

Willingness to Use HIV Pre-exposure Prophylaxis among Community Pharmacy Users in Uganda

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Abstract

HIV Pre-Exposure Prophylaxis (PrEP) uptake is limited in Uganda. Participants were recruited from 18 Kampala community pharmacies (CP); 52.2% had sexually transmitted infection (STI) symptoms, and 62.2% were females. Of the 424 participants with negative or unknown HIV status, only 127 (30.0%) were aware of PrEP; 91.0% reported willingness to use oral and 58.5% injectable PrEP. Preferences for PrEP delivery were at a community pharmacy (44.8%), health facility (48.7%), and home (6.6%). Use of CPs for distribution could increase PrEP uptake.

Introduction

Despite significant progress, new HIV infections continue to accrue in Uganda. In 2024, about 37,000 new infections disproportionately affected adolescent girls & young women (AGYW) accounting for up to 30% (1). Pre-exposure prophylaxis (PrEP) has demonstrated efficacy (2) and has been recommended by the World Health Organization (WHO) to reduce new HIV infections.

The Ugandan Ministry of Health launched the national PrEP rollout in 2017 with oral daily tenofovir disoproxil fumarate/emtricitabine (or lamivudine) for key populations. However, PrEP programs face challenges, such as limited availability in remote areas and poor adherence to the daily tablet regimen (3). Long-acting injectable (LAI) cabotegravir and lenacapavir PrEP have shown high acceptability and greater efficacy in clinical trials, especially in AGYW (2, 4). LAI-cabotegravir PrEP was adopted by the WHO in 2022 and approved for use in Uganda in February 2024, while LAI-lenacapavir was approved in 2026. Building on the lessons learned from oral PrEP, effective implementation of LAI-PrEP will be an important part of the strategy to eliminate HIV.

In resource-limited settings (RLS), community pharmacies (CPs) are frequently the initial point of contact for health services. They are preferred over government health facilities by the public due to their proximity, privacy, and shorter waiting times (5). Further, given the success of delivering ART through CPs in Uganda, extending these services to include PrEP provision should be explored. Several demonstration projects have used CPs to deliver oral PrEP in Kenya and the USA, with a few studies ongoing in the USA for injectable PrEP (6, 7). To plan future implementation approaches it is important to explore the willingness of potential users to accept oral and LAI PrEP and their preferences for the delivery point.

In a study of STI's, we previously reported that 30% of CP users had at least one STI including HIV, and 23% had a curable STI which increases their risk of HIV infection and suggests that they could benefit from PrEP (5). Within this study, we sought to assess the acceptability of and willingness to use LAI PrEP among individuals accessing CP services in Uganda.

Methods

The study methods have been previously reported (5). Briefly, participants seeking STI treatment, emergency contraception, and other non-STI related treatment at 18 CPs in urban Uganda (Kampala & Wakiso) were recruited, enrolled, and tested on site for HIV and curable bacterial STI's (syphilis, gonorrhea,

chlamydia) between May 2021 and June 2022. Those with positive tests were treated and/ or linked to care when applicable. Participants at risk for HIV were assessed using a structured questionnaire for their willingness to use HIV PrEP, including LAI-PrEP, if they were PrEP-eligible by Ugandan guidelines. Descriptive statistics were used to characterize sociodemographic characteristics, sexual and other behaviors, STI knowledge, PrEP awareness, STI symptoms, and laboratory-confirmed curable STIs. Bivariate and multivariable Poisson models were used to identify factors associated with willingness to use LAI-PrEP. Data were collected using REDCap 0.0.25 (Vanderbilt University, USA) and analyzed with STATA/SE 17.0 (College Station, Texas, USA). The research was approved by the Joint Clinical Research Center (JC1820) and Johns Hopkins University (IRB00279241) IRBs, and the Uganda National Council for Science and Technology (HS1274ES). All participants provided written informed consent in Luganda or English.

Results:

Of 474 people attending CPs and screened for the study, 450 (94.9%) participants were enrolled. Of those enrolled, 126 (28.0%) were aged < 25 years and 26 (5.8%) were known to have HIV. Of the remaining, 424 (94.2%) participants were either HIV-negative or not aware of their HIV-status; 266 (62.7%) were female, 298 (70.3%) were ≥ 25 years, and 209 (49.3%) were married. Most, 312 (73.6%) had attained more than primary level education, 322 (75.9%) reported a sex partner in the previous six months; 279 (65.8%) reported never using condoms, and 222 (52.4%) reported transactional sex in the prior six months. Half (215 (50.7%)) had low or no STI knowledge (**Table 1**).

Of the 424 participants with negative or unknown HIV status, 127 (30.0%) were aware of PrEP, with 117/127 (92.1%) expressing a willingness to use PrEP services. After being educated by the study nurses, 269/297 (90.6%) who had never heard of PrEP indicated they would be willing to use PrEP if deemed to be at high risk of HIV. Of 386 participants willing to use PrEP, 226/386 (58.5%) preferred injectable PrEP if it was available. Preferred locations to receive LAI-PrEP were: 44.8% at a CP, 48.7% at a health facility, and 6.6% at home. In the multivariable analysis, male sex (aPR,1.22; 95% C.I, 1.03–1.44, P = 0.024), post-primary education (aPR,1.26; 95% C.I, 1.02–1.55, P = 0.030), engagement in transactional sex (aPR,1.45; 95% C.I, 1.22–1.74, P < 0.001), alcohol use (aPR,1.29; 95% C.I, 1.10–1.51, P = 0.002), and STI symptoms (aPR,1.44; 95% C.I, 1.21–1.71, P < 0.001) were significantly associated with willingness to use LAI-PrEP (**Table 1**).

Discussion

Pre-exposure prophylaxis is a vital tool in HIV prevention, particularly in regions with ongoing high HIV transmission such as Uganda. However, barriers to PrEP access limit uptake. Nested within our study of men and women accessing CPs (5), 70% were unaware of PrEP; and more than 50% had low or no STI knowledge. Despite the low PrEP awareness similar to another study of AGYW in Kampala (8), there was almost universal willingness to consider PrEP after information was provided. This highlights the critical importance of education in shaping attitudes towards HIV prevention strategies.

If it were available, 60% were willing to use LAI-PrEP; less frequent dosing requires less day-to-day management, and may make it easier to continue treatment while preserving privacy and reducing social stigma (9).

In a large demonstration project in Kenya and Uganda that explored dynamic choice of oral and LAI-PrEP, LAI-CAB was preferred. This was attributed to the ease of injections over swallowing tablets daily (10).

Men were more likely to express interest in LAI-PrEP than women in our study, consistent with data from other settings (11). This may be attributed to convenience, stigma, adherence challenges, and the specific needs of men in the context of HIV prevention. Additionally, men's idea of masculinity may be threatened by having to take daily tablets which is seen as a sign of individual weakness and loss of independence (12). This could also be due to a greater perceived risk of HIV and beliefs that injectable PrEP is more effective (13). These hypotheses were not tested in this study. Research on gender comparison around willingness to use LAI-PrEP in Uganda are lacking. Understanding the barriers to and facilitators of LAI-PrEP in Uganda men could strengthen PrEP use since men are typically less able to engage in healthcare.

Transactional sex and alcohol use are associated with increased HIV risk (14, 15). In this analysis, people involved in transactional sex and alcohol users were 1.45 and 1.29 times more likely to report willingness to use LAI-PrEP respectively. The association with alcohol use is consistent with previous research (16). While research focusing on LAI-PrEP and alcohol users visiting pharmacies is limited, previous studies provide valuable context regarding the general preference for injectable PrEP among people using alcohol (16).

Participants with STI symptoms were more likely to report interest in LAI-PrEP. PrEP users also need frequent screening for STIs (17). Almost 75% of PrEP users were diagnosed with an STI within a year of PrEP initiation (18). CPs could provide opportunities to manage STIs and PrEP in a single encounter. The acceptability and feasibility of this approach require further study.

We found that most participants were willing to receive LAI PrEP in CPs, consistent with successful pilots in the USA and Kenya. The Kenyan study offered participants Post-Exposure Prevention (PEP) services as a complement to PrEP (6, 19). Our participants expressed high satisfaction with services due to increased accessibility. As programmatic roll-out of LAI PrEP evolves, alternative delivery sites including CPs should be considered to increase reach. Addressing policy restrictions on CP services in Uganda including delivery of PrEP would require stakeholder engagement and revision of policy and training.

This study was conducted in urban/peri-urban areas of Uganda; therefore, the results cannot be generalized to rural areas. Pharmacies and drug dispensaries are a common point of entry to healthcare regardless of population density due to limited access to government facilities in rural areas and fewer private clinics. Further information on PrEP and STI attitudes, knowledge, and practices in rural settings is needed to assess viability of pharmacy-based intervention outside of the capital.

These results suggest that CPs might serve as a valuable entry point for PrEP education and potentially provision to individuals at higher risk of HIV seeking STI treatment or emergency contraception. This

would involve leveraging the existing infrastructure of CPs, providing pharmacists with training, addressing awareness gaps, combating stigma, and ensuring confidentiality, which are crucial for successful implementation. As PrEP use in Africa increases, STIs remain an important biomarker of HIV vulnerability. STI testing and treatment combined with PrEP education and provision from CPs could expand choice beyond health facilities and reduce the burden and risk of STIs and HIV transmission in African communities.

Abbreviations

- AGYW
Adolescent Girls and Young Women
- CPs
Community pharmacies
- UNCST
Uganda National Council of Science and Technology
- JCRC
Joint Clinical Research Center
- IRB
Institutional Review Board
- PrEP
PreExposure prophylaxis
- STI
Sexually Transmitted Infections
- HIV
Human immunodeficiency Virus

Table 1: Willingness to use and factors associated with HIV PrEP and LAI PrEP among persons at high risk of HIV transmission seeking services at community pharmacy in Kampala and Wakiso, Uganda

Declarations

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Ethics approval and consent to participate

The authors confirm that all procedures in the studies were conducted in accordance with the relevant guidelines and regulations. In Uganda, Joint Clinical Research Center (JC1820) and the Uganda National Council for Science and Technology (HS1274ES) provided overall administrative approval. The study was also approved by the Institutional Review Board at Johns Hopkins University (Baltimore, MD, USA) under protocol IRB00279241. No study procedures were carried out until signed informed consent was obtained from all participants.

Consent for publication:

Not Applicable

Competing Interests

The authors declare that they have no competing interests.

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Author Contribution

All authors contributed to the study. NV: Project administration, data analysis, draft manuscript writing. EALO: Data analysis, manuscript writing, EALO is the guarantor; MMH: project supervision, manuscript reviews; AAO: Administration, data collection, manuscript writing, JHM: Manuscript writing, supervision; SJR: Manuscript writing; BC: Supervision, manuscript writing; RPR: Project supervision, manuscript writing; YCM: Funding acquisition, project supervision, manuscript reviews; ANK: Conceptualization, analysis, supervision, Manuscript writing.

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Data Availability

The datasets generated and analyzed in this study are not publicly available but are available from the corresponding author on reasonable request. The data is housed at the Infectious Diseases Institute data lake, and the Head of Research department (also the head of the institutional research data access committee) may be contacted on a case-by-case basis to provide data following a reasonable request to Dr. Stephen Okoboi, sokoboi@idi.co.ug .

Abbreviations

- AGYW – Adolescent Girls and Young Women
- CPs- Community pharmacies
- UNCST – Uganda National Council of Science and Technology
- JCRC – Joint Clinical Research Center
- IRB – Institutional Review Board
- PrEP- PreExposure prophylaxis
- STI – Sexually Transmitted Infections
- HIV- Human immunodeficiency Virus

Table 1

Table 1: Willingness to use and factors associated with HIV PrEP and LAI-PrEP among persons at high risk of HIV transmission seeking services at community pharmacy in Kampala and Wakiso, Uganda

	Overall total n(col%)	Willing to use HIV PrEP, n/N (%)	Willing to use monthly PrEP injection, n/N (%)	Willing to use LAI-PrEP			
				Unadjusted PR (95%CI)	P- Value	Multivariable PR (95%CI)	P- Value
Overall	424	386/424 (91.0)	226/386 (58.5)	N/A	N/A	N/A	N/A
Gender							
Female	265 (62.5)	246/265 (92.8)	136/246 (55.3)	Ref		Ref	
Male	159 (37.5)	140/159 (88.0)	90/140 (64.3)	1.16 (0.98– 1.37)	0.077	1.22 (1.03– 1.44)	0.024
Age (years)							
17–24 years	126 (29.7)	115/126 (91.3)	69/115 (60.0)	Ref		-	-
25–34 years	192 (45.3)	176/192 (91.7)	107/176 (60.8)	1.01 (0.84– 1.23)	0.892	-	-
≥ 35 years	106 (25.0)	95/106 (89.6)	50/95 (52.6)	0.88 (0.69– 1.12)	0.290	-	-
Marital status							
Married	209 (49.3)	189/209 (90.4)	114/189 (60.3)	Ref			
Single with no regular partner	35 (8.3)	30/35 (85.7)	22/30 (73.3)	1.22 (0.95– 1.55)	0.118	-	-
Single with regular partner	168 (39.6)	158/168 (94.0)	85/158 (53.8)	0.89 (0.74– 1.07)	0.226	-	-
Separated/widow	12 (2.8)	9/12 (75.0)	5/9 (55.6)	0.92 (0.51– 1.67)	0.787	-	-
Highest level of education							
Primary or below	112 (26.4)	94/112 (83.9)	48/94 (51.1)	Ref		Ref	

	Overall total n(col%)	Willing to use HIV PrEP, n/N (%)	Willing to use monthly PrEP injection, n/N (%)	Willing to use LAI-PrEP			
				Unadjusted PR (95%CI)	P- Value	Multivariable PR (95%CI)	P- Value
Overall	424	386/424 (91.0)	226/386 (58.5)	N/A	N/A	N/A	N/A
Post primary	312 (73.6)	292/312 (93.6)	178/292 (61.0)	1.19 (0.96– 1.49)	0.112	1.26 (1.02– 1.55)	0.030
Employment status							
Employed	355 (83.7)	323/355 (91.0)	186/323 (57.6)	Ref		-	-
Non-employed	69 (16.3)	63/69 (91.3)	40/63 (63.5)	1.10 (0.89– 1.36)	0.361	-	-
Reason for pharmacy visit							
Persons seeking Emergency contraception	81 (19.1)	78/81 (96.3)	33/78 (42.3)	Ref			
Persons seeking STI treatment	217 (51.2)	193/217 (88.9)	134/193 (69.4)	1.64 (1.25– 2.16)	< 0.001	-	-
Persons seeking other treatment	126 (29.7)	115/126 (91.3)	59/115 (51.3)	1.21 (0.89– 1.66)	0.230	-	-
Number of sex partners in previous 6 months							
None	5 (1.2)	4/5 (80.0)	2/4 (50.0)	Ref		-	-
1	322 (75.9)	298/322 (92.5)	159/298 (53.4)	1.07 (0.40– 2.86)	0.897	-	-
2 or more	97 (22.9)	84/97 (86.6)	65/84 (77.4)	1.55 (0.58– 4.16)	0.386	-	-

	Overall total n(col%)	Willing to use HIV PrEP, n/N (%)	Willing to use monthly PrEP injection, n/N (%)	Willing to use LAI-PrEP			
				Unadjusted PR (95%CI)	P- Value	Multivariable PR (95%CI)	P- Value
Overall	424	386/424 (91.0)	226/386 (58.5)	N/A	N/A	N/A	N/A
Frequency of condom use							
Never	279 (65.8)	250/279 (89.6)	147/250 (58.8)	Ref		-	-
Always	20 (4.7)	19/20 (95.0)	12/19 (63.2)	1.07 (0.75– 1.54)	0.696	-	-
Sometimes	125 (29.5)	117/125 (93.6)	67/117 (57.3)	0.97 (0.81– 1.18)	0.783	-	-
Engagement in transactional sex in the last 6 months							
No/unknown	202 (47.6)	184/202 (91.1)	85/184 (46.2)	Ref		Ref	
Yes	222 (52.4)	202/222 (91.0)	141/202 (69.8)	1.51 (1.26– 1.81)	< 0.001	1.45 (1.22– 1.74)	< 0.001
STI Knowledge							
None/Low	215 (50.7)	204/215 (94.9)	105/204 (51.5)	Ref		Ref	
High	209 (49.3)	182/209 (87.1)	121/182 (66.5)	1.29 (1.09– 1.53)	0.003	1.13 (0.97– 1.33)	0.122
Illicit drug use in the past 6 months							
No	408 (96.2)	373/408 (91.4)	217/373 (58.2)	Ref		-	-
Yes	16 (3.8)	13/16 (81.2)	9/13 (69.2)	1.19 (0.82– 1.72)	0.361	-	-

	Overall total n(col%)	Willing to use HIV PrEP, n/N (%)	Willing to use monthly PrEP injection, n/N (%)	Willing to use LAI-PrEP			
				Unadjusted PR (95%CI)	P- Value	Multivariable PR (95%CI)	P- Value
Overall	424	386/424 (91.0)	226/386 (58.5)	N/A	N/A	N/A	N/A
Alcohol use in the last 12 months							
No	314 (74.1)	284/314 (90.4)	150/284 (52.8)	Ref		Ref	
Yes	110 (25.9)	102/110 (92.7)	76/102 (74.5)	1.41 (1.20– 1.65)	< 0.001	1.29 (1.10– 1.51)	0.002
Laboratory confirmed curable STI result ¶							
No	322 (75.9)	293/322 (91.0)	171/293 (58.4)	Ref		-	-
Yes	102 (24.1)	93/102 (91.2)	55/93 (59.1)	1.01 (0.83– 1.23)	0.894	-	-
STI symptom present ¥							
No	196 (46.2)	183/196 (93.4)	86/183 (47.0)	Ref		Ref	
Yes	228 (53.8)	203/228 (89.0)	140/203 (69.0)	1.47 (1.23– 1.76)	< 0.001	1.44 (1.21– 1.71)	< 0.001

- Table displays characteristics of community pharmacy customers in Uganda and their willingness to use HIV PrEP and/ or willingness to use PrEP Injection.
- n/N denotes number of participants willing to use HIV PrEP and monthly PrEP injection of the total number in the category, % denotes proportion of participants willing to use HIV PrEP and monthly PrEP injection
- PR denotes prevalence ratio estimated from modified Poisson model fitted on complete cases, N=386.

- *Ref reference category for a covariate in the modified Poisson model. Variables for the multivariate model were chosen using 0.2 P-Value cut off at unadjusted analysis of each covariate. None of the variables in the adjusted model had missing values.*
- *considered participants with any sexually transmitted infection i.e., syphilis (using Abbott Bio-line Duo), gonorrhea, chlamydia (using Cepheid GeneXpert), trichomonas (women only-using OSOM lateral flow assay)*
- *¥ considered participants with any symptoms including (Urethral pus discharge, Abnormal vaginal discharge, Genital swelling or Genital growth, Lower abdominal pain, Genital itching)*
- *Total (col%), N=424 considered participants who reported HIV negative or had unknown HIV status*
- *PrEP- Pre-exposure Prophylaxis*
- *STI Sexually Transmitted Infections*
- *STI Knowledge was assessed from participant responses on how they rate their STI knowledge Including, Symptoms, transmission, consequences, and where to seek help in case they have an STI.*

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