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Acceptance of long-acting injectable HIV treatment and prevention options among people living with HIV and PrEP-service participants in Uganda

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Abstract

Background

Long-acting injectable antiretroviral products provide alternatives to daily oral medication for both HIV treatment and prevention. Their successful introduction will depend not only on clinical efficacy but also on whether potential users consider the products acceptable and feasible within routine care. We compared hypothetical acceptance of long-acting injectable HIV treatment and prevention options among people living with HIV (PLHIV) and HIV-negative participants recruited through PrEP services in Uganda, and examined associations with perceived benefits and risks.

Methods

We conducted a cross-sectional survey among 232 participants at Mildmay Hospital Uganda and Kajjansi Health Centre IV. The analysis included 116 PLHIV and 116 PrEP-service participants. Willingness was recorded on a five-point scale from 1 (very unwilling) to 5 (very willing); scores of 4 or 5 were classified as acceptance. Six perceived-benefit items were scored from 1 (strongly disagree) to 5 (strongly agree) and averaged, while eight perceived-risk items were scored from 1 (not concerned) to 4 (highly concerned) and averaged. Modified Poisson regression with robust standard errors was used to estimate crude and adjusted prevalence ratios.

Results

Overall, 178/232 participants (76.7%) accepted a long-acting injectable option. Acceptance was higher among PLHIV than among PrEP-service participants (104/116 [89.7%] vs 74/116 [63.8%], P < 0.001). Mean perceived-benefit scores were higher among PLHIV than PrEP-service participants (4.44 [SD 0.43] vs 4.19 [SD 0.57], P < 0.001), whereas mean perceived-risk scores were similar (2.63 [SD 0.85] vs 2.60 [SD 0.77], P = 0.640). In adjusted analysis, PrEP-service participants had a lower prevalence of acceptance than PLHIV (aPR 0.78, 95% CI 0.68–0.90), while each one-unit increase in the perceived-benefit score was associated with higher acceptance (aPR 1.48, 95% CI 1.26–1.73). Age, sex, prior awareness and perceived-risk score were not independently associated with acceptance.

Conclusions

Acceptance of long-acting injectable HIV treatment and prevention options was substantial but differed by service population. Perceived benefit was the strongest independent correlate of acceptance. Introduction strategies in Uganda should distinguish injectable HIV treatment from injectable PrEP, communicate product-specific benefits and requirements, and address concerns about safety, continuity of supply and scheduled clinic attendance.

Background

Daily oral antiretroviral therapy (ART) and oral pre-exposure prophylaxis (PrEP) are effective when taken as recommended, but daily dosing can be disrupted by pill fatigue, stigma, mobility, competing responsibilities and interruptions in access to services (1, 2). Long-acting injectable HIV options reduce the frequency with which medication must be taken. For HIV treatment, long-acting cabotegravir plus rilpivirine has maintained virologic suppression in appropriately selected people with HIV (3, 4). For HIV prevention, long-acting cabotegravir and twice-yearly lenacapavir have demonstrated high preventive efficacy in large trials (5–8). These products serve different clinical purposes: long-acting injectable ART is treatment for people living with HIV, whereas long-acting injectable PrEP is prevention for people without HIV who may benefit from ongoing protection.

Acceptability is an important precursor to uptake, but it is not equivalent to actual use. Theoretical work describes acceptability as a multidimensional judgement that reflects how people anticipate or experience an intervention, including its burden, perceived effectiveness and fit with their circumstances (9). Long-acting injectable HIV options also change how adherence is organised. Instead of remembering a tablet every day, users must return for injections within defined windows, and programmes must be able to maintain product supply, injection capacity, appointment tracking and management of delayed doses or adverse events (10). Thus, a person may value freedom from daily tablets while still being uncertain about injection pain, prolonged drug exposure, clinic attendance or whether the medicine will remain consistently available.

Ugandan evidence shows both strong interest and important reservations. In south-central Uganda, Kennedy and colleagues conducted qualitative interviews with 38 PLHIV with viraemia, 15 medical and nursing staff, and focus groups with peer health workers. Participants commonly viewed long-acting ART as a way to reduce daily pill-taking, protect privacy and make adherence easier during travel or busy schedules, but they also raised concerns about side effects, injections, treatment effectiveness, mistrust, stock-outs and monitoring treatment failure (11). In a separate Ugandan study among people who had actually received long-acting cabotegravir/rilpivirine for 12 months, Zakumumpa and colleagues held focus groups with 32 recipients and interviewed six health workers. Thirty of 32 recipients (94%) wanted to remain on injectable treatment, although injection-site pain, transient fever, missed injection appointments, cost, cold-chain requirements, physical space and workforce skills were reported as practical concerns (12).

Evidence on injectable prevention in Uganda is also emerging. At the Most At Risk Populations Initiative clinic in Kampala, Lukubuya and colleagues surveyed 234 key-population clients, including people who had never initiated oral PrEP, had discontinued PrEP, or were currently taking PrEP. Overall, 67.5% reported willingness to use long-acting injectable PrEP (13). This is important because prevention populations are not homogeneous: some people use PrEP continuously, others stop when their perceived HIV exposure changes, and others may be considering PrEP without having started it. In France, a survey of 100 PLHIV and 100 PrEP-service participants found interest in long-acting

antiretroviral options among 74% and 89%, respectively (14). Qualitative work in coastal Kenya similarly found that adults and young people living with HIV valued reduced pill burden and greater discretion but expressed concerns about pain, side effects and service capacity (15). In HPTN 076, which enrolled 136 HIV-negative women in South Africa, Zimbabwe and the United States, most participants rated injectable PrEP attributes as highly acceptable, although injection pain was common (16).

These studies show that interest in long-acting injectable HIV options is generally high, but the direction and magnitude of preference vary across settings and populations. The distinction between treatment and prevention is especially important. ART is lifelong treatment for established HIV infection, whereas the perceived need for PrEP may change with relationships, sexual exposure, personal risk assessment and prevention preferences. An injectable option may therefore offer a different relative advantage to a person replacing daily lifelong ART than to a person deciding whether and when to use HIV prevention. It is also possible for a clinically stable person doing well on oral ART to see little reason to switch. Directly comparing treatment and prevention populations within the same routine Ugandan service context can help clarify whether acceptance differs after accounting for age, sex, prior awareness and individual perceptions.

We therefore compared hypothetical acceptance of long-acting injectable HIV treatment and prevention options among PLHIV and PrEP-service participants attending two facilities in Central Uganda. We also described perceived benefits and risks and estimated factors independently associated with acceptance, with acceptance as the primary inferential outcome.

Methods

Study design and setting

This cross-sectional study was conducted within a broader mixed-methods project at Mildmay Hospital Uganda and Kajjansi Health Centre IV in Central Uganda. Mildmay Hospital is a specialised HIV referral, training and research facility. Institutional planning documents report that more than 17,000 clients access HIV care and treatment at the Mildmay Uganda main site [18]. Kajjansi Health Centre IV is a public-sector facility in Wakiso District that provides decentralised HIV prevention, care and treatment services. The two sites were selected to capture perspectives from a specialised high-volume HIV service and a decentralised public-sector setting. Participants did not receive long-acting injectable HIV options as part of this quantitative study; the outcome therefore represents anticipated rather than experienced acceptance.

Study population and eligibility

The study population comprised PLHIV receiving HIV care and HIV-negative participants recruited through PrEP services. Eligible participants were aged 15 years or older, receiving services at one of the study facilities, able to complete the interview in English or Luganda, and willing to provide informed

consent. Participants aged 15–17 years provided assent together with consent from a parent or guardian. Individuals who were too unwell to participate or unable to complete the consent and interview procedures were excluded.

The analytic prevention group included all 116 HIV-negative respondents recruited through PrEP services. The questionnaire distinguished current, previous and never use of oral PrEP; the analytic group was not restricted to people currently taking PrEP. We refer to this entire group as PrEP-service participants, regardless of oral PrEP use history.

Sample size and sampling

The quantitative sample comprised 232 participants: 116 PLHIV and 116 PrEP-service participants. The sample size was based on a two-sample comparison of proportions, assuming 74% acceptance among PLHIV and 89% among PrEP-service participants, 80% power, a two-sided 5% significance level, equal allocation and a 10% allowance for non-response (17). Separate sampling frames were developed by participant group, and recruitment was stratified by service population and age category.

Data collection and quality assurance

Research assistants received protocol-specific training before fieldwork. Training covered the study objectives, eligibility assessment, informed consent and assent, confidentiality, participant rights, administration of the electronic questionnaire, neutral interviewing and respectful discussion of sensitive HIV-related topics. Mock interviews and role-play were used to standardise administration. The questionnaire was pretested before the main survey at facilities with service profiles similar to the study sites but not included in the final study. Pretesting assessed wording, flow, comprehension, cultural appropriateness and interview duration, and the tool was refined before enrolment.

The final questionnaire was administered electronically using Open Data Kit on password-protected devices in a private setting. The benefit and risk items were informed by the study objectives and published literature on long-acting HIV treatment and prevention preferences (11, 14–16). Before questions on willingness and perceptions were asked, participants received a standardised, non-promotional explanation that distinguished long-acting injectable HIV treatment from long-acting injectable PrEP and described scheduled clinic attendance, possible injection-site reactions and systemic adverse effects. Interviews were conducted after consent procedures and routine clinical care where applicable.

Questionnaire response grading and study measures

The primary outcome was acceptance of a long-acting injectable HIV treatment or prevention option. The questionnaire graded willingness on a five-point ordered scale: 1 = very unwilling, 2 = unwilling, 3 =

neutral, 4 = willing and 5 = very willing. For the primary binary analysis, responses of 4 or 5 were classified as acceptance, while responses of 1, 2 or 3 were classified as non-acceptance. Thus, the analysis retained the original direction of the questionnaire, with higher scores representing greater willingness.

Perceived benefit was assessed using six questionnaire items: reduced pill burden, improved privacy or reduced stigma, better adherence, convenience during travel, feeling normal, and overall benefit relative to oral medication. Each item was graded as 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. For descriptive item-level summaries, responses of 4 or 5 were treated as agreement. A perceived-benefit score was calculated for each participant as the arithmetic mean of the six item scores. The possible score therefore ranged from 1.00 to 5.00, with higher values indicating stronger perceived benefit.

Perceived risk was assessed using eight items covering injection pain or discomfort, injection-site reactions, adverse effects lasting longer than oral therapy, strict clinic-attendance requirements, drug availability or cold-chain concerns, eligibility requirements, long-term safety uncertainty and overall risk relative to oral medication. Each item was graded as 1 = not concerned, 2 = neutral, 3 = concerned and 4 = highly concerned. For descriptive item-level summaries, responses of 3 or 4 were treated as indicating concern. A perceived-risk score was calculated as the arithmetic mean of the eight item scores, giving a possible range of 1.00 to 4.00; higher values indicated greater concern. Both composite scores were analysed as mean scores in their original units and were not summed or standardised.

Prior awareness was graded in the questionnaire as 1 = not heard of the option, 2 = had at least some prior awareness, 3 = understood the basics and 4 = well informed. Because these categories represented distinct levels of familiarity rather than a validated continuous scale, awareness was analysed as a categorical variable. The category "had at least some prior awareness" was used as the reference group in the regression model. Other descriptive questionnaire responses were analysed according to their original categorical coding rather than being combined into additional scores.

Data management

Electronic records were reviewed for completeness and internal consistency during data collection. The exported dataset was screened for duplicate records, missing values, out-of-range values and logical inconsistencies. Variables were coded using a predefined codebook, and categorical labels were checked before analysis. All participants had complete data for the acceptance outcome, the common covariates used in the pooled regression model, and the benefit and risk items. Variables specific to HIV treatment or PrEP use were structurally inapplicable to the other group and were not treated as ordinary missing data in the pooled analysis. The cleaned, de-identified dataset was exported to Stata version 18 for statistical analysis.

Statistical analysis

The analysis was organised around acceptance as the primary outcome. Participant characteristics were summarised using frequencies and percentages for categorical variables, means with standard deviations for approximately symmetric continuous variables, and medians with interquartile ranges where appropriate. Group comparisons in the descriptive table used Pearson chi-square tests for categorical variables and Wilcoxon rank-sum tests for continuous variables; these P values are descriptive and exploratory.

The perceived-benefit and perceived-risk composites were calculated before regression using the scoring rules described above. Internal consistency was assessed using Cronbach's alpha. For the primary inferential analysis, crude prevalence ratios (cPRs) were estimated using separate modified Poisson regression models with robust standard errors (17). The multivariable model included participant group, age category, sex, prior awareness, perceived-benefit mean score and perceived-risk mean score. Adjusted prevalence ratios (aPRs), 95% confidence intervals and two-sided P values are reported. Prevalence ratios were selected because acceptance was common. The reference categories were PLHIV, age 25 years or older, female sex and having had at least some prior awareness about long-acting injectable HIV options.

Model diagnostics included adjusted generalised variance-inflation factors to assess multicollinearity. Sensitivity analyses retained the original five-level willingness outcome in an ordinal logistic model and recalculated the perceived-benefit composite after removing the broad overall-benefit item. Statistical significance for the primary regression analysis was assessed at $P < 0.05$. Item-level benefit and risk findings were treated as descriptive and are presented in the appendix rather than as separate primary inferential analyses.

Ethical considerations

The parent study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by the Mildmay Uganda Research Ethics Committee (MUREC-2026-1828). Adult participants provided written informed consent. Participants aged 15–17 years provided written assent together with written consent from a parent or legal guardian. Interviews were conducted in private and the analytic dataset was de-identified.

Results

Participant characteristics

The analysis included 232 participants, comprising 116 (50.0%) PLHIV and 116 (50.0%) PrEP-service participants. The mean age was 29.5 years (SD 10.8); 106/232 (45.7%) participants were aged 15–24 years and 126/232 (54.3%) were aged 25 years or older. Women comprised 128/232 (55.2%) of the sample, including 79/116 (68.1%) PLHIV and 49/116 (42.2%) PrEP-service participants. University or vocational education was reported by 29/116 (25.0%) PLHIV compared with 59/116 (50.9%) PrEP-

service participants, while formal employment was reported by 15/116 (12.9%) and 34/116 (29.3%), respectively. Kampala urban residence was reported by 37/116 (31.9%) PLHIV and 54/116 (46.6%) PrEP-service participants. Most participants had had at least some prior awareness about long-acting injectable HIV options before the survey; 103/116 (88.8%) PLHIV and 94/116 (81.0%) PrEP-service participants selected the "had at least some prior awareness" category. The mean perceived-benefit score was 4.32 (SD 0.52) overall, whereas the mean perceived-risk score was 2.61 (SD 0.81) (Table 1).

Table 1
Participant characteristics overall and by participant group

Characteristic	Overall N = 232	PLHIV N = 116	PrEP-service participants N = 116	P value
Age, years, mean (SD)	29.5 (10.8)	30.9 (12.4)	28.2 (8.7)	0.310
Age 15–24 years	106 (45.7%)	52 (44.8%)	54 (46.6%)	0.792
Age 25 years or older	126 (54.3%)	64 (55.2%)	62 (53.4%)	
Sex: female	128 (55.2%)	79 (68.1%)	49 (42.2%)	< 0.001
Sex: male	104 (44.8%)	37 (31.9%)	67 (57.8%)	
Marital status: cohabiting	39 (16.8%)	13 (11.2%)	26 (22.4%)	0.056
Marital status: married	65 (28.0%)	32 (27.6%)	33 (28.4%)	
Marital status: separated/divorced	22 (9.5%)	14 (12.1%)	8 (6.9%)	
Marital status: single	103 (44.4%)	54 (46.6%)	49 (42.2%)	
Marital status: widowed	3 (1.3%)	3 (2.6%)	0 (0.0%)	
Education: none	14 (6.0%)	9 (7.8%)	5 (4.3%)	0.001
Education: primary	61 (26.3%)	40 (34.5%)	21 (18.1%)	
Education: secondary	69 (29.7%)	38 (32.8%)	31 (26.7%)	
Education: University	58 (25.0%)	20 (17.2%)	38 (32.8%)	
Education: Vocational/technical	30 (12.9%)	9 (7.8%)	21 (18.1%)	
Employment: formal	49 (21.1%)	15 (12.9%)	34 (29.3%)	< 0.001
Employment: homemaker	14 (6.0%)	8 (6.9%)	6 (5.2%)	
Employment: informal	93 (40.1%)	50 (43.1%)	43 (37.1%)	
Employment: student	47 (20.3%)	19 (16.4%)	28 (24.1%)	
Employment: unemployed	29 (12.5%)	24 (20.7%)	5 (4.3%)	
Household income quartile: Q1 (lowest)	54 (23.3%)	44 (37.9%)	10 (8.6%)	< 0.001
Household income quartile: Q2	59 (25.4%)	34 (29.3%)	25 (21.6%)	
Household income quartile: Q3	61 (26.3%)	20 (17.2%)	41 (35.3%)	
Household income quartile: Q4 (highest)	58 (25.0%)	18 (15.5%)	40 (34.5%)	

Characteristic	Overall N = 232	PLHIV N = 116	PrEP-service participants N = 116	P value
Residence: Kampala urban	91 (39.2%)	37 (31.9%)	54 (46.6%)	0.010
Residence: peri-urban	123 (53.0%)	65 (56.0%)	58 (50.0%)	
Residence: other	18 (7.8%)	14 (12.1%)	4 (3.4%)	
Formal education, years, mean (SD)	11.8 (5.7)	10.2 (5.5)	13.3 (5.5)	< 0.001
Monthly household income, UGX, median (IQR)	250,000 (0 -500,000)	100,000 (0 -300,000)	400,000 (200,000 -600,000)	< 0.001
Prior awareness: had at least some prior awareness	197 (84.9%)	103 (88.8%)	94 (81.0%)	0.029
Prior awareness: not heard of it	14 (6.0%)	4 (3.4%)	10 (8.6%)	
Prior awareness: understood the basics	10 (4.3%)	7 (6.0%)	3 (2.6%)	
Prior awareness: well informed	11 (4.7%)	2 (1.7%)	9 (7.8%)	
Perceived-benefit mean score, mean (SD)	4.32 (0.52)	4.44 (0.43)	4.19 (0.57)	< 0.001
Perceived-risk mean score, mean (SD)	2.61 (0.81)	2.63 (0.85)	2.60 (0.77)	0.640

Values are n (%) unless otherwise indicated. P values are exploratory descriptive comparisons. PLHIV, people living with HIV; PrEP, pre-exposure prophylaxis; SD, standard deviation; IQR, interquartile range; UGX, Ugandan shillings.

Acceptance and composite perception scores

Overall, 178/232 participants (76.7%) accepted a long-acting injectable HIV treatment or prevention option. Acceptance was higher among PLHIV than among PrEP-service participants (104/116 [89.7%] vs 74/116 [63.8%], P < 0.001). Perceived-benefit scores were also higher among PLHIV, whereas perceived-risk scores were similar between groups (Table 2).

Item-level benefit and risk responses are presented descriptively in Appendix Tables S1 and S2. Across the full sample, practical advantages such as reduced pill burden, privacy, adherence support and travel convenience were commonly endorsed. The two perception scales demonstrated good internal consistency: Cronbach's alpha was 0.81 for the six-item benefit scale and 0.88 for the eight-item risk scale (Appendix Table S3).

Table 2
Primary acceptance outcome and composite perception scores by participant group

Measure	PLHIV	PrEP-service participants	P value
Acceptance, all ages	104/116 (89.7%); 95% CI 82.8–94.0	74/116 (63.8%); 95% CI 54.7–72.0	< 0.001
Perceived-benefit mean score	4.44 (SD 0.43)	4.19 (SD 0.57)	< 0.001
Perceived-risk mean score	2.63 (SD 0.85)	2.60 (SD 0.77)	0.640

Willingness was graded from 1 (very unwilling) to 5 (very willing); scores of 4 or 5 were classified as acceptance. Benefit scores are means of six items graded from 1 (strongly disagree) to 5 (strongly agree). Risk scores are means of eight items graded from 1 (not concerned) to 4 (highly concerned). Higher composite scores indicate stronger perceived benefit or concern. CI, confidence interval; SD, standard deviation.

Factors associated with acceptance

In crude analysis, PrEP-service participants, lower perceived benefit and higher perceived risk were associated with lower acceptance. After adjustment, participant group and perceived benefit remained independently associated with acceptance. Compared with PLHIV, PrEP-service participants had a 22% lower prevalence of acceptance (aPR 0.78, 95% CI 0.68–0.90; P < 0.001). Each one-unit increase in the perceived-benefit mean score was associated with a 48% higher prevalence of acceptance (aPR 1.48, 95% CI 1.26–1.73; P < 0.001). Age, sex, prior awareness and perceived-risk score were not independently associated with acceptance (Table 3).

Table 3
Crude and adjusted prevalence ratios for factors associated with acceptance

Predictor	Crude PR (95% CI)	P value	Adjusted PR (95% CI)	P value
Participant group: PLHIV	1.00 (reference)	-	1.00 (reference)	-
Participant group: PrEP-service participants	0.71 (0.61–0.83)	< 0.001	0.78 (0.68–0.90)	< 0.001
Age: 25 years or older	1.00 (reference)	-	1.00 (reference)	-
Age: 15–24 years	0.97 (0.84–1.12)	0.680	0.97 (0.85–1.11)	0.640
Sex: female	1.00 (reference)	-	1.00 (reference)	-
Sex: male	0.96 (0.83–1.11)	0.578	1.05 (0.92–1.19)	0.463
Awareness: had at least some prior awareness	1.00 (reference)	-	1.00 (reference)	-
Awareness: not heard of it	0.64 (0.37–1.08)	0.093	0.75 (0.46–1.24)	0.267
Awareness: understood the basics	1.27 (1.18–1.37)	< 0.001	1.08 (0.92–1.27)	0.343
Awareness: well informed	0.69 (0.40–1.19)	0.187	0.79 (0.51–1.22)	0.286
Perceived-benefit mean score, per 1-unit increase	1.63 (1.40–1.89)	< 0.001	1.48 (1.26–1.73)	< 0.001
Perceived-risk mean score, per 1-unit increase	0.88 (0.81–0.95)	0.001	0.95 (0.88–1.02)	0.146

Prevalence ratios were estimated using modified Poisson regression with robust standard errors. The adjusted model included all 232 participants. Reference categories were PLHIV, age 25 years or older, female sex and having had at least some prior awareness about long-acting injectable HIV options. Estimates for benefit and risk represent a one-unit increase in the respective mean score. CI, confidence interval; PR, prevalence ratio.

Sensitivity and diagnostic analyses

Adjusted generalised variance-inflation factors ranged from 1.02 to 1.10, providing no evidence of material multicollinearity. In an ordinal sensitivity analysis using the original five-level willingness outcome, PrEP-service participants had lower odds of reporting a higher willingness category than PLHIV (adjusted OR 0.20, 95% CI 0.11–0.36), while perceived benefit remained positively associated with willingness (adjusted OR 8.57, 95% CI 4.72–15.96). Results were also stable after removing the general overall-benefit item from the benefit composite: the five-item benefit score remained associated with

acceptance (aPR 1.46, 95% CI 1.23–1.73; P < 0.001), and the participant-group association remained similar (aPR 0.79, 95% CI 0.68–0.91; P = 0.001).

Discussion

Within the same Ugandan study, hypothetical acceptance of long-acting injectable HIV options differed between treatment and prevention service populations. Nearly nine in ten PLHIV accepted a long-acting injectable treatment option, compared with approximately two in three PrEP-service participants accepting a long-acting injectable PrEP option. This difference remained after adjustment for age, sex, prior awareness and perception scores. Perceived benefit was the strongest independent correlate of acceptance, whereas perceived risk was associated with acceptance in crude analysis but not after adjustment.

The 89.7% acceptance among PLHIV is consistent with earlier Ugandan evidence, while extending that evidence to a routine cross-sectional comparison with a prevention population. Kennedy and colleagues found that PLHIV with viraemia in south-central Uganda commonly viewed long-acting ART as a way to reduce daily adherence burden, travel-related difficulties and inadvertent disclosure (11). Among Ugandan participants with direct 12-month experience of cabotegravir/rilpivirine, Zakumumpa and colleagues reported that 30/32 (94%) wanted to remain on injectable treatment (12). Our estimate is slightly lower than this experienced-user proportion, which is plausible because our participants were considering a hypothetical option rather than reflecting on a product they had already chosen and received.

Acceptance among PrEP-service participants was 63.8%, close to the 67.5% willingness reported among 234 key-population clients at the MARPI clinic in Kampala (13), but lower than the 89% interest reported among 100 PrEP users in France (14). Differences in service context, prior PrEP experience, risk perception, product familiarity and the way hypothetical options were described may contribute to these contrasts. Our prevention group included current, previous and never users of oral PrEP recruited through PrEP services. This makes the estimate useful for service planning but means it should not be interpreted as acceptance among current oral PrEP users alone.

The association between perceived benefit and acceptance helps interpret the group difference, although the cross-sectional analysis does not establish why it arose. Long-acting injectable HIV options can reduce daily pill-taking, make medication less visible to others and simplify adherence during travel. For people on lifelong ART, these advantages may ease a continuing treatment burden. For prevention participants, their value may change with perceived HIV exposure, relationships and preferences, while scheduled injections require a continuing commitment to clinic visits. This distinction helps explain why treatment and prevention populations should not be assumed to have identical demand even when both are offered a long-acting injectable option.

The item-level findings, although descriptive, identify issues that services should prepare to discuss. PrEP-service participants reported more concern about injection-site reactions, prolonged adverse

effects and strict clinic attendance, while long-term safety uncertainty was common in both groups (Appendix Table S2). Similar concerns have been reported in Uganda, coastal Kenya and HPTN 076 (11, 15, 16). Pharmacologic exposure from a depot injection cannot be stopped immediately after administration, and missed injection windows can have clinical and programme implications. Counselling should therefore explain the expected benefits, likely adverse effects, dosing schedule, missed-dose procedures and what options are available if a participant later wishes to stop or change the product.

The finding that the aggregate risk score did not remain independently associated after adjustment should not be interpreted as evidence that safety concerns are unimportant. Rather, the results suggest that willingness may depend on the balance participants make between anticipated benefit and anticipated burden. A participant may have genuine concerns and still accept an injectable if the perceived improvement in privacy, convenience or adherence is sufficiently valuable. This interpretation is consistent with acceptability theory, which treats acceptability as a multidimensional judgement rather than the absence of concern (9).

For implementation, long-acting injectable ART and long-acting injectable PrEP should be introduced as distinct services even when they share delivery challenges. Treatment programmes must consider eligibility for switching, maintenance of virologic suppression and continuity of lifelong therapy. Prevention programmes must also accommodate changes in HIV exposure, prevention preferences and decisions to start, pause or discontinue PrEP. Both require reliable product supply, trained staff, injection capacity and appointment systems (10, 18). The current findings indicate that demand-generation messages should be population-specific rather than built around a single generic claim that injectable products are more convenient.

Strengths and limitations

This study directly compared treatment and prevention service populations within the same Ugandan study and used a regression approach appropriate for a common binary outcome. The benefit and risk composites demonstrated good internal consistency, although this does not establish construct validity or equivalence across groups, and the main associations were stable in sensitivity analyses. Several limitations should be considered. First, acceptance was hypothetical because participants were not offered the products; stated willingness does not establish whether participants would initiate an injectable option when offered or continue it after experiencing injections and scheduled visits. Second, the prevention group included current, previous and never users of oral PrEP. We could not determine whether acceptance differed across these subgroups from the pooled results presented here. Third, cross-sectional data cannot establish temporal or causal relationships between perceptions and acceptance. Fourth, responses may have been influenced by social desirability or by how participants understood the standardised product description. The origin and language validation of the perception items require further documentation; internal consistency alone does not establish that the items

measure the same constructs in both groups. Finally, item-level comparisons were descriptive and were not intended to support multiple independent causal claims.

Conclusions

Long-acting injectable HIV treatment and prevention options were acceptable to a substantial majority of participants, but acceptance was markedly higher among PLHIV than among PrEP-service participants. Perceived benefit was the strongest independent correlate of acceptance. Introduction in Uganda should therefore distinguish long-acting injectable ART from long-acting injectable PrEP, communicate the practical and psychosocial benefits that matter to each population, and address product-specific concerns about safety, supply continuity and scheduled attendance. Future analyses should examine acceptance separately among current, previous and never oral PrEP users. Prospective implementation studies should measure actual initiation, continuation, missed injections, adverse events, user experience and equity after these products are available in routine services.

Abbreviations

aPR: adjusted prevalence ratio; ART: antiretroviral therapy; CI: confidence interval; HIV: human immunodeficiency virus; LAI: long-acting injectable; PLHIV: people living with HIV; PR: prevalence ratio; PrEP: pre-exposure prophylaxis; REC: Research Ethics Committee; SD: standard deviation; UGX: Ugandan shillings.

Declarations

Ethics approval and consent to participate

The Mildmay Uganda Research Ethics Committee approved the study (MUREC-2026-1828). All adult participants provided written informed consent. Participants aged 15-17 years provided written assent together with written consent from a parent or guardian.

Consent for publication

Not applicable.

Availability of data and materials

The de-identified dataset and analysis code are available from the corresponding author on reasonable request and subject to approval by Mildmay Research Centre Uganda and applicable ethical and data-governance requirements.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

WUM conceived the study, obtained funding, led protocol development, supervised study implementation, contributed to the analysis, and drafted the manuscript. CS provided senior scientific mentorship throughout the study, contributed to study design and statistical interpretation, and critically reviewed and revised the manuscript. DM, FA, BRK, MF, IS, SCO, WNK, WT, JFA, RM, and KU contributed to study implementation, interpretation of the findings, and critical revision of the manuscript. All authors reviewed and approved the final manuscript

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