ORIGINAL ARTICLE

Missed HIV Prevention Opportunities: Multilevel Determinants of PrEP Uptake Among STI Clinic Attendees in Zambia

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ABSTRACT

Background: Individuals with sexually transmitted infections (STIs) are at elevated risk of HIV acquisition, yet uptake of HIV pre-exposure prophylaxis (PrEP) in STI service settings remains suboptimal, especially in high-burden countries. This study evaluated PrEP uptake and determinants among STI clinic attendees in Lusaka and Livingstone, Zambia.

Methods: A retrospective observational study of 720 laboratory-confirmed, HIV-negative STI patients seen from January to December 2020 was conducted. Data were extracted from STI clinic records and PrEP files. Further, a cross-sectional survey of 45 healthcare workers (HCWs) working in STI delivery points was conducted to assess PrEP-related knowledge and training. Logistic regression was employed to identify factors associated with PrEP uptake, reported as adjusted odds ratios (AORs).

Results: PrEP was initiated by 34% of STI clinic attendees. Uptake was higher among those with multiple sexual partners (AOR 2.24, 95% CI 1.23–4.07), self-perceived HIV risk (AOR 2.48, 95% CI 1.47–4.19), prior PrEP use (AOR 2.09, 95% CI 1.22–3.58), and key population status (AOR 2.32, 95% CI 1.31–4.12). Lower uptake was observed among those formally married (AOR 0.25, 95% CI 0.13–0.45), with negative PrEP attitudes (AOR 0.18, 95% CI 0.10–0.33), or alcohol use (AOR 0.16, 95% CI 0.09–0.27). Only 38% of HCWs were formally trained in PrEP.

Conclusion: PrEP uptake in Zambian STI clinics is shaped by behavioural risk, perceived vulnerability, social context, and provider capacity. Optimizing HIV prevention requires integrating PrEP delivery in STI clinics with targeted interventions to address attitudinal barriers, and expanded HCW training.

Keywords: Sexually transmitted infections, HIV Pre-exposure prophylaxis; Zambia. HIV substantial risk,

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BACKGROUND

The association between HIV and sexually transmitted infections (STIs) remains significantly high. Studies have demonstrated as high as 17.5% risk of a subsequent diagnosis of HIV infection following syphilis diagnosis[1,2]. This could be because of the ulcerative nature of syphilis in its early stages, where the chancre can provide an entry point for human immunodeficiency viruses. HIV risk was seen three times higher in the general population infected with herpes simplex type II viruses (HSV-2), and was higher in newly HSV-2 infected persons compared to those with other infections[2]. This study attributes the high risk of HIV acquisition among individuals with newly acquired HSV-2 infection to an increased frequency and severity of genital ulceration, viral shedding, and inflammation in the genital tract.

In Zambia, Women who had STIs or symptoms within 12 months were twice as likely to be HIV positive (34%) as women who did not have STIs or STI symptoms (17%). Similarly, men who reported having a sexually transmitted infection or STI symptoms in the past 12 months were more than twice (30%) as likely to be HIV positive compared to men who did not report STI or STI symptoms (13%)[4]. The incidence of STIs treated in Zambian outpatient departments has been rising: 0.9% in 2017, 1.1% in 2018, 1.2% in 2019, 1.3% in 2020, and 1.4% in 2021 (Ministry of Health, 2022). Based on the National AIDS Council data. These data raise a concern that over 50% of STI patients may be at risk if HIV acquisition, and contribute to new HIV infections. In Zambia, approximately 0.13% (28,000) in 2021 among adults above 15 years, this still hinders to ambition of attaining HIV epidemic control[5]. This signifies the importance of placing dual HIV and STI preventive measures in STI clinics to strategically target this high-risk population, in this case, PrEP, given its 99% efficacy if used correctly[6].

Globally, PrEP uptake has increased significantly over the years, with studies showing a rise from 102,446 initiations in 2016 to 928,750 in 2020, and to as high as 3.5 million in 2024[7]. Sub-Saharan Africa had 4,154 initiations in 2016 and 517,727 in 2020, accounting for 56% of the global total and increased to 2.6 million by the end of 2023[8]. Zambia has seen an increase in PrEP uptake from 400 in 2017 to 23,250 in 2019, and 71,000 people initiating PrEP in 2020[9]. Despite the global increase in uptake, an average of 1.5 million people became infected, and 46.7% (670,000) of these new infections occurred in Eastern and Southern Africa[10], while 28,000 new infections were reported in Zambia in 2021[5]. Though beyond coverage for this study, advanced long-acting injectable molecules, Cabotegravir (CAB_LA) and Lenacapavir (LEN) have been introduced to address adherence concerns[11]. This signifies the importance of evaluating how PrEP is provided. This study aims to determine factors associated with low PrEP uptake among STI patients

MATERIALS AND METHODS

Study Design

This was a facility-based observational analytical study with a mixed-methods approach, combining a retrospective cross-sectional review of patient records and a cross-sectional survey of healthcare workers. The quantitative component consisted of a retrospective review of routinely collected clinical and programmatic data for laboratory-confirmed sexually transmitted infection (STI) patients who were attended to in six public sector high-volume routine STI clinics, three in Lusaka, and three in Livingstone between January and December 2020. The healthcare worker component involved a cross-sectional assessment of providers working in STI clinics to examine PrEP-related knowledge, training, and service delivery capacity. The study design enabled assessment of individual-, provider-, and system-level determinants of PrEP uptake without manipulating exposure or outcomes.

Sampling Techniques

The study population comprised individuals attending sexually transmitted infection (STI) clinics at selected public health facilities in Lusaka and Livingstone, Zambia. Inclusion criteria were

HIV-negative patients aged 15–49 years with a laboratory-confirmed STI diagnosis who attended a participating clinic between 1 January and 31 December 2020. Eligible patients were required to have unique identifiers to facilitate record linkage across outpatient department registers, laboratory registers, SmartCare electronic medical records, and PrEP clinic files for accurate ascertainment of PrEP prescription status. Patients were excluded if they had a clinically diagnosed STI without laboratory confirmation, were known to be HIV-positive at the clinic visit, had incomplete or missing records for PrEP screening or prescription, or presented as repeat visits within the study period; in such cases, only the first eligible encounter was retained. A census sampling approach was adopted, capturing all patient records meeting the eligibility criteria during the study interval. The final analytical sample comprised 720 STI clinic attendees.

The healthcare worker (HCW) component included all providers engaged in STI service delivery at the selected facilities during the data collection period. Eligibility was restricted to HCWs (Medical Doctors, Clinical Officers, Nurses, and Midwives) who had worked in STI clinics for a minimum of six months and were directly involved in clinical care or counselling related to STI or HIV prevention. HCWs on short-term rotations or lacking direct involvement in STI or PrEP services were excluded. Data from this category were collected using self-administered interviews.

A purposive sampling strategy was implemented, inviting all eligible HCWs present at the STI facilities during the study period to participate. Forty-five healthcare workers provided informed consent and completed the survey.

Variables and Measures

Primary Outcome

The principal outcome variable in this study was PrEP Uptake, defined as the documented initiation of pre-exposure prophylaxis, which involved the prescription and dispensing of Tenofovir disoproxil fumarate co-formulated with lamivudine or emtricitabine (TDF/XTC), as recorded in the SmartCare electronic medical record system or in the patient's file. PrEP uptake was operationalized as a binary variable (1 = yes, 0 = no). At the aggregate level, PrEP coverage was classified as low ($\leq$50%) or high ($\geq$50%).

Explanatory Variables

Explanatory variables were systematically classified into four domains: socio-demographic, behavioural, psychosocial, and risk-related. Specifically, socio-demographic variables included: age group (categorized as 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49 years), gender (male or female; male as reference), and marital status (married = 1, not married = 0). Behavioural and risk-related variables comprised multiple sexual partners (yes = 1, no = 0), sexual partner's HIV status (HIV-negative, HIV-positive, unknown; HIV-negative as reference), condom use (yes = 1, no = 0), and alcohol use (yes = 1, no = 0). Psychosocial and perception variables included self-risk perception (yes = 1, no = 0), attitude towards PrEP (good = 1, bad = 0), knowledge about PrEP (yes = 1, no = 0), key population (KP) status (KP = 1, non-KP = 0), and prior PrEP use (yes = 1, no = 0).

Statistical Analysis

Data were analyzed using Stata version 16.0. Categorical variables are presented as frequencies and proportions as appropriate. The primary outcome, pre-exposure prophylaxis (PrEP) uptake, was defined as documented prescription and dispensing of oral PrEP after a sexually transmitted infection clinic visit, and analyzed as a binary variable. Associations between PrEP uptake and patient-level characteristics were assessed using logistic regression. Variables with $p<0.20$ in bivariable analyses, as well as those considered clinically relevant a priori (age, sex, marital status), were included in the multivariable model. Results are presented as unadjusted and adjusted odds ratios with 95% confidence intervals. Statistical significance was set at $p<0.05$. Multicollinearity was

assessed using variance inflation factors. Model fit was evaluated using the Hosmer–Lemeshow test and the area under the receiver operating characteristic curve. Analyses were restricted to complete cases. Healthcare worker and facility-level variables were evaluated descriptively to contextualize patient-level findings.

Ethical Approval

Ethical approval for this study was obtained from the University of Zambia Biomedical Research Ethics Committee (UNZABREC; Ref. No. 1846-2021) and the National Health Research Authority (NHRA; Ref. No. NHRA00012/18/08/2021). Administrative authorization was granted by the Lusaka Provincial Health Office and the Livingstone District Health Office. Written informed consent was obtained from all healthcare workers before participation. Access to and review of medical records were authorized through a waiver of informed consent issued by the respective District Health Offices and facility in-charges. All participant identification was strictly coded with access to data restricted to the principal investigator and study assistants.

RESULTS

This analysis included 720 attendees of sexually transmitted infection (STI) clinics, of whom 247 (34%) were prescribed pre-exposure prophylaxis (PrEP). The most prevalent age group was 25–29 years, representing 24.3% of participants and accounting for the largest share of PrEP prescriptions (34.4%). Adolescents aged 15–19 years comprised 2.0% of PrEP recipients. Females accounted for 58.1% of the study cohort and 59.9% of PrEP recipients, while males comprised 41.9% of participants and 40.1% of PrEP prescriptions.

Unmarried individuals constituted 52.8% of participants and received 71.7% of PrEP prescriptions. Conversely, married individuals comprised 47.2% of the sample but only 28.3% of PrEP recipients. PrEP was prescribed more frequently to those reporting multiple sexual partners (57.9% of prescriptions among 49.9% of participants) than to those with a single partner. With regards to partner HIV status, 38.1% reported a partner living with HIV, 30.4% reported an HIV-negative partner, and 31.5% were unaware of their partner's status.

Participants with a positive attitude toward PrEP comprised 40.1% of the sample but accounted for 57.1% of PrEP prescriptions. PrEP knowledge was reported by 42.6% of participants and was comparably distributed among those prescribed and not prescribed PrEP. Self-perceived HIV risk was identified in 39.3% of participants and was more common among those prescribed PrEP (53.9%). Key populations constituted 52.9% of the sample and received 65.6% of PrEP prescriptions. Nearly half of the participants (48.2%) reported prior PrEP use. Condom use within the six weeks preceding the clinic visit was reported by 62.9% of participants, while 58.5% reported alcohol use.

Among the 45 healthcare workers surveyed, 75.6% were female, and 46.7% were aged 22–30 years. Formal PrEP training was reported by 38% of healthcare workers. All respondents were aware of PrEP, and 68% reported having skills in PrEP provision.

Table 1. Patient-related factors associated with PrEP prescription among clinic attendees (N=720)

Characteristic	Total, n (%)	PrEP prescribed, n (%)	PrEP not prescribed, n (%)
Overall	*720 (100)*	*247 (34.3)*	*473 (65.7)*
Age group (years)			
[illegible]	78 (10.8)	5 (2.0)	73 (15.4)
20–24	114 (15.8)	8 (3.2)	106 (22.4)
25–29	175 (24.3)	85 (34.4)	90 (19.0)
30–34	127 (17.6)	52 (21.1)	75 (15.9)
35–39	82 (11.4)	51 (20.6)	31 (6.6)
40–44	70 (9.7)	34 (13.8)	36 (7.6)
45–49	74 (10.3)	12 (4.9)	62 (13.1)
Gender			
Male	302 (41.9)	99 (40.1)	203 (42.9)
Female	418 (58.1)	148 (59.9)	270 (57.1)
Marital status			
Married	340 (47.2)	70 (28.3)	270 (57.1)
Not married	380 (52.8)	177 (71.7)	203 (42.9)
Multiple sexual partners			
Yes	359 (49.9)	143 (57.9)	216 (45.7)
No	361 (50.1)	104 (42.1)	257 (54.3)
Sexual partner's HIV status			
Negative	219 (30.4)	74 (28.0)	145 (30.7)
Positive	274 (38.1)	86 (34.8)	188 (39.8)
Don't know	227 (31.5)	87 (35.2)	140 (29.6)

Characteristic	Total, n (%)	PrEP prescribed, n (%)	PrEP not prescribed, n (%)
Attitude towards PrEP			
Bad	431 (59.9)	106 (42.9)	325 (68.1)
Good	289 (40.1)	141 (57.1)	148 (31.3)
Knowledge about PrEP			
Yes	307 (42.6)	111 (44.9)	196 (41.4)
No	413 (57.4)	136 (55.1)	277 (58.6)
Self-risk perception			
Yes	283 (39.3)	133 (53.9)	150 (31.7)
No	437 (60.7)	114 (46.2)	323 (68.3)
Key population			
Yes	381 (52.9)	162 (65.6)	219 (46.3)
No	339 (47.1)	85 (34.4)	254 (53.7)
Previously taken PrEP			
Yes	347 (48.2)	156 (63.2)	191 (40.4)
No	373 (51.8)	91 (36.8)	282 (59.6)
Condom use six weeks before clinic visit			
Yes	453 (62.9)	172 (69.4)	281 (59.4)
No	267 (37.1)	75 (30.4)	192 (40.6)
Alcohol use			
Yes	421 (58.5)	108 (43.7)	313 (66.2)
No	299 (41.5)	139 (56.3)	160 (33.8)

Note**:** *Values are n (%). Percentages are calculated within columns unless otherwise stated. Totals may not sum to 100% due to rounding. PrEP, pre-exposure prophylaxis*

Table 2. Healthcare Worker factors

Healthcare Worker Factors	Total=45 n (%)	Male n (%)	Female n (%)
Age range			
22-30	21 (46.67)	5 (11.11)	16 (35.56)
31-40	14 (31.11)	2 (4.44)	12 (26.67)
41-50	8 (17.78)	2 (4.44)	6 (13.33)
51-60	2 (4.44)	0 (0)	2 (4.44)
HCWs trained in PrEP	17 (38)	5 (11.11)	12 (26.67)
HCWs with skills in PrEP	28 (68)	6 (13.33)	22 (48.89)
HCWs who have heard about PrEP	45 (100)		
Healthcare knowledge in PrEP provision			
Low	8 (17.78)	1 (2.22)	7 (15.56)
Average	20 (44.44)	3 (6.67)	18 (40)
High	17 (37.78)	5 (11.11)	12 (26.67)

Note. *n = sample size, HCW = health care worker. Healthcare workers' knowledge of PrEP provision was assessed using a structured questionnaire consisting of key items covering PrEP indications, eligibility criteria, dosing regimen, monitoring requirements, and management of side effects. Each correct response was awarded one point and incorrect or "don't know" responses scored zero. Total scores were summed and converted into percentage scores. Knowledge levels were categorized as* ***low*** *(<50%),* ***average*** *(50–74%), and* ***high*** *(≥75%).*

Factors associated with PrEP uptake

PrEP uptake among attendees of sexually transmitted infection clinics exhibited substantial variation according to age, gender, marital status, behavioural risk, and psychosocial determinants. Compared to individuals aged 25–29 years, those aged 20–24 (AOR 0.06, 95% CI 0.02–0.17), 30–34 (AOR 0.09, 95% CI 0.04–0.21), 35–39 (AOR 0.04, 95% CI 0.02–0.09), and 40–44 years (AOR 0.06, 95% CI 0.02–0.16) demonstrated markedly lower odds of PrEP uptake. Women were more likely to initiate PrEP than men (AOR 1.89, 95% CI 1.02–3.50), whereas married participants were significantly less likely to use PrEP (AOR 0.25, 95% CI 0.13–0.45). Increased odds of uptake were identified among individuals reporting multiple sexual partners (AOR 2.24, 95% CI 1.23–4.07), an unknown HIV status of sexual partners (AOR 2.40, 95% CI 1.15–5.02), self-perceived HIV risk (AOR 2.48, 95% CI 1.47–4.19), identification with key populations (AOR 2.32, 95% CI 1.31–4.12), and prior PrEP use (AOR 2.09, 95% CI 1.22–3.58). In contrast, negative attitudes toward PrEP (AOR 0.18, 95% CI 0.10–0.33) and alcohol consumption (AOR 0.16, 95% CI 0.09–0.27) were linked to decreased uptake.

Table 3. Logistic regression analysis with unadjusted and adjusted odds ratios

Patient-related variables	**UOR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Age in years				
25-29	Ref		Ref	
15-19	[illegible]	0.86	0.94 [0.28–3.12]	0.92
20-24	0.08 [0.04–0.17]	p<. 001	0.06 [0.02–0.17]	p<. 001
30-34	0.11 [0.05–0.24]	p<. 001	0.09 [0.04–0.21]	p<. 001
35-39	0.05 [0.02–0.11]	p<. 001	0.04 [0.02–0.09]	p<. 001
40-44	0.08 [0.03–0.19]	p<. 001	0.06 [0.02–0.16]	p<. 001
45-49	0.39 [0.15–1.00]	0.050	0.42 [0.16–1.08]	0.072
Gender				
Male	Ref		Ref	
Female	1.82 [1.49–2.23]	P<. 001	1.89 [1.02–3.50]	0.043
Marital Status				
Not Married	Ref		Ref	
Married	0.29 [0.21, 0.41]	p<. 001	0.25 [0.13, 0.45]	p<. 001
Multiple sexual partners				
No	Ref		Ref	
Yes	1.64 [1.20, 2.23]	0.002	2.24 [1.23, 4.07]	0.008

Patient-related variables	UOR (95% CI)	P-value	AOR (95% CI)	P-value
Sexual partners HIV status				
Negative	Ref		Ref	
Positive	1.12 [0.76, 1.63]	0.56	1.40 [0.75, 2.57]	0.29
Unknown	1.61 [1.23, 2.10]	P<. 001	2.40 [1.15, 5.02]	0.020
Attitude				
Good	Ref		Ref	
Bad	0.34 [0.25, 0.47]	p<. 001	0.18 [0.10, 0.33]	p<. 001
Knowledgeable about PrEP				
Yes	Ref		Ref	
No	0.87 [0.64, 1.18]	0.37	0.71 [0.39, 1.25]	0.23
Self-risk perception				
No	Ref		Ref	
Yes	2.51 [1.83, 3.45]	P<. 001	2.48 [1,47, 4.19]	P<. 001
Key population				
No	Ref		Ref	
Yes	2.21 [1.61, 3.04]	P<. 001	2.32 [1.31, 4.12]	0.004
Condom use				
No	Ref		Ref	
Yes	1.63 [1.35, 1.98]	P<. 001	1.14 [0.60, 2.15]	0.697
Taken PrEP				
No	Ref		Ref	
Yes	2.53 [1.84, 3.48]	P<. 001	2.09 [1.22, 3.58]	0.007
Takes alcohol				
No	Ref		Ref	
Yes	0.40 [0.29, 0.54]	p<. 001	0.16 [0.09, 0.27]	p<. 001

Note: UOR = unadjusted odds ratio; AOR = adjusted odd ratio; CI = confidence interval; P>|z| = p-value.

DISCUSSION

This study provides empirical evidence on the determinants of HIV pre-exposure prophylaxis (PrEP) uptake among sexually transmitted infection (STI) clinic attendees in Lusaka and Livingstone, Zambia, a population with heightened biological and behavioural vulnerability to HIV acquisition. Despite the integration of PrEP into Zambia's national HIV prevention strategy and its increasing availability within STI services, uptake among this high-risk group remains suboptimal. The findings indicate that PrEP uptake is influenced by a complex interplay of sociodemographic characteristics, behavioural risk markers, perceived vulnerability, and attitudinal factors, rather than by knowledge alone. These results are consistent with global and regional evidence that biomedical availability of PrEP does not automatically lead to utilization without supportive social and service-delivery contexts[12,13].

Age emerged as a strong independent predictor of PrEP uptake, with individuals aged 20–44 years exhibiting significantly lower odds of initiation compared to those aged 25–29 years. This non-linear age gradient contrasts with findings from high-income settings, where PrEP uptake is often highest among older adults due to greater health system engagement and self-efficacy[14]. However, these results align with emerging evidence from sub-Saharan Africa (SSA), where PrEP uptake does not uniformly increase with age and may instead reflect variations in perceived HIV risk, partnership stability, and social identity. In Zambia, individuals in stable relationships within this age range may underestimate HIV risk despite persistent population-level transmission, particularly in high-prevalence urban settings[15-17]. The absence of a significant difference among adolescents after adjustment suggests that, when adolescents access STI services, they may be as receptive to PrEP as young adults. This finding highlights the potential of clinic-based interventions to overcome age-related barriers.

Gender disparities in PrEP uptake were pronounced, with women demonstrating significantly higher odds of initiation than men. This finding aligns with regional and global literature indicating that women are more likely to engage with PrEP when it is integrated into sexual and reproductive health services[18,19]. In Zambia, women's frequent contact with health facilities through antenatal care, family planning, and STI services may facilitate PrEP access and acceptance. In contrast, men's lower uptake reflects persistent structural and normative barriers, including clinic environments perceived as feminized, concerns about stigma, and prevailing masculinity norms that discourage preventive health-seeking[20,21]. The persistence of gender disparities after adjustment for sexual risk highlights the need for male-responsive PrEP delivery models, including community-based services and integration into male-dominated settings such as workplaces and social venues.

Marital status was independently associated with PrEP uptake, with married individuals significantly less likely to initiate PrEP compared to unmarried participants. This finding corroborates evidence from Zambia and other SSA settings demonstrating lower uptake of HIV prevention interventions within marital unions, often driven by assumptions of mutual monogamy, fear of partner suspicion, and the symbolic association of antiretrovirals with HIV infection rather than prevention[22-25]. Notably, this association persisted after adjusting for sexual behaviour and self-perceived risk, indicating that relational dynamics and social norms exert a substantial influence on prevention decision-making. These findings underscore the potential value of couples-based counselling and reframing PrEP as a shared protective strategy rather than an indicator of infidelity.

Behavioural risk factors were strongly associated with PrEP uptake. Participants reporting multiple sexual partners and those with unknown partner HIV status had significantly higher odds of PrEP initiation, indicating that uptake is responsive to tangible markers of sexual uncertainty and

exposure. Similar associations have been documented globally and across SSA, where PrEP demand is highest among individuals experiencing episodic or transitional risk rather than within clearly defined risk categories[26-28]. Self-perceived HIV risk emerged as one of the strongest predictors of uptake, supporting behavioural theory that perceived susceptibility is central to preventive action. Nevertheless, the persistence of low uptake among many high-risk individuals suggests that risk perception alone is insufficient without enabling service environments and supportive counselling.

Key populations were significantly more likely to initiate PrEP than non-key population STI attendees consistent with a myriad of studies in the SSA. This reflects the impact of sustained targeted programming, community-led demand creation, and differentiated service delivery approaches in Zambia[22,29-32]. Although this finding is encouraging, it also highlights disparities in PrEP access and normalization between key populations and the broader STI clinic population. Individuals outside formally defined key populations may experience intermittent but substantial HIV risk yet remain underserved by current programming. Expanding community-informed and risk-based PrEP approaches beyond traditional key population frameworks may be essential for achieving broader prevention impact.

Attitudinal factors were critical determinants of PrEP uptake. Participants with negative attitudes toward PrEP were significantly less likely to initiate, independent of behavioural risk and sociodemographic characteristics. In contrast, knowledge about PrEP was not independently associated with uptake, consistent with findings from multiple SSA studies that demonstrate the limited effectiveness of information-only interventions[33-38]. These results underscore the importance of addressing stigma, misconceptions, and concerns about identity and social judgement in PrEP counselling. Alcohol use was independently associated with substantially lower odds of PrEP uptake, consistent with regional evidence linking alcohol consumption to reduced engagement in HIV prevention services and impaired risk appraisal[39-41]. Integrating brief alcohol screening and counselling into PrEP services may improve uptake and persistence among high-risk clients.

Although PrEP awareness among healthcare workers is high, significant gaps persist in formal training and comprehensive service-delivery capacity[36,42]. Universal awareness and relatively high self-reported skills align with findings from other sub-Saharan African contexts, where provider knowledge is generally elevated due to national HIV prevention campaigns. Nevertheless, the low proportion of formally trained providers reflects evidence from both SSA and global settings, indicating that limited structured training impedes effective PrEP scale-up. In contrast to high-income countries, where formal PrEP training is more prevalent, SSA settings predominantly depend on informal or on-the-job learning, which may compromise service quality and consistency[43-45]. Our study acknowledges the introduction of long acting injectable CAB_LA and LEN for PrEP, these are fertile platforms we highly recommend to be rolled out and integrated in STI service delivery points for purposes of targeting individuals at substantial risk of contracting HIV. The two molecules come in at a time Zambia is at the edge of achieving HIV epidemic control hence the need to strategically place them in impactful service delivery points like STI clinics.

CONCLUSION

PrEP uptake among STI clinic attendees in Zambia is shaped by a constellation of behavioural, social, and attitudinal factors rather than by knowledge alone. The integration of PrEP into STI services presents a critical opportunity for HIV prevention. Still, its effectiveness depends on addressing gender norms, relational contexts, alcohol use, and stigma through differentiated and client-centred delivery models. These findings contribute to the expanding global evidence base, emphasizing the necessity of contextualized PrEP implementation strategies to achieve sustained population-level impact in high-

burden settings.

What is already known on this topic

PrEP used with other preventive measures significantly reduce the chances of contracting HIV

Studies have shown that uptake is good among discordant couple which was slightly different from findings in this study

Uptake is high among key population categories

What the study adds

Integrating PrEP in STI clinics would increase uptake among STI patients who have demonstrated substantial HIV risk

Formally married couples initiating PrEP should be counselled together to improve uptake, promote adherence and reduce intimate partner violence

Adolescents initiating PrEP need age specific counseling to reduce stigma and promote uptake

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Competing interest

The author declares that he has no competing interest

Author's contributions

The author came up with the study title, designed the study, formulated the proposal, supervised and participated in data collection. He further analyzed the data and sought for study approval.

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