



PRE-EXPOSURE PROPHYLAXIS RETENTION AMONG FEMALE SEX WORKERS, KAMPALA CAPITAL CITY, UGANDA

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ABSTRACT

Introduction: Despite all the interventions to promote the retention of female sex workers on Pre-exposure prophylaxis, it continues as a public health concern, resulting in HIV transmission, especially in developing countries. In Uganda, poor retention of female sex workers on Pre-exposure prophylaxis is among the leading contributors to HIV prevalence, contributing to 45% of HIV transmission rates among sex workers every year. The study assessed factors associated with pre-exposure prophylaxis retention among female sex workers at Kitebi Health Centre III, Kampala Capital City Authority, Uganda.

Methods: The study employed a cross-sectional study design on 186 participants selected by simple random sampling. Questionnaires and a key informant interview guide were administered to study participants to aid the data collection process. SPSS software version 20.0 was used for data analysis. Bivariate and Multivariate logistic regression analyses were used to identify the key factors associated with pre-exposure prophylaxis retention among female sex workers at a 95% confidence interval.

Results: The study found that PrEP retention was low at 34%. Findings also indicated that among individual factors, the majority or a high proportion of the FSWs who participated in the study were aged below 29 years (53.8%), were primary level graduates (53.2%), belonging to protestant religion (32.3%), were not married (82.8%), had low perceived stigma (95.2%), had high-risk perception (57.5%), had perceived pill burden (80.1%). The statistically significant associated factors were: perceived stigma (COR = 0.06 [0.01 - 0.46], $p = 0.007$), perceived pill burden (COR = 0.04 [0.02 - 0.11], $p = 0.000$) and perceived attitude of health workers (COR = 0.05 [0.01 - 0.20], $p = 0.000$). The Pre-exposure prophylaxis retention rate is very low. Pill burden, perceived stigma and perceived attitude of health workers were identified as predictors of pre-exposure prophylaxis retention among female sex workers. These findings highlight the need for a multifaceted approach to improve PrEP retention, addressing individual and health system factors to maximise the effectiveness of this crucial HIV prevention intervention.

KEYWORDS: Female sex worker, Pre-exposure prophylaxis, Pill burden, perceived stigma, retention.

1. BACKGROUND

Pre-exposure prophylaxis (PrEP) refers to the use of antiretroviral therapy (ART) by HIV-uninfected individuals to prevent HIV acquisition prior to exposure. According to the World Health Organisation, oral PrEP using tenofovir-based regimens acts by inhibiting viral replication at the cellular level,

thereby preventing HIV from establishing infection in CD4 cells [1]. The antiretroviral combination of emtricitabine and tenofovir disoproxil fumarate (F/TDF), marketed as Truvada, was the first medication approved by the U.S. Food and Drug Administration in 2012 for HIV prevention among populations at substantial risk. When taken consistently, daily oral PrEP has been shown to reduce the risk of HIV acquisition by more than 90% in real-world settings [2,3].

Despite its proven biomedical efficacy, the public health impact of PrEP is highly dependent on retention and persistence in use, particularly among key populations. The WHO defines substantial HIV risk as an incidence exceeding 3 per 100 person-years and emphasises that PrEP effectiveness is only sustained when users remain engaged in care for as long as risk persists [4]. In this study, PrEP retention is defined as continued use of PrEP for six consecutive months following initiation. Globally, PrEP uptake and retention remain uneven, with the greatest gaps observed in low- and middle-income countries, particularly in Sub-Saharan Africa. According to UNAIDS, Sub-Saharan Africa accounts for approximately 65% of the global HIV burden, with female sex workers (FSWs) experiencing HIV prevalence rates that are 5–10 times higher than those of the general female population [5]. While PrEP has been widely endorsed as a core prevention strategy for key populations, retention remains a persistent challenge across the region.

At the continental level, studies synthesised by WHO and AVAC indicate that PrEP retention at 6 months among female sex workers in Africa ranges between 20% and 40%, with sharp drop-offs occurring within the first three months of initiation [6,7]. A multi-country analysis across Kenya, South Africa, Zimbabwe, and Côte d'Ivoire reported an average 6-month retention of approximately 30% among FSWs, despite high initial uptake driven by outreach and peer-led models [8].

In East Africa, PrEP retention among female sex workers remains sub-optimal despite relatively strong policy support and donor investment. Evidence from Kenya and Tanzania shows 6-month retention rates ranging from 28% to 35%, with discontinuation commonly associated with mobility, stigma, pill fatigue, perceived reduction in risk, and service delivery barriers [9,10]. These regional patterns suggest that retention challenges are not merely individual-level issues, but reflect broader structural, social, and health-system constraints affecting key populations.

In Uganda, female sex workers continue to bear a disproportionate burden of HIV infection. According to the Uganda Population-Based HIV Impact Assessment (UPHIA) 2020–2021, HIV prevalence among sex workers is estimated at 31.3%, compared to 13.2% among men who have sex with men (MSM), 17% among people who inject drugs (PWID), and 15%



among people in prison [11]. Sex workers are estimated to be eight times more likely to acquire and transmit HIV compared to the general population [11].

National program data indicate that PrEP retention among female sex workers in Uganda remains below optimal levels. The Infectious Diseases Institute reports a national PrEP retention rate of 47.3% among FSWs, with Kampala registering slightly lower retention at 44% [12]. At Kitebi Health Centre III, PrEP retention among female sex workers stands at 35.8%, which is notably lower than comparable facilities in similar urban settings, including Kisenyi Health Centre IV (46.7%), Kiswa Health Centre III (39.3%), and Kawaala Health Centre IV (42.3%).

Although the Ministry of Health has implemented several interventions—such as standardised PrEP training materials, community refills through drop-in centres, multi-month dispensing, and peer-led mobilisation—retention among female sex workers remains persistently low. Existing literature identifies factors such as age, education level, stigma, perceived HIV risk, pill burden, mobility, social support, and knowledge of PrEP as critical determinants of continued use [9,13]. However, there is a paucity of facility-specific evidence examining how these factors operate within localised urban contexts such as Kitebi Health Centre III.

Given the high HIV burden among female sex workers and the central role of sustained PrEP use in HIV prevention, understanding the factors associated with PrEP retention is essential for optimising program effectiveness. Currently, there is limited empirical evidence documenting the determinants of PrEP retention among female sex workers at Kitebi Health Centre III. This study, therefore, aims to fill this gap by establishing the factors associated with PrEP retention among female sex workers attending Kitebi HC III in Kampala Capital City Authority.

Study Area

The study was conducted at Kitebi Health Centre III, a government-run urban facility under the Kampala Capital City Authority (KCCA) in Central Uganda. Among comparable health facilities in the area, Kitebi HCIII records the lowest PrEP retention rates, despite having the highest number of female sex workers initiated on PrEP relative to other key populations such as people who inject drugs (PWIDs), men who have sex with men (MSM), transgender persons, and people in prisons (PIP). The facility serves a predominantly low- and middle-income urban population across five parishes: Mutundwe, Rubaga, Bunamwaya, Kabowa, and Ndeeba.

2. METHODS

This study employed a mixed-methods approach, integrating both quantitative and qualitative techniques to provide a comprehensive understanding of the factors associated with PrEP retention among female sex workers at Kitebi Health Centre III. A cross-sectional research design was adopted, allowing the collection of data at a single point in time to assess relationships between individual- and health system-related

factors and PrEP retention.

The quantitative component enabled statistical analysis of numerical data to examine associations between key variables such as age, education level, follow-up systems, and service availability [14]. The qualitative component involved in-depth exploration of contextual and subjective experiences that influence retention, such as health worker attitudes, stigma, and structural barriers, generating rich narrative insights that cannot be captured through quantitative methods alone [15]. The cross-sectional design was suitable given the resource constraints and the study's aim to obtain a snapshot of factors influencing PrEP retention within a defined period [16]. Triangulation of quantitative and qualitative methods was employed to strengthen validity by cross-verifying results from different data sources [17].

A simple random sampling technique was used to select 186 participants for the quantitative survey to minimise bias and enhance representativeness [14,18]. For the qualitative strand, purposive sampling was employed to select nine key informants based on their expertise and involvement in PrEP service delivery: three local councillors, two clinical officers, one pharmacist, two peer educators, and one laboratory attendant [17,19].

Data analysis

Descriptive statistics were applied using percentages, frequencies, mean and standard deviation. The data was presented in tabular form and pie charts. Bivariate and multivariate analyses were applied to assess any association between each independent variable and the dependent variable (PrEP retention) using inferential statistics. The bivariate analysis involved employing Chi-Square analysis to test for association for categorical independent variables. All significant factors at $p < 0.05$ observed in Pearson's chi square test under bivariate analysis were thereafter subjected to the binary logistics linear regression model to obtain the Crude Odds Ratios (COR) and the corresponding 95% degree of confidence/ confidence interval (CI) and Adjusted Odds Ratios (AOR) were similarly obtained together with the corresponding 95% confidence intervals in order to establish the direction of the association of these factors on PrEP—retention among female sex workers.

3. RESULTS

The results of this study are presented in three main sections. First, the socio-demographic, individual, and health system characteristics of the female sex workers are described, along with the prevalence of PrEP retention at Kitebi Health Centre III (Table 1). Second, the bivariate and multivariate analysis of

factors associated with PrEP retention is presented, highlighting key predictors such as stigma, pill burden, and perceived health worker attitudes (Table 2). Finally, the strength of association between significant factors and PrEP retention is examined using crude and adjusted odds ratios to identify the most influential determinants of consistent PrEP use among the study population.



Individual Factors and PrEP Retention Among Female Sex Workers

Table 1 presents the socio-demographic and psychosocial characteristics of the 186 female sex workers who participated in the study, all of whom responded to the survey. The majority, 100 (53.8%), were aged below 29 years, while 99 (53.2%) had attained primary education. Most respondents, 154 (82.8%), were unmarried. Regarding psychosocial factors, 177 (95.2%) reported low perceived stigma, 107 (57.5%) had a high perception of HIV risk, 149 (80.1%) experienced pill burden, and 161 (86.6%) demonstrated high knowledge about PrEP.

Individual and health system Factors of Prep Retention among study participants are presented (Table) 1.

Table 1: Individual and health system Factors of Prep Retention among study participants

Variable	Distribution	Frequency	Percent
Age category	< 29 years	100	53.8
	≥ 30 years	86	46.2
Education level	Primary	99	53.2
	Post primary	87	46.8
Marital status	Unmarried	154	82.8
	Married	32	17.2
Perceived Stigma	High	9	4.8
	Low	177	95.2
Perceived Risk	High	107	57.5
	Low	79	42.5
Perceived Pill Burden	Yes	149	80.1
	No	37	19.9
Knowledge about PrEP	High	161	86.6
	Low	25	13.4
Distance	<5km	138	74.2
	≥5km	48	25.8
Waiting time	<2hours	165	88.7
	≥2hours	21	11.3
Perceived attitude	Positive	19	10.2
	Negative	167	89.8
Peer Utilisation	No	75	40.3
	Yes	111	59.7

Source: Primary Data (2024)

Table 1 show that slightly more than half of the respondents (53.8%) were below 29 years, while 46.2% were aged 30 years and above. The majority of the respondents were unmarried (82.8%), had primary level education (53.2%), and reported

low perceived stigma (95.2%). More than half of the respondents (57.5%) had high perceived risk of HIV infection, while 80.1% reported experiencing pill burden. The majority of respondents had high knowledge about PrEP (86.6%), lived within 5 kilometers of the health facility (74.2%), and waited for less than two hours to receive services (88.7%). However, most respondents perceived health workers' attitudes negatively (89.8%), although peer utilisation of PrEP was relatively high at 59.7%.

Health System Factors of PrEP Retention Among Female Sex workers

Of the 186 participants in the study, the majority 138(74.2%) ,covered a distance <5KM from their areas of residence to the facilities where they received PrEP, suggesting that healthcare services are relatively accessible. Additionally, 165(88.7%) reported an average waiting time of less than 2hours, indicating that healthcare services may be relatively efficient in terms of time. Furthermore, 167(89.8%) held a negative attitude towards health workers. Lastly, 111(59.7%) had received PrEP through peer Utilisation.

Prevalence of PrEP Retention at Kitebi Health Centre III

In this study, PrEP retention was defined as the proportion of sex workers who consistently used PrEP for six consecutive months following initiation. Retention was assessed by determining whether participants remained actively engaged in care and adhered to the prescribed regimen throughout the six-months. A participant was considered retained if she reported uninterrupted monthly use of PrEP as directed by health workers. This was measured using a questionnaire item asking whether the respondent had consistently taken PrEP (yes/no), supplemented by self-reported duration of continuous use in months. Descriptive statistics, specifically frequencies and percentages, were used to determine the prevalence of PrEP retention within the study population.

The analysis revealed that only 63(34%) were retained on PrEP at Kitebi Health Centre III, while the majority 123 (66%), discontinued use. This low retention rate underscores a significant challenge, indicating that a larger proportion of female sex workers initiated on PrEP do not sustain treatment over time. These findings highlight an urgent need for targeted interventions to improve PrEP adherence and continuity. Addressing the underlying factors contributing to discontinuation is essential to closing the retention gap, achieving national HIV prevention targets, and improving health outcomes for female sex workers in this setting.

Factors Associated with PrEP Retention among Female Sex Workers

Prior to multivariate analysis, bivariate analysis using the chi-square test was conducted to assess the association between each independent variable and PrEP retention. The purpose of the chi-square analysis was variable screening, not inference. Only factors that demonstrated a statistically significant association with PrEP retention at the bivariate level ($p < 0.05$) were subsequently included in the multivariate logistic regression model to control for potential confounding effects.



Stigma by Female Sex Workers

The findings presented in Table 4 indicate that stigma among sex workers was significantly associated with PrEP retention of female sex workers. The crude odds ratio (COR = 0.06 [0.01 - 0.46], $p = 0.007$) indicated that the odds of retaining on PrEP among female sex workers who experience high levels of stigma were 16.7 times significantly lower compared to those of FSWs who experience low levels of stigma. With further analysis using multivariate logistic regression, adjusted odds ratio (AOR = 0.07 [0.01 - 0.81], $p = 0.033$) showed that the odds of maintaining consistent PrEP among female sex workers who experience high levels of stigma were 14.3 times significantly lower compared to those of FSWs who experience low levels of stigma.

Perceived Pill Burden

Based on the findings presented in Table 4, the study revealed that perceived pill burden had a significant association with PrEP retention of female sex workers in the study. From the results, crude odds ratio (COR = 0.04 [0.02 - 0.11], $p = 0.000$) implied that the odds of retaining on PrEP among female sex workers who perceived a high pill burden were 25 times significantly lower compared to those of FSWs who did not perceive a high pill burden. Whereas, at multivariate analysis, the adjusted odds ratio (AOR = 0.05 [0.01 - 0.17], $p = 0.000$) implied that the odds of maintaining consistent PrEP among female sex workers who perceived a high pill burden were 20 times significantly lower compared to those of FSWs who did not perceive a high pill burden.

Perceived Attitude of Health Workers

The study findings presented in Table 4 demonstrate that the Attitude of Health Workers significantly showed an association with PrEP retention of female sex workers in the study. The crude odds ratio (COR = 0.05 [0.01 - 0.20], $p = 0.000$) implied that the odds of retaining on PrEP among female sex workers who held a negative perceived attitude towards health workers were 20 times significantly lower compared to those of FSWs who held a positive perceived attitude towards health workers. While conducting multivariate analysis, the adjusted odds ratio (AOR = 0.03 [0.01 - 0.19], $p = 0.000$) implied that the odds of maintaining consistent PrEP among female sex workers who held a negative perceived attitude towards health workers were 33.3 times significantly lower compared to those of FSWs who held a positive perceived attitude towards health workers.

Perceived Attitude of Health Workers

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maintaining consistent PrEP among female sex workers who held a negative perceived attitude towards health workers were 33.3 times significantly lower compared to those of FSWs who held a positive perceived attitude towards health workers.

The socio-demographic, individual, and health service-related factors associated with PrEP retention among female sex workers at Kitebi Health Centre III are presented (Table 2).

Table 2: Factors Associated with PrEP Retention among Female Sex Workers at Kitebi Health Centre III

	Consistent on PrEP		COR (95%)	P	AOR (95%)	P
	Yes	No				
Education level						
Primary	41.4	58.6	ref (1)		ref (1)	
Post primary	25.3	74.7	0.48 [0.26 - 0.90]	0.021	0.75 [0.29 - 1.95]	0.557
Age category						
< 29 years	23.0	77.0	ref (1)		ref (1)	
≥ 30 years	46.5	53.5	0.34 [0.18 - 0.65]	0.001	0.55 [0.23 - 1.39]	0.211
Stigma						
Low	88.9	11.1	ref (1)		ref (1)	
High	31.1	68.9	0.06 [0.01 - 0.46]	0.007	0.07 [0.01 - 0.80]	0.033
Pill burden						
No	86.5	13.5	ref (1)		ref (1)	
Yes	20.8	79.2	0.04 [0.02 - 0.11]	0.000	0.05 [0.01 - 0.17]	0.000
Knowledge						
High	29.2	70.8	ref (1)		ref (1)	
Low	64.0	36.0	0.23 [0.10 - 0.56]	0.000	0.77 [0.18 - 3.19]	0.714
H/W attitude						
Positive	89.5	10.5	ref (1)		ref (1)	
Negative	27.5	72.5	0.05 [0.01 - 0.20]	0.000	0.03 [0.01 - 0.19]	0.000

ref (1) = reference category; $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$

Source: Primary Data, 2024

The findings indicate that high stigma, pill burden, and negative health worker attitudes were significantly associated with lower PrEP retention among female sex workers. Respondents with high stigma were 93% less likely to remain consistent on PrEP compared to those with low stigma (AOR = 0.07, 95% CI: 0.01–0.80, $p = 0.033$). Similarly, respondents who experienced pill burden were 95% less likely to remain consistent on PrEP compared to those without pill burden (AOR = 0.05, 95% CI: 0.01–0.17, $p < 0.001$). Participants who perceived negative health worker attitudes were also 97% less likely to remain consistent on PrEP compared to those reporting positive attitudes (AOR = 0.03, 95% CI: 0.01–0.19, $p < 0.001$). Although education level, age, and knowledge about PrEP were significant at bivariate analysis, they were not statistically significant after adjustment in the multivariable model.



4. DISCUSSIONS

This study examined factors associated with PrEP retention among female sex workers at Kitebi Health Centre III in Kampala Capital City Authority, Uganda, and found an overall retention rate of 34%. This level is substantially lower than that reported in several studies conducted within Uganda and across East Africa, indicating a significant gap in sustained PrEP use among this key population. Evidence from community-based studies in Uganda and implementation research from Kenya and Tanzania suggests that higher retention can be achieved where peer support, client-centred service delivery, and differentiated care models are effectively implemented [14,15,18,21].

However, regional evidence also demonstrates that PrEP retention remains highly context-dependent. A study from Tanzania evaluating an mHealth-supported PrEP intervention among female sex workers reported low retention, highlighting that technological or programmatic innovations alone may be insufficient in the absence of supportive social and service environments [17]. The comparatively low retention observed at Kitebi Health Centre III therefore underscores the need for facility-specific interventions that address stigma, pill burden, and provider–client interactions. Strengthening peer-led engagement, improving health worker responsiveness, and enhancing client-friendly service delivery are likely critical to improving PrEP retention among female sex workers in urban public health settings.

Perceived Stigma

Stigma was significantly associated with lower PrEP retention. Female sex workers who reported high levels of perceived stigma were 14.3 times less likely to maintain consistent PrEP use compared to those reporting low stigma. Qualitative data illustrated this dynamic. One peer educator noted:

“Some of the girls hide their PrEP pills in different containers, like Panadol boxes, because they fear being judged if someone sees the actual bottle. A few even stop taking them when they go back to their families, especially upcountry, because they worry people will think they are HIV positive.” (KII, 2023)

These findings imply that stigma-reduction interventions should be prioritised within PrEP programming, including peer-led support mechanisms, strengthened confidentiality safeguards, and community-level dialogues that normalise PrEP use among female sex workers. While most studies identify stigma as a major barrier to PrEP continuation, some Ugandan implementation experiences have documented continued PrEP use among female sex workers despite persistent stigma, suggesting that supportive service delivery models and peer engagement may mitigate its negative effects [6,14]. In contrast, evidence from Kenya and other settings consistently demonstrates that perceived and anticipated stigma is strongly associated with early PrEP discontinuation [18]. Taken together, these findings underscore that the influence of stigma on PrEP adherence and retention is context-dependent and shaped by how stigma is experienced, measured, and addressed within specific service delivery environments [3,16].

Perceived Pill Burden

Perceived pill burden was significantly associated with lower PrEP retention. Those reporting pill burden had markedly lower

odds of retention, reflecting behavioural fatigue and the inconvenience of daily dosing routines. A key informant stated:

“Our clients complain on a regular basis that taking PrEP daily is not pleasing to them. They would rather take PrEP as a single pill once every six months than take it every day.” (KII, 2023)

This supports the growing demand for long-acting prevention options. Similar challenges with daily oral PrEP persistence have been documented among key populations and sex workers [6,25]. Interestingly, contrasting evidence has been reported across settings. A Ugandan study among female sex workers documented continued PrEP adherence despite experiences of stigma, suggesting that contextual factors such as peer support and program design may mitigate the negative effects of stigma [14]. In contrast, studies from Kenya have consistently shown that perceived and anticipated stigma are strongly associated with early PrEP discontinuation among women and key populations [18]. These divergent findings highlight the complex and context-dependent influence of stigma on PrEP adherence and retention, underscoring the importance of localised, stigma-responsive interventions [16].

Perceived Attitude of Health Workers

Perceived health worker attitude was strongly associated with PrEP retention. Participants reporting negative provider attitudes were substantially less likely to remain on PrEP. This points to the central role of respectful, non-judgmental, confidential service delivery, particularly for stigmatised populations. One key informant acknowledged:

“Some clients openly say to us that we are rude and arrogant, especially during clinic hours and that they do not feel comfortable with us. We are planning on how improvements to this shall be made.” (KII, 2023)

Comparable evidence shows that positive provider attitudes are associated with improved continuation and service engagement among female sex workers [27]. Strengthening key-population sensitivity training, patient-centred communication, confidentiality practices, and routine client feedback mechanisms may improve trust and retention.

5. CONCLUSION AND RECOMMENDATIONS

This study found that PrEP retention among female sex workers (FSWs) at Kitebi Health Centre III in Kampala Capital City Authority remains critically low at 34%, substantially below national and regional benchmarks. Perceived stigma, perceived pill burden, and negative attitudes of health workers were independently associated with reduced PrEP retention. The findings demonstrate that PrEP continuity among female sex workers is shaped not only by biomedical access but also by social and service-delivery factors. Persistent stigma, medication fatigue, and unfriendly provider–client interactions undermine sustained PrEP use among this high-risk population. Addressing these modifiable barriers is essential to improving the effectiveness of PrEP programming in urban public health facilities serving key populations.

PrEP retention monitoring should be strengthened within existing health management information systems, with routine



disaggregation by key population.

Client feedback mechanisms, recommended under national quality improvement frameworks, should be institutionalised to support adaptive service delivery and continuous program improvement.

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