

Seroprevalence of HIV, Hepatitis (B and C) Viruses and Syphilis among Female Sex Workers in Ekpoma, Nigeria

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ABSTRACT

Female sex workers (FSWs) are high-risk group susceptible to acquiring sexually transmitted infections, as well as transmitting the infection to others, due to the nature of their work. The study is aimed at determining the seroprevalence of Human Immunodeficiency Virus (HIV), hepatitis (B and C) viruses and syphilis among female sex workers in Ekpoma, Nigeria. A total of one hundred Female sex workers aged 18 to 45 years were recruited for this study. Human Immunodeficiency Virus serostatus was determined according to the Centre for Disease Control and prevention (CDC) Human Immunodeficiency Virus rapid testing algorithm 11 guideline (Abbot Diagnostics Medical Co., Ltd, Chiba, Japan) while hepatitis B and C viruses screening were carried out using Diaspot one step hepatitis B surface antigen and hepatitis C virus test strips (Diaspot Diagnostics (Diaspot Inc., USA)): Detection of Treponema pallidum antibodies in whole blood was done using Syphilis ultra-rapid test (Abon Biopharm, China). The results obtained revealed respective seroprevalence rates of 4%, 5%, 7% and 1% for Human Immunodeficiency Virus I & II, hepatitis B surface antigen (HBsAg), hepatitis C virus and Syphilis. We hereby recommend regular screening for early detection and initiation of treatment to prevent further transmission of these diseases in the study area.

Keywords: Female, Sex Workers, HIV, Hepatitis B Virus, Hepatitis C Virus, Syphilis, Ekpoma, Transmitted Diseases, Nigeria, *Palladium T*, Serology

INTRODUCTION

A female sex worker (FSW) is an adult woman engages in consensual sex for money or payment in kind, as her principal means of livelihood [1]. Sex work as a practice has over the years become one of the world's oldest professions [1]. Sex work is a worldwide phenomenon. Commercial sex is predominantly a feminine occupation and men comprise roughly ten percent of the overall commercial sex workers' population [2]. According to reports, approximately 40-42 million people are involved in prostitution globally and about 96% of the prostitutes are women [3].

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Female sex workers are one of the major transmitters of infectious diseases in developing countries [4].

Sexually transmitted infections (STIs) represent a major challenge for the health system due to the growing number of cases [5]. According to the World Health Organization (WHO), STIs are reaching the milestone of 1 million new cases per day worldwide [6, 7]. These infections have similar transmission routes, mainly by unprotected sex and/or sharing needles or drugs with exchange of blood or body fluids [8]. Co-infection with HIV and Hepatitis B virus (HBV) and/or Hepatitis C virus (HCV) occurs in a considerable number of cases and can be explained by common routes of viral transmission such as vertical infection, sexual transmission, intravenous drug use and blood transfusion [8]. Syphilis is an ulcerative Sexually Transmitted Infection (STI) that facilitates entry of infections agents like HIV [9].

A number of studies have assessed the seroprevalence of sexually transmitted infections in Nigeria [4]. However, there is scarcity of information on the seroprevalence of these infections among female sex workers in some regions (including Ekpoma, Nigeria), especially as this group of people who are often discriminated against by many societies [10]. This study was therefore aimed at determining the seroprevalence of HIV, Hepatitis (B and C) viruses and *Treponema pallidum* infection among a cohort of Female Sex Workers in Ekpoma, Nigeria.

MATERIALS AND METHODS

Study Area

This study was carried out in Ekpoma. Ekpoma is the capital of Esan West Local Government Area of Edo State. The area lies between latitudes 6° 43' N and 6° 45' N of the Equator and longitude 6° 51' E and 6° 81' E of the Greenwich Meridian. It has a population of approximately 125,842 people as at the 2006 census [11]. The town has an official post office and it is the home of Ambrose Alli University.

Research Design

This was a cross-sectional study, designed to determine the seroprevalence of HIV, Hepatitis (B and C) viruses and *Treponema pallidum* infection among a cohort of Female Sex Workers in Ekpoma, Nigeria. This was carried out according to the study protocol of Eigbedion et al. [12].

Study Population

A total of One hundred female sex workers aged 18 to 45 years were recruited for this study.

Ethical Approval

Ethical approval was obtained from the Health Research Ethics Committee of Ambrose Alli University, Ekpoma (NHREC/12/06/2013). Informed consent was obtained from all the participants.

Sample Collection

Whole blood collection was performed by venipuncture. The antecubital vein was cleansed with alcohol and allowed to dry. Five milliliters (5 ml) of blood was aseptically collected from each subject using a sterile disposable needle and syringe. The blood sample was dispensed into a well-labelled Ethylene Diamine Tetra Acetic acid (EDTA) container and mixed properly.

Laboratory Diagnosis

HIV serostatus was determined according to the Centre for Disease Control and prevention (CDC-UMD) HIV rapid testing algorithm II guideline [13]. Determine HIV- 1/2 kit, an immunochromatographic technique, was the first line kit used. Positive results by "Determine HIV- 1/2 (Abbot Diagnostics Medical Co., Ltd, Chiba, Japan) was confirmed with "Unigold HIV 1/2" test kit (Trinity Biotech Plc., Bray, Ireland), while negative results by "Determine HIV- 1/2" ended testing. Discordant results were repeated and finally tested with a tie-breaker kit "Stat-Pak. Final test results were considered positive or negative on the basis of the tie-breaker kit result [14].

Hepatitis B and C viruses screening were carried using Diaspot one step hepatitis B surface antigen and hepatitis C virus test strips" (Diaspot Diagnostics Inc., USA). This is a lateral flow chromatographic immunoassay for qualitative detection of Hepatitis B surface antigen (HBsAg) and Hepatitis C virus (HCV) in human serum or plasma. The kits have a relative sensitivity of 99.0% and a relative specificity of 98.6% [12].

Syphilis screening was carried out using Diaspot one step VDRL test kits (Diaspot Diagnostics Inc, USA). The syphilis ultra rapid test is a qualitative membrane strip-based immunoassay for the detection of *Treponema pallidum* (TP) antibodies (IgG and IgM) in whole blood, serum or plasma [12].

Statistical Analysis

Descriptive methods such as tables and figures were used for presentation of the results. Experimental variables between two groups were analyzed using unpaired t-test and one-way ANOVA was used to analyze three or more groups. $P < 0.05$ was considered significant [14].

RESULTS

Socio-Demographic Profile of Subjects Studied

The socio-demographic profile of the subjects studied are presented in Table 1. According to age, most (54%) of the subjects were within the age range of 18-24 years, followed by 25-31 years (30%), 32-38 years (14%), and 39 years & above (2%). All (100%) the participants were female subjects. According to ethnicity, most (34%) of the subjects were Tiv, followed by Igbo (29%), Efik (18%), Ibibio (5%), Hausa (4%), Edo (3%), Esan, Kalabari and Yoruba (2%) each, and Berom (1%). Christianity was the dominant (90%) religion, while the remainder practiced Traditional religion (6%) and Islam (4%). Most participants (61%) had received secondary education while 34% received primary education and tertiary education (5%). The subjects were predominantly (52%) nulliparous while others had low multiparity (45%), and grand multipara (3%). Consistent condom use was reported by 89% of the subjects while the remainder (11%) did not use condoms. None of the subjects reported having any chronic disease. The duration of sex work less than 5 years, above 5 years and those that “preferred not to say” were 69%, 15% and 16% respectively. Alcohol was consumed by most subjects (61%), while 39% did not. The participants were mainly non-smokers (64%), while 36% smoked cigarette. Most of the subjects did not agree of hard drug usage (82%), while 18% reported usage of hard drugs. The majority of the subjects were single, 90(90%), while the others were divorced/separated (10%). Ninety-eight percent of the subjects reported previous history of multiple sex partner, while 2% declined. Only one subject had ever had a blood transfusion while the majority have never had a blood transfusion (99%). Scarification marks/tattoo was found in 70% of the subjects, while 30% didn’t have it. The

vast majority of the subjects have never had a surgery (95%), but 5% have had it. Most of the subjects declined ever using any intravenous drug (90%), while others accepted that they have used them (10%). Sixty percent of the subjects had nose/ear piercing, while 40% did not.

Seroprevalence of Sexually Transmitted Diseases among FSW in the Study Area

The seroprevalence of sexually transmitted diseases among FSW in the study is shown in Table 2 The respective seroprevalence rates of HIV 1 & II, HBsAg, HCV and Syphilis were 4%, 5%, 7% and 1%.

Seroprevalence of Sexually Transmitted Diseases with Respect to Age

Table 3 reveals the seroprevalence of Sexually transmitted diseases with respect to age. The distribution of HIV 1 & II, HBsAg, HCV and Syphilis among the different age groups revealed the four STDs studied were more prevalent in subjects belonging to the age group of 18-24 years compared to the other age groups. However, statistical comparison did not reveal any significant difference ($P>0.05$) between age and the four STDs studied.

Seroprevalence of Sexually Transmitted Diseases according to History of Sex Work

The seroprevalence of Sexually Transmitted Diseases according to the history of sex work is summarized in Table 4. Statistical comparison between duration of sex work and the STD variables studied did not show any statistically significant difference ($P>0.05$) in the study area.

Table 1: Socio-Demographic Profile of Subjects Studied (n=100)

Variables	Categories	Number observed	Frequency (%)
Age (years)	18-24	54	54
	25-31	30	30
	32-38	14	14
	39 & above	2	2
Sex	Male	0	0
	Female	100	100

Ethnicity	Ibibio	5	5
	Efik	18	18
	Edo	3	3
	Esan	2	2
	Hausa	4	4
	Igbo	29	29
	Berom	1	1
	Kalabari	2	2
	Tiv	34	34
Religion	Yoruba	2	2
	Christianity	90	90
	Islam	4	4
	Traditional Religion	6	6
Education	Primary	34	34
	Secondary	61	61
	Tertiary	5	5
	No formal education	0	0
Parity	Nulliparity (0 parity)	52	52
	Low multiparity (1,2 and 3 parity)	45	45
	Grand multipara (4-8 parity)	3	3
Condom use	Yes	89	89
	No	11	11
Duration of sex work	<5years	69	69
	>5years	15	15
	Preferred not to say	16	16
Alcohol	Yes	61	61
	No	39	39
Smoking	Yes	36	36
	No	64	64
Hard drugs	Yes	18	18
	No	82	82

Marital status	Single	90	90
	Married	0	0
	Divorced/separated	10	10
Previous history of multiple sexual partners	Yes	98	98
	No	2	2
Previous blood transfusion	Yes	1	1
	No	99	99
Scarification marks/ Tattoo	Yes	70	70
	No	30	30
Previous surgery	Yes	5	5
	No	95	95
Intravenous drugs use	Yes	10	10
	No	90	90
Unsafe injection	Yes	90	90
	No	10	10
Nose/ear piercing	Yes	60	60
	No	40	40

Table 2. Seroprevalence of HIV 1 & II virus, Hepatitis B and C viruses and *T. pallidum* infection among FSWs in the study area

Variables	No. Tested	Status	Frequency
HIV 1 & II	100	Positive	4 (4%)
		Negative	96(96%)
HBsAg	100	Positive	59(5%)
		Negative	95(95%)
HCV	100	Positive	7(7%)
		Negative	93(93%)
Syphilis	100	Positive	1(1%)
		Negative	99(99%)

Table 3. Seroprevalence of HIV I & II, HBsAg, HCV and *T. pallidum* infection among the study subjects with respect to age

Variables/Age	Status	18-24 years	25-31 years	32-38 years	39 years & above	X ²	P value
HIV	Positive	3(3)	0(0)	1(1)	0(0)	2.034	0.563
	Negative	51(51)	30(30)	13(13)			
HBsAg	Positive	3(3)	0(0)	2(2)	0(0)	4.261	0.235
	Negative	51(51)	30(30)	12(12)	2(2)		
HCV	Positive	4(4)	2(2)	0(0)	1(1)	.753	0.080
	Negative	50(50)	28(28)	14(14)	1(1)		
Syphilis	Positive	1(1)	0(0)	0(0)	0(0)	2.034	0.565
	Negative	53(53)	30(30)	14(14)	2(2)		

Table 4: Seroprevalence of HIV 1 & 11, HBsAg, HCV and *T. pallidum* infection in the study area according to history of sex work

Variables	Status	<5years	>5years	PNTS	X ²	P-value
HIV	Positive	4(4)	0(0)	0(0)	1.872	0.392
	Negative	65(65)	15(15)	16(16)		
HBsAg	Positive	3(3)	1(1)	1(1)	0.202	0.924
	Negative	66(66)	14(14)	15(15)		
HCV	Positive	5(5)	2(2)	0(0)	2.135	.0344
	Negative	64(64)	13(13)	16(16)		
Syphilis	Positive	1(1)	0(0)	0(0)	0.454	0.797
	Negative	68(68)	15(15)	16(16)		

DISCUSSION

Female Sex Work is a high-risk activity associated with HBV, HCV, and several other sexually transmitted infections [15]. From the angle of STIs-related HIV infection, the seroprevalence of 4% obtained in the study area is close to the 5% reported by da Silva et al. [5] in Southern Brazil. However, our results contradicted the previous studies of Eledo et al. [4] and Schuelter-Trevisol et al. [16] that reported respective seroprevalence rates of 8.33% and 8.8% in Bayelsa State (Nigeria) and Brazil. Elsewhere, a much higher HIV seroprevalence rate of 42.9% was reported by Mutagoma et al. [17] among FSWs in Rwanda. Different studies conducted in different geographic regions have identified multiple factors contributing to HIV infection [18]. Some of the

contributing factors include unprotected sexual intercourse, having multiple sexual partners, casual sex, sex under the influence of alcohol, and paying or receiving goods or money for sexual intercourse [19-22]. Studies conducted in other parts of the world also detected that alcohol use increases the desire to engage in unprotected sexual intercourse and may delay testing for HIV, accessing appropriate medical care, and initiating antiretroviral therapy (ART), which may hasten disease progression to full-blown AIDS [23-26]. Furthermore, the intoxicated HIV-positive individual may also engage in unprotected sexual intercourse with HIV-negative individuals [24].

In this study, there was a slightly higher prevalence rate (5%) of HBsAg among FSWs in the study area when

compared to the earlier studies of Eledo et al. [4], da Silva et al. [5] and Mutagoma et al. [17] who reported lower seroprevalence rates of 0 %, <1% and 2.5% respectively. According to Okokhere et al. [27], this may be explained partly due to the changing dynamics of risky behaviours in the study communities, especially as most of the positive tests were among the age bracket most likely to engage in risky practices. However, the seroprevalence rate of 5% obtained in our study is relatively lower compared to the prevalence rate of 23.1% reported by Schuelter-Trevisol et al. [16] among a cohort of FSWs in Southern Brazil.

In the present study, the seroprevalence of HCV among FSWs was 7%. This is comparable to the seroprevalence rate of 8.8% reported by Schuelter-Trevisol et al. [16]. In contrast, our result is higher than those of the earlier works of Eledo et al. [4], da Silva et al. [5] and Mutagoma et al. [17] who found seroprevalence rates of 0.64%, 1% and 1.4% respectively. With respect to STIs, HCV ranked highest among the four (4) STIs tested in the study area. According to Babatope et al. [14], socio-economic, cultural and biological factors might be responsible for the female gender vulnerability to HCV.

With respect to syphilis, a seroprevalence of 1% was obtained in the study area. This is close to the seroprevalence rate of 0.64% reported by Eledo et al. [4] in Bayelsa State, Nigeria. Our result is considered low when compared to the seroprevalence rates reported in other studies. However, our finding disagreed with the previous studies of da Silva et al. [5], Schuelter-Trevisol et al. [16] and Mutagoma et al. [17] who reported respective seroprevalence rates of 10%, 19.7% and 51.1%. The high syphilis seropositivity rates reported by these authors may be attributable to the demographic and behavioural characteristics of their study populations.

CONCLUSION

It is widely accepted that FSWs are a high-risk group susceptible to acquiring sexually transmitted infections (STIs), as well as transmitting the infections to others, due to the nature of their work. In conclusion, the seroprevalence rate of HCV ranked the highest in study area followed by HBsAg (5%), HIV 1 & II (4%) and syphilis (1%). Age and duration of sex work did not affect the transmission of any of the STDs studied. We hereby recommend regular screening for STDs in the study area for early detection and initiation of treatment in order to prevent further transmission of these diseases.

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Conflict of Interest

The authors declare no conflicts of interest. The authors alone are responsible for the content and the writing of the paper.

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Authors' Contributions

- Conceptualization – BABATOPE, I. O.
- Methodology – AGHANEMUZOR, J., SIMEON, C.U., IZUYON, A.J.
- Data curation – BABATOPE, I. O., and IYEVHOBUBU, K.O.
- Formal analysis – BABATOPE, I. O., AGHANEMUZOR, J., SIMEON, C.U., IZUYON, A.J.
- Writing – original draft – BABATOPE, I. O.
- Writing – review & editing – IYEVHOBUBU, K.O.
- Supervision – BABATOPE, I. O.

REFERENCES

1. Sanchez S. (2022). The world's oldest profession gets a makeover: sex work, only fans, and celebrity participation. *Women leading change: Case studies on women, Gender, and feminism*. 6(1):4-17.
2. Scott J, Kumar N. (2022). Male Sex workers as students. In: D. Jones & T. Sanders (Eds.), *Students sex Work: Palgrave Advances in Sex Work Studies*. Palgrave Macmillan Cham. 201-228.
3. Socialists & Democrats (2024). Sexual exploitation and prostitution and its impact on gender equality.
4. Eledo BO, Izah SC, Onuoha EC. (2017). Sexually Transmitted Infections among female sex workers in some selected region of Bayelsa State. *International STD Research & Reviews*. 5(3):1-6.
5. da Silva BG, Ferreira LH, Ribeiro CEL, Raboni SM. (2022). HIV, Syphilis, Hepatitis B and C in key populations: results of a 10-year cross-sectional study, Southern Brazil, *Einstein Journal*. 20: eA069-34.
6. World Health Organization (WHO). (2016). *Global Health Sector Strategy on Sexually Transmitted Infections 2016-2021. Towards ending STIs*. Geneva: WHO.
7. World Health Organization (2019). *Sexually Transmitted Infections (STIs)*. Geneva: WHO.

8. Chen JJ, Yu CB, Du WB, Li LJ. (2011). Prevalence of Hepatitis B and C in HIV-infected patients; a meta-analysis. *Hepatobiliary Pancreat Dis Int.* 10(2):122-127.
9. Kofoed K. (2006). Syphilis and Human Immunodeficiency Virus (HIV-1) coinfection: influence of CD4 T-cell count, HIV-1 viral load, and treatment response. *Sexually Transmitted Diseases.* 33(3):143-148.
10. de Souza RL, Dos Santos Madeira LDP, Pereira MVS, da Silva RM, de Luna Sales JB, Azevedo VN, et al. (2020). Prevalence of syphilis in female sex workers in three countryside cities of the state of Para, Brazilian Amazon. *Biomedical Central Infectious Diseases.* 20:129.
11. National Population Commission (NPC) (2006). Nigeria national census: population by local government area and sex.
12. Oseghale EA, Obozokhale AG, Olayele AP, Oriasotie UM, Imhonikhe OM, Oshiohayamhe IK. (2025) Association Between Hepatitis B and C Co-Infection, HIV Disease Stage, and Immune Status in Pediatric Patients. *Applied Medical Research.* 12(8):1-11.
13. World Health Organization. (1997). Revised recommendations for the selection and use of HIV antibody tests. *Weekly Epidemiological Record.* WHO Geneva, Switzerland. 72:81-82.
14. Babatope IO, Esumeh FI, Iyevhobu KO, Okodua MA, Oisadebamen SM, Ifeonu OJ, et al. (2024). Seroprevalence of HIV I & II Antibodies among Students of a State-Owned University in South-South Nigeria. *Biomedical Journal of Scientific & Technical Research (BJSTR).* 59(1):51255-51260.
15. Bedassa BB, Ebo GG, Yimam JA, Tura JB, Wariso FB, Lulseged S, Abraham SA. (2022). Prevalence and factors associated with hepatitis B and C virus infections among female sex workers in Ethiopia: Results of the national biobehavioural Survey. *Plos One.* 17(12):e0269510.
16. Schuelter-Trevisol F, Custódio G, Silva AC, Oliveira MB, Wolfart A, Trevisol DJ, et al. (2013). HIV, Hepatitis B and C, and Syphilis prevalence and confection among sex workers in Southern Brazil. *Revista da Sociedade Brasileira de Medicina Tropical.* 46(4):493-497.
17. Mutagoma M, Samuel MS, Kayitesi C, Gasasira AR, Chitou B, Boer K, et al. (2017). High HIV prevalence and associated risk factors among female sex workers in Rwanda. *Int J STD AIDS.* 28(11):1082-1089.
18. Qanche Q, Wondimu W, Asefa A, Yosef T, Midaksa G, Nigussie T. (2021). Factors contributing to High HIV prevalence in Majang zone, Southwest Ethiopia: What lies Beneath the Tip of the Iceberg? *J Multidiscip Healthc.* 14: 3273-3283.
19. Nakiganda LJ, Nakigozi G, Kagaayi J, Nalugoda F, Serwadda D, Sewankambo N, et al. (2017). Cross-sectional comparative study of risky sexual behaviours among HIV-infected persons initiated and waiting to start antiretroviral therapy in rural Rakai, Uganda. *British Medical Journal Open.* 7(9):1-9.
20. Molla AA, Gelagay AA. (2017). Risky Sexual practice and associated factors among HIV positive adults attending anti-retroviral treatment clinic at Gondar University Referral Hospital, Northwest Ethiopia: a cross-sectional study. *PLoS One.* 12(3):1-12.
21. Okoboi S, Castelnuovo B, Moore DM, Musaazi J, Kambugu A, Birungi J, et al. (2018). Risky sexual behaviour among patients on long-term antiretroviral therapy: a prospective cohort study in urban and rural Uganda. *AIDS Research & Therapy.* 15(1):1-9.
22. Tadesse WB, Gelagay AA. (2019). Risky sexual practice and associated factors among HIV positive adults visiting ART clinics in public hospitals in Addis Ababa city, Ethiopia: a cross-sectional study. *BMC Pubic Health.* 19(1):4-11.
23. World Health Organization (WHO). (2005). Alcohol use and Sexual Risk Behaviour: A cross-cultural study in eight countries. Geneva.
24. Kiene SM, Simbayi LC, Abrams A, Cloete A, Tennen H, Fisher JD. (2009). High rates of unprotected sex occurring among HIV-positive individuals in a daily study in South Africa: the role of alcohol use. *Journal of Acquired Immune Deficiency Syndrome.* 49(2):219-226.
25. Bryant KJ, Nelson S, Braithwaite RS, Roach D. (2010). Integrating HIV/AIDS and alcohol research. *Alcohol Research & Health.* 33(3):167-178.
26. Rehm J, Shield KD, Joharchi N, Shuper PA. (2011). Alcohol consumption and the intention to engage in unprotected sex: systematic review and meta-analysis. *Addiction.* 107:51-59.
27. Okokhere PO, Babatope IO. Gborogen EE. (2009). Another look at the prevalence of hepatitis B surface antigenaemia in Irrua, Edo State, Nigeria. *Journal of Applied and Basic Sciences.* 5 (1):50-52.