Uptake of oral-based HIV self-testing among Key Populations taking HIV pre-exposure prophylaxis in central Uganda

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Abstract

Introduction: HIV incidence is higher among key populations such as sex workers, fishermen and men who have sex with men. HIV self-testing among key populations taking HIV Pre-Exposure Prophylaxis has not been studied in Uganda yet it could be an alternative testing approach for these population categories. We assessed the uptake of oral based HIV self-testing among key populations enrolled on Pre-Exposure Prophylaxis in Uganda.

Methods : A mixed methods cross-sectional study was conducted on 366 key populations attending Pre-Exposure Prophylaxis clinics at MARPI Mulago and Kasensero HC II Uganda, during May-August 2018. Respondents aged 15 years and above with no prior history of HIV self-testing were issued with “Oraquick” HIV rapid diagnostic test (kit) for self-testing. Data were collected using an interviewer administered structured questionnaire and through in depth interviews of selected respondents. A chi square test was performed to determine association between socio demographic, economic factors and propensity to uptake HIV self-testing. Logistic regression was used to determine the predictors of HIV self-testing uptake. Thematic analysis was performed to explore factors that promote and inhibit HIV self-testing uptake.

Results : HIV self-testing acceptability was 100% (365/365) with 73% (n=265) of respondents willing to pay for a kit. Of these, 85%(n=227) would pay not more than 1.4USD. Sixty-six percent (n=243) of respondents had high propensity to uptake HIV self-testing. Predictors of uptake were clinic location (rural vs urban) (aOR = 17.63 95% CI 8.44 – 36.81, p<0.001); Key Population category (female sex worker’s vs others) aOR= 4.36 (95% CI: 1.63 – 11.66, p=0.003) and education level (< primary vs post primary) aOR=0.38 (95% CI: 0.20 – 0.73). Using an oral fluid based kit “Oraquick” was reported to be free of pain, convenient, easy to use and time saving. A multimodal approach to distributing HIV self-testing kits was suggested by respondents.

Conclusion HIV self-testing can be an alternative to the conventional routine 3 monthly follow up HIV screening for key populations on Pre-Exposure Prophylaxis. Kits’ distribution may employ several models. Majority of key populations would afford the kits at a cost not more than 1.4USD.

Background

Human Immunodeficiency Virus (HIV) remains a global health threat. Globally, by the end of the year 2016, there were about 36.7 million people living with HIV and in the same year, approximately one million people died of HIV related illnesses (1). More HIV cases are found in Sub Saharan Africa with approximately 25 million people in the region living with HIV (2). It is estimated that globally, 70% of all people living with HIV know their status, and as the world prepares to end the HIV pandemic by 2030, the remaining undiagnosed proportion of 30% needs to be identified, initiated on treatment, and virally suppressed (1).

In Uganda, HIV is the 3rd leading cause of death following neonatal disorders and diarrhoeal diseases (3). The HIV epidemic is considered generally stable for past 7 years (4). However, despite the improving trends, Uganda is still among the countries in sub Saharan Africa categorized as high “burden” in respect to HIV prevalence (5). Most of the new HIV infections in the country are reported to occur in Key Populations (KP) which include sex workers, fisher folks, long distance truck drivers, uniformed service personnel, men who have sex with men (MSM), and boda-boda taxi-men (6). According to Ministry of Health (MoH) Uganda Population HIV/AIDS indicator survey (5), 78% of people living with HIV (PLHV) in Uganda know their status. To contribute to the global 2030 target, Uganda needs to scale up HIV testing.

In order to align the national response to HIV with World Health Organisation (WHO) guidelines, Uganda revised its National HIV Testing Services (HTS) Policy in 2016. The revised policy focuses on offering “targeted” HTS in the country while minimising the cost per HIV positive result (6). HIV self-testing is one of the strategies identified by the Ministry of Health to reach people who are not easily reached by HIV testing services.

The Uganda National HTS policy recommends providing Pre- Exposure Prophylaxis (PrEP) to key populations as a way of preventing HIV acquisition in this category of people. In August 2017, Uganda started providing PrEP to KPs in six health facilities. The cumulative number of clients on PrEP by the end of January 2018 at all the six clinics was 1900 (National PreP clinics records, January 2017). It is routine to have the KPs on PrEP tested for HIV and longitudinally monitored for various outcomes including HIV acquisition, drug toxicities, and cessation risk of exposure to HIV. It is hoped that HIV Self Testing can be ideal in such a category of people who have to frequently retest for HIV during the follow up period.

Overview of HIV Self-Testing (HIVST)

Human Immunodeficiency Virus (HIV) Self Testing (HIVST) is where a person collects his or her own specimen (oral fluid or blood) and performs an HIV test and interprets the result, often in a private setting, either alone or with someone he or she trusts (7). The WHO in 2015 recommended the use of HIVST as an additional approach to HIV testing services (8). This declaration was graded as a strong recommendation, moderate quality of evidence and called for more research in the field.

HIVST is believed to be a good strategy for increasing HIV testing uptake (9). A number of factors such as its ability to increase convenience, offer privacy, save time and minimise stigma are attributed to its possible success as observed in a study by [Walensky and Bassett \(10\)](#). Oral HIVST has been associated with additional advantages including; the oral fluid-based self-test being non-invasive, ease of use of the test, and having no fear of pain (11). Nevertheless, like any other approaches, HIV self-testing has been attributed to some barriers such as: unease of use, in case the particular test may be difficult to use, increased costs where the tests may have to be bought by the users, and accessibility to professional support in case one has concerns about the test (10, 12). Other challenges as noted by [Figuerola et al. \(13\)](#) include; lack of counselling where a person may have psychosocial concerns, and accuracy concerns since the test is not performed by a health professional. For effective implementation and optimisation of the outcomes of HIVST, these barriers require to be adequately addressed.

Acceptability of HIVST

Overall, studies conducted worldwide about HIV self-testing have shown high acceptability, with varying levels among population categories, age and gender. A literature review undertaken by [Figueroa, Johnson \(13\)](#) on attitudes and acceptability of HIVST among key populations indicated that in 8 out of 14 included articles, an average acceptability level for HIVST of 67% was found and, overall, acceptability ranged from 21-98%. In a qualitative acceptability study on HIV self-testing among 144 participants, including transgender women, men who have sex with men, and female entertainment workers in Cambodia by Pal and colleagues [\(12\)](#), all 144 participants expressed acceptability of HIVST. Another study conducted in USA, by Katz and others [\(14\)](#), to assess the acceptability of home-based HIVST revealed an acceptability of 84% in men having sex with men.

Research has also shown high acceptability levels of oral HIVST. Kurth and others [\(15\)](#), in their study to determine the accuracy and acceptability of oral HIV testing in Kenya concluded that the test was highly acceptable in the general population, represented by an acceptability of 94%. Similarly, another study from Kenya by Mugo et al. [\(16\)](#) on the uptake and acceptability of an oral HIVST among pharmacy clients showed a high level (84%) of uptake of the test. Another related study conducted in Uganda to determine the accuracy and acceptability of rapid HIV oral testing revealed a rate of acceptability of 87% among 440 clients attending an urban health facility in Kampala [\(17\)](#). As these studies were conducted from a similar setting, they are likely to offer some understanding on the acceptability of oral HIVST in the Ugandan context. Nevertheless, all of these studies focused on the general population, and not on any particular key population. Contextualised data is still required to provide a picture of acceptability of the test in key populations in Uganda.

HIVST among PrEP users

Pre-Exposure Prophylaxis is one of the biomedical interventions put in place for the prevention of HIV. It involves taking ART by a person who has continuous exposure to HIV but is HIV negative at the time of starting on PrEP [\(6\)](#). The aim is to prevent HIV infection in those taking the medicines. It is recommended that clients on PrEP are regularly monitored for HIV acquisition every after three months [\(1\)](#), to detect HIV infection as early as possible and start the client early on long life HAART [\(6\)](#).

In Uganda, over 80% of clients on PrEP belong to 3 categories: female sex workers, MSM, and injectable drug users (IDUs) [\(6\)](#). Such key populations are characterised by poor access to HIV testing due to a number of causes including stigma in the public, lack of key population friendly services, and the nature of their work which does not easily fit into the existing public HIV services delivery structures. Due to the advantages of HIVST listed in the previous section (such as ease of administration, privacy, and time saving), it is likely to be an appropriate method to scale up HIV testing among the key populations, the majority of which use PrEP regularly due to their HIV exposure risk, hence the need to evaluate HIVST among this population.

HIV self-testing has been reported to be highly acceptable among PrEP users. A recent study conducted in Kenya on the feasibility and acceptability of HIV self-testing among 240 PrEP users in Kenya revealed that 98% of the clients accepted to use the self-testing kit (18), representing high acceptability of HIVST among PrEP clients. This study applies well to the Ugandan setting, although the PrEP clinic studied only involved discordant couples, yet in Uganda discordant couples undergoing PrEP represent only about 2% of the entire clients on PrEP.

HIVST KITS distribution approaches/ models

For HIVST kits to reach the intended users, innovative distribution approaches need to be identified and established. Various models of HIVST kit distribution have been evaluated to establish the preferences of the users. Geng and his colleagues (9) studied the direct provision versus facility collection models of HIV self-tests among female sex workers in Uganda. Their findings indicated that HIV self-testing was more likely to be successful if kits were distributed by peers compared to health facility pick up. The direct provision model was more likely the priority due to the privacy it could offer for the sex workers and could be a better choice for other key populations likely to be stigmatised by society.

In summary, literature shows that HIVST is acceptable. What is not well documented however, is the acceptability of HIVST among individuals taking PrEP. Our study aims to address this evidence gap.

Study justification

Key populations on PrEP in Uganda are required to retest for HIV every after 3 months. The only existing HIV testing method is by use of a health worker provided blood based test either at the facility or in the community during outreaches. Providing a variety of HIV testing kits to the public enables people to choose which kit to use and this can enhance HTS uptake of HIV testing.

Acceptability for HIVST in Uganda has been studied in a few settings as part of determining the diagnostic accuracy of self-testing kits in key populations as well as in the general population. There is no study in Uganda that has determined acceptability of HIV self-testing using an oral based kit among PrEP users. Our study aimed to determine the uptake and factors associated with oral based HIV self-testing in KPs receiving PrEP at two of the six PrEP clinics in Uganda. The study is hoped to contribute to generation of evidence that can be used to inform policies on HTS programming.

Study objectives

1. To determine the proportion of Key Populations taking Pre-Exposure Prophylaxis for HIV in central Uganda who accept oral-based HIV Self-Testing.
2. To establish factors associated with HIVST uptake among Key Populations taking Pre-Exposure Prophylaxis in central Uganda.
3. To determine the preferred HIV Self-Testing kit distribution approaches/models among Key Populations taking PrEP in central Uganda

Methods

Study design

This was a cross sectional study that employed both quantitative and qualitative research methods.

Study setting

The study was conducted at two clinics in Uganda where PrEP is offered: Most At Risk Population Initiative (MARPI) clinic and Kasensero HC II between May and August 2018.

MARPI Clinic is situated within Mulago National Referral Hospital and is affiliated to the STD control unit-STD/ACP-Ministry of Health. The clinic started enrolling clients and initiating them on PrEP in July 2017. By December 2017, a cumulative number of 945 clients was on PrEP. The clinic runs on all week days (Monday to Friday) but there are weekly targeted outreaches that enable health workers deliver PrEP services to clients from the community. Clients in this clinic mainly come from Kampala, the capital of Uganda and its surroundings.

Kasensero HC II is located at Kansesero landing site, in rural Kyotera district. By December 2017, the clinic had enrolled approximately 800 clients on taking PrEP. Clients who attend this clinic come from the fishing communities, general population, plus commercial sex workers. The clinic offers PrEP in two arms. The health facility arm and the outreach arm (which was our source of respondents) where health workers take medicines to designated outreach points for clients to pick up.

Study participants

The study targeted all people categorized as key populations who had been enrolled and active on PrEP at both PrEP clinics by December 2017. We included HIV uninfected (sero status determined as those whose HIV test in the last 3 months was negative) or with unknown HIV status (determined as those who had not tested for HIV in the last three months), at least 15 years of age and receiving PrEP at MARPI Mulago and Kasensero HC II PrEP clinics during the study period. We excluded clients who had ever performed HIV self-testing prior to the study and those who were unable to provide consent on their own either due to ill health, altered mental state or any other reason.

Sample size determination

Using a sample size formula by Kish Leslie for cross-sectional studies for a single sample proportion for a categorical outcome,

$$N = \frac{Z_{1-\alpha/2}^2 \times P(1-P)}{d^2}$$

N= Calculated sample size

P= assumed sample proportion that accepts HIVST estimated at 85% (P=0.85)

1-P = The probability of not accepting the HIVST

Z_{1-α/2} = Standard normal deviate at 95% confidence interval (z=1.96)

δ =acceptable margin of error acceptability of 5%.

D=Design effect of 1.5 was included in the sample size estimate. This is because our respondents were sampled from two different clinics (Clusters) purposively selected, and further still, clients were being reviewed at each of those clinics as per clusters of KP category on different days.

Therefore, our sample size was: (Acceptability 85%, 95% CI with 5% Margin of Error)

$$N = \frac{Z_{1-\alpha/2}^2 \times P(1-P) \times D}{(\delta)^2} = \frac{1.96^2 \times 0.85(0.15) \times 1.5}{0.05^2} = 294$$

Due to the characteristics of the study population, an estimated dropout rate of 20% was expected. The effective sample size became:

$$N = \frac{294}{80/100} = 367 \text{ clients}$$

Therefore, a total of 367 participants was considered for the study.

Sampling

For logistical reasons as well as due to the nature of the study population, we employed a consecutive convenience sampling strategy. Potential participants were screened for eligibility as they came for their respective clinic appointments until the desired sample size was achieved for each clinic to make a total of 366 respondents. Most respondents were identified from outreach clinics since both PrEP clinics use targeted outreaches to recruit clients for PrEP as well as to provide drug refills. Purposive sampling was used for the qualitative study and respondents were drawn from those who had attended the quantitative study, after giving consent to participate in the qualitative interview.

Study variables

Dependent variables

The primary outcome (dependent) variable for the study was propensity for HIVST uptake.

To estimate uptake of HIV Self testing, we used five parameters to calculate a composite score “propensity for HIV testing uptake”. The variables were: acceptability of HIVST, testing kit preference, willingness to pay for the kits, amount to pay for the kit and preferred testing kit distribution approach/model. Uptake was categorised as low or high using a cut off score of 6.

Independent variables

i. Socio-demographic Characteristics

Age, gender, education level, occupation, marital status and religion were assessed.

ii. Level of income

Level of income was assessed by asking participants the approximate amount of money each earns per month from all sources, captured as a range of sums in Uganda shillings.

iii. KP category

Respondents were categorized as follows: female sex workers, negative partners in discordant sexual relationships, men who have sex with men, people who use and inject drugs, fisher folks, transgender and adolescent girls and young women (who were in essence part of FSWs). Each respondent was captured only once even if he/she belonged to more than one of the above categories

Data Collection

Quantitative data was collected using an interviewer administered structured questionnaire. The questionnaire was in English language. For clients who did not understand English language, questions were directly translated in the preferred language during the interview session. In-depth individual interviews were used to collect the qualitative data after collection of the quantitative data. An interview guide with open ended questions was used to interview the participants. Data collection took place from May to August 2018.

Data collection procedures, data sources and measurement

Quantitative data was collected using an interviewer administered structured questionnaire (Appendix 1). The questionnaire was in English language. For those clients who did not understand English language, questions were directly translated in the preferred language during the interview session. Research assistants were trained for two days by the principle investigator before data collection. Data was cleaned every day and kept in water proof folders. The data questionnaire was pretested on a population similar to the target population before setting off to the field. Participants for pretesting were selected from MARPI Mulago clinic. These clients were not included in the actual study. Minor edits to the tool were made and majority were mainly spelling and grammatical errors.

Research assistants educated study participants on how to use an Oral HIVST kit (Oraquick) by use of a video and practical demonstration. Leaflets guiding HIVST using the Oraquick in a local language and English were provided. Such information was included in the leaflet insert (pre-packaged) in the testing kit pack. Information giving to the clients included an account on the availability of the standard testing services at the health facility. Clients were first taken through a demonstration on how to perform self-testing. This demonstration involved three steps of preparing for oral fluid sample collection, the actual

process of using the kit to test, and finally interpreting the results. Clients were asked if they were willing to perform a self-test and those willing were provided with a kit to do self-testing (accepting). Research assistants supervised self-testing to ensure adherence to standard operating procedure as a quality assurance measure.

After self-testing, respondents were asked to interpret the results and thereafter, interviewed further to answer the study objectives. All respondents were willing to perform a self-test. Those who tested HIV positive on self-testing were subjected to a confirmatory test using the national HIV testing algorithm. Respondents who were HIV positive on confirmatory testing (4 in number) did not continue with the questionnaire.

HIV testing kit type preference

We measured this variable by interviewing participants and asking them questions regarding the preference for routine 3 monthly follow up HIV testing. Options were either using a self-testing kit they had which had been issued to them, using a blood based self-testing kit if introduced in future or using the conventional health facility based-health worker provided HIV test.

HIVST kit distribution model preference

Participants who preferred self-testing were asked how they would wish to access the testing kits through an interviewer guided questionnaire. Responses were graded as choices of “either,” or “or” for each distribution model.

Willingness to pay for a test kit

Participants were asked whether or not, they would be able to pay for an HIVST kit if it was at a cost. In addition, those that answered “yes” were asked how much they would be willing pay and responses were captured in Uganda shillings (UGX) and converted in USD equivalent during analysis.

Addressing potential sources of bias

Our study being a cross sectional study had potential to face non response. During sample size estimation, we included a non-response rate of 20%. We measured variables that did not require long time information recall, hence recall bias was minimised. The proportionate allocation of study subjects between the two PreP clinics minimised selection bias.

Data analysis

Quantitative variables analysis and statistical methods

Quantitative data was analysed using STATA software version 14.2. Acceptability to HIVST was calculated as a percentage of those who performed self-testing out of those who were offered the testing kit. Client characteristics were summarized using descriptive statistics by computing proportions for

categorical variables. Continuous variables were summarized by computing the mean, median, mode and range. Age was grouped into 7 categories with a 5-year age range for the first 6 categories and those 45 years and above for the seventh category. This 5-year age categorisation aimed at establishing if age would influence acceptability of HIVST

Data for specific objectives was analysed as indicated below:

1. What is the proportion of KPs taking PrEP in central Uganda who would accept HIVST?

We analyzed this objective by computing the proportion of clients who performed HIV self-testing over those who were issued with an HIVST kit. The proportion was computed as follows:

$$\frac{\text{Number of respondents who performed a self-test}}{\text{Number of clients who were issued with a self-testing kit}} \times 100$$

There was no missing data in all data capture tools during this study

2. What factors are associated with HIVST uptake among KPs taking PrEP in central Uganda?

In order to answer this study question, five variables (HIVST acceptance, kit preference, willingness to pay for the testing kit, the amount of money one is willing to pay, and the model preferred for kit distribution) were used to derive a composite variable (propensity for HIVST uptake) graded as high or low. This score was used as the dependent variable in estimating HIVST uptake using social demographic and social economic characteristics of the respondents.

First, the five variables were generated and coded as follows; acceptability for HIVST (0=Did not accept HIVST, 1=accepted HIVST), kit preference (0=conventional testing, 1=blood-based, 2=oral fluid-based), willingness to pay (0=not willing, 1=yes, willing), amount to pay (0=zero Uganda shillings (UGX), 1=less than or equal to 5000 UGX, 2=more than 5000 UGX), model of kit distribution (0=pick from facility, 1=deliver by health worker, 2=deliver by peers, 3=buy from health facility). Hence, somebody who accepted HIVST, prefers oral fluid-based, is willing to pay, can pay more 5000 and prefers to buy from health facility, the score would be 9. Thus, someone with a score 0 would have the lowest propensity to uptake HIVST and a highest propensity if he/she scores 9. A cut off point of 6 (median score) was used to define high and low propensity to accept HIVST.

Demographic and socioeconomic characteristics were analysed against the propensity score using logistic regression (coded 1 if propensity score is greater than 6 and 0 if otherwise). Factors with p values less than 0.2 at bi-variable analysis were subjected to multivariable analysis producing adjusted estimates. Associations with p values less than 0.05 were considered to be statistically significant. Odds ratio was used as a measure for association.

3. What are the preferred HIV Self-Testing kit distribution approaches/models among Key Populations taking PrEP in central Uganda?

We answered this objective by computing the proportion (percentage) of clients who preferred a particular HIVST kit distribution model of choice over others. Such models were: picking kits from a health facility, having kits delivered home by health workers, having kits delivered home by peers or buying from a private facility. We used the following formula to get the proportion for each model.

$$\frac{\text{Number of respondents who prefer a given HIVST kit distribution model}}{\text{Total number of respondents}} \times 100$$

The qualitative aspect of the study

The qualitative study employed an in-depth interview technique to gather data from participants and followed the quantitative data collection. We interviewed 20 participants with effort to ensure variation between KP categories, gender and testing site. Purposive sampling was used to select the participants and the principle of data circulation (where no new insights emerge from the data) was used to guide participant enrolment into the study.

An interview guide with open ended questions was used to interview the participants. The tool was in English but questions were directly translated in the preferred language during the interview session. To ensure the appropriateness of the data collection instrument, it was piloted on 2 individuals (10 % of the study the qualitative study sample) with similar characteristics to the study participants. Consent was sought before interviews were conducted and all interviews were audio recorded.

Recorded information was transcribed verbatim and important statements were identified and extracted. The thematic analysis approach was employed for data analysis, where statements/words were grouped according to similarity in meaning and into meaningful labels (Codes). These labels were eventually grouped into themes, and finally into categories. Categories were presented in a narrative form and supported with verbatim quotes from participants.

Results

Participants

A total of three hundred sixty-seven (367) clients were reached for interviews but one client opted out leaving 366 study participants. The client who opted out preferred not to be interviewed for personal reasons. Out of the 366 clients who were willing to perform HIV self-testing, 365 performed the test translating into 99.7% acceptability. Of the 365 clients who performed a self-test, 5 clients tested HIV positive on self-testing. Both the negative (360) and the positive (5) clients were subjected national HIV testing algorithm, and 4 were confirmed HIV positive. All the positive were linked to Anti-retroviral Therapy (ART) clinics for initiation on treatment.

Socio demographic and economic characteristics of participants

Three hundred sixty-six individuals were in the study. The mean age was 28 (SD=7.5) with the youngest participant at 17 years and the oldest at 54 years. Of these, 54.1% (n=198) were from urban settings, 49.2% (n=180) were males, and 48.4% (n=177) had attained up to primary education. About 34% (n=124), were married or cohabiting and more than half 51.9%, (n=190) were catholic. Casual labor was the major source of income contributing to 62.6%. (n=229) as detailed in the table below.

Table 1: Socio demographic and economic characteristics of the study participants

	n (N=366)	%
Site		
Marpi Mulago (Urban)	198	54.1
Kasensero (Rural)	168	45.9
Age category		
15-19	34	9.3
20-24	96	26.2
25-29	103	28.1
30-34	56	15.3
35-39	42	11.5
40-44	21	5.7
45 and above	14	3.8
Sex		
Male	180	49.2
Female	186	50.8
Education level		
Never went to school	25	6.8
Primary	177	48.4
Secondary	141	38.5
Tertiary institution	13	3.6
University	10	2.7
Marital status		
Single/Never Married	117	32.0
Married/Cohabiting	124	33.9
Divorced/Separated	122	33.3
Widowed	3	0.8
Religion		
Catholic	190	51.9
Protestant	70	19.1

Muslim	72	19.7
Adventist	3	0.8
Pentecostal	28	7.7
None	2	0.6
Source of income		
Formally employed (Gov't/NGO/ Private	24	6.6
Casual labor	229	62.6
Self Employed	84	23.0
In school, not employed	7	1.9
Peasant farmer	22	6.0

Proportion of Key Populations taking Pre-Exposure Prophylaxis for HIV in central Uganda who accept HIV Self-Testing

Acceptability of HIV self-testing

Of the 366 participants, 365 (99.7%) were willing to perform self-testing. One client declined to take the kit. All the 365 performed the self-test resulting in 100% acceptability.

Factors associated with HIVST uptake among Key Populations taking Pre-Exposure Prophylaxis in central Uganda

Factors associated with propensity of HIVST uptake

Distribution of the propensity score

The median propensity score for HIVST was 6 (interquartile range, IQR: 5, 7) on a scale of 0 to 9 with the latter indicating the highest propensity. The median was used as a cut off to indicate the degree of HIVST uptake (high and low propensity). Of 366 participants, 243 (66.4%) had high propensity to uptake HIVST. The results indicate that the propensity to uptake HIVST significantly differed by location, gender, key population category and marital status at 5% significance level. The participants in the rural area had a higher propensity for HIVST uptake compared to the urban area (OR=7.44; 95% CI: 4.35 – 12.71, $p<0.001$). Females had higher odds for up taking HIVST compared to the males (OR=2.52; 95%CI: 1.61 – 3.95; $p<0.001$). Consequently, the female sex workers significantly had higher odds to uptake HIVST

compared to other key population categories (OR=1.83; 95%CI: 1.13 – 2.94; p=0.014). Lastly, single or never married participants had lower odds to uptake HIVST compared to the married or ever married (OR=0.62; 95%CI: 0.39 – 0.98; p=0.040) as detailed in the table below.

Table 2: Bi-variable analysis for the associations between uptake HIVST and other covariates

	High propensity (N=243) n (%)	Low propensity (N=123) n (%)	Odds Ratio (95% CI)	p-value
Site				
Kasensero (rural)	147 (60.5)	21 (17.1)	7.44 (4.35 – 12.71)	<0.001
Marpi Mulago (urban)	96 (39.5)	102 (82.9)	Reference	
Sex				
Female	142 (58.4)	44 (35.8)	2.52 (1.61 – 3.95)	<0.001
Male	101 (41.6)	79 (64.2)	Reference	
Age categories (years)				
Less than 30	157 (64.6)	76 (61.8)	1.13 (0.72 – 1.77)	0.596
30 and more	86 (35.4)	47 (38.2)	Reference	
Education level				
None/primary	133 (54.7)	69 (56.1)	0.95 (0.61 – 1.46)	0.804
Post primary	110 (45.3)	54 (43.9)	Reference	
Marital status				
Single/Never Married	69 (28.4)	48 (39.0)	0.62 (0.39 – 0.98)	0.04
Married/Ever married	174 (71.6)	75 (61.0)	Reference	
Religion				
Catholic	132 (54.3)	58 (47.2)	1.33 (0.86 – 2.06)	0.195
Others	111 (45.7)	65 (52.9)	Reference	
Source of income				
Casual labor	150 (61.7)	79 (64.2)	0.90 (0.57 – 1.41)	0.641
Others	93 (38.3)	44 (35.8)	Reference	
Monthly income levels (UGX)				
Less than 100,000	88 (36.2)	48 (39.0)	0.89 (0.57 – 1.39)	0.599
100,000 and more	155 (63.8)	75 (61.0)	Reference	
Key population category				
Female sex worker (FSW)	95 (39.1)	32 (26.0)	1.83 (1.13 – 2.94)	0.014

Others	148 (60.9)	91 (74.0)	Reference
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Monthly income, age, level of education, religion and occupation were not associated with propensity to uptake HIVST.

Multivariable analysis

Key populations who access care from rural facilities have seventeen times the odds of propensity for uptake of HIVST compared to KPs who access care in urban facilities (OR=17.63, 95% CI:8.44 – 36.81; p=<0.001). The odds of propensity for uptake among female sex workers were four times those of other KPs (OR=4.36, 95% CI:1.63 – 11.66; p=0.003). Those with education level lower than secondary school have reduced odds of propensity for uptake of HIVST (OR =0.38, 95% CI: 0.20 – 0.73; p=0.004) i.e, the odds of propensity for uptake of HIVST among those with lower than secondary school education were 0.38 times those with secondary education and above. The odds to uptake HIVST did not significantly vary by age, marital status, religion, source of income or monthly income levels at 5% significance level.

Table 3: Adjusted (multi-variable) analysis for factors associated with propensity for uptake of HIVST

Adjusted estimates		
	OR (95% CI)	p
Site		
Kasensero (Rural)	17.63 (8.44 – 36.81)	<0.001
Marpi Mulago (Urban)	Reference	
Sex		
Female	1.36(0.59 – 3.15)	0.471
Male	Reference	
Key population category		
Female sex worker (FSW)	4.36 (1.63 – 11.66)	0.003
Others	Reference	
Marital status		
Single/Never Married	0.82 (0.45 – 1.50)	0.512
Married/Ever married	Reference	
Age categories (years)		
Less than 30	1.55 (0.84 – 2.85)	0.159
30 and more	Reference	
Education level		
None/primary	0.38 (0.20 – 0.73)	0.004
Post primary	Reference	
Religion		
Catholic	0.86 (0.51 – 1.46)	0.575
Others	Reference	
Source of income		
Casual labor	0.64 (0.36 – 1.14)	0.127
Others	Reference	
Monthly income levels (UGX)		
Less than 100,000	0.84 (0.48 – 1.47)	0.545
100,000 and more	Reference	

Proportion of KPs taking PrEP in central Uganda who prefer specific HIV Self-Testing kits distribution approaches/models.

Majority of respondents (88.4%, n=320) prefer to use an oral fluid based HIVST for routine 3 monthly HIV testing while on PreP, 73.2% (n=265) were willing to pay for an HIV self-testing kit and of those willing to pay, 85.7% (n=227) were willing to pay an amount not exceeding 5000/ Uganda shillings.

Table 4: Distribution of participants by preferred HIV testing method, willingness to pay for the kit, amount one is willing to pay and kits distribution model

	n	%
Preferred HIV testing method (N=362)		
Conventional health facility testing	31	8.6
Blood-based HIVST	11	3
Oral fluid-based HIVST	320	88.4
Willingness to pay for HIVST kit (N=362)		
Yes	265	73.2
No	97	26.8
Amount to pay (N=362)		
Not willing	97	26.9
Up to 5000 UGX	227	62.7
More than 5000 UGX	38	10.5
Kits distribution model (N=350)		
Pick from health facility	106	30.3
Home delivered by health workers	132	37.7
Home delivered by peers	82	23.4
Buy from private facility	30	8.6

Figures 2 and 3 show disaggregation of willingness to pay by KP category. Figure 4 shows the distribution of all respondents by model of test kit preference and gender.

Majority of KPs (85.7%, n=227) were willing to pay for kit at fee not exceeding 5,000 UGX (USD 1.4)

Preferred HIV Self-Testing kit distribution approaches/models among Key Populations taking PrEP in central Uganda

Figure 4 shows that more male respondents compared to female prefer home delivered kits (37.8% vs 34.6%) followed by picking from health facilities (29.4% vs 28.7), as well as buying from private facilities (9.4% vs 7%). Females preferred, (compared to men) distribution of the kits by peers (25.4% vs 19.4).

Kit distribution model preferences

FSWs and AGYW (who were in essence a sub category of FSWs) would use multiple distribution approaches to access the kits. Discordant couples however prefer picking kits from health facilities (21.7%, n=23), PWUID mostly prefer kits to be delivered to them by health workers (20.5, n=27), and fisher folks prefer kits delivered by peer (30.5%, n=35).

Table 5: Preferred model of delivery of HIV self-testing kits per KP category

KP Category	Home delivered- Peers (%YES, n=84)	Home deliver HWs (%YES, n=132)	Pick from Facility (%YES, n=106)	Buy from drug shop/pharmacy (%YES, n=30)
FSW	42.7	39.4	27.4	23.3
DISCORDANT	2.4	6	21.7	3.4
MSM	11	12.9	18.9	3.3
PWUID	3.7	20.5	13.2	0
TRANSGENDER	1.2	0	1.9	0
AGYW	8.5	5.3	7.5	10
FISHERFOLKS	30.5	15.9	9.4	60

Results From Qualitative Data

Socio demographic characteristics of the participants

Twenty interviews were conducted, with 11 male and 9 female participants. Twelve participants were from the MARPI Mulago while 8 were from Kasensero HC III. Participants ranged between the ages of 19-40 years. The KP category representation included: 5 female sex workers, 3 people who use and inject drugs, 3 MSM, 6 discordant, 2 young people and 1 fisherman.

Main findings

Four main themes emerged from the qualitative study which were generally aligned to the study aim. These were: acceptability of HIVST, choice of an HIV testing approach, preferred kit distribution models and willingness to pay for the test, as presented below.

Acceptability of HIVST

All (20) participants expressed high acceptability of HIVST. Participants felt HIVST was an approach that would greatly reduce on a number of obstacles associated with current approaches to HIV testing, such as the hospital based approach. Various factors were associated with the high acceptability of HIVST as opposed to the conventional approaches. These included being time saving, cost effective, private and accessible (*'you move with your lab'*). These factors were seen as motivations to use a self-test.

The other problem is having to line up, I may come but when I have no time for lining up and I go back without being tested. I will sit until the line is completed, yet here I will be alone and still go when I know whom I am (M05, MSM).

The time factor was particularly an important concern for special categories of people, such as sex workers, who work during night and sleep during day hence find day time very valuable. Additionally, some participants felt HIVST was particularly important for special groups who feel stigmatised when they go to health facilities. Particularly, FSWs and MSMs reported this concern and felt society has not accepted them and discriminates them, hence found HIVST more convenient.

Like for us (MSM), there are those who do not want to be identified. When they just want to be in hiding, but for us we bump on them. This method will be helpful when they come to know their status and take care accordingly, because they may say they have no time, and you offer them the test (M05, MSM).

Specifically, those who are likely to engage in unplanned sex e.g. those who use drugs and sex workers felt HIVST was very convenient, as they may need to test a sexual partner before engaging into sex, something not easy with facility based approaches. On the other hand, those who use and inject drugs stated that drugs can abruptly increase their sexual desire which can lead them to engage with irregular sexual partners. In this case, they will be safer by testing them first, hence the need for HIVST.

It is good because it is handy, any time when you have someone, you can use it with a customer (sex customer), because many will fear to go to the clinic. So it is safe for you to move with your own test (M10, FSW).

I was excited as a person and I thought if I can have somewhere to find them I would not be worried, because like some of us who use drugs, you may be there high on drugs and you just pick up a woman, and by the time you come to your senses, you regret your actions, [...]. But when you have that test, it becomes easy for you to test yourself and take caution to protect your-self (M01, PUWD).

In addition to testing one individual, HIVST was seen as being capable of engaging many more people (through peer recommendation), and thus increase the number of people who will become aware of their

HIV status.

Many participants expressed that they trusted HIVST as compared with facility based HIV testing. They reported that since they do the test themselves, they remain with no doubts about the test results. On the other hand, they felt if someone else gave them the results, there was a possibility that results could be altered (intentionally or not). A participant cited an example of false HIV test results they were given at a facility and felt HIVST would be a solution to such a problem.

The other thing is that here I will be able to see the results by myself and know that, I am like this. This is how my status is, when I can personally see the results. Because you may be told that you are OK, because it happened to me two times, by the time I came here for testing, I first cheeked myself in two places, and they were telling me that I was not ok, so someone invited me to come to this place. When I arrived, they told me that I was HIV negative, and I took long to accept it (M03, Discordant).

It therefore appears that HIVST would also possibly eliminate errors of false HIV test results resulting from transcription (recording), as participants are able to check for themselves the results of the test results. This also eliminates mistrust that health workers could provide wrong results intentionally.

Despite its acceptability, participants noted a few concerns regarding HIVST, the common one being the psychological/emotional concerns associated with an HIV positive test result. Participants felt that whereas privacy was an advantage in the HIVST approach, it also stood the challenge of lack of emotional support in case one turned HIV positive. This could also be associated with a lack of post-test counselling in general, even when one turns to be HIV negative, which requires them to be adequately guided on the next steps to maintain their HIV negative status. Others felt that this approach also may result into false results if one panics and ends up misinterpreting the test results.

Counselling for this approach is lacking. For example, if you have always known yourself to be HIV negative and you find yourself HIV positive, handling the situation may be difficult when you are alone, with no body to council you. That's the only problem or side effect I see with this approach (M07, FSW).

The other issue is that some people have weak hearts. You may test yourself and find him reading a negative result as a positive because of panic (M06, MSM).

However, the emotional concerns were expressed by fewer (6) participants compared with those (14) who felt that was not a problem to them. Nevertheless, this concern together with the concern of linkage to care should not be taken for granted and therefore need further exploration, as this study did not have an in-depth evaluation of them, yet these have been reported in literature as significant concerns of the HIVST approach.

Choice of an HIV Testing Kit during routine 3 monthly follow up HIV testing for clients taking PreP

Participants were asked about an HIV testing method of their choice, with explanations of their choices. Of the three approaches proposed (Oral based HIVST, finger prick HIVST, facility based HIV conventional

testing), participants overwhelmingly were in support of the oral based HIVST kit. Although many of the reasons for choosing an oral fluid based HIVST kit choice were associated with HIVST in general (e.g. time saving, private, accessible, as discussed in the previous section), specific factors were mentioned and are attributed to the high acceptability of the oral based kit. Participants highlighted various advantages of the oral based HIVST over the other two as being: non-invasive, not painful, no blood loss, and easy to use.

I would prefer the oral based test, because for it will not be difficult like the others. The one of a finger prick may be difficult for me to use, because I do not want to be pricked. They prick you and you get damages on your fingers (M05, MSM/MSW)

From among the three, this one of oral fluid test is the best, because, the other two are painful. You are removing one which pains and replacing it with another painful one. It is not good to feel the pain of the needle. But this one is very simple, I just rub it around the teeth. So this one is so far the best of all the three (M08, PWUD).

Other participants expressed a fear of continued blood loss during HIV testing procedures that involved blood based testing. People on PrEP were particularly concerned as they frequently underwent HIV testing, on a three monthly basis. Some felt that the continued blood loss could cause them health complications, yet with the oral fluid based test, no such fears could arise.

I have found this one (oral fluid based HIVST approach) different from others because for me, I don't want to lose my blood, because sometimes when there are checking you, they take off quite a lot of blood, but here there is no blood I lose and yet I will be sure of the results, just like the ones I will get using the blood test. So with this method, I will not lose blood and yet I will receive correct results, and I am the one who has also tested myself, I have not wasted time going to hospital, I have done the test by myself, and I have received correct results, without losing blood or experiencing pain. So I find this quite unique from other methods (M02, Discordant).

In terms of ease of use, participants found the oral based HIVST easier compared with the other approaches. For example, participants explained that the test procedure was easy for lay persons compared e.g. with the finger prick based HIVST, where the technique of drawing blood could be more difficult. Whereas this concern could result from lack of training in the finger prick approach, some felt even with training, the finger prick would still be more complex as it required one piercing themselves (which many also be feared) as opposed to only paring a test instrument around the mouth, a procedure many compared to brushing of the teeth. Hence, the majority felt the oral fluid based HIVST approach was more suitable to lay people compared with the finger-prick approach.

And sometimes you may use it (the finger prick based test) wrongly since you are not a health professional. So, it may not treat you well. But this method is so far the best (M01, PUWD).

Willingness to pay for an HIV self-test

Paying for HIVST kits was contested by the majority of participants. Although some were willing to pay, they felt if this approach is to be fully successful, it should be at no or a very reduced cost, in order to benefit the majority of Ugandans who are generally poor. In addition, the majority of KPs are individuals with poor financial status, yet these require frequent testing. Hence to help them, the tests require to be free of charge.

If this kit comes at a cost, it will be difficult for me to pay. Why...because I don't have a permanent job which I can use to pay. But if it comes free of charge, everyone will want to use it. Because many of us do not have permanent jobs, we only get temporally jobs which pay us little income. So if you want us to use the test, and for people to like it, it is good if you give it out freely (M06, MSM).

If the test came at a cost, that is a dead deal...it's a dead deal because not everyone has money. There are those who have, meaning it will be the rich to use them (M08, PWUD).

When asked how much they would be willing to pay, the amount ranged between 1000-20,000, indicating variation in opinion on this issue. However, the majority of participants were at the lower side, and many expressed willingness to pay so long as the figure did not exceed 2,000.

As for me I want it freely. At least if it came at around 2000, there I can afford, but still you see that even people fail to afford a pregnancy test, so when you are doing something, you also put into consideration that people fall under different categories (M10, FSW).

This finding suggested that in order for the saliva based HIVST approach to be successful, it should be free of charge and if at a cost, this should be very minimal.

Preferred kit distribution models

Various ways were mentioned in regard to the choice of where participants would prefer to receive the oral based HIVST kits. These included: both public and private health facilities, small and large health facilities, community centres and groups, plus commercial sites e.g. shops. Although many models were suggested, the motivation behind the choice was highly associated with the ease of access, cost implications and privacy concerns. For example, some preferred their current health facilities (facility based model), even if these are far from their residencies as they feel to be better understood by their primary service providers. Other participants preferred to receive the kits from their peers (Community Based Model), whom they feel identify with them, while others preferred the kits to be distributed at all levels of health care facilities to facilitate accessibility by all those who need them.

We also have our peers who can distribute them to us. Even I am also a peer, so we can get condoms and go and distribute them to the communities. So even this approach can work. They train you and you come to know how to use it. Because for me I know but there is someone who does not know. So, that approach would work, especially for us (MSMs), who don't want to go to hospital, who can even spend a year, or six months, such people would benefit a lot more (M05, MSM).

For me I have no problem because I have many health facilities around me but there are some people living in the villages when they need to travel for about 20 miles to access it. So I request that if it is possible, the government should provide the tests free of charge and they should be available everywhere, not only in large health facilities, not only in the cities, but also in villages, so that everyone can access it easily (M02, Discordant).

Participants expressed problems likely to be associated with particular distribution models, for example, if the kits were put in private facilities, there was a likeliness that these would be sold expensively for profit gains. They also raised concerns that if kits are to be sold at other places such as shops, there was a possibility of duplication. Hence, government facilities were more preferred as opposed to private and commercial sites.

I don't want to find it from any other place, because they are many people who duplicate. Like this test, you may find its duplicates by tomorrow. So if the government decides to bring them, we should access them from the main hospital, Mulago, from a qualified doctor (M08, PWUD).

The above findings suggest that in determining the models of HIVST kit distribution, accessibility by the users, privacy, and cost implications should be considered.

Discussion

Our study findings reveal that HIVST is highly acceptable among clients taking PreP irrespective of their social demographic and economic characteristics. Our acceptability study findings are comparable to other studies; for instance, acceptability of HIVST was 100% among pregnant women in India (19) and in Kenya, acceptability and feasibility of HIVST in clients taking PreP was found to be 98% (18). However unlike our study which involved a variety of MAPRS, the study by Sarkar and colleagues (19) was conducted among pregnant women. Similarly, the Kenya study focussed on only KPs on PREP who were in sero discordant relationships (18). Our study, having catered for a variety of KPs including MSM, sero discordant, FSW, PWUIDS, fisher folks, adolescent young girls and women provides grounded evidence on the acceptability of HIV self-testing among clients taking PreP. Acceptability results in our quantitative study are further justified by the qualitative findings in which respondents singled out key reasons to justify self-testing as: The procedure being time saving, cost effective (eliminates transport costs), private, and accessible; findings that are similar to those from previous research (20).

Although the majority of respondents preferred the oral fluid-based kit for subsequent 3 monthly HIV testing, a limited number of respondents (8.5%) preferred either the conventional health worker and health facility based testing or a blood based self-testing kit if introduced in future (3%). These findings suggest that HTS providers need to customise HIV testing according to client specific preferences, by having a variety of options available for the users

Our study established that socio demographic characteristics (KP category, urban/rural residence and gender were important factors in determining uptake of the HIVST. The results indicated that uptake of

HIVST significantly differed by location, level of education and key population category. Our findings however were incongruent with those from previous research (16), where sociodemographic factors were found to be insignificant in determining acceptability of HIVST. Possible reasons for the difference are that their study was conducted among members of the general population living in an urban setting yet our study focused on MAPRPS on PreP. Some KPs belong to particular gender by default for example, FSWs are female and MSM are males, hence KP category and gender seemed to go hand in hand in our study. Our study participants came from both urban and rural settings thereby giving better comparison.

In the qualitative study, respondents gave reasons for preferring the oral-based testing kit over others. These were non-invasiveness of the test procedure, being painless, ease of use, lack of blood loss, and cost effectiveness. These findings did not differ much from an acceptability study conducted in the general population in Uganda (17), and from other studies conducted elsewhere (11, 21). It is feared that blood-based methods can cause blood loss and injury to the body, causing cosmetic concerns for some KP groups such as sex workers. A non-invasive (saliva-based) method is therefore likely to be appropriate for such a group.

Despite the high acceptability, concerns were raised about the HIVST model. The commonest and most important to participants was the lack of emotional support, since pre and post-test counselling are not catered for in this model. Such a revelation calls for an establishment of a system that ensures that clients access pre and post-test counselling as they use HIVST. Such a system can involve the use of a toll-free telephone line where clients can call and consult or express their fears as well as establishing community structures where client support can be provided.

Whereas our findings indicate high acceptability of HIV self-testing in clients taking PreP in central Uganda, only up to 73% of the respondents were willing to pay for the kit. The remaining 27% (n=97) would not use the kit if it were for a cost. These findings appear to be in line with previously documented literature (16), where authors reported that uptake of HIVST remained high (84%) if the test was offered at a subsidised cost (of approximately \$1). The cost of a testing kit can bar individuals who are financially constrained to access it. A self-testing kit among our study population could be affordable by 50% of the KPs if it costs 5,000 UGX (USD 1.4) or less. Compared to other studies elsewhere, Ng and colleagues (22), in their study to determine accuracy and user acceptability of HIV self-testing using Oraquick HIVST kit, 87.4% of participants were willing to pay for the kit, and out of those willing to pay, only 28% could afford the kit at a market price of USD 5 (approximately 18,000/ Uganda shillings). In addition to these findings, Maheswaran and others (23), in their study entitled “Cost and quality of life analysis of HIV self-testing and facility-based HIV testing and counselling in Blantyre” recommended that HIVST would be affordable if the kits were subsidized to a cost comparable to that of routine HIV facility based testing.

Of importance is the revelation that PWUID, the discordant and MSM had the highest rates of unwillingness to pay for the kits. Further analysis about average monthly income for these respondents indicated that for each of the three categories, over 50% of the respondents had an approximated monthly income amounting to 200,000/UGX (USD 54), thus income level poses a barrier to self-testing for

those categories of clients should the kit be at a cost. Since male respondents were more unwilling to buy kits compared to their female counterparts (16% vs 38%), targeted distribution of kits needs to cater for gender differences to ensure equitable access to HIVST kits

Our assessment went further to explore the amount one would be willing to pay for an HIV self-testing kit. We found that 51% of those willing to pay for kits would pay up to 1,000 UGX (USD 0.3), and 82% of all clients willing to pay would pay a maximum of 5,000/ UGX (USD 1.4). This amount is a third of the current market price for the Oraquick kit (USD 4). This finding is nearly similar to that of Mugo et al. (16), where participants were willing to pay for a test if it were sold at approximately \$1. Our findings indicate that majority of clients taking PreP, and who are willing to pay for the kit would not afford it unless the current market price of 15,000 UGX (USD 1.4) has been subsidized. Our findings relate to those of Mwenge et al. (24), who reported that although HIVST was highly favoured in many aspects, participants strongly opposed it being sold to them.

The current study indicated that there is no single most popular HIVST kits distribution model that would apply to all categories of respondents. However, the three most preferred distribution models are home delivered by health workers, picking from health facility, and home delivered by peers. These findings relate with those from other studies which favored home based (25), facility based, and peer facilitated (9) models. It was also noted that special groups such as FSWs and fisher folks preferred the peer distribution approach compared to the rest of the KPs, while some groups such as fisher folks also considered finding the kits at commercial sites such as drug shops for easy access. However, Geng and colleagues (9), in their study to find the best distribution approach for HIV self-testing kits among FSWs noted that picking kits from the facility was a better method and was associated with linkage to care compared to community distribution of kits using coupons, a finding different from those of our study. Nonetheless, our findings indicate that it is important to have multiple kit distribution models to meet varying distribution needs of different KPs.

Study limitations

Our study findings could have been affected by the following limitations:

1. A non-probability consecutive convenience sampling method was used to enrol respondents hence not all clients on PreP had an equal chance of being selected. This could have led to a selection bias. The choice of the sampling method was majorly influenced by the available time and resources to conduct the study, plus the dynamic nature of the study population.
2. HIV self-testing was supervised by a trained personnel and therefore, the ability to perform a correct self-test and interpret results by respondents could not be assessed yet it is an important factor if these clients have to test at the comfort of their homes subsequently. Additionally, the presence of a supervisor could have increased respondent's acceptability of HIV testing since supervisors provided further procedural guidance during the process of self-testing.

3. The provision of testing kits to clients and requesting them to test on the same day could have influenced their decision to accept self-testing without adequately reflecting on their choice. A better method if time could allow, would have been to let clients go with the kits, and decide to or not to perform self-testing.

Conclusion

This study established that HIV self-testing is highly acceptable among KPs taking PrEP in central Uganda. The majority of KPs on PrEP prefer HIV self-testing using an oral fluid-based kit compared to other HIV testing methods for subsequent routine 3 monthly follow up testing. Propensity for uptake of HIVST among KPs on PrEP is influenced by the location of PrEP clinics where KPs receive care (urban or rural) as well as the KP category to which one belongs. Low education level (below secondary school) is associated with higher uptake of HIVST. HIVST kit distribution among KPs on PrEP may employ the following most preferred models: self-pick from facility, health worker distribution and peer distribution. Cost may be a hindrance to uptake of HIVST by some KPs. Therefore, HIV self-testing can be used as an alternative for routine follow up HIV testing among clients taking PrEP. Our findings can also apply to all clients who require regular follow on HIV rapid testing due to persistent risk of exposure.

Abbreviations

AGYW: Adolescent Girls and Young Women, AIDS: Acquired Immune Deficiency Syndrome , eMTCT: Elimination of Mother to Child HIV Transmission , FSW: Female Sex Workers , FSW: Female Sex Worker, HAART: Highly Active Antiretroviral Therapy, HBCT: Home Based HIV Counselling and Testing , HCT: HIV Counselling and Testing , HIV: Human Immunodeficiency Virus, HIVST: HIV Self Testing, IDUs: Injectable Drug Users , IRB: Institutional Review Board , IUDs: Injectable Drug Users ,KP: Key Populations, MARPI: Most At Risk Populations Initiative; MoH: Ministry of Health, MSM: Men who have Sex with Men, PICT: Provider, Initiated HIV counselling and Testing , PLHA: People Living with HIV/AIDS, PrEP: Pre-Exposure Prophylaxis, PWIDs: People Who Inject Drugs , PWUDs: People Who Use Drugs (PWUD), PWUID: People Who Use and Inject Drugs , UAC: Uganda AIDS Commission, UNAIDS- United Nations Program on HIV/AIDS, UPHIA: Uganda Population-Based HIV Impact Assessment, VCT: Voluntary Counselling and Testing, WHO: World Health Organisation

Declarations

Ethics approval and consent to participate

Formal ethical approval for the study was obtained from Mbale Regional Referral Hospital Research Ethical Committee. Approval number **MRRH-REC IN-COM 024/2018, Eastern Uganda**. The youngest respondent in this study was 17 years old hence approval for consent was not sought from the parent/guardian (No study participant was 16 years old or younger). All respondents provided a written informed consent.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed plus data collection instruments used during the study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that there is no competing interest

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Authors contributions

MJB Jr conceptualized and designed the study, led the data acquisition process, analysis and interpretation, and drafted the manuscript. NS participated in the qualitative data collection and analysis, and reviewed the manuscript. JTB and RWM improved the study design, data analysis and interpretation of results, and reviewed the manuscript. All the authors approved the final manuscript and agree to be accountable to it.

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Figures

Figure 1

Flow diagram for client participation

Figure 2

Distribution of respondents by willingness to pay for an HIV self-testing kit as a percentage

Figure 3

Distribution of amount one can pay for the kit per KP category

Figure 4

Percentage distribution of study participants by model preference and gender

Supplementary Files

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