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Service delivery characteristics preferences and trade-offs for long-acting injectable pre-exposure prophylaxis among female students in tertiary institutions in South Africa: A discrete choice experiment

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ABSTRACT

Oral pre-exposure prophylaxis (PrEP) for HIV prevention promises women more control over HIV prevention. To alleviate low PrEP uptake, rolling out long-acting PrEP methods could increase uptake in women's preferred ways. The study sought to determine injectable PrEP service delivery characteristics that effectively meet young women's service needs. In 2023, we conducted a discrete choice experiment in South African tertiary institutions. We recruited and interviewed 400 female students mostly queuing for sexual health services. Data were analysed using mixed logit and latent class models.

Young women strongly prefer using campus clinics to non-campus clinics and returning to the facility for product information and its side effects to using a chatbot [OR = 1.07, CI: 1.02, 1.13]. Also, compared to getting a free service, students were prepared to pay R50 (\$2.90) [OR = 1.14, CI: 1.05, 1.25]. Three classes emerged from the latent class model and these differed by background characteristics like age group and study year. Receiving PrEP through campus services from sensitive, PrEP providers and providing accurate information on side effects was preferred by students over community-based primary health care clinics with public health nurses. PrEP-trained providers should provide PrEP services as young people prefer returning to facilities for further youth-friendly support.

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Introduction

High HIV incidence among young women (18–24 years) continues to be a public health concern in South Africa. Although there are many freely available HIV prevention options, especially through the public health care system, most of the methods, like condoms, are male-controlled, and young women struggle to negotiate for their use (Maharajh & Haffeejee, 2021; Rousseau, Katz, et al., 2021). The use of antiretroviral drugs for HIV prevention, such as pre-exposure prophylaxis (PrEP), is highly effective and gives women more control over HIV prevention (Bond & Gunn, 2016). Oral PrEP became available in South Africa in 2016 (Pillay et al., 2020). A phased approach to oral PrEP introduction was used in South Africa. It was first introduced to key populations such as sex workers and men who have sex with men and later on to students at selected tertiary institutes in 2017 (Pillay et al., 2020). However, the daily administration of oral PrEP is a burden to many young people (Beesham

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et al., 2022). PrEP uptake remains low and has been described as inadequate to meaningfully contribute towards ending the epidemic (Bavinton & Grulich, 2021; Heck & Abdool Karim, 2022), and the UNAIDS target of 3 million PrEP users by 2020 was missed (UNAIDS, n.d.).

Long-acting PrEP methods, including cabotegravir (CAB-LA), dapivirine vaginal ring (DVR) and the injectable lenacapavir, can solve the daily pill adherence challenges, as these methods are administered bimonthly, monthly and biannually respectively. CAB-LA and DVR have both been approved by the South African Health Products Regulatory Association, while lenacapavir is still in phase three clinical trials (NIH, n.d.). In the HPTN 084 clinical trial, CAB-LA resulted in a 90% relative reduction in HIV risk compared to oral PrEP (Delany-Moretlwe et al., 2022).

User preferences continue to be an important part of service delivery and understanding the needs of end-users can help to overcome barriers to service utilisation. Barriers to sexual and reproductive health and rights (SRHR) services utilisation reported among young women include long waiting times, unfriendly health providers, prohibitive transport costs, and long travelling distances (Rousseau, Bekker, et al., 2021). Differentiated service delivery (DSD) is crucial to overcome these barriers as it is about tailoring care to meet clients' unique needs (Ehrenkranz et al., 2019). In HIV treatment, DSD with varied locations, providers, timing and frequency have been shown to enhance efficiency in HIV care (Mando et al., 2022). A similar benefit could be reaped in PrEP for HIV prevention. To successfully implement informed DSD which enables successful service introduction and sustained use, an understanding of clients' preferences is necessary.

The World Health Organization (WHO) outlines four DSD elements: who provides the service (provider), where (location), what (service package) and when the service is provided (frequency) (WHO, n.d.). DSD aims to simplify services by reducing the frequency of administration, de-medicalise, and task shift, including the use of virtual platforms, such as mHealth and mobile applications, and integrated services (International AIDS Society, 2024). A scoping review that examined oral PrEP service delivery broadly covered four elements, some of which overlap with the WHO DSD components. These were the delivery setting, healthcare providers, target population and delivery channel (Vanhamel et al., 2020). The delivery setting refers to the places where the service is delivered, such as clinics (Marcus et al., 2016) while the health care providers include nurses and specialist physicians (Schmidt et al., 2018; Vanhamel et al., 2020). The WHO DSD elements, scoping review and formative qualitative research guided the identification of service delivery attributes for the DCE reported in this paper.

Studies focussing on PrEP service delivery have examined attributes such as preferred delivery locations such as clinics and pharmacies close to where people live (Lancaster et al., 2020; Minnis et al., 2020b). Also, the youth friendliness of clinics has been assessed (Mudzingwa et al., 2024). Offering additional services including getting contraceptives, pregnancy tests and pap smears, among other services has been reported (Lancaster et al., 2020). During workshops conducted as part of the formative qualitative phase of this study, participants showed a general preference for long-acting injectable PrEP compared to DVR and oral PrEP as it was perceived to be more compatible with their lives as students (Shamu et al., 2024). This study, therefore, focuses on service delivery characteristics for long-acting CAB-LA.

Before long-acting injectable PrEP becomes available, it will be important to investigate the participants' willingness to trade certain attribute levels over others and to determine the strength of their preferences. While studies have shown that young women prefer long-acting injectable PrEP, little is known about the attributes of service delivery which attract young women to take up this option.

Methods

Study design

We used a discrete choice experiment (DCE) to collect data. A DCE is a quantitative, stated preference method of data collection. We opted for a DCE so we could calculate the trade-offs young women are prepared to take when choosing a long-acting injectable PrEP service.

Study setting

The study was conducted in the Tshwane District of the Gauteng province of South Africa between September and October 2023. The district forms part of the She Conquers high-priority districts which provide comprehensive sexual and reproductive health services ('She Conquers', [n.d.](#)). She Conquers is a multi-sectoral South African government-driven national campaign aiming to reduce new HIV infections in girls and young women, reduce teenage pregnancies, keep girls in school until completion of high school, reduce sexual and gender-based violence, and expand economic opportunities for young people (Subedar et al., [2018](#)). A university and a Technical and Vocational Education and Training college that were close to each other in the district were conveniently selected. Both facilities were serviced through mobile clinics providing SRHR services including contraception and oral PrEP. The services were freely offered to students through mobile donor-funded services.

Sampling and recruitment

A convenience sample was utilised. Young women aged 18–24 years who were students at the selected sites and had experience of using contraceptive methods or sexually active were recruited from the campus clinic waiting areas, mobile clinics and from the college campus. The data collectors explained the details of the study to potential participants in groups in campus clinic waiting areas, mobile clinics and on the college premises. Those interested in participating who met the inclusion criteria then approached data collectors, underwent the consenting process, and voluntarily participated in the study.

Development of DCE instrument

Formative qualitative work was used to inform the DCE design. Through Focus Group Discussions (FGDs) and workshops, we identified attributes and levels of long-acting PrEP service delivery through the Nominal Group technique (NGT). NGT is a consensus method used to generate ideas concerning the delivery of long-acting PrEP (McMillan et al., [2016](#)). Trained female data collectors conducted five FGDs with 6–10 participants per group and two workshops in English with 22 participants at both sites using semi-structured interview guides (Shamu et al. under review). After the FGDs, participants were invited to a workshop where they provided input on long-acting PrEP. Participants broke into small groups to discuss service attributes they wanted in the delivery of PrEP. Each group ranked the attributes, and then the groups presented back to the larger group, and a final ranking was reached through consensus.

The priorities identified through the NGT informed the DCE. The final seven attributes for the delivery of long-acting injectable PrEP used in the study were informed by the literature (Lancaster et al., [2020](#); Minnis et al., [2020b](#)) and the formative qualitative component of the study. The seven attributes as depicted in [Table 1](#), included: how frequently the participants would be willing to go back to the facility to get injectable PrEP; how participants should be assisted between appointments; the location of the PrEP service; cost of the service; skills of the provider in the facility; provider sensitivity and waiting time at the facility.

We used a Bayesian efficient design for the final experimental design. A full factorial design would yield 256 alternatives ($2 \times 2 \times 2 \times 4 \times 2 \times 2$). However, 256 choice sets would cause participant fatigue; hence, we designed the DCE using Hole's D-efficient design (Hole A. *DCREATE: Stata Module to Create Efficient Designs for Discrete Choice Experiments*; 2017 – [Google Search](#), [n.d.](#)). For the pilot phase where 30 students participated, 15 per site, we used zeros as priors. Using the Bayesian efficient design for a Multinomial logit, 16 choice sets were created. Each participant was then presented with 16 choice sets and had to choose between services A and B as alternatives for service delivery. The DCE design was unlabelled. We also had a third alternative

Table 1. Identified attributes of injectable PrEP service delivery and their levels.

Attributes of the delivery of injectable PrEP	Levels
How frequently you would go back to the health facility to get injectable PrEP?	(i) Months (ii) 6 months
How you would be assisted should you have questions between appointments?	(i) An interactive App (Chatbot) (ii) A health care provider
The location of this PrEP service	(i) Onsite campus clinic (ii) Public clinic
The cost of this service	(i) Free (ii) R50 [USD2.9] (iii) R100 [USD 5.8] (iv) R150 [USD8.7]
The skills of the provider in the facility	(i) Providers who specialise in PrEP (ii) Provider who is not a PrEP specialist
The Providers' sensitivity	(i) Good listeners (ii) Not good listeners
Waiting time at this facility	(i) 30 min (ii) 1 h

for opting out. The opt-out option was included to simulate a real-life scenario (Balogun et al., 2022) where consumers make choices and may sometimes not choose any of the provided options. To aid the cognitive processing of the different options, we included images of each attribute level (2). All the attributes used in the design were categorical and dummy-coded. For the sample size calculation for this study, a recommendation from Orme was taken whereby a minimum sample of 200 participants per group is needed where group comparisons are being made and 300 where there are no comparisons (Orma, 2010) hence the minimum sample size was, therefore, 300. A total of 6 400 choice tasks were yielded from 400 participants.

Procedures and data collection

Trained data collectors administered the questionnaire in English, and each interview took about 45 minutes. An example of completing the choice tasks was also included to ensure that the participants understood the instructions. Data collectors administered the study tool in English using password-protected computer tablets which only the study team had access to. Study participants received R50 (USD2.90) for the time inconvenience. Study data were collected and managed using Research Electronic Data Capture (REDCap) tools hosted at the University of the Witwatersrand (Harris et al., 2009, 2019). REDCap is a secure, web-based software that supports data capture for research studies (Harris et al., 2009).

Variables collected under background characteristics

We collected socio-demographic characteristics including age in years, the year they were currently studying, relationship status, and whether they were sharing accommodation with others or not. Also, we asked questions on sexual behaviour, such as having sex without condoms or under the influence of alcohol in the past three months.

Data analysis

Participants' demographics and background characteristics were described using descriptive statistics. The DCE results were analysed using regression models, specifically the multinomial logit model (MNL) and the mixed logit model (MXL) which are anchored on the random utility theory

(RUT). Since the study had two service options, and an opt-out option, the workhorse for the data analysis then was the MNL (de Bekker-Grob et al., 2012). MXL can approximate any random utility model as it is highly flexible (McFadden & Train, 2000). The RUT assumes that utility (U_{jn}) can be derived from a service with a deterministic and a random component. The deterministic component (V_{jn}) is a vector of service delivery attributes observed by the researcher and their marginal utilities, while the random component comprises the error in the regression specification that the researcher cannot explain (Arije et al., 2024; Hensher & Greene, 2003). Equation 1 simplifies how the utility of each alternative is a linear function of both an observable and an unobservable component (ϵ_{jn}).

$$U_{jn} = (\beta_{frequency} * V_{jn frequency}) + (\beta_{support} * V_{jn support}) + (\beta_{location} * V_{jn location}) + (\beta_{cost} * V_{jn cost}) + (\beta_{skills} * V_{jn skills}) + (\beta_{sensitivity} * V_{jn sensitivity}) + (\beta_{waiting-time} * V_{jn waiting-time}) + \epsilon_{jn} \quad (1)$$

Where: U_{jn} is the utility derived by individual n from option j ; V_{jn} is the observable component; β is the coefficient attached to V_{jn} a, also representing the part-worth utilities attached to the different attribute levels, and ϵ_{jn} is the unobservable component.

The odds ratios indicate the strength of preference for the different levels of the attributes of service delivery over others (Minnis et al., 2020a). Since the MNL is limited because of its preference homogeneity assumption, which renders it restrictive in describing human behaviour such as decision-making, we then used the MXL, which relaxes the assumption (de Bekker-Grob et al., 2012). The MXL recognises the differences in preferences among individuals.

Furthermore, latent class Analysis (LCA), a statistical method, was used to detect unobserved heterogeneity within a sample by identifying subgroups sharing certain characteristics within a population (Weller et al., 2020). Class membership was assigned based on the highest probability of being a member. Stata version 16 (Stata/SE, 2019) was used to analyse the data. We reported odds ratios and 95% confidence intervals.

Ethical approval

Study participants provided written informed consent. This study received approval from the University of the Witwatersrand Research Ethics Committee (Medical) [Approval number M111133]. In addition, ethical approval was also sought from study site authorities.

Results

Demographic characteristics

Table 2 summarises the respondents' characteristics. The participants were 18–24 with a median age of 22 years. About half (54.8%) reported that they were in stable relationships, about 70% confirmed that they were sharing accommodation with friends, family or partners. About 80% of the participants had at least one sexual partner in the past three months, 12% had at least two partners. In the past three months, almost half of the participants had accessed campus clinics (49%), public clinics (30.2%), or mobile clinics (16%). Also, unsafe sexual activities were reported by over two-thirds (69.7%) who reported not using a condom at last sex, and 16.7% having sex while under the influence of alcohol. Over 93.2% of the students had used a contraceptive method before, with over 60% using injectable contraceptives that is, a 2-month injection (Nuristerate) being used by 37.5% and the 3-month injection (Depo-Provera) used by 27.6% of the participants. About a third (33.5%) of the participants had ever been pregnant. Most students (64.5%) indicated that CAB-LA would be their preferred method of taking PrEP, followed by oral PrEP (28.8%) while DVR was the least preferred (6.8%).

Mixed logit model

Table 3 depicts the determinants of students' preferences for service delivery using the Mixed logit model for DCE analysis. On the frequency of long-acting injectable PrEP dosing, there was lower preference for 6 monthly compared to bi-monthly administration [OR = 0.98, CI: 0.93, 1.04]. Participants preferred to go back to the facility for support compared to getting assisted through a chat-bot. Compared to getting a free service, participants preferred paying R50 and preferred being

Table 2. Background characteristics of study participants.

Background characteristics	Frequency N = 400(%)
Age (years) median (IQR)	22 [21–23]
Study year	
First	184 (46)
Second	85 (21.3)
Third	108 (27)
Fourth	23 (5.8)
Relationship status	
Married	1 (0.3)
Stable relationship	219 (54.8)
Casual partner/s	99 (24.8)
Single	81 (20.3)
Live at home with parent(s)/ caregiver	77 (19.3)
Share accommodation with others^a	268 (96.8)
Partner	9 (3.3)
Service utilisation	
# visited the facility in the last 3 months	362 (90.5)
Type of facility visited in the past 3 months	
Campus clinic	177 (49.0)
Mobile clinic:	58 (16.1)
Pharmacy	3 (0.8)
Public Clinic:	109 (30.2)
Hospital	4(1.1)
Private clinic/Drs private rooms	10 (2.8)
Sex without condoms	279 (69.8)
Sex under the influence of alcohol	
Yes	67 (16.8)
No	331 (82.8)
Unsure	2(0.5)
Treated of an STI in the last 3 months	35 (8.8)
Contraceptive use	373 (93.3)
Contraceptive method used	
3-month injection (Depo-Provera)	103 (27.6)
2-month injection (Nuristerate)	140 (37.5)
Oral Pill	49 (13.1)
Implant	72(19.3)
IUD	1(0.37)
Other contraceptives	8 (2.1)
Ever pregnant	134 (33.5)
Own children	122 (30.5)
Who makes main decisions on contraceptive use?	
Myself	311 (77.8)
Partner	3 (0.8)
Jointly	86 (21.5)
PrEP preference	
Oral PrEP	115 (28.8%)
PrEP ring	27 (6.8)
CAB-LA	258 (64.5)
Ever used PrEP	143 (35.8)
Current PrEP use	54 (13.5)

Notes: ^a[N = 274], the total for the respondents who reported that they were staying with their mothers

•Intra uterine device: IUD

•Long-acting Cabotegravir: CAB-LA

served by a provider specialising in PrEP services compared to a non-specialist [OR = 1.10, CI:1.04, 1.16]. Participants also preferred providers who were good listeners compared to those who were not good listeners [OR = 1.30, CI: 1.23, 1.37] and waiting for an hour was least preferred compared to waiting for 30 minutes [OR = 0.79, CI: 0.75, 0.84].

Latent class modelling

Three major classes emerged as there was no convergence beyond the third class. As depicted in Table 4, class one showed strong preferences for campus clinics, shorter waiting times, cost-effectiveness, and providers who are good listeners. The second class had the highest preferences for Services A and B, back-to-facility support, shorter waiting times, and PrEP-specialized providers. Cost and waiting time were important determinants for this group. All classes demonstrated a significant aversion to increasing costs. The utilities for cost were -0.18 for both Class 1 and Class 2 ($p < 0.001$). The third class demonstrated the highest sensitivity to cost ($\beta = -0.33$, $p = 0.004$), strong preferences for back-to-facility support ($\beta = 0.65$, $p = 0.003$), and significant aversion to public clinics and providers who are not good listeners, ($\beta = -0.44$, $p = 0.047$).

As depicted in Table 5, classes differed significantly in age group and study year distribution. Membership in Class 1 and Class 2 was strongly associated with being aged 18–19 years ($p < 0.001$) while class 3 exclusively comprises individuals aged 20–24. First-year students were significantly associated with membership in Class 1 and Class 2 ($p < 0.001$). Class 3 had the highest proportion of third-year students.

Attribute order of importance

Table 3 also highlights the relative importance (RI) of the different attributes, with cost being the most important attribute, followed by sensitivity and waiting time while frequency of PrEP was the least in order of importance. RI of an attribute is the proportion of the total utility or preference variance explained by the attribute, calculated as the attribute's utility parameter range as a proportion of the total utility parameter range across all attributes.

Discussion

The study examined service delivery characteristics most important in encouraging students to take up long-acting injectable PrEP. The study informs the delivery of long-acting PrEP as it points out the young women's preferred type of health cadres, support required by young women, preferred location of receiving the services and the acceptable waiting times. Our results show that participants preferred to return to the facility and speak to providers who are specialists in PrEP provision and good listeners for any PrEP-related support needed over using a Chatbot. Also, they opted to get their PrEP from campus clinics to public clinics. In addition, shorter waiting times were attractive to students. Three classes with varying background characteristics were identified.

Compared to getting a free service, students were willing to trade off a free service to get the provider characteristics that were important to them. Unlike in the hospitality industry, for example, where free services could be used to increase consumer demand, free services are often shunned when they present with hidden costs such as long waiting hours (Fan et al., 2022; Liu et al., 2020), especially in the health sector. Participants, therefore, considered paying a nominal fee of R50 [USD2.9] and be served by empathetic PrEP specialists. This implies that students are prepared to pay something, but high costs would deter service use. The study's three latent classes demonstrated a significant aversion increasing costs. Studies conducted in other African countries and also richer countries such as the United States also showed that cost was initially a barrier to PrEP use (Venter, 2018; Wakjira & Habedi, 2022). There is still a need to source funds to sustain PrEP services as the potential clients are only prepared to pay a nominal amount for the quality of care they want.

Table 3. Mixed logit model for determinants of injectable long-acting service delivery preference.

Attribute	Level	Parameter mean		95%CI	P value	Parameter SD OR	95%CI	P value	RI (%)
		OR	mean						
Frequency of injectable PrEP	2 monthly		***						
	6 monthly	0.98		[0.93, 1.04]	0.471	1.03	[0.75, 1.43]	0.847	1.4
Support	Chatbot		***						4.8
	Back to facility	1.07		[1.02, 1.13]	0.01	1.00	[0.90, 1.10]	0.964	
Location	Campus clinic		***						
	Public Clinic	1.12		[1.06, 1.19]	<0.001	1.17	[1.01, 1.35]	0.037	7.7
Cost	Free		***						
	R50	1.14		[1.05, 1.25]	0.003	1.00	[0.83, 1.20]	0.975	46.3
	R100	0.58		[0.53, 0.63]	<0.001	1.00	[0.65, 1.58]	0.971	
	R150	0.66		[0.60, 0.73]	<0.001	1.01	[0.87, 1.18]	0.877	
Skills	Provider specialising in PrEP		***						
	Provider not specialising in PrEP	1.10		[1.04, 1.16]	0.001	1.12	[0.91, 1.39]	0.281	6.3
Sensitivity	Provider who is a good listener		***						
	Provider who is not a good listener	1.30		[1.23, 1.37]	<0.001	1.22	[1.08, 1.38]	0.002	17.6
Waiting time	30 minutes		***						
	60 minutes	0.79		[0.75, 0.84]	<0.001	1.13	[0.94, 1.35]	0.189	15.8
AIC 8879.727									
BIC 9052.633									

Key: **** Reference level

*Odds ratio: OR

*Confidence interval: CI

*Standard Deviation: SD

* Relative Importance (RI). RI is the attribute's utility parameter range as a proportion of the total utility parameter range across all attributes.

* Akaike information criterion (AIC)

* Bayesian Information Criterion (BIC)

Table 4. Latent class conditional logit model.

Attributes	Class 1		Class 2		Class 3	
	Utility	p-value	Utility	p-value	Utility	p-value
Frequency of PrEP						
2monthly*	-0.02 (0.1-0.06)	0.622	0.03 (0.17-0.23)	0.788	-0.28 (0.69-0.13)	0.186
6monthly						
Support						
Chatbot*						
Back to facility	0.05 (0.03-0.12)	0.200	0.18 (0.04-0.32)	0.013	0.65 (0.22-1.07)	0.003
Location						
Campus clinic*						
Public clinic	-0.19 (0.28-0.11)	<0.001	0.21 (0.1-0.53)	0.183	-0.45 (0.86-0.04)	0.030
Cost	-0.18 (0.23-0.14)	<0.001	-0.18 (0.27-0.09)	<0.001	-0.33 (0.56-0.11)	0.004
Skills						
Provider specialising in PrEP*	-0.04 (0.12-0.05)	0.373	-0.2 (0.38-0.03)	0.021	-0.22 (0.67-0.23)	0.333
Provider not specialising in PrEP						
Sensitivity						
Provider who is a good listener*						
Provider who is not a good listener	-0.41 (0.55-0.26)	<0.001	0.2 (0.04-0.45)	0.097	-0.44 (0.88-0.01)	0.047
Waiting time						
30minutes*						
1 h	-0.17 (0.24-0.09)	<0.001	-0.31 (0.49-0.13)	0.001	0.13 (0.27-0.53)	0.529
Alternative						
Opt Out*						
Service A	5.93 (5.23-6.63)	<0.001	6.64 (2.67-10.61)	0.001	1.77 (0.92-2.61)	<0.001
Service B	5.6 (4.9-6.29)	<0.001	6.31 (2.37-10.26)	0.002	0.96 (0.15-1.78)	0.021
Background characteristics						
Age group						
20-24 years*						
18-19 years	15.03 (12.13-17.94)	<0.001	13.49 (N/A-)	<0.001		
Relationship status						
Single*						
Married	-212.9 (1126.25-700.44)	0.648	44.86 (41.77-131.48)	0.310		
Casual partner(s)	-0.42 (1.96-1.13)	0.598	-0.93 (2.63-0.77)	0.285		
Single (no partner)	-0.26 (2.05-1.52)	0.771	-0.02 (1.91-1.87)	0.984		
Study year						
First-year*						
Second-year	14.93 (13.66-16.21)	<0.001	13.73 (N/A-)	<0.001		
Third-year	0.11 (1.35-1.57)	0.884	-0.6 (2.17-0.97)	0.455		
Fourth-year	14.57 (318.94-348.08)	0.932	14.97 (318.53-348.48)	0.930		

(Continued)

Table 4. Continued.

Attributes	Class1		Class 2		Class 3	
	Utility	p-value	Utility	p-value	Utility	p-value
Shares accommodation						
No*						
Yes	-1.49 (3.64-0.67)	0.177	-1.91 (4.17-0.36)	0.099		
Contraceptive use in last intercourse						
No*						
Yes	-14.03 (244.35-216.28)	0.905	-13.26 (243.57-217.05)	0.910		
Constant	17.99 (212.32-248.3)	0.878	17.02 (213.3-247.33)	0.885		

*Reference category/class

*Probability value: *p* value. It describes the likelihood of obtaining the observed data under the null hypothesis of a statistical test.

Table 5. Association between latent class membership and selected participant characteristics.

Background characteristics	Class 1		Class 2		Class 3		Test of association
	No. n = 296	% n = 87	No. n = 14	%	No.	%	
Age group							LR χ^2 (2) = 10.8056 $p = 0.005$
20–24 years	263	88.9	85	97.7	14	100	
18–19 years	33	11.1	2	2.3	0	0	
Relationship status							LR χ^2 (6) = 8.5471 $p = 0.201$
Married	0	0	1	1.1	0	0	
In stable relationship	160	54.1	50	57.5	7	50	
Casual partner/s	81	27.4	14	16.1	4	28.6	
Single – no partner/s	55	18.6	22	25.3	3	21.4	
Study year							LR χ^2 (6) = 31.6794 $p < 0.001$
First-year	127	42.9	48	55.2	8	57.1	
Second-year	76	25.7	8	9.2	0	0	
Third-year	82	27.7	19	21.8	6	42.9	
Fourth-year	11	3.7	12	13.8	0	0	
Shares accommodation							LR χ^2 (2) = 5.7674 $p = 0.056$
No	87	29.4	35	40.2	2	14.3	
Yes	209	70.6	52	59.8	12	85.7	
Contraceptive use in last intercourse							LR χ^2 (2) = 3.1394 $p = 0.208$

*Probability value: p value. It describes the likelihood of obtaining the observed data under the null hypothesis of a statistical test.

Concerning the frequency of receiving PrEP services, there were no significant differences in preference between the 2-month and the 6-month injections. This could be attributed to the young women's perceived compatibility with CAB-LA as most were on the 2 monthly administered contraceptives (Shamu et al., 2024).

The students' preference for getting PrEP-related support from health service providers specialising in PrEP and who were good listeners suggests that these young women valued interactions with providers with these attributes. This could also imply that providers are valued as reliable sources of PrEP information. The participants' preference for sensitive providers also reflects the needs of the young women for a good relationship with providers. Studies have shown that young people generally trust providers who demonstrate respect, honesty, empathy, and confidentiality (Hardin et al., 2021). Trust has previously been reported to be one of the fundamental elements forming the provider-client relationship, with the nature impacting the client outcomes (Delany-Moretlwe et al., 2022). The training of providers for long-acting PrEP should also cover the sensitivity of providers as young women present at facilities not only to get a PrEP product but also to value the nature of the relationship they have with the provider as they get the service. Providing PrEP services to young women goes beyond just administering the injections; students need to interact with providers after getting the service. Young women also need providers who listen to their concerns without judging them. Previous studies have shown how providers' judgemental attitudes deter young people from accessing health services (Musakwa et al., 2021). Also, some studies have reported that young women, especially the unmarried, face stigma and discrimination from healthcare providers while trying to get sexual and reproductive health services, negatively affecting their ability to access the services (Mohammadi et al., 2016; Musakwa et al., 2021; Nyblade et al., 2019). Clients normally prioritise a friendly provider attitude (15). Future PrEP providers should be open to conversations with young people who approach them to ask questions about side effects and other concerns they may have while using the new long-acting PrEP technologies.

As young women are reported to face stigma and discrimination from healthcare providers, we expected that participants would rather choose to interact with technology than interact with them.

However, their choice of sensitive providers implies they were aware of the stigma and discrimination challenges. Using technologies such as chatbots has been thought to reduce the stigma associated with getting PrEP at a facility (Nyblade et al., 2019). The young women's choice to get PrEP support from providers compared to the chatbots also suggests that they seem to realise the limitations of technologies such as chatbots in responding to their questions. Although nearly 100% of the participants owned a mobile phone and had access to the internet, access to these did not seem to influence their preferences for support services. This may imply that while young people may be technologically advanced, they still need human contact to address their concerns. This, however, complicates the DSD move to manage visits by offering virtual services (International AIDS Society, 2024). However, since long-acting PrEP is still new, initially young women may need provider contact but as they get used to the methods, chatbots may also be used. A systematic review reported that the use of mHealth technologies improved contraceptive use among young people (Inhae & Jiwon, 2021), similarly, long-acting PrEP could benefit from the use of technology. Our results however show that service providers are still an important part of the service mix but will need to be trained specifically to provide PrEP and to be good listeners. Future studies may need to explore this finding and understand why getting support from providers was preferred compared to getting it through technologies like the chatbot.

The young women's preference for campus clinics indicates their satisfaction with the attributes of the services they receive there. Campus clinics could be attractive because they are strategically located at the tertiary institutions hence offering students the benefits enjoyed through community delivery models. The benefits include overcoming logistical barriers such as walking long distances, transport or challenges in making appointments (Rousseau, Bekker, et al., 2021). One of the cited barriers to service utilisation among young people include transport costs (Musakwa et al., 2021). Furthermore, it is also convenient for students to access campus clinics. Campus clinics are known to provide youth-friendly services tailor-made to the needs of young people (Evans et al., 2018). Also, campus clinics mainly provide services to young people, hence creating safe spaces for young people. Since services are described by their attributes, it is important to unpack these attributes and use them to inform the providers' training. Providers at the campus clinics are trained to provide youth-friendly services; hence, it is not surprising that young women chose campus clinics because of the quality of services they receive. Other studies have documented the importance of youth-friendly services for young people (Mazur et al., 2018). When we asked participants the types of facilities they had visited in the past three months, most had visited campus clinics, public clinics, mobile clinics, private doctors' rooms, hospitals and pharmacies. Mobile clinics serve the campuses usually once a week while campus clinics and public clinics open daily. While mobile clinics are convenient, the opening hours and days could be improved.

The preference for providers specialising in PrEP is interesting. This suggests that young women treated PrEP provision as a specialised area. By providing the same service over time, the providers would gain more experience, making them specialists and well-positioned to provide ongoing support. Specialist physicians who specialised in HIV, sexual health or infectious diseases have been used elsewhere to provide PrEP (Vanhamel et al., 2020). The countries where the studies were conducted include Scotland, New Zealand and the United States. What is unique in this study is that students preferred providers who are PrEP specialists. The preference for providers specialising in PrEP suggests that students trust providers who are specialists. This could, however, have financial implications for PrEP provision as there will be a need to add to the existing human resources. Also, this could complicate the DSD move towards the demedicalisation of PrEP and task sharing by using lay health workers (International AIDS Society, 2024). However, already existing healthcare providers can be trained in PrEP services for young people as it is important for service integration that these providers continue to perform other SRHR functions.

Students' preference for a short waiting time is not a surprise. Since these students were young women still busy with their studies, the opportunity costs of waiting for lengthy periods for PrEP were too high. Long waiting times are known to be one of the major barriers to service use among young people (Musakwa et al., 2021). Therefore, an attractive service for this population does not

make them wait. It would be important to identify strategies to reduce waiting time at facilities to increase PrEP uptake and ensure sustained use of the services. Students have busy lifestyles with lectures to attend and assignments to work on; hence, waiting time is an important attribute of a service.

Limitations

This study was based on a hypothetical product as the injectable PrEP was not available freely in South Africa at the time of the study and is only being used in research studies. However, students are using injectable contraceptives. The service delivery outcomes of this DCE are still valid since the variables assessed also apply to the LA contraceptives that they already receive. These results could indicate what students would like to have basing on their experiences with LA contraceptives at the currently available clinics, with existing providers. Selection bias is possible since the participants were volunteers who met the eligibility criteria. This study was conducted at two tertiary institutions in one district; hence, the results may not be generalisable to the entire country. The participants were also all students; hence, their preferences may not reflect the preferences of other young women in the general population.

Conclusions

The value young women placed in interactions with sensitive health providers point to a need to invest in training providers involved in PrEP delivery to offer youth-friendly services. This will likely result in high uptake and sustained use of long-acting injectable PrEP. Campus clinics seem to be one of the places where youth-friendly services are provided; hence, more should be set up and considered for long-acting PrEP delivery. Future studies should look at strategies to shorten waiting times for young women.

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