

Willingness to take and ever use of pre-exposure prophylaxis among female sex workers in Ghana

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Abstract

Pre-exposure prophylaxis (PrEP) is a drug taken by people who are human immunodeficiency virus (HIV) negative and at increased risk of acquiring HIV. It's an effective intervention for HIV prevention. This study seeks to report on the prevalence and determinants of willingness to take and ever use of PrEP among female sex workers (FSW) in Ghana.

The data analyzed was obtained from the Integrated Bio-behavioral Surveillance Survey conducted across the 16 regions of Ghana in 2020. Analysis was only performed on FSW who were tested negative to HIV and were sexually active. All included variables were described using medians, percentages, and graphs. Bayesian adjusted odds ratios and 95% credible intervals were estimated using a Bayesian generalized linear model via the binomial family of distributions under the logit link function.

Of the 5107 FSW with complete data on willingness to use PrEP, 2737 (53.59%) reported their willingness to take PrEP. Out of the 998 respondents who have ever heard of PrEP only 64 (6.39%) have ever used PrEP. The median age of the respondents was 25 years. People with no comprehensive knowledge of HIV and acquired immunodeficiency syndrome as well as those who entered into the FSW business at age less than 25 years; 946 (34.56%) and 2181 (79.65%) respectively were more willing to take PrEP. FSW from 6 out of the 16 regions of Ghana have never used PrEP. A statistically significant difference between those who entered the sex work at age less than 25 years and those within 25 to 34 years was observed. About 23% of FSWs who had been screened for Sexually Transmitted Infections were more likely to take PrEP.

Respondents with lesser age and no comprehensive knowledge of HIV were more willing to take PrEP. The willingness to accept PrEP among FSWs in Ghana is modest. However, utilization is low. Advocacy or intervention programs are required to improve uptake of PrEP.

Abbreviations: AIDS = acquired immunodeficiency syndrome, CrI = credible interval, FSW = female sex workers, HIV = human immunodeficiency virus, OR = odds ratio, PrEP = pre-exposure prophylaxis, STI = Sexually Transmitted Infections, VDT = venue, day, and time.

Keywords: Bayesian generalized linear regression model, ever used pre-exposure prophylaxis, female sex workers, Ghana, pre-exposure prophylaxis, willingness to use pre-exposure prophylaxis

1. Introduction

Globally, human immunodeficiency virus (HIV) continues to be a major public health issue. In 2020 about 37.7 million people lived

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with HIV/acquired immunodeficiency syndrome (AIDS) worldwide. Although 27.5 million people accessed antiretroviral therapy, 680,000 people died from illness related to AIDS with 1.5 million newly infected HIV cases in 2020.^[1] In Western and Central Africa, 4.7 million people lived with HIV/AIDS and 150,000 deaths related to AIDS occurred.^[1] Southern and Eastern Africa were the most affected subregions and are resident to the largest number of people living with HIV in sub-Saharan Africa and the world. In 2020, 20.6 million people lived with HIV in Eastern and Southern Africa with 670,000 newly recorded cases and about 310,000 deaths related to AIDS occurred.^[1] The high numbers of new HIV infections are mostly due to inconsistent condom use during sexual intercourse and multiple sexual partners.^[2]

Sexual transmission continues to be the major mode of transmission of HIV in sub-Saharan Africa.^[3] However, the availability of antiretroviral therapy has metamorphosed the fatal disease to a manageable medical condition resulting in a decline in the global deaths related to AIDS and the incidence of HIV.^[4] Major progress in reducing the incidence of HIV includes preventing transmission of infection vertically and horizontally by using antiretroviral drugs, voluntary male medical circumcision and pre-exposure prophylaxis (PrEP) implementation.^[4,5]

The prevalence of HIV among female sex workers (FSW) in Ghana is relatively high (4.6%) as against the general population of 1.7% in 2020, Bio-Behavioral Survey report. The estimated total number of FSW was 60,049 in Ghana which represents a

0.75% of total female population in Ghana, Bio-Behavioral Survey, 2020.^[6] FSW are among the key population in sub-Saharan Africa with a high prevalence of HIV and AIDS mostly because they have multiple sex partners and also engage in unprotected sex.^[7] This calls for a more proactive and concerted approaches to effectively and efficiently prevent the spread of HIV and AIDS among FSW and their sexual partners as well as the general population.

In recent times, the use of PrEP has been advanced as a potentially effective approach to prevent HIV.^[8–14] Studies conducted across the globe have shown that willingness to use PrEP is very low.^[15–17] This is attributable to poor knowledge and understanding of the risk and prevention of HIV and AIDS.^[15] Studies reported in some African countries and other regions on PrEP interest among female bar workers show a very low level of awareness or knowledge of PrEP among FSW, these include Dar es Salaam (5%), Guangxi, China (15.1%), and Baltimore (21%).^[18–20] A number of factors have been identified in literature as possible barriers to PrEP uptake, these are; drug security, possible drug-drug interaction, increased risk of other sexually transmitted diseases, pregnancy among FSW, stigma, effectiveness and cost, reduced risk perception, concerns about effectiveness of PrEP and side effects all affects the willingness to take PrEP.^[17,21,22] Men who have sex with men exhibited low knowledge of PrEP but high acceptability after they have been introduced to it in Ghana.^[23]

Despite the broad recommendations provided by the World Health Organization,^[24] for the use of PrEP among at risk population of HIV and AIDS, there is little information, if any at all, about the willingness and ever use of PrEP among FSW in Ghana. To scale up the uptake based on World Health Organization recommendations on PrEP use among FSW, it's important to establish the proportion of FSW who are willing to accept and are prepared to use the drug as well as those who have ever used PrEP after having heard about it. It is equally important to find out factors either inhibiting their willingness to use or use of PrEP. The objective of this study is to investigate the prevalence and correlates of PrEP of FSW willingness and it ever use among this at high-risk population in Ghana.

2. Method

2.1. Target populations

This study uses data from the FSW survey conducted in Ghana in 2020. The study targeted FSW aged 16 years or older who reported to have exchanged sexual acts in the last 6 months with someone other than her established partner for something of value. The survey covered the entire 16 regions of Ghana, namely; Greater Accra, Ashanti, Western, Western North, Central, Eastern, Volta, Oti, Bono, Ahafo, Bono East, Northern, Savannah, North East, Upper East, and Upper West.

2.2. Survey design

The survey was conducted using time location sampling approach. This is a probability-based method used to enroll members of a key population taken into consideration venue, day and time where the FSWs congregate.

Before the survey, the team undertook listing of all FSW venues across the entire country. During the listing of the venues, the research team took into consideration the time and day the FSW congregate to carry out their activities. This was grouped

into 4-hour intervals (venue, day and time – VDT). This constituted a comprehensive sampling frame (derived from the sampling universe) for each population group at each venue across all the regions. These were developed and organized systematically by key geographic units.

A simple random sample of venues was selected from the sampling frame exclusively for unique venues. This was followed by another simple random selection of a specific day and time period associated with the sampled venue (VDT).

2.3. Data collection

In the survey, a structured questionnaire was used to assess a number of indicators, these include; background characteristics, sexual risk behaviors, condom usage, HIV and AIDS, stigmatization, Sexually Transmitted Infections (STIs), injection of drugs, discrimination and others. At each of the VDTs, the field supervisors upon their arrival, with the help of the peer educators, counted the number of women present at the venue. Other women who arrived at the venue after the study team were also counted. At the end of the survey, the total number of women who visited the venue were recorded. Almost all the women found at the venue were approached using a screening log form. At each venue, nearby private rooms were acquired for both the behavioral and the biological interviews. Only women born biological females, aged 16 years and above and engaged in sex for money or gift within the last 6 months were eligible to participate.

Prior to field data collection, a pilot study was carried out in Greater Accra, Eastern, Ashanti, and Northern regions. The pilot study enabled the team to assess several aspects of the study, including duration for the administration of the behavioral questionnaire and the acceptability and availability of the FSW to take part in the main survey. Their willingness to take part in the biological part of the survey by providing blood and urine samples was assessed.

2.4. Outcome variables

This study has 2 outcome variables; willingness to use PrEP and Ever use of PrEP. Willingness to use PrEP was obtained from the question, as PrEP has similar side effects to other drugs used to treat HIV, would you be willing to take it? Yes or no. While, ever use of PrEP had a yes or no response to the question, have you ever used PrEP, to only participants who said they have ever heard of it.

2.5. Exposure variables

The variables considered in the final adjusted model were based on their statistical significance and relevance in the literature with respect to the outcomes of interest. These include: Age at last birthday of all participants who responded to the questionnaire and was analyzed as a continuous variable. Marital status was categorized into never married, currently married or cohabiting and divorced or separated or widowed, age at which the respondent started the FSW job (less than 25, 25–34, and 35 years and above) and comprehensive knowledge of HIV and AIDS defined as: knowing that both limiting sex partners to 1 uninfected partner and consistent condom use are HIV prevention methods, knowing that a healthy-looking person can have HIV, and rejecting 2 of the most common misconcep-

tions – that HIV can be transmitted through mosquito bites and by supernatural means. Others include; forced sex with the question; during the last 12 months, did any one, paying or otherwise, force you to have sex (yes or no)? Injecting drugs based on the question, have you ever shared a needle with someone to inject drugs recreationally (yes or no)? Highest level of education (no, middle, junior secondary school/junior high school, secondary/senior secondary school/senior high school, and higher), religion (Christians, Muslims, and Others), ever had anal sex (yes or no) and nationality of the participant (Ghana, Nigeria, and Other). Under the ever-used PrEP outcome variable, we recategorized the educational variable into completed primary and some secondary education due to the frequencies within each level of the highest education.

2.6. Statistical analysis

To obtain regional and national level estimates for FSWs in Ghana, sampling weights were calculated and applied to the survey dataset. Survey weight=1/probability of selection. The probability of selection=probability that the venue was randomly selected * the probability that the person was selected at the venue. Roamer and seater venues were selected independently and randomly from complete lists of seater and roamer venues. For seater venues, the probability that the venue was selected was estimated by the number of selected seater venues divided by the total number of seater venues. Similarly, the probability of a roamer venue being selected was the number of randomly selected roamer venues divided by the total number of roamer venues. The probability that an individual was selected was the number of individuals interviewed at a venue divided by the number of eligible individuals counted at the venue during the interview period. Descriptive statistics (medians, frequencies, and percentages) were carried out. Inferential analysis between the outcomes, willingness to take PrEP and ever use of PrEP, and the independent variables; socio-economic, demographic, and sexual behaviors. These were examined at the bivariate level to establish associations using Bayesian generalized linear model via the binomial family of distributions under the logit link function. All variables that showed significant relationship with the outcomes of interest were entered and used to obtain the adjusted odds ratios (ORs) and credible intervals (CrIs). All the regression model parameters were assigned noninformative normal (0, 10,000) priors. The reason for choosing the noninformative priors were to exhibit our lack of previous knowledge on the parameters to be estimated. During the running of the models, 2 chains were specified with 12,500 simulations, a thinning of 10 and burn-in of 2500. Convergence diagnostics were carried out using trace plots, autocorrelation plots, histograms as well as the Gelman–Rubin convergence rule. Statistical analyses were completed using StataCorp. 2021. Stata 17 Base Reference Manual (College Station, TX: Stata Press).

2.7. Ethical considerations

This research was approved by 3 institutions, namely: University of Ghana Noguchi Memorial Institute for Medical Research Institutional Review Board (certified protocol number 083/18–19), the Ghana Health Service Ethical Review Committee (002/05/19), and the Population Council Institutional Review Board (Protocol 891), NY. Study participation was voluntary, and respondents were informed that they were free to withdraw from

the study at any time during the survey process. Following careful explanation of the survey, study staff gave eligible respondents the consent form to read or, if necessary, had the consent form read to the respondents by a staff member. All respondents signed that they understood and agreed to all the items contained in the consent form before being enrolled into the survey.

3. Results

3.1. Willingness to take PrEP

Of the 5107 FSW who tested negative to HIV and had complete data, 2737 (53.59%) reported their willingness to take PrEP. Majority of the respondents who were willing to take PrEP were from Greater Accra 735 (26.86%) and Ashanti regions 523 (19.10%) of Ghana, followed by Central region 366 (13.38%) with the lowest from the Savannah region 8 (0.29%), Figure 1. Most of the respondents who never married 1516 (55.39%), people with no comprehensive knowledge of HIV and AIDS 1791 (65.44%) as well as those who entered the FSW business at age less than 25years 2181 (79.65%) said they were willing to take PrEP. About 1210 (44.72%) and 278 (10.21%) FSW had been screened for STIs and ever had anal sex respectively expressed their willingness to take PrEP. The median age of the respondents was 25 years, Table 1.

The results as obtained from the Bayesian generalized linear model show that FSWs who ever heard about PrEP were twice the odds of being more willing (OR 2.59, CrI: 2.22–2.98) to take

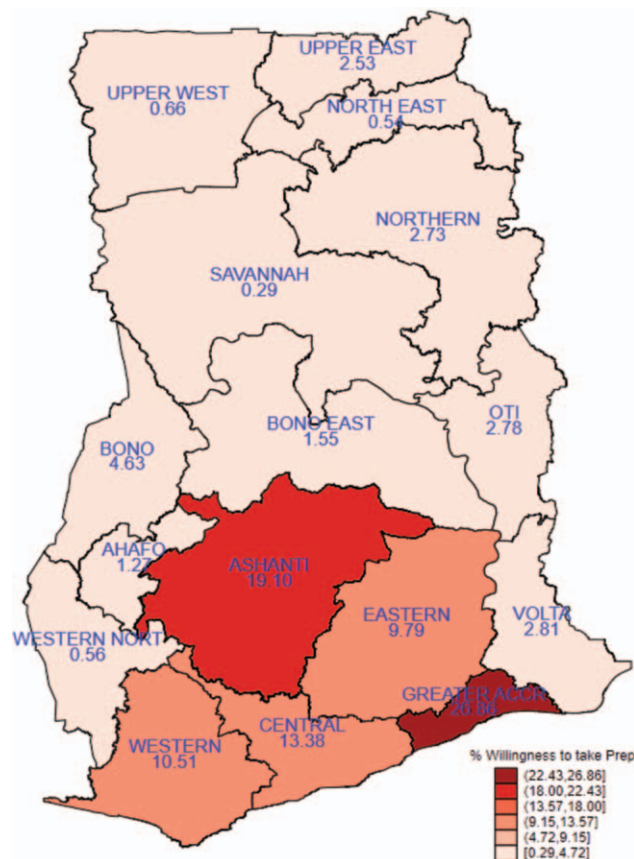


Figure 1. Percentage distribution of willingness to take PrEP among female sex workers across the 16 regions of Ghana.

Table 1
Descriptive and Bayesian adjusted odds ratio of willingness to take pre-exposure prophylaxis (PrEP) among human immunodeficiency virus (HIV)-uninfected female sex workers in Ghana using the national bio-behavioral survey – 2020.

Variable	Overall (%) N=5107	Willing (yes) N=2737	Odds ratios (CI)
Age	Median (range) 25 (16–68)	Median (range) 25 (16–62)	0.97 (0.95, 0.99)
Region			
Ashanti	966 (18.92)	523 (19.10)	Ref
Ahafo	105 (2.05)	35 (1.27)	0.18 (0.10, 0.47)
Bono	298 (5.94)	127 (4.63)	0.32 (0.12, 0.60)
Bono East	83 (1.62)	42 (1.55)	0.87 (0.47, 1.16)
Central	531 (10.39)	366 (13.38)	0.96 (0.56, 1.49)
Eastern	580 (11.35)	268 (9.79)	0.58 (0.28, 0.98)
Greater Accra	1379 (27.00)	735 (26.86)	0.62 (0.43, 0.88)
North East	26 (0.51)	15 (0.54)	0.80 (0.27, 1.49)
Northern	125 (2.44)	75 (2.73)	0.75 (0.44, 1.12)
Oti	111 (2.17)	76 (2.78)	0.79 (0.14, 1.72)
Savannah	22 (0.43)	8 (0.29)	1.62 (0.46, 3.00)
Upper East	117 (2.29)	69 (2.53)	0.70 (0.26, 1.35)
Upper west	55 (1.08)	18 (0.66)	0.31 (0.26, 0.45)
Volta	124 (2.43)	77 (2.81)	1.23 (0.63, 1.87)
Western	553 (10.84)	288 (10.51)	0.66 (0.56, 0.85)
Western North	32 (0.63)	15 (0.56)	0.59 (0.25, 0.98)
Have you heard of Prep			
No	4044 (79.19)	2010 (73.42)	Ref
Yes	1063 (20.81)	728 (26.58)	2.59 (2.22, 2.98)
Marital status			
Never married	3035 (59.43)	1516 (55.39)	Ref
Currently married/cohabiting	1025 (20.07)	604 (22.07)	1.52 (1.09, 2.01)
Divorced/separated/widowed	1046 (20.50)	617 (22.54)	1.93 (1.41, 2.53)
Age at work			
<25	3991 (78.16)	2181 (79.65)	Ref
25–34	985 (19.28)	485 (17.70)	0.84 (0.72, 0.95)
35 and above	131 (2.56)	73 (2.65)	0.98 (0.62, 1.36)
Force you to have sex			
No	4323 (84.65)	2281 (83.32)	Ref
Yes	784 (15.35)	457 (16.68)	0.99 (0.74, 1.29)
Have you injected drugs			
No	4991 (97.73)	2654 (96.95)	Ref
Yes	116 (2.27)	84 (3.05)	5.31 (1.64, 10.60)
Highest level of school attended			
Primary	867 (16.97)	450 (16.46)	Ref
Middle	101 (1.97)	54 (1.98)	0.74 (0.56, 0.94)
JSS/JHS	2078 (40.68)	1136 (41.48)	0.98 (0.75, 1.26)
Secondary/SSS/SHS	1762 (34.50)	952 (34.78)	0.89 (0.59, 1.30)
Higher	300 (5.87)	145 (5.31)	1.03 (0.80, 1.37)
Comprehensive knowledge			
No	3264 (63.91)	1791 (65.44)	Ref
Yes	1843 (36.09)	946 (34.56)	1.00 (0.81, 1.17)
Religion			
Christian	4295 (84.09)	2313 (84.49)	Ref
Muslim	607 (11.89)	342 (12.48)	1.31 (1.04, 1.53)
Others	205 (4.02)	83 (3.04)	2.82 (0.50, 5.31)
Country			
Ghana	4295 (84.10)	2321 (84.79)	Ref
Nigeria	696 (13.62)	361 (13.20)	0.87 (0.72, 1.03)
Others	116 (2.28)	55 (2.01)	0.61 (0.48, 0.73)
Have you ever had anal sex			
No	4581 (90.03)	2448 (89.79)	Ref
Yes	507 (9.97)	278 (10.21)	1.41 (0.83, 2.04)
Screened STIs			
No	2072 (41.08)	1496 (55.30)	Ref
Yes	2972 (58.92)	1210 (44.70)	1.23 (1.10, 1.40)
Clients per week			
<10	3847 (75.33)	2066 (75.45)	Ref
10–20	824 (16.13)	427 (15.59)	0.68 (0.40, 1.05)
>20	436 (8.54)	246 (8.96)	0.84 (0.55, 1.24)

CI = confidence interval, JHS = junior high school, JSS = junior secondary school, SHS = senior high school, SSS = senior secondary school, STIs = sexually transmitted infections.

PrEP and this was statistically significant. We observed a statistically significant difference between those who entered the sex work at age less than 25 years and those within 25 to 34 years, in that, 25 to 34 years group were 16% less likely to be willing (OR 0.84, CrI: 0.72–0.95) to take PrEP. About 23% of FSW who had been screened for STIs (OR 1.23, CrI: 1.10–1.40) were more likely to take PrEP. Muslims were 31% more willing (OR 1.31, CrI: 1.04–1.53) while other religions had thrice the odds of being willing (OR 2.82, CrI: 0.50–5.31) to take PrEP compared to Christians. Though respondents who have ever had anal sex were 41% more likely to be willing (OR 1.41, CrI: 0.83–2.04) to take PrEP, the result was statistically insignificant. With Ashanti region used as the reference category, Ahafo were 82%, Bono 68%, Eastern 42%, Greater Accra 38%, and Upper West 69% less likely of wanting to take PrEP and these were statistically significant, Table 1.

3.2. PrEP usage

Out of the 998 respondents who have ever heard of PrEP only 64 (6.39%) have ever used PrEP. FSW from 6 out of the 16 regions of Ghana have never used PrEP. The highest users of PrEP were FSWs who operate in Ashanti 19 (29.21%) and Greater Accra 15 (23.24%), Figure 2. About 61 (95.21%) of FSWs who were willing to use PrEP have ever used it. Majority of FSWs who have never been forced (80.69%) to have sex in the past 12 months have ever taken PrEP. Also, 68.44% of FSW who entered sex work at age less than 25 years have ever taken PrEP. FSW who

have never injected drugs for recreation, who do not have comprehensive knowledge on HIV and AIDS and have never had anal sex, about 96.74%, 56.19% and 78.98% of them have ever taken PrEP respectively, Table 2.

FSW who were willing to use PrEP had 43 higher odds of ever taking PrEP compared to FSW not willing to take PrEP (OR 43, CrI: 2.93–150). FSW who had ever screened for STI were 5 times the odds of taking PrEP, compared to those not screened (OR 5.2, CrI: 1.68–11.36). All other remaining variables were not statistically significantly associated with ever use of PrEP, Table 2.

4. Discussion

PrEP uptake is an important component of combination prevention and is a critical factor toward global targets of reducing HIV infection or transmission.^[25] In addition, PrEP is a very effective and ethical method used to prevent HIV infections with its efficacy dependent upon adherence.^[26] Progress has been made over the years in interventions (for instance PrEP) to help prevent the infection of HIV globally. However, there is limited information on implementation of evidence-based prevention methods like PrEP in Ghana and their impact among high-risk populations such as FSW. In this research, we focused our attention on the willingness and ever use of PrEP among FSW in Ghana. This is the first study ever to evaluate the willingness and ever use of PrEP in Ghana among FSW.

The median age of respondents willing to take PrEP was 25yrs while that of PrEP usage was 28years. A little above half of the FSW expressed their desire or willingness to take PrEP with majority of them, coming from Greater Accra and Ashanti regions. The high percentage of willingness to use PrEP from these regions may be because of exposure to awareness programs and interventions. A similar study conducted among FSW in Guangxi, China saw a much higher (85.9%) percentage of respondents indicating their willingness to use PrEP.^[27,19] Ghayda et al^[26] states that the success of the PrEP intervention is highly dependent on user’s willingness and adherence to the PrEP prescribed regimen. Therefore, lack of awareness or knowledge regarding PrEP could pose as major barriers to its optimal benefits.^[26] Only about 6% of the respondents who engage in female sex work have ever used PrEP in Ghana with Ashanti and Greater Accra regions recording the highest. This is likely due to interventional programs because there is a concentration of CSOs and NGOs in these regions due to the high numbers of FSW. A study on HIV risk and PrEP interest among female bar workers in Dar es Salaam reports that only 5% have ever heard of PrEP.^[20] A similar study in Asia (Guangxi, China) reports that FSW who have ever heard of PrEP were only 15.1%.^[19] Almost all the respondents in this study who indicated they have ever used PrEP were willing to use PrEP again.

Willingness to use PrEP was significantly different across the 16 regions of Ghana with FSW from Ahafo being less likely to use PrEP compared to FSWs from Ashanti region. Both Greater Accra and Ashanti regions have quite a number of organizations working in the area of HIV programs and therefore it’s expected to have more FSW willing to want to use PrEP as observed from the findings.

Age was observed to be a significant predictor of FSW willingness to take PrEP, in that, those FSW with higher age were less likely to use PrEP. This may be because the younger FSW are either more aware or place much value on their lives over the

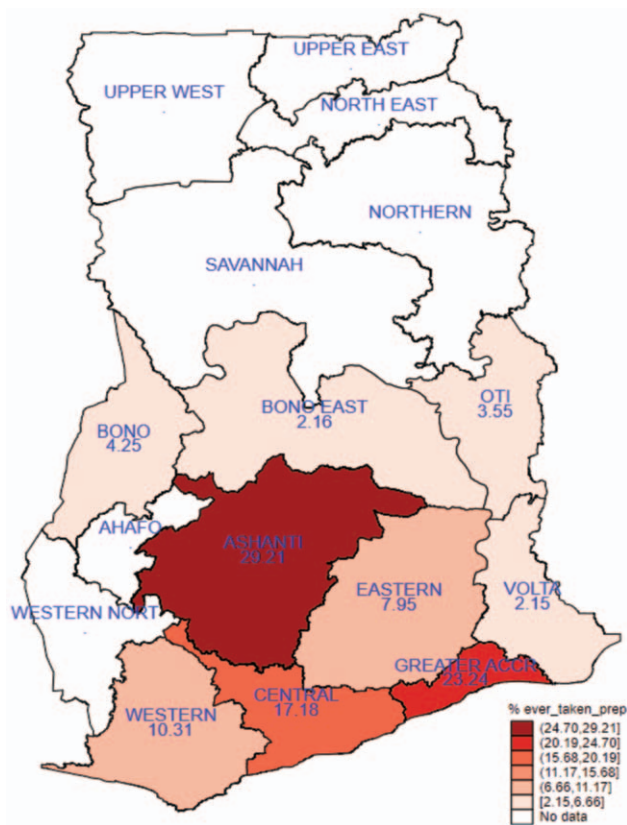


Figure 2. Percentage distribution of female sex workers who have ever used PrEP across the 16 regions of Ghana.

Table 2
Descriptive and Bayesian adjusted odds ratio of ever use of pre-exposure prophylaxis (PrEP) among human immunodeficiency virus (HIV)-uninfected female sex workers in Ghana using the National bio-behavioral survey, 2020.

Variable	Frequency N = 998 (percent)	Taken (yes) N = 66	Odds ratios (CI)
Age	Median (range) 26 (17–55)	Median (range) 28 (18–44)	1.10 (1.00, 1.22)
Marital status			
Never married	543 (54.36)	33 (52.62)	Ref
Currently married/cohabiting	253 (25.31)	13 (19.69)	1.16 (0.46, 1.92)
Divorced/separated/widowed	203 (20.30)	18 (27.68)	1.03 (0.49, 1.02)
Age at work			
<25	774 (77.60)	44 (68.44)	Ref
25–34	205 (20.50)	17 (27.20)	0.97 (0.51, 1.55)
35 and above	19 (1.90)	3 (4.36)	0.40 (0.18, 5.45)
Force you to have sex			
No	802 (80.34)	51 (80.69)	Ref
Yes	196 (19.66)	12 (19.31)	1.55 (0.51, 3.56)
Have you ever injected drugs			
No	967 (96.85)	62 (96.74)	Ref
Yes	31 (3.15)	2 (3.26)	0.66 (0.03, 1.72)
Education status			
Complete primary	171 (17.11)	9 (13.95)	Ref
Some secondary	827 (82.89)	55 (86.05)	2.04 (0.82, 4.32)
Willing to take PrEP			
No	317 (31.72)	3 (4.79)	Ref
Yes	681 (68.28)	61 (95.21)	43.35 (2.93, 150.31)
Screened for STIs			
No	570 (57.74)	49 (77.54)	Ref
Yes	418 (42.26)	14 (22.46)	5.20 (1.68, 11.36)
Number of clients in a week			
<10	708 (70.96)	38 (60.17)	Ref
10–20	222 (22.22)	18 (28.22)	1.25 (0.41, 2.68)
>20	68 (6.82)	7 (11.61)	0.86 (0.15, 2.06)
Comprehensive knowledge			
No	536 (53.70)	36 (56.19)	Ref
Yes	462 (46.30)	28 (43.81)	0.84 (0.44, 1.34)
Religion			
Christian	839 (84.07)	56 (87.28)	Ref
Muslim	114 (11.39)	8 (12.72)	0.68 (0.06, 1.98)
Others	45 (4.45)	0 (0.00)	–
Country			
Ghana	890 (89.22)	55 (86.96)	Ref
Nigeria	96 (9.64)	7 (11.38)	0.83 (0.18, 1.81)
Others	11 (1.14)	1 (1.67)	–
Have you ever had anal sex			
No	864 (86.97)	50 (78.98)	Ref
Yes	129 (13.03)	13 (21.02)	1.65 (0.73, 2.67)

CI = confidence interval.

elderly and therefore would take any precautionary measures necessary to protect themselves from getting infected. Education is higher among the young FSW than that of the older ones and this could have played a role in their determination to use PrEP. This finding was also anchored by a qualitative study that looked at perspectives on HIV pre- and postexposure prophylaxes (PrEP and PEP) among female and male sex workers in Mombasa, Kenya: implications for integrating biomedical prevention into sexual health services. In their study, respondents at age 25 years showed their willingness to use PrEP because they were inconsistent in the usage of condoms.^[28] However, Ransome et al^[29] study was among a population of black people in the US, which observed that age was not a significant predictor of willingness to use PrEP.

FSW who entered sex work at a later age were less likely to use PrEP. About 23% of FSW who have ever been screened for STIs

have ever used PrEP previously. Those who have ever screened for STIs infections also showed statistical significance to be willing to use PrEP. These findings are supported by a study conducted in China which shows that FSW who have previous knowledge of their STI status were more willing to use PrEP to prevent HIV infection.^[30] This may be as a result of their knowledge of their HIV status and therefore see the usage of PrEP as a protective effect as against those who are unaware. Compared to Christians, Muslim's respondents were more likely to take PrEP. This may be due to the way Muslims girls are brought up. Most of them are brought up to adhere strictly to the teachings of the Quran and so they see sex and pregnancy before marriage as a crime. It is therefore expected that, those who find their way into this trade are more likely to want to protect themselves from getting infected, otherwise, their illicit trade could be exposed, as sex work is closely associated with HIV

infection. This could expose the girls to discrimination in their communities due to the strict Muslim teachings.

The ever use of PrEP among Ghanaian FSW who have heard of PrEP is very low (6.39%). This has been observed in other studies. A study by Peng et al^[30] on the willingness to use PrEP for HIV prevention among FSW, observed that out of a 16.5% FSWs who have ever heard of PrEP, only 1.4% have ever used the drug previously to prevent HIV infection. Findings reported by Liu et al^[31] show that out of a total of 16% of respondents saying they have ever heard of PrEP, only 0.8% said they have ever used it among a population of men who have sex with men. Others include a study by Golub et al^[32] in New York city of which 23.7% have ever heard and only 1.7% have ever used and that of Kellerman et al^[33] where 25% have ever heard, with about 5% ever using PrEP.

A number of publications in mathematical modelling approaches have suggested that PrEP could help in changing the HIV prevention dynamics. These studies observed that PrEP has the potential to enhance conventional prevention efforts, which depends on the ability of programs to prioritize those at risk and manage costs.^[8,34–36] Therefore, calls for an improved prevention efforts to help understand how to strategically focus on PrEP interventions that will help in achieving optimal outcomes are needed to prevent HIV infections.

4.1. Limitation

It is possible that some sex workers were shy and may have provided responses which were socially desirable. FSW were provided with a compensation of 50 Ghana cedis after the interview. This might have influenced their responses. Some sex workers tried to enroll more than once but were identified by the peer educators, research assistants or supervisors.

5. Conclusion

The findings show that about half of FSW are very much willing to use PrEP for the purpose of preventing the infection and transmission of HIV/AIDS. Youth were more willing than the elderly to use PrEP. Also, FSW with no comprehensive knowledge of HIV and AIDS expressed their willingness to use PrEP. Due to the inadequate awareness of PrEP among the Ghanaian FSW, civil society organizations who work with sex workers should endeavor to educate them on the availability, risk and benefits of PrEP. This is the first study in Ghana providing evidence of willingness, ever heard and usage of PrEP among FSW and identifying factors for their acceptability and ever use of PrEP. This work provides a clear message for implementers to design interventional strategies for high-risk population of HIV infection.

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