



HIV Infection and Potential Predisposing Risk Factors among Brothel-Based and Non-Brothel-Based Female Sex Workers in Port Harcourt



Azuonwu O^{1*}, Ogoloma O¹ and Ihua N²

¹Department of Medical Laboratory Science, Medical Bacteriology/Virology/Parasitology Unit, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Rivers State, Nigeria

²Department of Hematology and Transfusion Science, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Rivers State, Nigeria

Submission: October 06, 2023; **Published:** November 08, 2023

***Corresponding author:** Azuonwu O, Obioma, Rivers State University, Port Harcourt, Nkpolu-Oroworukwo,, Port Harcourt, Rivers State, Nigeria.
Email: bimajacobs@yahoo.co.uk

Abstract

The study comparatively evaluated the epidemiological distribution of HIV infection among brothel-based and non-brothel-based female sex workers in Port Harcourt. This cross-sectional study design employed venue/facility-based profiling and obtained unequal sample distribution, with more brothel-based, 108 (54%), compared to non-brothel-based, 92 (46%). Recruitment was through a multi-stage sampling with strict adherence to ethical guidelines and diagnostic protocol. The study followed standard clinical laboratory practices for HIV screening using HIV screening kit protocol. The study reported a general prevalence of 29 (14.5%), greater than the venue-specific prevalence among brothel FSWs (13.0%) but less than the prevalence among non-brothel-based FSWs (16.3%). Risk assessment showed no significance with an odd ratio of 1.308 (95% Confidence Interval = 0.595 to 2.877). There was also a relative risk of 1.139 (95% confidence interval = 0.763 to 1.699) and 0.871 (95% confidence interval = 0.590 to 1.284) for brothel-based female sex workers and non-brothel-based female sex workers, respectively. Despite the reported decline in HIV prevalence among FSWs in this study, the prevalence is still higher than the national prevalence in Nigeria. An enhanced expansion of HIV prevention intervention programs is crucial, even as the measure would help to curtail the trend among these high-risk populations.

Keywords: HIV; Infection; Brothel-Based; Non-Brothel Based; Female Sex Workers; Predisposing Risk Factors; Port Harcourt

Abbreviations: FSW: Female Sex Workers; SPSS: Statistical Product for Service Solution; HIV: Human Immuno Virus

Introduction

Female Sex Workers (FSWs) have been known as a major group in the spread of HIV infection across the globe [1]. It is estimated that there are 176,400 FSWs in Nigeria [2]. Several factors have been implicated to create a web of susceptibilities thereby facilitating the spread of HIV among this particular key affected population [1]. The national HIV prevalence estimate in Nigeria is low, but some states and key populations obviously contradict this estimation [3]. This is similar to the Indian population as reported [4]. The rising prevalence of HIV among sex workers is an indication of the increasing probability of a generalized epidemic in endemic communities around the world. Interestingly, various

HIV intervention programs have been administered through the route of operational venues; however, the effectiveness of this is of critical concern as there are assumptions of a skewed distribution of interventions due to certain visible and non-visible factors that are inherent. A venue-based intervention approach is a helpful method used for FSW to reach out to brothel-based and non-brothel-based (nightclubs, bars, and streets) [5]. However, a comprehensive approach to reducing HIV transmission among these key populations is crucial; therefore, the need for this study would probably intensify and promote the search for the FSWs that are not within the confinement of an operational venue, as

this group of FSW (non-brothel based) is literally missed out and is always classified as a hard-to-reach key population during the time of HIV interventions. Effective HIV prevention intervention demands approaches and policies capable of minimizing the vulnerability of the affected population of FSWs to HIV infection. This can be done through the development of a social, legal, and economic framework that would eventually stimulate sustainable prevention, diagnosis, and management strategies for the menace [4].

The legal complexity of sex work, including the structural components, poses a serious critical challenge anyway. The requisite enhanced expansion of HIV prevention intervention programs, especially the inclusion and accessibility of non-brothel operational venues of FSW to make sure that they are not left out. This is because a majority of the existing ones are skewed, thus focusing attention largely on brothel-based female sex workers remains a problem not yet solved. This situation is akin to the worry in India⁴. Nevertheless, Nigeria shares similar legal complexity in sex work with India, including being harassed by the police [4,6]. Thus, the legal framework has been implicated as a factor disrupting HIV prevention intervention efforts, and this is in connection with the operational venue in addition to structural factors [6]. The background of this study emphasized strongly that the operational venue for FSW should seek to provide an enabling context for HIV intervention, particularly behavioural change, among this key population. Hence, within the context of this study, FSWs were classified according to the operational location or venue of the sex work activity, basically into two namely; brothel based (reside and work in brothels) and non-brothel based (operates on the hotels, streets, bars, nightclubs, homes etc.) FSWs. Brothel-based FSWs operate under the supervision of managers and administrative structures in place within the brothel, whereas non-brothel-based FSWs are at liberty and independence of these administrative structures and rules confined within the brothels [7].

The significance of this study cannot be undermined as it is an indispensable primary component of a prospective need assessment for HIV prevention interventions [8], especially given the assumed declining prevalence of HIV among FSWs. As such, this study comparatively evaluated the prevalence of HIV infection among brothel-based and non-brothel-based FSWs in Port Harcourt, Rivers State. It is strongly expected that information from this study would provide an evidence-based picture of the degree and enormity of the burden, as well as the trend and what is happening in Rivers State, Nigeria, as an under-represented state in this regard. Nonetheless, the reported change in the HIV prevalence rate among FSW in Nigeria informed the researchers' interest to find out whether declining variation exists among FSW in specific operational venues or locations [3]. Hence, the study hypothesized significant differences in HIV prevalence rates

between brothel-based FSW and non-brothel-based FSW. The dearth of published data in this area resulted in this investigation, seeing the growing number of FSWs in Nigeria with increasing risky behaviors despite awareness campaigns. The study's findings will be used to inform decisions, plans, and the provision of targeted programs and interventions for this key population.

Materials and Methods

Study Design

The study adopted a cross-sectional approach and comparatively determined the prevalence rates of HIV infection among brothel-based and non-brothel-based female sex workers in Port Harcourt, Rivers State, Nigeria.

Study Area

The study was carried out in Port Harcourt. Port Harcourt is the capital of Rivers State, Nigeria. It lies along the Bonny River and is located in the Niger Delta with a population of 1,148,665. Port Harcourt is one of Nigeria's leading industrial centers. The Trans-Amadi Industrial Estate, 4 miles (6 km) north, is a 2,500-acre (1,000-hectare) site where tires, aluminium products, glass bottles, and paper are manufactured. The area has three public Universities, Colleges of Health Science and Education, Polytechnics, and other private tertiary institutions. Also, there are two public tertiary hospitals which serve as referral centres and teaching hospitals including the military hospital, secondary healthcare centres and primary healthcare centres within the region of the study. Port Harcourt is an urban city with the characteristics of urbanization, including social life and nightlife. The area has nightclubs, brothels and other social centres common with modern emerging cities across the world.

Study Population

The population comprised female sex workers in Rivers State, precisely the Port Harcourt metropolis. The participants consist tenets commercial female sex workers. Participants were recruited across the area from hotels, brothels, bars, restaurants, nightclubs, hotels, or on the street.

Sample Size

Gpower version 3.1 was used to estimate sample size following the Wilcoxon-Mann-Whitney test (two groups) through the Options A.R.E. method for analysis of a priori and required sample size computed for a two-tailed logistic distribution with these inputs: effect size $d = 0.5$, alpha error probability = 0.05, power $(1 - \beta \text{ err prob}) = 0.95$ and unequal allocation ratio). A minimum sample size of 192 was estimated but made up to 200 as an increased sample size increases the power of the study. A disproportionate distribution of the sample size was made with 108 (54%) for brothel-based FSW and 92 (46%) for non-brothel-based FSW.

Sampling Technique

The study utilized a venue profiling approach according to the National Agency for the Control of AIDS, Nigeria and Weir et al., because a majority of the FSW cluster and meet clients in a defined area or spot, thereby making the FSW accessible [2,9]. The sampling method involved a multistage technique. Rivers State was first selected from the 31 States of Nigeria including the Federal Capital Territory of Nigeria as a representative state of the South-South Geopolitical zone in Nigeria. The initial step involved reaching out to key people who possess information about the study area, like commercial motorists/drivers, people in shops, storekeepers, sellers, bar/restaurant attendants, and others on the streets. These persons formed the key informant for the study due to the fact they had good knowledge about the study terrain. With the aid of the key informant within the region of the study, different brothels and non-brothel hot spots were identified within the Port Harcourt metropolis operating in the two largest local government areas of the state for the second stage selection.

Further selection was made following venue mapping and hot spots of FSW and clients meeting points identified in addition to self-reporting of FSW based on the adopted definition of FSW - A "female sex worker," according to the National AIDS/STI Control Programme, Federal Ministry of Health, Nigeria, was defined "as any female who receives money or other valuable gifts/incentives from a man in exchange for sex in areas such as brothels, bars, hotels, nightclubs, restaurants, or on the street" [10]. Based on this, participants were admitted into the study based on this common definition, and the study site or venue profiling followed the pre-set definition of a brothel (living inside the venue) and non-brothel (streets, nightclubs, bars/restaurants). All hot spots and participants who met the inclusion criteria of being within the study area, having over six months of work experience on sex work, must be female, resident in a brothel to be classified as brothel-based, and vice versa. Those who did not self-report as FSW were not included and FSWs who disapproved of recruitment were excluded from the study.

Specimen Collection and Processing

For this investigation, blood samples from female sex workers were collected in accordance with the recommended standard of clinical laboratory practices as well as the analysis. Determine HIV kit was used for the screening following the manufacturer's instructions.

Ethical Concern

Study participants provided informed written consent to participate in the study in addition to the disclosure of personal information and collection of biological specimens for screening of their HIV status. The study protocol and ethical concerns were approved by the ethics committees of Rivers State University, brothel managers and unit heads of all facilities used in this study.

Data Collection, Collation, and Analysis

Data were collected from the selected brothels and non-brothel facilities such as; nightclubs, bars, restaurants, and streets using a well-structured questionnaire. Microsoft Excel sheet was used to collate the data, and data analysis was performed using the Statistical Product for Service Solution (SPSS) version 21. Frequency and percentage were obtained as well as prevalence (overall and specific). Data obtained were qualitative as such, and non-parametric test statistics such as the Mann-Whitney U test and Kruskal-Wallis tests were used to make the inferential deduction for two- and three-group comparisons at a 5% alpha level.

Results

The study examined 200 Female Sex Workers (FSW) residents in Rivers State, Nigeria, located in brothels and other outlets categorized as non-brothels. Categorization of the FSW recruited in this study showed a disproportionate sample distribution, with more brothel-based FSW sampled - 108 (54%) due to their availabilities in various brothel channels as they are mostly residents there whereas non-brothel FSW were 92 (46%). Furthermore, (Figures 1-3) present a simple bar chart of the demographic variables- age group, marital status and education in this study, showing the cumulative distribution of both brothel-based and non-brothel-based female sex workers included in this study for a graphic view. While (Figures 3-6) show comparative visualization between the brothel and non-brothel-based FSW. See Figures 1-6 below for visualization (Table 1). The prevalence of HIV infection among brothel and non-brothel FSWs in this study presents that, out of 108 brothel-based FSWs examined, 94 appeared negative while 14 demonstrated positive for HIV with an observed prevalence rate of 13%. While out of 92 non-brothels-based FSWs, 77 tested negative while 16 tested positive for HIV. The study measured 16.3% as the prevalence of HIV among non-brothel-based FSWs. Comparative analysis based on the difference in the rate of HIV infection between brothel and non-brothel-based FSW using the Mann-Whitney U test, the test statistics could not establish any significant difference in the rates of HIV infection between brothel and non-brothel-based FSW (Mann-Whitney U = 4802.000; p = 0.51). This implies equal rates. In general, out of a total of 200 FSWs sampled and examined, 171 tested negative for HIV while 29 subjects were positive for HIV, this amounted to an overall prevalence rate of 14.5% of HIV infection among the sampled population of FSW in Rivers State, Nigeria. See Table 2 for detail.

The distribution of HIV among FSW by operational venues at a 95% confidence interval showed for brothel operational venues, the HIV-negative frequency was 94 (87.0%), standard error = 3.2, 95% and confidence interval = 80.6 - 92.6; while the HIV-positive frequency was 14 (13.0%) standard error = 3.2, and confidence interval = 7.4 - 19.4. In addition, non-brothel FSW was negative for

HIV with 77 (83.7%), standard error = 3.8, and confidence interval = 76.1 - 90.2 while sero-positive for HIV for the non-brothel FSW were 15 (16.3%), standard error = 3.8, and confidence interval = 9.8 - 23.9. Details are presented in Table 2. Odds ratio and relative risk were the risk estimates used which measured and compared the risk of HIV infection between brothel-based and non-brothel-based female sex workers. Risk assessment of having HIV infection showed an odds ratio of 1.308 (95% confidence interval = 0.595

to 2.877) of having HIV infection among brothel-based female sex workers, which was higher compared to the non-brothel-based female sex workers. Furthermore, the relative risks were 1.139 (95% confidence interval = 0.763 to 1.699) and 0.871 (95% confidence interval = 0.590 to 1.284) for brothel-based female sex workers and non-brothel-based female sex workers, respectively. Generally, the risk estimates showed no indication of statistical significance from the result (Table 3).

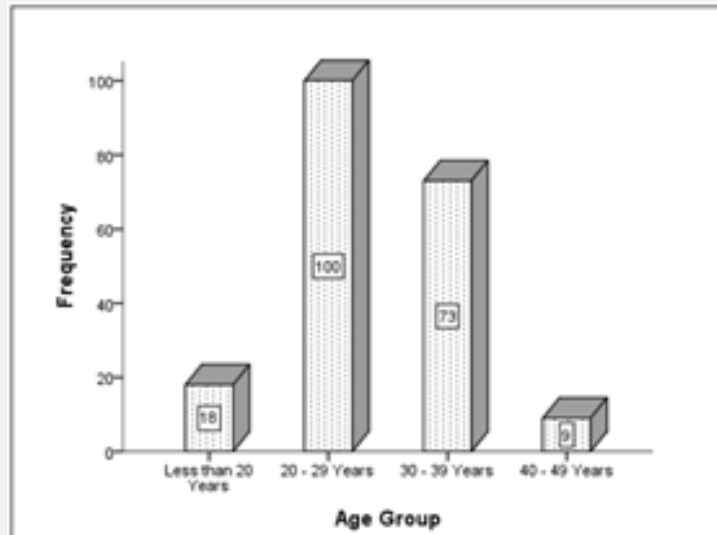


Figure 1: Bar Chart of Age Distribution of Total Study Participants.

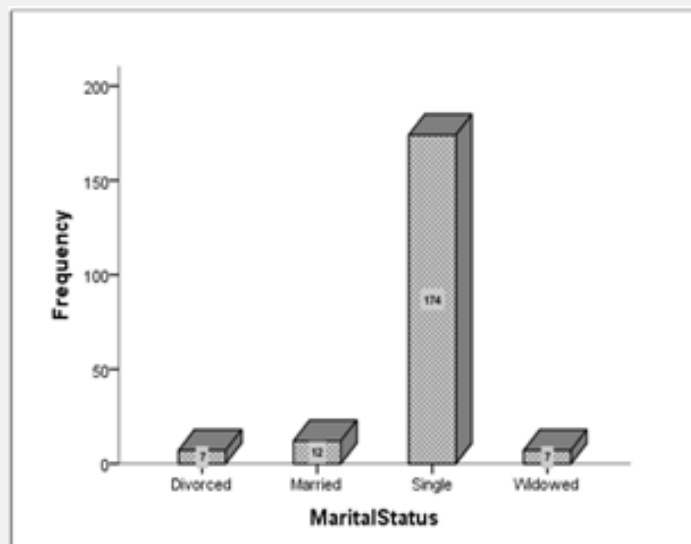


Figure 2: Distribution of Marital Status of Total Study Participants.

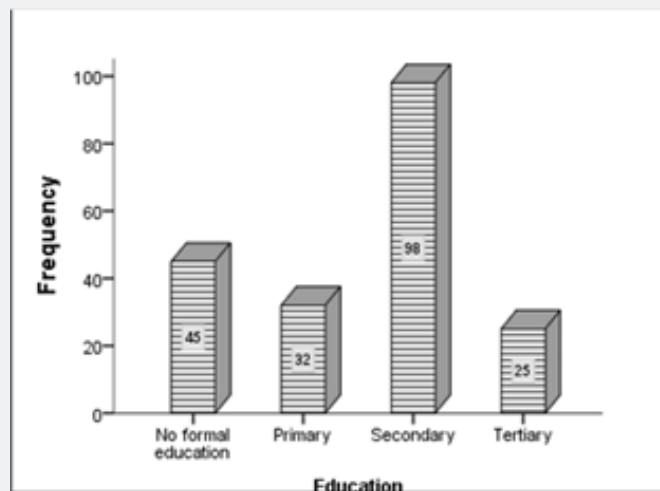


Figure 3: Distribution of Educational Level of Total Study Participants.

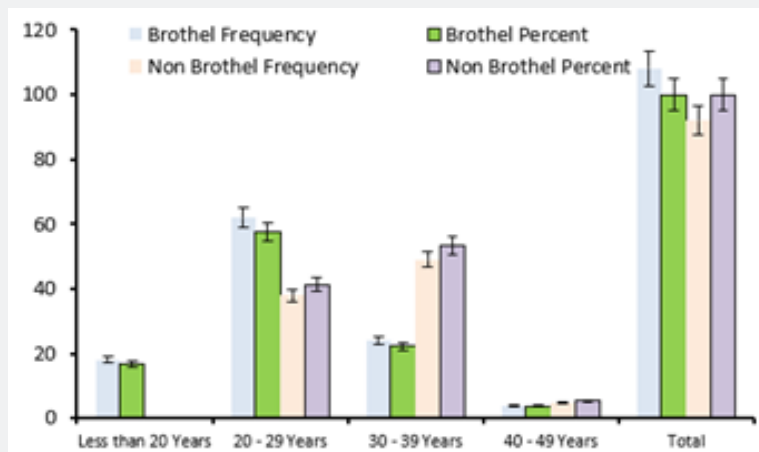


Figure 4: Bar Chart of Comparative Distribution of Age Groups of Brothel and Non-Brothel Based FSW.

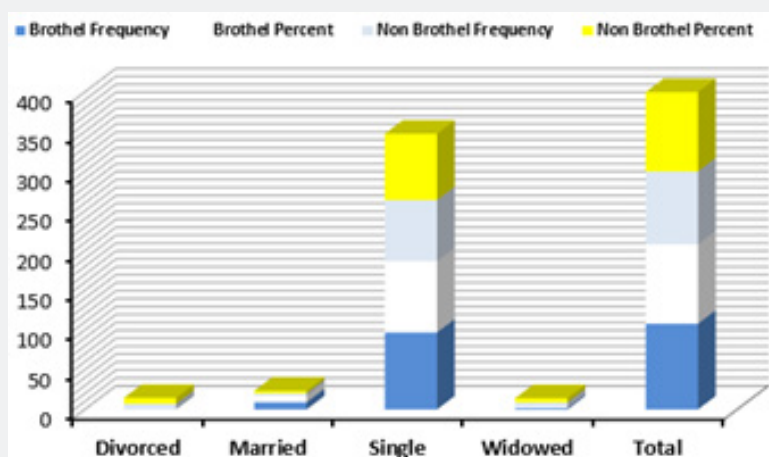


Figure 5: Bar Chart of Comparative Distribution of Marital Status of Brothel and Non-Brothel-Based FSW.

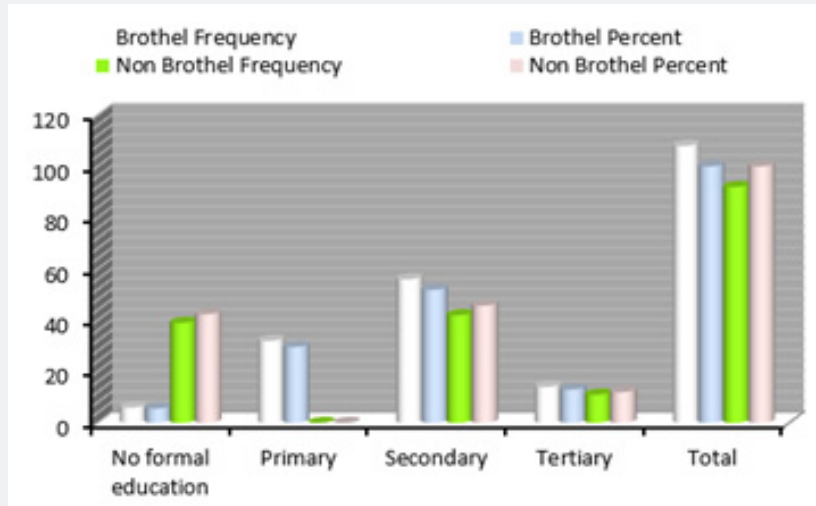


Figure 6: Bar Chart of Comparative Distribution of Educational Level of Brothel and Non-Brothel Based FSW.

Table 1: Prevalence of HIV Infection among Brothel and Non-Brothel FSW.

Group	Number Examined	Number Negative	Number Positive	Prevalence	Mann-Whitney U	p-value
Brothel	108	94	14	13.0%	4802.000	0.51
Non-Brothel	92	77	15	16.3%		
Total	200	171	29	14.5%		

Table 2: Distribution of HIV among FSW by Operational Venues at a 95% Confidence Interval.

Source		Frequency	Std. Error	95% Confidence Interval	
				Lower	Upper
Brothel	Negative	94 (87.0%)	3.2	80.6	92.6
	Positive	14 (13.0%)	3.2	7.4	19.4
	Total	108 (100.0%)	0	100	100
Non-Brothel	Negative	77 (83.7%)	3.8	76.1	90.2
	Positive	15 (16.3%)	3.8	9.8	23.9
	Total	92 (100.0%)	0	100	100

Table 3: Risk Estimate of HIV Infection for Brothel-Based and Non-Brothel-Based FSWs.

	Risk Value	95% Confidence Interval	
		Lower	Upper
Odd Ratio			
Brothel / Non-Brothel	1.308	0.595	2.877
Relative Risk			
For Brothel	1.139	0.763	1.699
For Non-Brothel	0.871	0.59	1.284

Discussion

General Prevalence of HIV among Female Sex Workers (FSW)

The study investigated the general epidemiological distribution of HIV sero-prevalence among female sex workers in

Rivers State, Nigeria and comparatively showed the distribution between brothel-based and non-brothel-based in addition to the illustration of specific HIV prevalence according to socio-demographic characteristics. Findings from this study confirmed a declining HIV prevalence among this key population.

Mohammed et al. reported HIV prevalence (24.75%) among Abuja (Nigeria) based FSW to be higher than the report obtained in this study (14.5%) [11]. On the contrary, a later study conducted in the Federal Capital Territory-Abuja demonstrated a lower HIV prevalence among commercial sex workers (7.01%) compared to this present study, although the commercial sex workers were the study group with the highest HIV infection notwithstanding the reported rate in the study [12]. Nevertheless, another study in Nigeria revealed higher HIV prevalence (20%) among FSWs compared to this study (14.5%) [13]. Generally, variations in the prevalence of HIV among FSWs exist as evident in this study among others. There are inter-country and intra-country variations. Specifically, a meta-analysis of HIV among FSWs in West Africa showed a disparity in the rate of HIV infection. The reported prevalence of HIV among FSWs was 20.1% among the Senegal population, while HIV prevalence rates of 25.7%, 26.6%, 30.4%, and 45.4% were presented for Burkina Faso, Côte d'Ivoire, Benin; and Togo respectively. A higher rate (68.6%) was observed in a study in Ghana and Benin [14]. On the other hand, there is more to the overall prevalence highlighted. Socio-demographic specific prevalence of HIV prevalence observed in this study has more information. Nonetheless, variations, as seen in different studies in different locations, may be promoted by different seeming factors; thus, variations in sample size, research design, method of assay deployed, and the environmental/social-economic situation of the subjects may perhaps encourage the prevalence variations seen across the board in the studies above.

Comparison of Venue-based (brothel and non-brothel) epidemiologic distribution of HIV Prevalence

The study established the comparative epidemiologic distribution of HIV infection among brothel-based and non-brothel-based female sex workers in Rivers State, Nigeria, with a reported general prevalence (14.5%) greater than the group-specific prevalence among brothel FSW (13.0%), but less than the prevalence among non-brothel-based FSW (16.3%). However, the study had an unequal sample distribution with more brothel-based compared to non-brothel-based. Remarkably, the sample size per group in this study is not equivalent to an earlier study which reported a lower number of brothel-based FSWs due to social problems, including the stigma associated with residing in brothels [1]. The findings of this study corroborated with a previous study showing a reduction in HIV prevalence among FSW in Nigeria, with brothel-based FSWs having a lower rate (13%) compared to non-brothel based FSW (16.3%) although the difference was not statistically significant. This study agrees comparatively with a study which reported lower rates of HIV prevalence among brothel-based (23%) compared to non-brothel-based (37%) in Nigeria as of 2007. The unequal result was presented in 2010 showing brothel-based FSWs to have an HIV prevalence of 16% while non-brothel-based had 28% [3]. The two reported results, however, showed statistical significance

compared to this study which demonstrated no evidence of a significant difference in the rates of HIV for the two groups. The rate of HIV infection reported in this study is lower than the observation of Okafor et al. which reported a higher rate for brothel, 746 (41.5%), and non-brothel, 1050 (58.5%). Moreover, comparing the venue with the highest HIV prevalence; this study contradicts a prior study which showed that brothel-based FSWs had a statistically lower prevalence compared to non-brothel-based FSWs [1].

The prevalence of HIV infection observed in this study which showed a decline can be attributed to the positive impact of HIV intervention programs such as; sexual health education, and the supply of some deliverables including condoms and reproductive and friendly services available for key populations [15]. Alternatively, it could be a reflection of the low prevalence of HIV in the general population. Although Ogbe et al. reported that the low rate could probably be due to varying sex work milieu [15]. In addition, the low rate of HIV prevalence observed in this study agrees with the research of Eluwa and colleagues who reported over a one-third significant decrease in the study of HIV prevalence trend among FSW between 2007 and 2010 (37% and 23%, respectively) [3]. The report supports a steeper reduction in the rate of HIV infection as reported among brothel-based FSWs in Jos, North-Central, Nigeria. The prevalence of HIV among brothel-based FSW obtained in this study is lower than what was observed in a previous study in the Jos-Plateau State of Nigeria (23.5%), according to Ogbe et al., and likewise the findings of the Integrated Biological and Behavioural Surveillance Surveys which reported higher HIV prevalence of 27.4% among brothel-based FSW in Nigeria [15,16]. Similarly, a Kano-based study among FSWs also reported a higher prevalence rate of 29.6% among brothel-based commercial sex workers, notwithstanding the level of HIV prevention interventions attained within the locality [17]. Equally, the prevalence of HIV estimated in this study is lower compared to a report from India - precisely the Southern region, even after the reported decline from 19.6% to 16.4% among sex workers in an interval of three years following the commencement of a large-scale HIV prevention intervention [18].

The explanation for the higher rate of HIV among non-brothel-based FSWs has not fully been explored and brought to eminence. Although, "the Nigerian government has made some proactive efforts to tackle the scourge of HIV with an overarching strategy in the form of a bottom-up policy for stakeholders and a multi-sector National Strategic Plan" according to [19]. Furthermore, there is an assumption that brothel-based FSWs enjoy some level of freedom due to their coordination and their clients do not have the right to coerce them as there are established guidelines and standards governing the practice which is not common in non-brothel venues due to the lack of regulations. Coercion and violence against FSW are issues affecting the non-brothel FSWs as adopting safe sexual practices in non-brothel venues (such

as nightclubs, and streets which were the main non-brothel venues included in this study) are challenging. Violence directly influences the adoption of safe sexual practices among FSWs [20]. Violent engagement in unsafe sexual practices, particularly against the will of the FSW, reflects the stigma and discrimination suffered by the FSW, which is strongly associated with adverse health outcomes [21,22]. Structural issues including stigma and discrimination are major barriers that deter some individuals as well as reduce their access to HIV prevention interventions and the use of health services as reported by [23]. Also, in a separate study in China found similar concerns about stigmatization and discrimination as hindrances with the consequence of high HIV prevalence among this special population [24].

Conclusion

The study confirmed a declining HIV prevalence among FSW, with brothel-based FSW having a lower prevalence rate compared to non-brothel-based, although no considerable disparity. Despite the established decline in HIV prevalence among FSWs in this study, generally, the prevalence of HIV established in this study is higher than the national prevalence. This explains the degree of work to be done to reduce the burden of HIV among this key population. The higher rate observed among the non-brothel-based FSWs reinforces the need for evidence-based HIV prevention intervention for this affected population to lessen the rate of this viral infection.

Recommendations

Expansion of HIV prevention intervention, which should be focused on reaching out to venue-oriented local context particularly the non-brothel based female sex workers which are the missing group and hard to reach is required. In other words, to further narrow down and understand holistically, the differences between brothel and non-brothel prevalence, demands that there is an urgent need for a comprehensive national estimate and increasing access to non-brothel FSW in order to close the gap in the distribution of HIV prevention intervention programs disparity. This is very critical to reduce the trend steadily to a minimum standard, if not complete eradication. Sex work and being a woman places the FSW at risk with high vulnerability to HIV infection. Addressing the legal context, including structural factors such as discrimination, criminalization, stigmatization and physical environment, is essential for attaining and sustaining an expanded venue-specific HIV intervention strategy for this high-risk population.

Limitation

The sample size used in this study under-represents the true population of FSWs in Rivers State, Nigeria. Also, the questionnaire was the source of information therefore, no guarantee of completely unbiased information. Thus, a more funded study would be required with a massive sample size representation.

References

1. Okafor UO, Crutzen R, Ifeanyi O, Adebajo S, Van den BH (2017) HIV prevalence and high-risk behavior of young brothel and non-brothel based female sex workers in Nigeria. *BMC Res Notes* 10(1): 380.
2. (2012) National Agency for the Control of AIDS, Nigeria. *Geographic Mapping Manual - Mapping key populations at a higher risk of HIV in Nigeria*. Abuja: National Agency for the Control of AIDS.
3. Eluwa G, Strathdee AS, Adebajo S, Ahonsi B, Azeez A (2021) Sexual Risk Behaviors and HIV among Female Sex Workers in Nigeria. *J Acquir Immune Defic Syndr* 61(4):507-514.
4. Rakhi D, Lalit D, Juan PG, Anil GK, Sam M (2005) High risk of HIV in non-brothel based female sex workers in India. *BMC Public Health* 5: 87.
5. Society for Family Health Nigeria (2009) *Assessing Behavior Change among HIV Risk Groups in Nigeria: Indirect Interventions through Civil Society Organizations*. Abuja, Nigeria: Society for Family Health. (16) (PDF) *Sexual Risk Behaviors and HIV among Female Sex Workers in Nigeria*.
6. Shahmanesh M, Wayal S (2004) Targeting commercial sex workers in Goa, India: time for a strategic rethink? *Lancet* 364: 1297-1298.
7. Kerrigan D, Kennedy C, Morgan TR, Sushena Reza PS, Mwangi P (2013) A community empowerment approach to the HIV response among sex workers: effectiveness, challenges, and considerations for implementation and scale-up. *AIDS Behav* 17: 1926-1940.
8. Bartholomew LK, Parcel GS, Kok G, Gottlieb NH, Fernandez ME (2011) *Planning health promotion programs: an intervention mapping approach*. 3rd ed. San Francisco: Jossey-Bass.
9. Weir SS, Morroni N, Coetzee N, Spencer J, Boerma JT (2002) A pilot study of a rapid assessment method to identify places for AIDS prevention in Cape Town, South Africa. *Sex Transm Infect* 78(Suppl 1): 106-113.
10. (2010) National AIDS/STI Control Programme Federal Ministry of Health, Nigeria. *HIV/STI Integrated Biological Behavioral Surveillance Survey (IBBSS)*. Abuja: Federal Ministry of Health.
11. Mohammed SB, Onoja AJ, Yaaba Y, Abubakar A (2018) Sero-Prevalence of HIV-1 among Commercial Sex Workers in Abuja, Federal Capital Territory, Nigeria. *Nigeria Journal of Pure & Applied Science* 31: 3129-3136.
12. Mohammed SB, Yakubu Y, Moses CA, John B (2019) Sero-Prevalence of Human Immunodeficiency Virus (HIV-1) among High-Risk Groups in Abuja, Nigeria. *Journal of Epidemiology* 9(1): 89-103.
13. George I, Eluwa SA, Strathdee SB, Adebajo B, Ahonsi AA (2012) Sexual Risk Behaviors and HIV among Female Sex Workers in Nigeria. *J Acquir Immune Defic Syndr* 61: 507-514.
14. Gaston D, Silas Q, Patrick SS (2014) HIV Epidemic among Key Populations in West Africa. *Curr Opin HIV AIDS* 9(5): 506-513.
15. Ogbé AE, Sagay GE, Imade J, Musa VC, Pam D (2015) Declining Prevalence of HIV and other Sexually Transmitted Infections Among Female Sex Workers In Jos, North-Central Nigeria. *Afr J Med Med Sci* 43(Suppl 1): 5-13.
16. (2010) National AIDS/STI Control Programme, Federal Ministry of Health. *HIV/STI Integrated Biological Behavioral Surveillance Survey (IBBSS)* Abuja, Nigeria: Federal Ministry of Health.
17. Lawan UM, Abubakar S, Ahmed A (2012) Risk Perceptions, Prevention and Treatment Seeking for Sexually Transmitted Infections and HIV/AIDS among Female Sex Workers in Kano, Nigeria. *Afr J Reprod Health* 16: 61-67.

18. Ramesh BM, Beattie TSH, Shajy I, Washington R, Jagannathan L (2010) Changes in risk behavior and prevalence of sexually transmitted infections following HIV prevention interventions among female sex workers in five districts in Karnataka state, south India. *Sex Transm Infect* 86: 17-24.
19. Adeniyi FF, Samson BA, Erhabor I (2016) Marital status and HIV prevalence among women in Nigeria: Ingredients for evidence-based programming. *Int J Infect Dis* 48: 57-63.
20. World Health Organization (WHO) (2017) Violence against sex workers and HIV prevention. In: *Violence Against Women and HIV/AIDS: Critical Intersections*.
21. Lima FSS, Merchan HE, Urdaneta M, Damacena GN, Szwarcwald CL (2017) Factors associated with violence against female sex workers in ten Brazilian cities. *Cad Saude Publica* 33: e00157815.
22. Pascoe EA, Smart RL (2009) Perceived discrimination and health: a meta-analytic review. *Psychol Bull* 135: 531.
23. King EJ, Maman S, Bowling JM, Moracco KE, Dudina V (2013) The influence of stigma and discrimination on female sex workers' access to HIV services in St. Petersburg, Russia. *AIDS Behav* 17: 2597-603.
24. Yang Y, Wang J, Lin F, Zhang T, Yu F (2015) Stigma against HIV/AIDS among female sex workers and general migrant women in eastern China. *BMC Womens Health* 15: 2.



This work is licensed under Creative Commons Attribution 4.0 License
DOI: [10.19080/JPCR.2023.09.555772](https://doi.org/10.19080/JPCR.2023.09.555772)

**Your next submission with Juniper Publishers
will reach you the below assets**

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats
(Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission
<https://juniperpublishers.com/online-submission.php>