increase the risk of acquiring AIDS also increase the risk of acquiring STDs (Paz-Bailey *et al.*, 2004). Furthermore, genital ulcerations and inflammation caused by STDs are implicated as co factors for acquiring or transmitting HIV infection. Recent data suggested that when they already have other STDs, individuals are 3 to 5 times more likely to acquire AIDS if exposed to the virus through sexual contact (Rachel *et al.*, 1997). *Treponema pallidum* is transmitted from lesion of skin and mucous membrane (genitalia, mouth) containing spirochaetes of an infected person to another person by intimate contact (Bakare *et al.*, 2002). The virus can be transmitted only if such HIV infected fluid enters the blood stream of another person (Taiwo *et al.*, 2007). Concurrent infection with *Treponema pallidum* and HIV presents a serious health problem. HIV alters the natural history of syphilis and response to therapy. Incidence of neurosyphilis is increased among the HIV infected persons, even when treated in recommended complete dosage (Ikeme *et al.*, 2006). Nnoruka and Ezeoke (2005) reported a 2.1% prevalence of HIV-syphilis co-infection in Enugu State, eastern part of Nigeria (Nnoruka *et al.*, 2005) also, Forbi *et al.*(2009) reported 3.3% in Nasarawa State, north central of Nigeria (Forbi *et al.*, 2009).

This research studies was carried out to determine the prevalence of syphilis among seropositive HIV patients and among apparently healthy individuals in Osogbo, southern part of Nigeria.

2.0 Materials and Methods

2.1 Study Area

This study was carried out at Ladoke Akintola University Teaching Hospital, Osogbo for six month. Osun State in the Southwestern part of Nigeria. The area is in the tropical rain forest belt and lies approximately on longitude 40°N and latitude 7.35°E. It is about 1100 meters above sea level. It is bounded in the north by Kwara State, in the east partly by Ekiti State and partly by Ondo State, in the south by Ogun State and in the west by Oyo State.

2.2 Ethical Approval and Consent to participate

Ethical approval was obtained from Osun State Ministry of Health(OSHREC/PRS/5691/97).

2.2.1 Informed Consent

Informed consent was obtained from all the subjects.

2.3 Collection of Blood samples

Venous blood (5mL) was collected from the antecubital vein of 228 HIV seropositive patients attending Ladoke Akintola University Teaching Hospital and from 100 apparently healthy individuals in Osogbo metropolis from February to July 2019. The blood was allowed to retract and centrifuged at 4000 revolution per minute for 10 minutes. The supernatant (serum) was stored at 4°C until further analysis.

Detection of *Treponema pallidum* was done using both the screening and confirmatory tests. For the screening test, Rapid plasma Reagin test (RPR) from Diaspot diagnostics was used while confirmatory test using TPHA (*Treponema pallidum* Haemagglutination assay)

Immutrep from Omega Diagnostics was also used.

2.4 Screening test for *Treponema pallidum* using RPR

RPR (Rapid plasma Reagin) is a qualitative strip based immunoassay for the detection of *TP* antibodies (IgG and IgM) in serum. Anti-*Treponema pallidum* antibodies (IgG and IgM) were detected in serum using Diaspot syphilis test-kit.

It utilises a double antigen combination of a syphilis antigen coated particle and syphilis antigen immobilized on the membrane to detect *TP* antibodies qualitatively and selectively in serum.

Confirmatory test using TPHA (*Treponema pallidum* Haemagglutination assay)

The TPHA reagents are used to detect human serum antibody to *Treponema pallidum* by means of an indirect Haemagglutination (IHA) method preserved avian erythrocytes are coated with antigenic components of pathogenic *Treponema pallidum* (Nichol's strain). These test cells agglutinate in the presence of specific antibodies to *Treponema pallidum* and show characteristic pattern in micro titration plates.

For qualitative method, each samples require a micro titration plate, 190 μ L of diluents was added to well and 10 μ L of serum was also added.

Any non-specific reaction occurring were detected using the control cells which have erythrocytes not coagulated with *Treponema pallidum* antigens. Antibodies to non-pathogenic *Treponemes* were

absorbed by an extract of Reuters *Treponemes* included in the cell suspension. A test result was determined after 60 minutes.

Strong positive reactions showed some folding at the end of the cell. The control cell settled at a compact bottom, they were used as comparison for non-reactive serum patterns. Agglutination in the control well indicated the presence of non-specific agglutinations.

Results

Out of a total of 228 blood samples of HIV seropositive patients used for the study, 80(35%) were male, while 148 were females (65%) (Table1).

Age distribution of seropositive HIV patients were shown in Table 2. The two subjects positive for syphilis infection were females of ages 32 years and 34years, both were in the age group 31 to 35. Among apparently healthy individuals, 50 males and 50 females were examined. Nineteen people (19%) were positive for syphilis, they were. between age range of 21 - 49 years (Table3). Eleven (58%) were females while eight (42%) were males. The highest occurrence of HIV infection was from the age group 31 to 35 years. Out of 228 subjects screened for syphilis infection, two (0.9%) tested positive for the RPR (Rapid plasma Reagin) screening. Confirmatory test was performed for all the blood samples. These two subjects were confirmed positive for *Treponema pallidum* by the confirmatory TPHA screening among HIV seropositive (Table 4) and 19 subjects were confirmed positive for *Treponema pallidum* by the confirmatory TPHA.

Table 1: Gender distribution of subjects among seropositive HIV.

Sex	Number of subject
Male	80 (35%)
Female	148 (65%)
Total	228 (100%)

Table 2: Age Distribution of seropositive HIV patients.

Age (years)	Numbers of subject	Percentage (%)
16 – 20	7	3.0
21 – 25	20	8.7
26 – 30	18	7.8
31 – 35	25	11.0
36 – 40	28	12.2
41 – 45	48	21.0
46 – 50	32	14.0
51 – 55	36	15.7
56 – 60	14	6.1

Table 3: Age Distribution of apparently healthy individuals.

Age (years)	Numbers of examination	Number positive
16 – 20	9	0
21 - 26	10	4
27 – 32	7	8
33 – 38	18	3
39 – 44	20	2
45 – 50	26	2
51 – 56	10	0
	100	19

Table 4: Result of Screening and Confirmatory Tests among seropositive HIV patients.

<i>Treponema pallidum</i> Test Result	Number of Subject
Positive	2 (0.9%)
Negative	266 (99.1%)
Total	228

Table 5: Result of Screening and Confirmatory Tests among apparently healthy individuals.

<i>Treponema pallidum</i> Test Result	Number of subject
Positive	19 (19%)
Negative	81 (81%)
Total	100 (100%)

Discussion

It was observed that out of the 228 HIV subjects, majority were females 148(65%). This result was in agreement with a study conducted in Ibadan (Nigeria) in 2006 in which gender also have an effect on the incidence of HIV infection with (33%) males and (67%) and females respectively (Musher *et al.*, 1991). In healthy individuals, 50 males and 50 females were recruited, eighteen people were positive for syphilis, they were between age range of 21-49 years. Eleven females and eight males. The occurrence of syphilis was higher among apparently healthy individuals than HIV patients this may be due to the fact that HIV patients are placed on various drug treatments. In this study, two females of ages 32 and 34 years among the seropositive HIV patients were positive for syphilis. Individuals in this age group tend to be sexually active and have a greater risk of exposure for uncontrolled and unprotected sexual practices. HIV co-infection has been observed to be strongly associated with syphilis (Darrow *et al.*, 1987). HIV and syphilis are both sexually transmissible infection and syphilis could increase the risk of HIV infection (Holme *et al.*, 2003; Wong *et al.*, 2005). However, this increased risk could also be associated with sexual behaviour, as HIV-positive patients engage in high-risk sexual behaviors than HIV-negative patients as reported herein, similar to others researches (Taylor *et al.*, 2007; Lewnard *et al.*, 2014). Factors such as sex in group, multiple sex partners and use of drugs for sex, could also increase the risk of syphilis (Rompalo *et al.*, 2001)

Also, the gender of the individuals positive for syphilis also is a factor that increases the risk of the acquisition of the infection,

as females have a higher risk of infection with venereal diseases due to their anatomical structure. The age of the infected individuals also comes with increased risk of the dreaded human immunodeficiency virus (HIV)

Though syphilis is a common co-infection among HIV patients and a predisposing factor to HIV infection and vice versa its prevalence is relatively low in Osun metropolis as shown by this study. The work carried out by (Bakare *et al.*, 2002) on prevalence of syphilis among 340 HIV seropositive patients among commercial female sex workers (CMFMSW) in Ibadan metropolis showed that there was 4% prevalence. From 228 blood sample of seropositive HIV men and women patients screened for syphilis, only two samples were positive. Also, among healthy individuals, the prevalence is higher, it maybe that they have not been to the clinic for medical examination to know their health status (Hutchinson *et al.*, 1994).

The ability of syphilis to increase susceptibility to HIV infection and vice versa is widely accepted (Mara *et al.*, 2011) however the prevalence which is extremely low in Osogbo metropolis as shown in this study could be as a result of various medications and treatments embarked upon by HIV patients. Increase in effective treatment, medical intervention and cure for syphilis available nowadays could account for the decline in the disease (Zhang *et al.*, 2017).

Furthermore, the low sex abuse within the state might have been caused by factors such as cultural believes of the people, government intervention in various ways like the abolishment of professional Sex Workers' Joints within the state. The study

design used does not give a clue as to whether syphilis preceded HIV infection or HIV infection preceded syphilis infection in the case of syphilis that was observed in the study. Thus it is recommended that all the patients with newly diagnosed syphilis should be counseled for HIV testing.

Conclusion

From this study, it could be inferred that syphilis may not be a common co-infection with HIV in Osogbo Metropolis.

Authors' Contributions

Adekunle Olutoyin Cathrine, Idris Oluwatoyin Jelilat, Fakorede Joel Kayode and Ojedele Richard Olulowo were involved in the conception and design, data collection and collation, data analysis, data interpretation and manuscript proofreading.

Conflict of Interest

The authors declare no conflict of interest, financial or otherwise.

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