

Predictors of Adherence to Pre-Exposure Prophylaxis among Female Sex Workers in South-Western Nigeria

Adenike Iyanuoluwa Olugbenga-Bello¹, Oluwatosin Samson Jegede^{2,*}, Norbertta Ekpen Anegbe², Goodman Olayinka³

¹Ladoke Akintola University of Technology, Ogbomoso, Nigeria

²LAUTECH Teaching Hospital, Ogbomoso, Nigeria

³Lagos State College of Medicine, Ikeja, Lagos, Nigeria

Corresponding author:

Oluwatosin Samson Jegede, LAUTECH Teaching Hospital, Ogbomoso, Nigeria

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Abstract:

Introduction: Pre-exposure prophylaxis (PrEP) is an element of the biomedical interventions of Human Immunodeficiency virus (HIV) prevention. The level of protection is strongly correlated to PrEP drug adherence. In Nigeria, the prevalence of HIV among female sex workers (FSW) is 15.5%. The 2020 integrated biological and behavioral surveillance

survey did not report on PrEP adherence among FSW. This study therefore assessed the level of adherence to PrEP and its predictors among FSW in South-Western Nigeria.

Methodology: This cross-sectional analytical study was conducted in 2021. Study population were brothel-based FSW at Gambari Ogbomoso and Lagos, Nigeria. A total of 156 FSW participated in the study. Data was collected using interviewer-administered semi-structured questionnaire and analyzed using IBM SPSS Version 25.

Results: One hundred and forty-nine properly completed questionnaires were analyzed. Ninety-nine respondents (66.4%) have been working for more than 5 years as a FSW and 65 (43.6%) had initiation of sex work before 18 years of age. Respondents' sexual behavior showed that 55 (36.9%) of total respondents had consistent use of condom. One hundred and thirty-four respondents (89.9%) had good knowledge of PrEP, 97 (65.1%) had good attitude towards PrEP while 111 (74.5%) had good perception of risk of HIV infection. One hundred and thirty-two (88.6%) reported to be taking PrEP and 119 (79.9%) had good adherence

to PrEP. Predictors of adherence to PrEP were educational status, age of commencement of sex work and monthly income. It was found that educated sex workers were 2.67 times more likely to adhere to PrEP (OR=2.67, 95% CI=1.280-5.591, $p=0.019$). Those who commenced sex work after clocking 18 years of age were 75% times less likely to adhere to PrEP (OR=0.251, 95% CI=0.106-0.597, $p=0.001$) while those with average monthly income more than #10,000 were 1.65 times more likely to adhere to PrEP (OR=1.65, 95% CI=0.674-4.042, $p=0.0275$).

Discussion and Recommendation: The level of adherence to PrEP is considerably high and underscores a positive effect of the efforts of the Government of Nigeria in controlling HIV as a threat by 2030. Further studies would be useful to understand the behavioral factors associated with low adherence to PrEP among FSW who have spent more than 5 years in sex work.

Introduction

Human Immunodeficiency virus (HIV) continues to be a major global public health issue. Nigeria has a mixed HIV epidemic and the prevalence and transmission dynamics of HIV vary across geo-political zones and population groups. The south-south states have a prevalence of 3.1% while the southwestern states have a prevalence of 1.2%. Six states in Nigeria (Kaduna, Akwa-Ibom, Benue, Lagos, Oyo and Kano) account for 41% of people living with HIV.¹ The key populations for HIV transmission are female sex workers (FSW), people who inject drugs (PWIDs), gay men and other men who have sex with men (MSM), transgender people, and people in prisons and other closed settings.²

Pre-exposure prophylaxis (PrEP) is one of the elements of biomedical interventions of HIV prevention for sex workers. Pre-exposure prophylaxis is a strategy developed to prevent individuals who are Human Immunodeficiency Virus (HIV) negative from developing HIV infection.³ Pre-exposure prophylaxis (PrEP) is a medication people at risk for HIV take to prevent getting HIV from sex or injection drug use. It reduces the risk of

getting HIV from sex by about 90% and injection drug use by at least 74%.⁴ The level of protection is strongly correlated with PrEP drug adherence.

In Nigeria, the preferred daily oral dose regimen for PrEP is the combination of TDF +FTC (Tenofovir + Emcitrabine). The alternate regimen for PrEP is a daily dose of TDF. These drugs are to be taken indefinitely until the individual no longer qualifies as high risk for HIV.⁵

In 2012, the World Health Organization (WHO) developed guidelines for PrEP for serodiscordant couples, MSM, and transgender people (TG) at high risk of HIV.⁶ However, based on further evidence of the effectiveness and acceptability of PrEP, in September 2015, it became recommended that PrEP should be offered only to HIV negative individuals who are at risk of being infected with HIV such as 1) serodiscordant couples 2) commercial sex workers 3) people who inject drugs and 4) individuals who engage in anal sex on a prolonged and regular basis.⁵

WHO defines sex work as the provision of sexual services for money or goods. FSW exchange anal, vaginal or oral sex for money and other items of value primarily with men. In Nigeria, most sex workers are females. The operational characteristics of female sex workers vary considerably across Nigeria. For example, in Lagos 40% of FSW operate through hotels and lodges, 27% in bars, night clubs or casinos, 21% in brothels and 6% in public places where they solicit for clients. There are several groupings of sex work viz Brothel-based sex work, Street-Based sex work, Home-Based sex work, Venue-Based sex work, Internet-Based sex work etc. The risk of HIV and other Sexually Transmitted Diseases (STDs) is high among persons who exchange sex for money or non-monetary items.³

Although sex workers are one of the groups most affected by HIV, they are also one of the groups most likely to respond well to HIV prevention programmes.⁷ To achieve the 90-90-90 targets, UNAIDS emphasizes the need to focus on 5 prevention pillars delivered through a rights based, people centred, combination approach of which the fifth pillar is to provide PrEP to 3 million people

at high risk of HIV.⁸

In Uganda, PrEP roll out started in 2017 using a phased approach, initially offered at public health facilities that provide care to high-risk populations. A study done four years after showed a large proportion of participants (71.4%) were said to have high adherence to PrEP.⁹ It's been documented that 37,736 people in Nigeria are currently receiving PrEP.¹⁰ However, there has been no national record of adherence to PrEP among female sex workers (FSW).

Statement of the Problem

Sex workers are among the highest risk groups for HIV. Globally, they make up to 9% of the total number of new HIV infections. They are 13 times more at risk of HIV compared to the general population due to an increased likelihood of being economically vulnerable, unable to negotiate consistent condom use and experiencing violence, criminalization and marginalization.⁷

A major risk factor for HIV infection among female sex workers in Nigeria is their underestimation of the risk of infection. They rationalize, defend or justify their high-risk behaviours. "They believe in fatalism, predestination and faith-based invulnerability to HIV infection. They also experience a high level of HIV related stigma. Brothel based female sex workers reported less condom use with boyfriends and casual partners than non-brothel based female sex workers, whereas injection-drug use was reported higher among non-brothel based than among brothel-based female sex workers."³

Nigeria has the fourth largest epidemic in the world as 1.7million people¹⁰ were living with HIV in 2019. UNAIDS estimated that, in 2019 about two-thirds of new HIV infections in West and Central Africa occurred in Nigeria. Adult aged 15-49 HIV prevalence rate is 1.3% with 65,000 new infections and 37,000 deaths due to AIDS among this age group.¹⁰ Unprotected heterosexual sex accounts for 80% of new HIV infections in Nigeria with the majority of remaining HIV infections, occurring in key affected population such as sex workers.¹¹

The estimated sex workers population in Nigeria

is 874,000.¹² The HIV prevalence among sex workers is eight times higher than the general population. Female sex workers have a prevalence of 15.5%.¹⁰ Female sex workers in Nigeria face violence and abuse which are structural risk factors for increasing their risk for HIV infection and Sexually Transmitted Infections (STI).¹² They experience economic, physical, sexual and psychological abuses from clients, brothel management and the police. It is estimated that about 20-40% of female sex workers began selling sex before the age of 18years.³

A study done in Nigeria revealed that fewer than half of the female sex workers were interested in the use of PrEP, however numerous individual and structural barriers such as stigma, cost, frequency of HIV counseling and treatment services required, lack of peer educators and HIV test counselors who would provide information and refer clients to clinics that provide PrEP; are predictors to adherence.¹³

Justification

Nigeria may not reach its UNAIDS goals to end AIDS by 2030 without specifically addressing the epidemics among key populations including female sex workers. Many literatures in Nigeria have focused on assessing interventions for HIV prevention including acceptability of PrEP among FSW, specific considerations on predictors of adherence of female sex workers to PrEP is lacking. For instance, the 2020 integrated biological and behavioral surveillance survey did not report on PrEP adherence among FSW. Our study therefore assessed the level of adherence to PrEP and its predictors among FSW in South-Western Nigeria. We hope that the results of this study will be used to inform a nationwide scale up of PrEP among FSW as part of a comprehensive HIV prevention package.

Methodology

The study was cross-sectional analytical in design and was conducted between August and September 2021. A sample size of 149 was used for this study. The study population were brothel-based female sex workers in Gambari Ogbomosho and Lagos; both in Southwest, Nigeria.

A non-probability sampling technique was used to select the study participants above the age of 18 years who gave consent to participate in the study. Data was collected using interviewer-administered semi-structured questionnaire and analyzed using IBM SPSS version 25. Descriptive statistics was done for sociodemographic characteristics and to depict the respondents' sexual behavior. Chi-square test was used to test for association between sexual behavior, knowledge, risk perception attitude and adherence to PrEP among female sex workers. Multivariate logistic regression analysis was done to identify the predictors of adherence to PrEP.

Ethical clearance was sought and received from the Ethical Review Committee of LAUTECH Teaching Hospital, Ogbomoso, Oyo State.

Results

One hundred and forty-nine (149) questionnaires were collected and analysed. Of the total respondents 16 (10.7%) were university graduates, 73 (48.9%) were school drop-outs (both primary and secondary schools) and 12 (8.1%) did not have any formal education. In terms of duration of sex work, 99 (66.4%) respondents have been working for more than 5 years and 65 (43.6%) had initiation of sex work before 18 years of age. The number of FSW who practice their work every day were one hundred and fifteen (77.2%). The average monthly income (both from sex work and other works) earned by 36.2% of respondents was above #20,000 while 49 (32.9%) respondents earned less than #10,000. The location of practice for 99 (66.4%) FSW was Lagos while 50 (33.5%) were working in Gambari Ogbomoso. As regards marital status 7 (11.4%) were married while the others were unmarried (Table 1).

Table 2 below shows that 90 (60.4%) of total respondents use condoms at varied frequencies (i.e most of the time and sometimes) as depicted by 58 (38.9%) and 32 (21.5%) respectively while 55 (36.9%) use condom every time. In the month preceding the research, forty-three (28.9%) of respondents have had anal sex with occasional clients and 5 (3.4%) with regular clients. The number of those who currently have a regular, non-paying

sexual partners were 139 (93.3%) out of which, 23.1% have had anal sex without condom.

Figure 1, Figure 2, Figure 3, Figure 4 shows the knowledge, attitude, use of PrEP and adherence to PrEP respectively. Of the total 149 respondents, 134 (89.9%) had good knowledge of PrEP, 97 (65.1%) had positive attitude to PrEP and 132 (88.6%) reported to be using PrEP. Out of the 132, 119 (79.9%) had good adherence to PrEP use.

The table 3 below shows a bivariate analysis of the association between socio-demographic characteristics and adherence to PrEP. It was found that educational status, duration of sex work, age at commencement of sex work, approximate number of occasional clients, average monthly income and marital status were significantly associated with adherence to PrEP.

Table 4 below shows bivariate analysis of the association between respondents' sexual behavior, knowledge about PrEP, perception of risk of HIV infection, attitude towards PrEP and adherence to PrEP. The association between overall perception and adherence to PrEP is statistically significant ($p=0.017$), while the overall sexual behavior, knowledge and attitude of respondents do not show statistically significant association with adherence to PrEP.

The seven variables (educational status, duration of sex work, age at commencement of sex work, approximate number of occasional clients, average monthly income, marital status and perception of risk of HIV infection) which were statistically associated with adherence to PrEP in bivariate analysis were included in a multivariate logistic regression analysis to ascertain the predictors of adherence to PrEP. Educational status, age of commencement of sex work and monthly income were found to be independent predictors of adherence to PrEP.

Table 5 shows the predictors of respondents' adherence to medication. The educated female sex workers were 2.67 times more likely to adhere to PrEP at 95% CI=1.280 -5.591, and $p=0.355$. FSWs who commenced sex work after the age of 18 years were 75%

Table 1. Socio-demographic and socio economic characteristics of respondents (n=149)

| Variables | Frequency | Percentage |
|---------------------------------------------------------------------------------|-----------|------------|
| Highest level of education completed | | |
| No formal | 12 | 8.1 |
| Did not complete primary school | 31 | 20.8 |
| Completed primary education | 27 | 18.1 |
| Did not complete secondary education | 42 | 28.2 |
| Completed secondary education | 21 | 14.1 |
| Graduate | 16 | 10.7 |
| Duration of sex work (years) | | |
| ≤ 5 | 99 | 66.4 |
| 6-10 | 39 | 26.2 |
| >10 | 11 | 7.4 |
| Age of commencement of sex work (years) | | |
| ≤ 15 | 17 | 11.4 |
| 16-18 | 48 | 32.2 |
| >18 | 84 | 56.4 |
| In the past week, approximate number of clients (occasional clients) | | |
| ≤ 5 | 37 | 24.8 |
| 6-10 | 52 | 34.9 |
| >10 | 41 | 27.5 |
| In the past week, approximate number of clients (repeat clients) | | |
| ≤ 5 | 71 | 47.7 |
| 6-10 | 41 | 27.5 |
| >10 | 37 | 24.8 |
| In the past month, approximate number of days involved in sex work | | |
| ≤ 10 | 13 | 8.7 |
| 10-20 days | 21 | 14.1 |
| Everyday | 115 | 77.2 |
| In past month, average monthly income (includes sex work and other work) | | |
| ≤ 10000 | 49 | 32.9 |
| 11000 - 20000 | 46 | 30.9 |
| >20000 | 54 | 36.2 |
| Location of sex work | | |
| Lagos | 99 | 66.4 |
| Gambari Ogbomoso | 50 | 33.5 |
| Marital status | | |
| Never married | 97 | 65.1 |
| Married | 17 | 11.4 |
| Widow/widower | 1 | 0.7 |
| Divorced | 26 | 17.4 |
| Separated | 8 | 5.4 |

*Multiple responses allowed

Table 2. Respondents sexual behaviours (n=149)

| Variables | Frequency | Percentage |
|----------------------------------------------------------------------------------------------|-----------|------------|
| In the past week, frequency of use of condom when having sex with occasional clients. | | |
| Never | 4 | 2.7 |
| Sometimes | 32 | 21.5 |
| Most of the time | 58 | 38.9 |
| Every time | 55 | 36.9 |
| Use of condom the last time worker had sex with an occasional client | | |
| Yes | 143 | 96.0 |
| No | 6 | 4.0 |
| In the past month, was there anal sex with any occasional clients | | |
| Yes | 43 | 28.9 |
| No | 106 | 71.1 |
| Use of condom when having anal sex with an occasional client the last time. | | |
| Yes | 2 | 4.7 |
| No | 41 | 95.3 |
| In the past week, frequency of use of condom when having sex with regular clients | | |
| Never | 6 | 4.0 |
| Sometimes | 18 | 12.1 |
| Most of the time | 57 | 38.3 |
| Every time | 68 | 45.6 |
| Use of condom the last time sex worker had sex with a regular client | | |
| Yes | 142 | 95.3 |
| No | 7 | 4.7 |
| In the past month, was there anal sex with any regular clients | | |
| Yes | 5 | 3.4 |
| No | 144 | 96.6 |
| Use of condom when having anal sex with regular clients. | | |
| Yes | 1 | 20.0 |
| No | 4 | 80.0 |
| Current regular non-paying sexual partner (husband/boyfriend) | | |
| Yes | 139 | 93.3 |
| No | 10 | 6.7 |
| In the past week, use of condom when having sex with husband/boyfriend? | | |
| Sometimes | 24 | 17.3 |
| Most of the time | 64 | 46.0 |
| Every time | 51 | 36.7 |
| Use of condom the last time worker had sex with husband/boyfriend | | |
| Yes | 93 | 66.9 |
| No | 46 | 33.1 |
| In the past month, was there anal sex with husband/boyfriend | | |
| Yes | 39 | 28.1 |
| No | 100 | 71.9 |
| Use of condom the last time FSW had anal sex with husband/boyfriend | | |
| Yes | 30 | 76.9 |
| No | 9 | 23.1 |

Table 3. Association between respondents' Sociodemographic characteristics and sexual history and their level of adherence to PrEP

| Variables | Adherence on prep | | X ² | df | P-value |
|--------------------------------------------------------------------------------|-------------------|------------|----------------|----|---------|
| | Adhere | Not adhere | | | |
| Highest level of education you completed | | | | | |
| No formal | 10(83.3) | 2(16.7) | 26.533 | 5 | *<0.001 |
| Did not complete primary school | 24(77.4) | 7(22.6) | | | |
| Completed primary education | 24(88.9) | 3(11.1) | | | |
| Did not complete secondary education | 40(95.2) | 2(4.8) | | | |
| Completed secondary education | 15(71.4) | 6(28.6) | | | |
| Graduate | 6(37.5) | 10(62.5) | | | |
| Duration of sex work (years) | | | | | |
| ≤ 5 | 82(82.8) | 17(17.2) | 8.756 | 2 | *0.013 |
| 6-10 | 32(82.1) | 7(17.9) | | | |
| >10 | 5(45.5) | 6(54.5) | | | |
| Age of commencement of sex work (years) | | | | | |
| ≤ 15 | 15(88.2) | 2(11.8) | 16.667 | 2 | *<0.001 |
| 16-18 | 29(60.4) | 19(39.6) | | | |
| >18 | 75(89.3) | 9(10.7) | | | |
| In the past week, approximately number of clients (occasional clients) | | | | | |
| ≤ 5 | 30(81.1) | 7(18.9) | 6.259 | 2 | *0.044 |
| 6-10 | 36(69.2) | 16(30.8) | | | |
| >10 | 37(90.2) | 4(9.8) | | | |
| In the past week, approximately number of clients (repeat clients) | | | | | |
| ≤ 5 | 53(74.6) | 18(25.4) | 2.192 | 2 | 0.334 |
| 6-10 | 34(82.9) | 7(17.1) | | | |
| >10 | 4(100.0) | 0(0.0) | | | |
| In past month, Average monthly income (include sex work and other work) | | | | | |
| ≤ 10000 | 44(89.8) | 5(10.2) | 9.547 | 2 | *0.008 |
| 11000 - 20000 | 30(65.2) | 16(34.8) | | | |
| >20000 | 45(83.3) | 9(16.7) | | | |
| Marital status | | | | | |
| Never married | 90(92.8) | 7(7.2) | 37.685 | 4 | *<0.001 |
| Married | 13(76.5) | 4(23.5) | | | |
| Widow/widower | 1(100.0) | 0(0.0) | | | |
| Divorced | 11(42.3) | 15(57.7) | | | |
| Separated | 4(50.0) | 4(50.0) | | | |

*Statistically significant at p<0.05

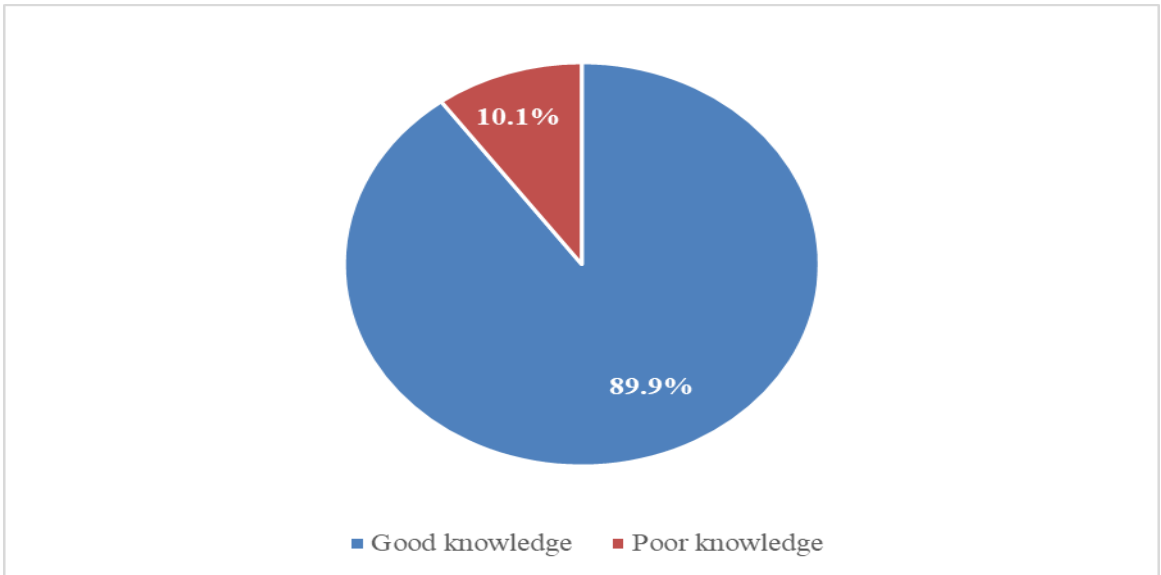


Figure 1. Knowledge of respondents on PrEP

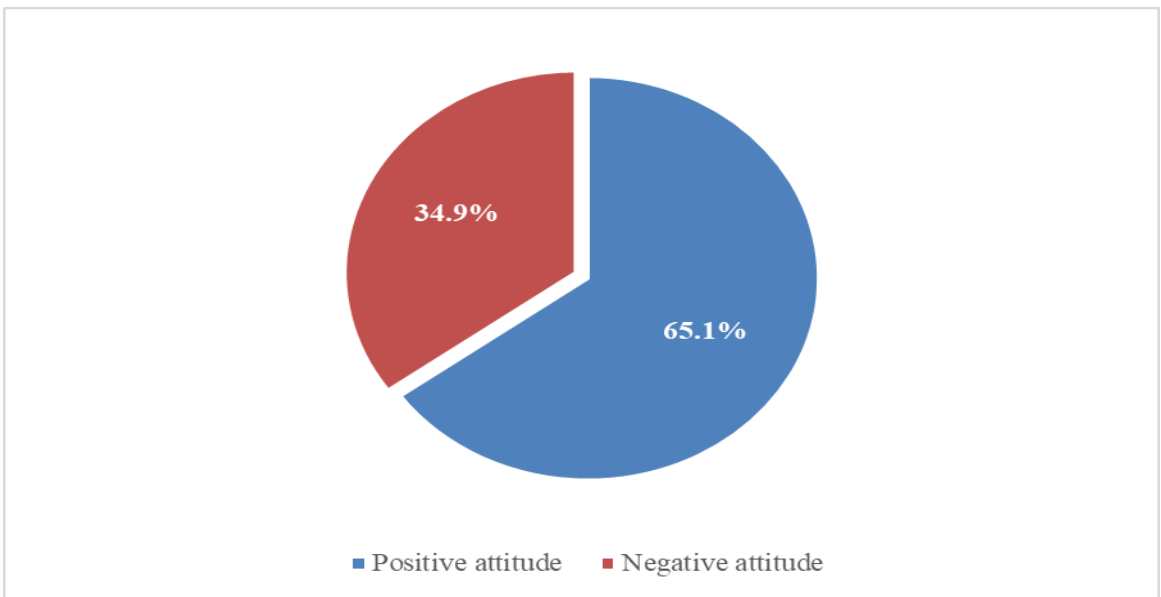


Figure 2. Attitude of respondents to PrEP.

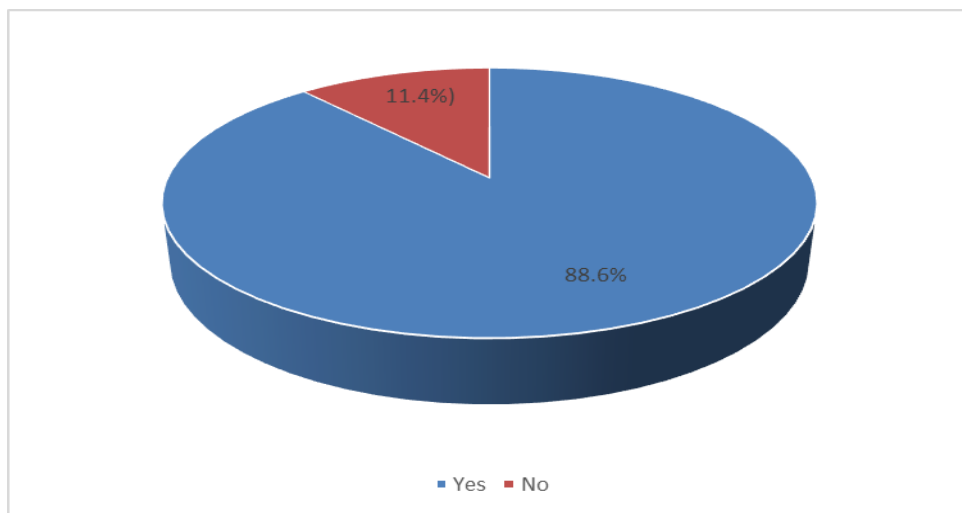


Figure 3. Utilization of PrEP among respondents.

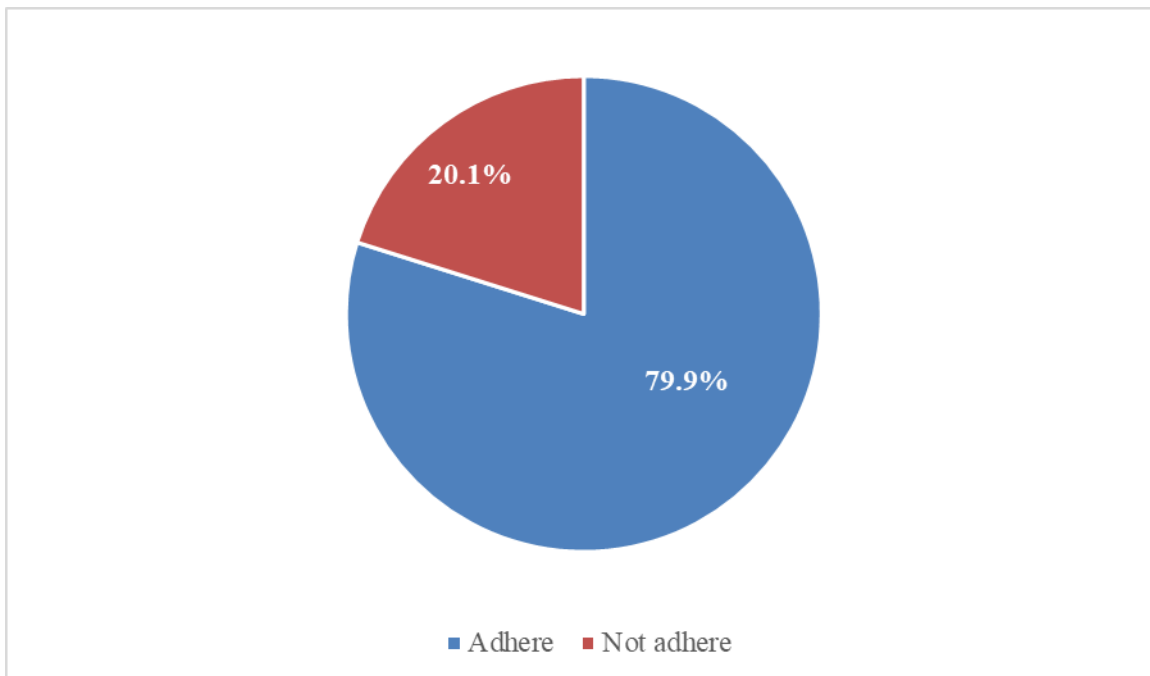


Figure 4. Adherence to PrEP by respondents.

Table 4. Association between respondents' knowledge about PrEP, their sexual behavior, perception, attitude and Adherence to PrEP

| Variable | Overall Adherence | | X ² | Df | P-value |
|----------------------------------------------------|-------------------|------------|----------------|----|---------|
| | Adhere | Not Adhere | | | |
| Overall sexual behavior | | | | | |
| Poor | 55(82.1) | 12(17.9) | 0.374 | 1 | 0.344 |
| Good | 64(78.0) | 18(22.0) | | | |
| Overall knowledge about PrEP | | | | | |
| Good knowledge | 110(82.1) | 24(17.9) | 4.093 | 1 | 0.052 |
| Poor knowledge | 9(60.0) | 6(40.0) | | | |
| Overall Perception of risk of HIV infection | | | | | |
| Good | 96(86.5) | 15(13.5) | 5.710 | 1 | *0.017 |
| Poor | 38(100.0) | 0(0.0) | | | |
| Overall Attitude towards PrEP | | | | | |
| Positive | 79(81.4) | 18(18.6) | 0.430 | 1 | 0.326 |
| Negative | 40(76.9) | 12(23.1) | | | |

*Statistically significant at p <0.05

Table 5. Predictors of respondents adherence to medication

| Explanatory factors | B | OR(95% CI) | df (p-value) |
|-------------------------------------------------------------------------------------------------------------|--------|--------------------|--------------|
| Educational status Not educated (<i>Ref</i>) Educated | 0.984 | 2.675(1.280-5.591) | 1(0.019*) |
| Duration of sex work (years) ≤ 5 (<i>Ref</i>) >5 | -1.443 | 0.236(0.012-4.629) | 1(0.342) |
| Age of commencement of sex work (years) ≤ 18 (<i>Ref</i>) >18 | 0.758 | 0.251(0.106-0.597) | 1(0.001*) |
| In the past week, approximately number of clients (occasional clients) ≤ 5 (<i>Ref</i>) >5 | -0.043 | 0.958(0.242-3.797) | 1(0.951) |
| In the past week, approximately number of clients (repeat clients) ≤ 5 (<i>Ref</i>) >5 | 0.685 | 1.984(0.464-8.472) | 1(0.355) |
| In past month, Average monthly income (include sex work and other work) ≤ 10000 (<i>Ref</i>) >10000 | 0.500 | 1.648(0.672-4.042) | 1(0.0275*) |
| Marital status Never married (<i>Ref</i>) Ever Married | -0.058 | 0.944(0.607-1.467) | 1(0.797) |
| Overall Perception of risk of HIV infection Good (<i>Ref</i>) Poor | 0.896 | 0.181(0.023-1.421) | 1(0.069) |

Omnibus test; $X^2 = 16.417$, p-value=0.355. Correct classification; 77.8%

(Ref): Reference Category

times less likely to adhere to PrEP at 95% CI=0.106-0.597, and $p=0.001$). In addition, those whose average monthly income was more than #10,000 were 1.65 times more likely to adhere to PrEP at 95% CI= 0.674 - 4.042, $p=0.355$.

Discussion

The socio-demographic distribution of this study population showed that a small proportion of sex workers were university graduates. This finding is similar to the results from another study conducted in Kenya where a proportion of those engaged in sex work were graduates.¹⁴ Whereas our study showed that a small proportion of individuals (8.1%) had no formal education, and 48.9% were school drop-outs; a previous study showed that 78.1% stopped schooling before high school.¹⁵ This may have resulted from the low socio-economic level in Nigeria acting as a barrier to accessing quality education.

Findings here on the duration of sex work of greater than 5 years is different from the result of a previous study where the mean duration of prostitution was 10 years.¹⁶ It was found that the longer a sex worker has spent in sex work, the higher the tendency to be exposed to various HIV prevention interventions including PrEP. Our study found that initiation of sex work was before 18 years of age among 43.6% which is a lower proportion compared to another study which showed a higher proportion (63%) of sex workers initiating sex work before 19 years.¹⁷

Early onset of sex work might invariably lead to new HIV infections as risk perception will be low at such age. Also, the sex workers may not be able to practice safe sexual behaviors' like insisting on condom use with their clients or even having access to PrEP. These high-risk sexual practices lead to vulnerabilities to HIV and STI. A study conducted in China supports this reasoning by showing that those who initiated sex work over the age of 20 years were negatively associated with condom use and gave possible reason for this as the competition those >20 years face from younger FSW for clients, and as such do not negotiate consistent condom use with clients.¹⁸

The average monthly income of one third of the

respondents was between #11,000 and #20,000 and this finding is lower than the average monthly earning of #50,000 among commercial sex workers in a study conducted in Zaria, Nigeria.¹⁹ The average monthly income from our study is lower than the average monthly wage of low skilled workers in the Nigerian Public Service. This implies that money might not be the main reasons why many FSW engage in this job but underscores the need for government to improve access to adolescent health services to, at least, discourage the early initiation of sex work.

This study revealed a small proportion of participants were married. This is similar to another study where 95.5% were single and 5.5% married.¹⁴ This finding was not unexpected as, culturally, individuals in a marital relationship are not expected to engage in extra-marital sex. Worthy of note is the proportion of FSW who are married and probably be raising children. These group might benefit from good adherence to PrEP in preventing HIV infection among themselves and their children.

We found that all respondents have used condom while engaging in sexual activities with their clients which was similar to the findings in a study done at India.¹⁷ However, consistent condom use is seen in a little above one-third of our respondents. This may be attributed to sensitization programs organized to improve the practice of consistent and correct use of condoms. Also, sex workers who are involved with regular non-paying sexual partners such as boyfriends and husbands have condom use practiced by 76.9% of respondents. In another study conducted in China, condom use with non-paying partners (boyfriends and husband) was lower (34.3%) in comparison to our study.¹⁵ The public health significance of our finding is that female sex workers reporting a non-paying sexual partner are more likely to be exposed to and utilize HIV prevention services than those who have paying partners. This may have resulted from the drive to protect their loved ones from HIV including their unborn children.

Our study showed that a majority of the

respondents had good knowledge about PrEP. This is higher than the outcome of a previous study where just 21% were aware of PrEP.²⁰ This can be attributed to health education given to these FSW on PrEP in the past. We also found that two-thirds had a positive attitude to PrEP. Also, a large proportion of the study population adhere to PrEP. This study showed that overall perception to risk of HIV infection is statistically associated with level of adherence as those with good perception adhere to the use of PrEP. A previous study had also showed that low risk perception to acquiring HIV infection was found to be a contributing factor towards non-adherence.^{21,22}

This study showed that the level of education, early age at initiation of sex work, and average monthly income individually predict level of adherence to PrEP. A study in East Africa also reported an association between young age of initiation of sex work less than 25 years and a PrEP adherence of less than 80%.²² A previous study showed other predictors of adherence which included household expenditure monthly, consistent use of condoms, alcohol use and satisfaction with health service provision.²² Other predictor variables in another study were lack of knowledge, lifestyle modification, social values and stigma.²¹ Knowledge of these predictors can serve as a basis for interventions to improve adherence of PrEP among FSW. The general improvement in standard of living by government policies and programmes is key to improved educational status and this might discourage the commencement of sex work at an early age and for those who are already involved in such work, positive educational status will contribute to understanding the benefits of PrEP and adherence to its use.

Those who earn >#10,000 monthly income may adhere to PrEP probably because of the availability of funds to access and procure PrEP medication in clinics where PrEP service is offered. However, to increase access to other FSW whose average monthly income is small, it is important that the drugs be given free just in the same way ARVs are giving free to HIV positive clients.

Conclusion

The level of adherence to PrEP is considerably high and underscores a positive effect of the efforts of the Government of Nigeria in controlling HIV as a threat by 2030. However, there is a low adherence to PrEP among FSW who have spent more than 5 years in sex work.

Recommendations

Considering that low level of education has been identified as a predictor of poor adherence to PrEP, a high level advocacy for a compulsory enrollment in school and the provision of subsidized tuition fees for vulnerable females and the girl child will impart positively in reducing early onset of sex work. There is also a need to promote adolescent health and sexual education in schools. This will go a long way in equipping students with relevant knowledge about sexual health, vulnerability to HIV and HIV prevention packages and in helping them to make informed decisions about PrEP and its adherence if they go into sex work in future.

Government and Non-Governmental Organisations are encouraged to increase awareness of female sex workers on PrEP and adherence to PrEP. There is also a need to use innovative approaches to ease the financial access to key population (KP) friendly clinics and one-stop shops offering PrEP and other HIV prevention services.

Further studies would be useful to understand the behavioral factors associated with low adherence to PrEP among FSW who have spent more than 5 years in sex work.

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