



## Original Article

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## Awareness of and willingness to use pre-exposure prophylaxis to prevent HIV infection among female sex workers in Anambra State, south-eastern Nigeria

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### Abstract:

**Background:** Pre-exposure prophylaxis (PrEP) is a highly effective preventive measures against HIV infection but its success is strongly based on adherence, which in turn depends on willingness to use. This study is aimed at assessing the level of awareness and willingness to use PrEP to prevent HIV infection among female sex workers (FSWs) in Anambra State, Nigeria, and to identify factors that influence willingness to use PrEP.

**Methodology:** The study was a cross-sectional survey involving 265 brothel-based FSWs recruited through snowballing technique. A structured questionnaire was used to collect relevant information on demographic characteristics, awareness of HIV/AIDS and transmission route, attitudes/behavior related to HIV/AIDS, and awareness of and willingness to use PrEP. Univariate and bivariate analyses with Chi square test (with Odds ratio and 95% confidence interval) was used to determine association of socio-demographic and predictive factors with willingness to use PrEP. Statistical significance was considered when *p* value was less than 0.05.

**Results:** Of 265 FSW respondents, only 81 (31.2%) have heard of PrEP, 10 (3.9%) indicated they have previously used PrEP while 91.0% indicated willingness to use PrEP. Univariate analysis showed that FSWs in Onitsha had a significantly higher odds (OR=28.6, 95% CI=1.718-476.82, *p*=0.0006) while those from Awka had a significantly lower odds (OR=0.184, 95% CI=0.0704-0.1812, *p*=0.0004) of willingness to use PrEP. Also, FSWs with monthly income less than 18,000 Naira had a lower odd of willingness to use PrEP (OR=0.3980, 95% CI=0.1593-0.9945, *p*=0.08). Bivariate analysis shows that FSWs who wish to have more knowledge of HIV/AIDS had higher odd of willingness to use PrEP than those who did not wish to have more knowledge (OR=4.235, 95% CI=1.577-11.374, *p*=0.0066). Similarly, FSWs who are worried of being discriminated against have a lower odd of willingness to use PrEP than those who are not worried of being discriminated against (OR=0.3921, 95% CI=0.1582-0.9718, *p*=0.0439).

**Conclusion:** Our study showed low awareness but high willingness to use PrEP among FSWs in Anambra State, Nigeria. Cost, HIV/AIDS knowledge and fear of discrimination are significant predicting factors of willingness to use HIV PrEP and should be considered when formulating PrEP policy. Adequate enlightenment on PrEP should be emphasized among FSWs.

**Keywords:** HIV; pre-exposure prophylaxis; awareness, willingness to use; female sex workers

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## Sensibilisation et volonté d'utiliser la prophylaxie pré-exposition pour prévenir l'infection à VIH chez les travailleuses du sexe dans l'État d'Anambra, au sud-est du Nigéria

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## Résumé:

**Contexte:** La prophylaxie pré-exposition (PrEP) est une mesure préventive très efficace contre l'infection par le VIH, mais son succès repose fortement sur l'observance, qui à son tour dépend de la volonté de l'utiliser. Cette étude vise à évaluer le niveau de sensibilisation et de volonté d'utiliser la PrEP pour prévenir l'infection par le VIH chez les travailleuses du sexe (FSW) dans l'État d'Anambra, au Nigeria, et à identifier les facteurs qui influencent la volonté d'utiliser la PrEP.

**Méthodologie:** L'étude était une enquête transversale impliquant 265 FSW de bordel recrutés par la technique de la boule de neige. Un questionnaire structuré a été utilisé pour recueillir des informations pertinentes sur les caractéristiques démographiques, la connaissance du VIH/SIDA et de la voie de transmission, les attitudes/comportements liés au VIH/SIDA, et la connaissance et la volonté d'utiliser la PrEP. Des analyses univariées et bivariées avec test du Chi carré (avec rapport de cotes et intervalle de confiance à 95%) ont été utilisées pour déterminer l'association des facteurs sociodémographiques et prédictifs avec la volonté d'utiliser la PrEP. La signification statistique a été considérée lorsque la valeur  $p$  était inférieure à 0,05.

**Résultats:** Sur 265 répondants FSW, seuls 81 (31,2%) ont entendu parler de la PrEP, 10 (3,9%) ont indiqué avoir déjà utilisé la PrEP tandis que 91,0% ont indiqué leur volonté d'utiliser la PrEP. L'analyse univariée a montré que les FSW d'Onitsha avaient une cote significativement plus élevée (OR=28,6, IC à 95%=1,718-476,82,  $p=0,0006$ ) tandis que ceux d'Awka avaient une cote significativement plus faible (OR=0,184, IC à 95%=0,0704-0,1812,  $p=0,0004$ ) de volonté d'utiliser la PrEP. De plus, les FSW dont le revenu mensuel était inférieur à 18000 nairas avaient une probabilité plus faible de vouloir utiliser la PrEP (OR=0,3980, IC à 95%=0,1593-0,9945,  $p=0,08$ ). L'analyse bivariée montre que les FSW qui souhaitent avoir plus de connaissances sur le VIH/SIDA avaient une cote plus élevée de volonté d'utiliser la PrEP que ceux qui ne souhaitaient pas avoir plus de connaissances (OR=4,235, IC 95%=1,577-11,374,  $p=0,0066$ ). De même, les FSW qui craignent d'être discriminés ont une probabilité plus faible de vouloir utiliser la PrEP que ceux qui ne craignent pas d'être discriminés (OR=0,3921, IC 95%=0,1582-0,9718,  $p=0,0439$ ).

**Conclusion:** Notre étude a montré une faible sensibilisation mais une forte volonté d'utiliser la PrEP parmi les FSW de l'État d'Anambra, au Nigeria. Le coût, la connaissance du VIH/SIDA et la peur de la discrimination sont des facteurs prédictifs importants de la volonté d'utiliser la PrEP contre le VIH et doivent être pris en compte lors de la formulation de la politique de PrEP. Une éducation adéquate sur la PrEP devrait être soulignée parmi les FSW.

**Mots clés:** VIH; prophylaxie pré-exposition; sensibilisation; volonté d'utiliser; travailleuses du sexe

## Introduction:

Human immunodeficiency virus (HIV) infection has been a global public health issue for the past thirty years (1). Nigeria has the second largest HIV epidemic in the globe and also has one of the highest rates of new infection in sub-Saharan Africa (2). The West and Central African countries account for 59% of all new HIV infection in 2016 (3), and the Countries population indicates that about 3.1 million persons were living with HIV (PLWH) in 2017 (4). Eighty percent of new infections in Nigeria are on account of unprotected heterosexual intercourse, and the majority of the remaining HIV infections were found to occur in specific affected populations such as sex workers (5). Irrespective of the fact that sex workers, men who sleep with men (MSM) and injection drug users (IDUs) make up only about 3.4% of Nigeria's population, and this group accounts for about 32% of new HIV infections (2). In 2016, estimates of 14.4% of sex workers were living with the disease in Nigeria (6).

Some risk factors contribute to the vulnerability of female sex workers (FSWs) to HIV. This includes the use of injectable substances, large number of clients, unprotected sex with clients, excessive intake of alcohol and having unprotected sex with non-paying clients such as husbands and boyfriends (7, 8). Furthermore, their vulnerability is also increased by some community and societal

factors which include social discrimination, gender inequalities, gender-based violence, and limited access to social opportunities and health services (9). On the other hand, biologically, there is a high prevalence of sexually transmitted infections (STIs) in sex workers (10). These infections have a synergistic relationship with HIV (11). Studies have shown that the prevalence of HIV among FSWs is higher at the rate of 24.5% compared to their male counterparts which is at 18.6% in Nigeria (14). Similarly, FSWs who are brothel-based face greater HIV risks in the country, with a prevalence of 27.4% (15).

The Constitution of Nigerian recognizes sex work as illegal in the country (16). The criminalizing law makes it difficult for individuals to disclose that they are sex workers to healthcare personnel and therefore have less access to quality healthcare. This increases the vulnerability FSWs to HIV and AIDS, the more reason why pre-exposure prophylaxis (PrEP) among FSWs in Nigeria is very important. The brothel-based FSWs are known to have more clients than non-brothel based FSWs, thus, at higher risk of contracting HIV (17). Anambra is one of the States in south-eastern zone of Nigeria, one of the six geo-political regions in the country, and ranks third in HIV prevalence with 1.9% (18).

In Nigeria, PrEP is not available to the general public, however, some sero-discordant couples have been able to access the drug through demonstration projects. As at

1<sup>st</sup> May 2019, the estimated number of current PrEP users are 400-600 persons in Nigeria (19) and the recipients are sero-discordant couples. The new national guidelines for HIV prevention and care states that the future expansion of PrEP will include commercial sex workers, sero-discordant couples, people who inject drugs, and individuals who engage in anal sex on a prolonged and regular basis (21). The study aims at assessing level of awareness and willingness to use of PrEP against HIV among female sex workers in Anambra State, Nigeria and identify factors that influence willingness to use PrEP. It is hoped that the results of the study will be used to inform a nation-wide scale-up of PrEP as part of a comprehensive HIV-prevention package (20).

## Materials and method:

### Study setting, design and participant recruitment:

The study was a cross-sectional survey which was conducted between October and November 2019 in three major cities in Anambra state, Nigeria. These cities include; Awka, Nnewi and Onitsha. The study group involved Brothel-Based FSWs. Inclusion criteria were age 18 years and above, being sexually active, having HIV-negative status, having multiple sexual partners, ability to read and understand the questionnaire and willingness to participate in the study.

The study used questionnaire survey. Three social workers were recruited and given a one-day training. The study adopted the snowballing technique whereby 'lead' participants were first recruited and trust was built, and also with monetary incentives. These lead participants then helped in the recruitment of other participants until the required number of participants was recruited.

### Ethical considerations:

Ethical approval was obtained from the Ethics Committee of Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria (NAUTH/CS/66/VOL.12/107/2018/048). Participation in the survey was strictly voluntary. Assurances of confidentiality were given to the participants. To guarantee anonymity, names of participants were not required. Consent forms were signed by participants.

### Data collection:

Pretested and validated structured questionnaire was used to collect data. Validation was done using face and construct validity. Afterwards, pilot study was conducted for feasibility. In the pilot study, about 10.0 % of the total sample size not included in the study was pre-tested with the questionnaires. Some questions were further modified accordingly after the pre-test to enhance comprehension by the participants

Before the questionnaire was self-administered, FSWs were given brief explanation on PrEP and its use. They were encouraged to ask questions on terms not understood. After the explanation had been done, questionnaire was given to the female sex workers to fill. Majority of the participants filled the questionnaire in 15-30 minutes. Items in the questionnaire were questions related to Demographics, awareness of HIV/AIDS and routes of transmission, and attitudes towards HIV/AIDS. Participants were also asked on the awareness of and use of PrEP, source of their information, attitudes towards the use of PrEP in terms of cost and discrimination, and likely behavioral changes as a result of PrEP use. Willingness to use PrEP was measured with questions such as "how likely would you use PrEP if it were free?", "how likely would you use PrEP if you can only get it from the hospital?" etc. These intentions were reported on a 5-point scale; [definitely (D), probably (P), not sure (N), probably not (PN), and definitely not (DN)].

### Statistical analysis of data:

Data were entered into pre-designed excel worksheets to capture the important information, and questionnaire responses were coded into the worksheet. Data were then entered and analyzed using Statistical Package for Social Sciences (SPSS) version 23 computer software. Descriptive statistics was used to assess factors such as demographic characteristics, awareness of HIV/AIDS transmission and prevention, attitudes/behavior related to HIV/AIDS, awareness of PrEP, and willingness to use PrEP. Univariate and bivariate analyses (with Odds ratios and their 95% CI) were used to determine significant association of predictors with willingness to use PrEP using Chi Square Test of independence with  $p$  value less than 0.05 taken as statistical significance.

## Results:

### Demographic characteristics:

Of the 329 respondents, 64 indicated being HIV positive and were excluded from the study, leaving 265 respondents. Seventy-four (27.9%) of the 265 female sex workers (FSWs) in the survey were from Nnewi, 88 (33.2%) from Onitsha and 103 (38.9%) from Awka metropolitan. The age group 25-29 yrs constitute the largest number of respondents (34.8%) compared to other groups. Most of the respondents were Christians 236 (90.4%), single 184 (69.7%) and belonged to the Igbo ethnicity 179 (68.3%). One hundred & forty-five (62.5%) had secondary school education and only 87 (37.0%) reported that they have

children. The demographic characteristics of the respondents with respect to willingness to use PrEP is shown in Table 1.

#### Attitudes towards HIV/AIDS:

Among the respondents, 68.8% indicated worry when they hear about a family member infected with HIV/AIDS while 67.8% indicated their concerns of being infected themselves. Majority of the respondents (82.9%) have gone for trainings where HIV/AIDS related issues were taught and 89.4% indicated interest in getting more knowledge on HIV/AIDS.

Of the 260 participants who responded to the question of ever being diagnosed of STI, 50% responded in the affirmative, 71.5% correctly believed that STIs are risk factors for HIV/AIDS while 43.1% responded that they use medications they believed will prevent them from contracting STIs. Nineteen percent (49/260) of the FSWs affirmed that taking drugs or concoctions would prevent them from contracting HIV/AIDS. The relationship between attitude towards HIV/AIDS and willingness to use PrEP is shown in Table 2.

Table 1: Univariate analysis of the relationship between demographic characteristics and willingness to use HIV pre-exposure prophylaxis among female sex workers in Anambra State, south-eastern Nigeria

Variables		Willingness to use PrEP		OR (95% CI)	p value
		Yes (%)	No (%)		
Location (n=263)	Nnewi	66 (91.7)	6 (8.3)	1.145 (0.435 - 3.009)	0.973
	Onitsha	88 (100)	0	28.624 (1.718 - 476.82))	0.0006*
	Awka	85 (82.5)	18 (17.5)	0.184 (0.0704 - 0.1812)	0.0004*
Age group (yrs) (n=262)	18-24	81 (90)	9 (10)	0.8599 (0.3606 - 2.050)	0.9082
	25-29	82 (90.1)	9 (9.9)	0.8761 (0.3675 - 2.089)	0.9411
	30-34	44 (93.6)	3 (6.4)	1.588 (0.4533 - 5.561)	0.6530
	35-39	12 (92.3)	1 (7.7)	1.221 (0.1518 - 9.826)	0.8507
	40-44	9 (90)	1 (10)	0.9038 (0.1095 - 7.640)	0.9252
	45-49	3 (75)	1 (25)	0.2936 (0.0293 - 2.940)	0.8155
	50-54	3 (100)	0	0.7282 (0.0365 - 14.525)	0.5801
	55-59	2 (100)	0	0.5180 (0.02415 - 1.108)	0.6521
	60-64	1 (100)	0	0.3095 (0.0123 - 7.81)	0.7504
	65>	1 (100)	0	0.3095 (0.0123 - 7.81)	0.7504
Marital status (n=262)	Single	162 (88.5)	21 (11.5)	0.3045 (0.0881 - 1.053)	0.0812
	Married	26 (96.3)	1 (3.7)	2.821 (0.3655-21.772)	0.4930
	Divorced	19 (95.0)	1 (5.0)	1.995 (0.2551-15.606)	1.000
	Separated	22 (95.7)	1 (4.3)	2.343 (0.3015-18.199)	0.7888
	Widow	9 (100)	0	2.028(0.1144-35.948)	0.7028
	Others	0	0		
Ethnicity (n=260)	Igbo	161 (91.0)	16 (9.0)	0.9268 (0.3659-2.347)	0.8726
	Yoruba	35 (92.1)	3 (7.9)	1.155 (0.3258-4.096)	0.8231
	Hausa	17 (100)	0	3.730 (0.2171-64.089)	0.3751
	Others	24 (85.7)	4 (14.3)	0.5352 (0.1681-1.704)	0.4710
Religion (n=259)	Christianity	210 (89.7)	24 (10.3)	0.1685 (0.00993-2.857)	0.1874
	Islam	19 (100)	0	4.413 (0.2582-75.443)	0.3001
	Others	6 (100)	0	1.388 (0.0758-25.404)	0.9364
Educational status (n=230)	None	11 (91.7)	1 (8.3)	1.050 (0.1285-8.585)	0.9635
	Primary	26 (86.7)	4 (13.3)	0.5652 (0.1754-1.822)	0.5357
	Secondary	133 (91.7)	12 (8.3)	1.152 (0.4508-2.941)	0.9580
	Tertiary	40 (93.0)	3 (7.0)	1.333- (0.3725-4.772)	0.8859
Monthly income (x ₦ 1000) (n=259)	<18	39 (83.0)	8 (17.0)	0.3980 (0.1593-0.9945)+	0.0804
	18 - 29	65 (86.7)	10 (13.3)	0.5353 (0.2264-1.266)	0.2282
	30 - 49	58 (90.6)	6 (9.4)	0.9831 (0.3724-2.595)	0.9725
	50 -90	34 (100)	0	8.390 (0.4982-141.29)	0.0926
	100 - 200	27 (100)	0	6.463 (0.3819-109.38)	0.1604
	>200	12 (100)	0	2.740 (0.1573-47.75)	0.532
Have children (n=240)	Yes	78 (91.8)	7 (8.2)	0.4903 (0.2291-1.050)	0.0960
	No	131 (90.3)	14 (9.7)		

n= number of respondents; \*= statistically significant; + = although not statistically significant, ( $p=0.0804$ ), the odd ratio ( $<1.0$ ) and 95% CI values of ( $<1.0$ ) indicate that the odd of PrEP was lower when monthly income was less than ₦18,000 (i. e. FSWs with low income are less willing to use PrEP, likely due to cost)

Table 2: Bivariate analysis of attitude to HIV/AIDS and PrEP with willingness to use HIV pre-exposure prophylaxis among female sex workers in Anambra State, south-eastern Nigeria

Predictors	Response	Willingness to use PrEP		OR (95% CI)	p value
		Yes (%)	No (%)		
Worried of getting infected with HIV/AIDS (n=259)	Yes	156 (89.1)	19 (10.9)	0.410 (0.1351-1.248)	0.1673
	No	80 (95.2)	4 (4.8)		
Listened to or received training on HIV/AIDS (n=256)	Yes	192 (90.6)	20 (9.4)	0.9600 (0.3112-2.962)	0.9434
	No	40 (90.9)	4 (9.1)		
Wish to get more knowledge about HIV/AIDS (n=261)	Yes	216 (92.7)	17 (7.3)	4.235 (1.577-11.374)	0.0066*
	No	21 (75.0)	7 (25.0)		
Noticed or ever been diagnosed of STI (n=259)	Yes	122 (94.6)	7 (5.4)	2.446 (0.9706-6.165)	0.00840
	No	114 (87.7)	16 (12.3)		
Take drugs to prevent HIV (n=257)	Yes	43 (87.8)	6 (12.2)	0.6379 (0.2375-1.713)	0.5352
	No	191 (91.8)	17 (8.2)		
Heard of PrEP (n=259)	Yes	77 (95.1)	4 (4.9)	2.437 (0.8048-7.378)	0.1647
	No	158 (88.8)	20 (11.2)		
Highest amount willing to spend on PrEP (n=242)	<500	110 (94.8)	6 (86.7)	2.477 (0.9270-6.621)	0.1031
	500 – <1000	26 (86.7)	4 (13.3)	0.5667 (0.1770-1.815)	0.5344
	1000 – <3000	50 (86.2)	8 (13.8)	0.4751 (0.1864-1.211)	0.1876
	3000 – <5000	32 (91.4)	3 (8.6)	1.016 (0.2828-3.649)	0.9807
	>5000	3 (100)	0	0.6888 (0.0344-13.789)	0.5911
Worried of discrimination (n=253)	Yes	94 (87.0)	14 (13.0)	0.3921 (0.1582-0.9718)	0.0439*
	No	137 (94.5)	8 (5.5)		

n=number of respondents; \*=statistically significant

**Awareness of and willingness to use HIV PrEP:**

Among the 260 FSWs who responded to this question, 179 (68.8%) stated that they have never heard of PrEP prior to the study, and only 10 (3.9%) participants indicated that they have previously used PrEP. The willingness to use PrEP was qualitatively measured using the parameters; “definitely” and “probably” as willingness, while “not sure”, “probably not” and “definitely not” as unwillingness (as shown in Table 3a and summarized in Table 3b). Overall, majority of the respondents (91.0%) are willing to use PrEP from the bivariate analysis.

**Attitudes towards PrEP use in terms of cost and discrimination:**

Among 242 participants who responded, high number of FSWs 116 (47.9%) were

willing to spend only less than 500 Naira on PrEP in a month, 30 (12.4%) were willing to spend 500-<1,000 Naira, 58 (24.0%) were willing to spend 1,000-3,000 Naira, 35 (14.5%) were willing to spend 3,000-<5,000 Naira, while only 3 (1.2%) were willing to spend >5,000 Naira on PrEP in a month. On the issue of worry about being discriminated by others for using PrEP, 108 (42.7%) of the respondents indicated their concerns in the affirmative.

**Perceived changes in behavior as a result of PrEP use:**

Among 250 participants who responded to willingness to use PrEP, 87 (34.8%) reported willingness to reduce condom use while 163 (65.2%) of the respondents were willing to be screened for HIV every 3 months as a prerequisite for PrEP use.

Table 3a: Ranking of the predicting factors of willingness to use HIV pre-exposure prophylaxis among female sex workers in Anambra State, south-eastern Nigeria

Predicting factors	D = 5	P = 4	N = 3	PN = 2	DN = 1	Mean	Decision
	n (%)	n (%)	n (%)	n (%)	n (%)		
Willingness to use PrEP if safe and effective in preventing HIV	217 (83.1)	24 (9.2)	13 (5.0)	5 (1.9)	2 (0.8)	4.72	Accept
Willingness to use PrEP if available for free	194 (74.0)	47 (17.9)	15 (5.7)	4 (1.5)	2 (0.8)	4.63	Accept
Willingness to use PrEP if available for free and used by few people	128 (49.0)	73 (28.0)	50 (19.2)	8 (3.1)	2 (0.8)	4.21	Accept
Willingness to use PrEP if available for free and used by fairly large people	161 (62.6)	61 (23.7)	24 (9.3)	8 (3.1)	3 (1.2)	4.44	Accept
Willingness to buy PrEP if readily available but not free	54 (20.8)	103 (39.8)	74 (28.6)	7 (2.7)	21 (8.1)	3.63	Accept
Willingness to use PrEP if only available in Hospital	62 (23.7)	122 (46.6)	70 (26.7)	4 (1.5)	4 (1.5)	3.89	Accept
Willingness to use PrEP if available in Pharmacy shops	99 (39.6)	48 (19.2)	84 (33.6)	17 (6.8)	2 (0.8)	3.9	Accept
Willingness to use PrEP if one must take it once daily for effectiveness	183 (69.6)	52 (19.8)	17 (6.5)	6 (6.3)	5 (1.9)	4.53	Accept
<b>Total mean</b>						<b>4.24</b>	<b>Accept</b>

n=number of respondents; D = definitely; P = probably; N = not sur; PN = probably not; DN = definitely not

Table 3b: Determining factors of willingness to use HIV pre-exposure prophylaxis among female sex workers in Anambra State, south-eastern Nigeria

Determining factors	Willingness n (%)	Unwillingness n (%)
Safe and effective	241 (92.3)	20 (7.7)
Available for free	241 (91.9)	21 (15.2)
Free and few are using	201 (77.0)	60 (23.1)
Free and many are using	222 (86.3)	35 (13.6)
Not free	157 (60.6)	102 (39.4)
Available only in hospitals	184 (70.3)	78 (29.7)
Available only in pharmacy shops	147 (58.8)	103 (41.2)
If taken once daily	235 (89.4)	28 (14.7)

n=number of respondents

**Predictors of willingness to PrEP use:**

As shown in Table 1, willingness to use PrEP was observed in majority of the respondents. Univariate analysis showed that FSWs from Onitsha were more willing to use PrEP (100%, OR = 28.624, 95% CI = 1.718–476.82,  $p = 0.0006$ ) than others from Awka, who were less willing (82.5%, OR = 0.184, 95% CI = 0.0704 – 0.1812,  $p = 0.0004$ ) and Nnewi, who were indifferent (91.7%, OR = 1.145, 95% CI = 0.435 – 3.009,  $p = 0.973$ ). In relation to educational level, there was no significant difference in FSWs to use PrEP ( $p > 0.05$ ). Although not statistically significant ( $p = 0.0804$ ), FSWs who earned less than

18,000 Naira were less willing to use PrEP (OR = 0.3980, 95% CI = 0.1593 – 0.9945), which may indicate that FSWs with low income are less willing to use PrEP, likely due to cost.

Table 2 shows bivariate analysis of attitude to HIV and PrEP of the FSWs as predictors of willingness to use PrEP. There are two statistically significant predictors of willingness to use PrEP in the Table. Firstly, among FSWs who wish to have more knowledge of HIV/AIDS, 92.7% (216/233) were willing to use PrEP with only 6.3% (17/233) not willing, while among those who do not

wish to have more knowledge of HIV/AIDS, only 75% (21/28) were willing to use PrEP with 25% (7/28) not willing to use PrEP (OR = 4.325, 95% CI=1.577-11.374,  $p=0.0066$ ). This indicates a higher odd ( $\sim 4$  times) of willingness to use PrEP among FSWs who wish to have more knowledge of HIV/AIDS than those who did not wish to have more knowledge of HIV/AIDS. Secondly, with respect to discrimination, 13% (14/108) of the FSWs who worried about being discriminated against are not willing to use PrEP compared to 5.5% (8/145) of those not worried about being discriminated against (OR = 0.3930, 95% CI = 0.1593 - 0.9945,  $p=0.0439$ ). This indicates a lower odd ( $\sim 1/3$ ) of willingness to use PrEP among FSWs who worried about being discriminated against.

## Discussion

There are sparse data on awareness and willingness to use PrEP among FSWs especially in Nigeria, and this formed the basis for our study. The findings showed that awareness of PrEP among FSWs in our study was 31.2% (81/260), indicating a low awareness of PrEP as reported in other studies where awareness rates were 10.2% (22), 15.1% (23), and 11.55% (24). A systematic review showed that FSWs had low awareness of PrEP ranging from 12 to 17% (25). However, the findings in these studies contrast that of a study carried out among men who sleep with men (MSM) and FSWs in Nigeria where 95.2% online respondents indicated awareness of PrEP (26). We reported a high rate of willingness to use PrEP (91%), similar to a study that reported 85.9% of FSWs were willing to use PrEP if it was deemed to be effective, safe and provided for free (23). About 69.29% were willing to take PrEP in yet another study (24), which contrasted a more recent finding where only 35.5% were willing to use PrEP (22).

Majority of the participants who indicated having heard of PrEP in our study stated their source of information to be through health training (42.5%) which was as a result of health trainings carried out by community-based Non-Governmental Organizations (NGOs), in partnership with Society for Family Health (SFH) among at-risk groups in their quest for eradication and prevention of the spread of HIV/AIDS. These trainings are organized for the purpose of enlightenment and empowerment of key populations. On PrEP use, only 3.9% of the participants indicated its usage which is consistent with a similar study where only 1.4% of the participants had used PrEP (27), which is the consequence of low awareness of PrEP among FSWs. Although, our result showed that FSWs who have heard of PrEP prior to the study

were more willing to use PrEP (95.1%) than those who have not heard (88.8%), the difference did not reach statistical significance (OR=2.437, 95% CI=0.81-7.38,  $p=0.164$ ).

Willingness to use PrEP varied with predicting factors. Although, rate of willingness to use PrEP was generally high, it was reduced when PrEP was available only at the hospital (70.3%) and less so, only at the pharmacy (58.8%). This is because of the illegality and discrimination associated with sex works which make FSWs in Nigeria less willing to identify with health workers and the general public. A systematic review of studies carried out among at-risk population across several countries on their values and preferences to PrEP showed that dispensing site was an important factor of willingness especially for African countries (25). Moreso, perceived high cost of these drugs at pharmacy, and lower cost at the hospital or health facility (28), could be the reason while FSWs, even though were less willing to use the drug if it were available only at the hospitals, were even more unwilling to get them from the pharmacy. This is also in line with the study where PrEP drugs were preferred to be prescribed and given by healthcare workers in health facilities (29). On willingness to use PrEP if it were to be taken once daily, a high number of participants (89.4%) indicated willingness which is similar to a previous study where sex workers were willing to take PrEP on a daily as it aligns with the nature of their work (28).

From the result of our study, cost seems to be an important predicting factor to PrEP use. Sex workers who earned less than 18,000 Naira per month were less willing to use PrEP. Also, most of the sex workers (47.9%) were willing to spend only less than 500 Naira on PrEP in a month, and as the cost increased, fewer number of sex workers showed interest in using it. This is an important consideration factor to PrEP implementation program in achieving effectiveness of PrEP use. In a similar study carried out in Nigeria, participants suggested that PrEP should be provided for free, one of the reasons for this recommendation was to reduce the incidence of fake drugs which will make the purpose of the medication ineffective, however, if it were to be sold, the drug should be sold not more than 2,000 Naira per prescription (29). Another study carried out among Peruvian at-risk population, cost was the greatest determinant in PrEP acceptability and use (28).

A high number of the FSWs (93.3%) were willing to undergo HIV screening every 3 months as a prerequisite for PrEP use. This screening is presumed to be free as always been done for at-risk groups including FSWs, thus the high willingness to be tested, ano-

ther strong indicator that cost is an important factor in PrEP implementation in the country. HIV commodities (medications and tests) in Nigeria are hugely funded by foreign agencies (30). These commodities and services have been provided for free for some years in the country. The aids are beginning to decline gradually as the country is expected to keep on with provision of the commodities (30). Presently, the availability of these services is also being affected. PrEP drugs, which are part of HIV commodities, may pose additional burden to the already burdened cost and expectations, thus, implementation of PrEP in the country may seem a long way coming.

Some limitations were encountered in this study. Firstly, we adopted a non-probability sampling method, snowballing technique, because the study participants (sex workers) are a difficult group to find, but our method could result in potential selection bias. Secondly, the cross-sectional design used may be associated with potential recall bias as participants are expected to give information about past events. Thirdly, the questionnaire administered by social workers could lead to potential bias as the participants may want to give socially acceptable answers in line with provision of health commodities for their business. Lastly, willingness to use PrEP does not necessarily translate to its actual practice of PrEP.

## Conclusion:

Our study showed low awareness but high willingness to use PrEP among FSWs in Anambra State, Nigeria. Adherence, which is very important in achieving the goal of PrEP use could be affected by some factors such as cost, awareness, and stigmatization among others. Factors which may mitigate PrEP effectiveness include discrimination by others over PrEP use, reduced condom use and most importantly, cost. PrEP and its benefits require good information dissemination among FSWs. The place of adequate knowledge and enlightenment about HIV/AIDS and PrEP cannot be over emphasized. Even though PrEP is very effective in HIV prevention, FSWs must be enlightened on the need to sustain the use of condom as PrEP use is just one of the preventive measures for HIV/AIDS.

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## Contributions of authors:

ECN OIE and ACM were involved in the conceptualization, design and execution of the study; OIE and OCK were involved in the supervision, data analysis and writing up the manuscript

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