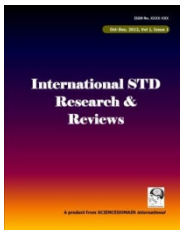

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Syphilis and Human Immunodeficiency Virus Co-infection among Pregnant Women in Nigeria: Prevalence and Trend

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Authors' contributions

This work was carried out in collaboration between all authors. Authors CTO and AJE designed the study, performed the analysis, wrote the protocol, and wrote the first draft of the manuscript. Author KAF was also involved in study design and assessment of the literature. Authors CTO, AJE, OOB and OOA managed the analyses of the study. Authors CTO, AJE, MFO and DPO managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Pregnant women are at increased risk of sexually transmitted infections (STIs) due to physiological changes that accompany pregnancy, such as congestion of the cervix, edema of the vaginal mucosa, and alterations in the vaginal flora. Syphilis and HIV are both transmitted sexually and so it is not surprise that a substantial number of people are infected with both agents. The rate of HIV and syphilis co-infection varies depending on the prevalence of both infections in the community or the patient group being studied, along with individual risk factors. 1913 apparently healthy pregnant women were recruited for the study after obtained their consent. Detection of HIV p24 antigen and antibodies to HIV1/2 was screened for using BIO-RAD in-vitro diagnostic enzyme immunoassay; syphilis was screen for using DIA-PRO in-vitro diagnostic Bio-probes enzyme immunoassay for the determination of antibodies to *Treponema pallidum.* Age group 26-

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30 had highest prevalence of HIV and VDRL in the study years, a decreasing trend was observed in the prevalence of HIV and syphilis infection within the study years. Sero-prevalence of HIV and VDRL were 63(3.29%) and 03(0.16%) respectively. The prevalence of HIV and VDRL co-infection was 01(0.05%) observed in age group 26-30. This present study clearly documents a relatively declined in sero-prevalence of HIV and VDRL within the consecutive three years of study, this reflects the level of HIV and VDRL in the general population.

Keywords: Syphilis; human immunodeficiency virus; mode of transmission.

1. INTRODUCTION

Pregnant women are at increased risk of STIs due to physiological changes that accompany pregnancy, such as congestion of the cervix, edema of the vaginal mucosa, and alterations in the vaginal flora [1]. Additionally, pregnant women may be less likely to have partners that use condoms, and may have fewer options to leave unsafe relationships [2]. Syphilis and HIV are both transmitted sexually and so it is no surprise that a substantial number of people are infected with both agents. Syphilis is a systemic infectious disease caused by sexual or congenital transmission of the spirochete bacterium *Treponema pallidum* (*T. pallidum*). Syphilis causes a variety of signs and symptoms corresponding to stages of infection (primary, secondary, latent and tertiary). The primary stage classically presents with a single chancre (a firm, painless, non-itchy skin ulceration), secondary syphilis with a diffuse rash which frequently involves the palms of the hands and soles of the feet, latent syphilis with little to no symptoms, and tertiary syphilis includes gummatous, cardiovascular, and neurological complications that can lead to significant disability and premature death. Congenital syphilis results in fetal or perinatal death, as well as disease complications in surviving newborns [3,4,5]. Syphilis is believed to have infected 12 million people in the year 1999, with greater than 90% of cases in the developing world. It affects between 700,000 and 1.6 million pregnancies a year, resulting in spontaneous abortions, stillbirths, and congenital syphilis [6]. Rates are proportionally higher among intravenous drug users, those who are infected with HIV and men who have sex with men [3,4,5]. In the United States, rates of syphilis as of 2007 were six times greater in men than women, while they were nearly equal in year 1997 [7]. African Americans accounted for almost half of all cases in year 2010 [8]. Syphilis infections declined rapidly with the widespread use of antibiotics, syphilis is associated with HIV infection which increases the risk of HIV transmission by two to five times and acquisition by causing genital ulcers. Genital ulcer disease is linked to increased risk of HIV infection and is most commonly due to herpes simplex virus (HSV) in both HIV positive and negative patients [9]. The rate of HIV and syphilis co-infection varies depending on the prevalence of both infections in the community or the patient group being studied, along with individual risk factors. Co-infection is common (30–60% in a number of urban centres) [10]. Sexually transmitted infections (STIs) are a major global cause of infertility, long-term disability and death with severe medical and psychological consequences for millions of men, women and infants [11]. 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 carried out, serious complications including male and female infertility may result, and in pregnancy, adverse outcomes such as still-birth, congenital abnormalities, prenatal death and serious neonatal infection [12]. Syphilis, a reportable disease caused by *Treponema pallidum*, is tracked by the Centers for Disease

Control and Prevention (CDC). That is, it can be transmitted either by intimate contact with infectious lesions (most common) or via blood transfusion (if blood has been collected during early syphilis), and it can also be transmitted transplacentally from an infected mother to her fetus [13,14].

2. MATERIALS AND METHODS

2.1 Study Area

The study site was Ido town, the headquarters of ido-osi local government in Ekiti State, Nigeria. The secretariat sited in between Ido town and Usi town. It is very close to other local government districts, (Moba, Ijero, Ilejemeje and Ado). The local government comprises rural towns: Aaye, Ido, Usi, Ayetoro, Ilogbo, Osi, Ifaki, Orin, Ora, Igbole and some other smaller villages, inhabited mainly by the Ekitis, but with some non-Ekitis fund living peacefully among the people. According to 1991 Census, the Local government has a total population of 107,000 people with eleven electoral wards in the Local government.

2.2 Samples Collection and Laboratory Methods

One thousand nine hundred and thirteen (1913) apparently healthy pregnant women who attended the antenatal clinic at the Federal Medical Centre Ido-Ekiti, Ekiti State, Nigeria between January 2011 and December 2013 were recruited for the study after obtained their consent. An ethical clearance for this study was obtained from ethical and research committee. 4ml of venous blood was collected by venepuncture into a plain bottle and allowed to clot. Detection of HIV p24 antigen and antibodies to HIV-1 and HIV-2 was screened for using BIO-RAD in-vitro diagnostic enzyme immunoassay (ELISA-method). The procedure was described by the manufacturer of the kit; syphilis was screen for using DIA-PRO in-vitro diagnostic Bio-probes enzyme immunoassay (ELISA-method) for the determination of antibodies to *Treponema pallidum.* The procedure was as described by the manufacturer of the kit.

3. RESULTS

A total of 1913 apparently healthy pregnant women were recruited for the study from Federal Medical Centre, Ido-Ekiti. HIV and syphilis infections (VDRL) were screened for during the period of three consecutive years between 2011 and 2013; age group 26-30 had highest prevalence of HIV and VDRL in the study years. Sero-prevalence of HIV and VDRL were 63 (3.29%) and 03 (0.16%) respectively as showed in (Tables 1-2). The prevalence of HIV and VDRL co-infection was 01 (0.05%) observed in age group 26-30 as showed in (Table 3).

Table 1. Prevalence of HIV among study population

Age group	Positivity	Negativity
15 – 20	-	52(2.72%)
21 – 25	15(0.78%)	568(29.69%)
26 – 30	38(1.99%)	612(31.99%)
31 – 35	08(0.42%)	411(21.48%)
36 – 40	02(0.1%)	195(10.19%)
41- Above	-	12(0.63%)
Total	63(3.29%)	1850(96.71%)

Table 2. Prevalence of VDRL among study population

Age group	Positivity	Negativity
15 – 20	-	52(2.72%)
21 – 25	01(0.05%)	582(30.42%)
26 – 30	02(0.10%)	648(33.87%)
31 – 35	-	419(21.90%)
36 – 40	-	197(10.30%)
41 –Above	-	12(0.63%)
Total	03(0.16%)	1910(99.84%)

Table 3. Sero prevalence and co-infection of HIV and VDRL among study population

Age group	HIV positivty	VDRL positivity	Co-infection of HIV/ VDRL
15 – 20	-	-	-
21 – 25	15(0.78%)	01(0.05%)	-
26 – 30	38(1.99%)	02(0.10%)	01(0.05%)
31 – 35	08(0.42%)-	-	-
36 – 40	02(0.10%)	-	-
41 –Above	-	-	-
Total	63(3.29%)	03(0.15%)	1(0.05%)

4. DISCUSSION

Sexually transmitted infections are widely spread in developing countries and constitute a major public health problem. Syphilis has also acquired a new potential for morbidity and mortality through association with increased risk of HIV infection [15,16]. The sero-prevalence of HIV1/2 and VDRL in the study population was 63 (3.29%) and 03 (0.16%) respectively which suggests that HIV affect a large percentage of clinic patients. 1 (0.05%) co-infection for HIV-syphilis was reported in age group 26-30 years. Less than 4.1% prevalence rates for HIV was reported for Oyo State in the last national sentinel survey which is similar to the prevalence rate for HIV infection in this present study. Nigeria's epidemic is characterized as one of the most rapidly increasing rates of HIV and AIDS. The prevalence rate of 3.29% recorded for HIV in this study is in line with that of the Federal Ministry of Health (2005) Sentinel Study on HIV in Nigeria. Contrary to this present study [17] reported that out of 400 subjects under study, Syphilis and HIV Status were 35 (8.8%) for HIV positive and 3(0.8%) were reactive for syphilis [18] reported that out of 863 subjects, 1 (0.1%) co-infection for HIV-syphilis, 21 (2.4%) was serologically reactive for HIV-1/2 and 47 (5.4%) was reactive for syphilis which is contrary to what observed in this present study. The VDRL reactivity in this present study was very low compared to 2.6% noted by [19] and 1.6% by [20] but relatively similar to [9] and [21] reported a 0.9% and 0.72% of VDRL reactivity respectively. The results of serological screening tests for HIV and syphilis infections performed by [22]. In Tehran blood transfusion service between year 2003 and 2005 showed that the sero-prevalence was 2509 (0.2%) for HIV Ab1/2, and 402 (0.04%) for VDRL in 1004889 subjects; contrary to this present study, he reported the trend of HIV infection frequency had no increasing or decreasing pattern and was relatively stable and the trend of syphilis infection frequency was increasing in year 2003 to 2005. However, similar to this present study [23] reported a gradual decline in the prevalence rate of anti-HIV which declined from 1.44% in 2006 to 0.94% in 2007 and to reach its lowest level of 0.66% in 2008 but rose to 0.96% in the first half of 2009. VDRL showed a downward trend from

2.93% in 2008 to 1.92% in the first half of 2009, but contrary to this present study, 7.4% co-infection with HIV and syphilis was reported. In sub-Saharan Africa between 2 and 17% of women test positive for syphilis in antenatal clinics and rates of HIV co-infection are very high, contrary to this present study. In North America and Western Europe the incidence of syphilis is much lower at less than 5/100 000 of the population or less [24]. There was steady decline in the incidence of syphilis in both Europe and the USA during the second half of the last century [24,25], this is similar to this present study leading to the suggestions that endemic syphilis might even be eradicated in the study area. Age group 26-30 had highest prevalence of 38(1.99%) and 02(0.10%) in HIV and VDRL infection respectively in the study years, this is similar to [26], who reported that age group 26-30 and 31-35 had highest prevalence of HBV and HCV among pregnant women, it was then concluded that these were the majority age groups that attending antenatal clinic of the hospital. Contrary to this study, [27,28.29,30] reported that 2(0.6%) subjects in the 16-39 years age group and 1 (1.7%) in the 40years and above age group were VDRL positive. The difference in syphilis positive status was reported significant between ages of subjects 28(8.2%) subjects in the 16-39 years age group and 7 (11.7%) in the 40 years and above age group were HIV positive, but the difference in HIV positive status was not significant between ages of subjects [31,32].

5. CONCLUSION

This present study clearly documents a relatively declined in sero-prevalence of HIV and VDRL within the consecutive three years of study, this reflects the level of HIV and VDRL in the general population, this is due to the fact of the community based outreach embarked upon by the health professionals in the area with a focus of getting to zero level in the region.

6. RECOMMENDATION

All pregnant women should be screened for HIV and syphilis at their first antenatal visit within the first trimester and again in the third trimester. Pregnant women presenting with syphilis should be offered HIV testing and all HIV-positive pregnant women should be regularly screened for syphilis.

CONSENT

All authors declare that written informed consent was obtained from the patients for publication of this study.

ETHICAL APPROVAL

This research work was performed according to ethical guidelines of federal medical centre, idoekiti. no bio-data of the patients were required for research.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1 Schwebke J. abnormal vaginal flora as a biological risk factor for acquisition of HIV infection and sexually transmitted diseases. J infect Dis. 2005;192:1315-7.

2 Mugo N, Heffron R, Donnell D, et al. Increased risk of HIV-1 transmission in pregnancy: a prospective study among African HIV-1-serodiscordant couples. AIDS (London, England). 2011;251887-95.

3 Coffin LS, Newberry A, Hagan H, Cleland CM, Des Jarlais DC, Perlman DC. Syphilis in Drug Users in Low and Middle Income Countries. The International Journal on Drug Policy. 2010;21(1):20–7

4 Kinghorn GR. Syphilis. In: Cohen J, Powderly WG, eds. Infectious Diseases, 2nd edn. London: Mosby. 2004;807–16

5 World Health Organization (WHO). Rapid advice: Revised WHO principles and recommendations on infant feeding in the context of HIV; 2009.

6 Centers for Disease Control and Prevention (CDC). Trends in Reportable Sexually Transmitted Diseases in the United States, 2007. 13 January 2009. Retrieved 2 August 2011.

7 Centers for Disease Control and Prevention (CDC). STD Trends in the United States: 2011 National Data for Gonorrhea, Chlamydia, and Syphilis. 22 November 2010. Retrieved 20 November 2011.

8 Arora PN, Sastry CV. HIV infection and genital ulcer disease. Indian J Sex Transm Dis. 1913;71–73.

10 Schmid G. Economic and programmatic aspects of congenital syphilis prevention. Bull of World Health Organization. 2004;82:4-02 4-09

11 WHO. HIV/AIDS in Asia and the Pacific region; 2001.

12 De Cook km, Fowler MG, Mercier E, et al. Prevention of mother to child HIV; 283(9). Transmission in resource poor countries: translating research into policy. JAMA. 2000;1175-1182.

13 Hussain T, Kulshreshtha KK, Sinha S, Yadav VS, Katoch VM (2006). HIV, HBV, HCV, and syphilis co-infections among patients attending the STD clinics of district hospitals in Northern India. Int J Infect Dis. 2006;10(5):358-363. Epub 2006 May 4

14 UNAIDS. UNAIDS report on the global AIDS epidemic; 2008.

15 Okonko IO, Anugweje KC, Adeniji FO and Abdulyekeen RA. Syphilis and HIV, HCV and HBsAg co-infections among Sexually Active Adults. Nature and Science. 2012;10(1):66-74. (ISSN: 1545-0740). Available: http://www.sciencepub.net

16 Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. Indian J Pathol Microbiol. 2010;53:308–309.

17 Center for Disease Control & Prevention (CDC&P). Sexually Transmitted Center for Disease Control (CDC, 2008). National STD prevention conference Confrontin challenges, applying solutions. Division of STD prevention for HIV/AIDS Viral Hepatitis, STD and TB prevention. CDC Press Release. 2006;404:639-889.

18 Cox DL, Chang P, McDowall AW, Radolf JD. The outer membrane, not a coat of host proteins, limits antigenicity of virulent *Treponema pallidum.* Infect Immun. 1992;60(3):1076-83.

19 Curry MP, Chopra S, Dienstag JL. Viral Hepatitis In: Mandell GL, Bennett JE, Dolin R. Principles and Practice of Infectious Diseases. 7th Edition, New York: Churchill-Livingstone: 2010;1577-1593.

20 Srikrishna A, Sitalakshmi S, Damodar P. How safe are our safe donors. Indian J Pathol Microbiol. 1999;42:411–416.

21 Gao L, Zhang L, Jin Q. Meta-analysis: prevalence of HIV infection and syphilis among MSM in China. Sexually transmitted infections. 2009;85(5):354–8.

22 Salawu L, Bolarinwa RA, Adegunloye AB, Muraina HA. HBsAg, anti-HCV, anti-HIV and VDRL in blood donors: Prevalence and trends in the last 3.5 years in a tertiary health care facility in Ile-Ife, Nigeria; International Journal of Medicine and Medical Sciences. 2010;2(11):335-341.
23 Singh B, Verma M, Kotru M, Verma K, Batra M. Prevalence of HIV and VDRL seropositivity in blood donors of Delhi. Indian J Med Res. 2005;122:234–236
24 UNAIDS. UNAIDS report on the global AIDS epidemic; 2009.
25 Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. Indian J Pathol Microbiol. 2010;53:308–309.
26 Esan AJ, Omisakin CT, Ojo-Bola T, Owoseni MF, Fasakin KA, Ogunleye AA. Sero-prevalence of Hepatitis B and C virus Co-infection among pregnant women in Nigeria. American Journal of Biomedical Research. 2014;2(1):11-15.
27 Karp G, Schlaeffer F, Jotkowitz A, Riesenberg K. Syphilis and HIV co-infection. European Journal of Internal Medicine. 2009;20(1):9–13
28 Kent ME, Romanelli F. Reexamining syphilis: an update on epidemiology, clinical manifestations, and management. Ann Pharmacother. 2008;42(2):226–36.
29 Lozano R. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2095–128.
30 UNGASS. UNGASS country progress report: Nigeria; 2010.
31 UNGASS. UNAIDS report on the global AIDS epidemic; 2010.
32 World Health Organization (WHO). Global prevalence and incidence of selected curable sexually transmitted infections: Overview and estimates. Geneva; 2001.

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