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Point-of-care testing for sexually transmitted infections and HIV pre-exposure prophylaxis among pregnant women in South Africa, 2021—2022: randomised controlled trial

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Point-of-Care Sexually Transmitted Infection Testing Improves HIV Preexposure Prophylaxis Initiation in Pregnant Women in Antenatal Care in Cape Town, South Africa, 2019 to 2021

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Background: Preexposure prophylaxis (PrEP) programs present a platform for diagnostic sexually transmitted infection (STI) testing in low- and middle-income countries, and availability of targeted STI testing has been hypothesized to influence PrEP use. We evaluated the association of STI testing modality and PrEP uptake among pregnant women in antenatal care.

Methods: We enrolled pregnant, HIV-uninfected women (16 years or older) at their first antenatal visit with follow-up through 12 months postpartum. Women were offered oral PrEP and tested for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* using a point-of-care (POC; Cepheid, August 2019–November 2020) or laboratory-based (Thermofisher, December 2020–October 2021) test. We compared the proportion of women initiating and continuing PrEP by STI test adjusting for confounders.

Results: We evaluated 1194 women (median age, 26 years [interquartile range, 22–31 years]) with an STI result (46% POC and 54% laboratory-based). The prevalence of any STI was the same in POC-tested (28%) and laboratory-tested (28%) women—25% versus 23% for *C. trachomatis* ($P = 0.35$) and 7% versus 9% for *N. gonorrhoeae* ($P = 0.11$). Mean time from testing to result was 0 day for POC and 26 days for laboratory testing, and mean time from testing to treatment was 3 days for POC and 38 days for laboratory testing. Receiving a POC STI test was associated with higher PrEP initiation compared with women receiving a laboratory-based test (90% vs. 78%; adjusted odds ratio, 2.1; 95% confidence interval, 1.5–2.9), controlling for age, gravidity, STI diagnosis, intimate partner violence, gestational age, employment, HIV risk perception, and cohabiting status.

Conclusions: Point-of-care STI testing, offering same-day results and treatment initiation, may increase PrEP initiation among pregnant women in antenatal care.

In South Africa, pregnant and postpartum women (PPW) are at high risk of HIV and curable sexually transmitted infections (STIs).[1,2] Bacterial STIs during pregnancy, specifically *Chlamydia trachomatis* (CT), and *Neisseria gonorrhoeae* (NG), and parasitic STIs such as *Trichomonas vaginalis* (TV), can lead to complications in both the mother and neonate. Sexually transmitted infections can increase the risk of HIV acquisition and transmission,[3] and maternal STIs can result in stillbirth,[4] neonatal death, low birth weight,[5,6] neonatal conjunctivitis, or congenital deformities.[7]

Preexposure prophylaxis (PrEP) is a safe and effective prevention strategy to reduce the risk of HIV acquisition among women during pregnancy and the postpartum period.[8] The World Health Organization recommends that PrEP programs target individuals at high risk for HIV, including pregnant women.[8] Many of the biological and behavioral factors that lead to an increased risk of HIV acquisition also place persons at an increased risk of an STI. Acquisition risk factors for STI/HIV include changes in the vaginal microbiota during the pregnancy and postpartum period, having multiple and/or anonymous sex partners and having condomless sex.[9,10] In South Africa, the standard approach to diagnosing and managing curable STIs is syndromic management, where the signs or symptoms of a group of diseases are treated.[11] During pregnancy, women are asked if they are experiencing any STI-related symptoms, such as vaginal discharge, and if so, empirical treatment is provided to symptomatic women.[11] Syndromic STI management is advantageous because it is low cost, is easy to implement, and facilitates treatment at the first visit for most pathogens associated with each syndrome.[12] However, the efficacy of syndromic management is limited because a majority of STIs are asymptomatic and therefore remain untreated, which can lead to STI-related sequelae.[13,14] In addition, during pregnancy vaginal discharge is common with limited specificity for STI diagnosis[15] and has been shown to be a poor predictor of STIs among high-risk women in South Africa,[16] which could lead to overtreatment.

Etiological STI testing and treatment is an alternative to syndromic management with the potential to improve STI diagnosis and treatment among pregnant women.[17] Even though etiological STI testing has superior sensitivity to syndromic management in detecting and treating STIs, it can be difficult to implement in resource-constrained settings with limited access to laboratory diagnostics.[18] In settings where laboratory diagnostics are available, STI test results may only be available after extended waiting periods (days–weeks), making immediate treatment based on laboratory

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results impossible.[18,19] Near-patient point-of-care (POC) STI tests are commercially available for CT, TV, and NG and have been shown to reduce STI missed treatment and overtreatment.[13]

Given the synergistic relationship between HIV and STIs, PrEP programs can provide a platform for etiological STI testing and treatment.[20–22] The inclusion of routine STI screening in PrEP programs could lead to the rapid diagnosis and treatment of STIs, such as CT, NG, and TV. Point-of-care STI tests could render results available more readily, which may influence PrEP use (initiation and continuation). The return of same-day STI results could facilitate longer and more robust provider-patient discussion around STI (including HIV) risk. Given that these encounters (collection of specimen(s) for STI testing and the return of STI results) would likely happen with the same counselor or provider, the continuity could allow for better engagement and additional opportunities for offering PrEP. Point-of-care STI screening among PrEP candidates could help identify individuals at risk of HIV acquisition and may prompt discussion about sexual health to better contextualize an individual's perception of his or her HIV/STI risk.

In this study, we hypothesized that POC STI testing had a positive association with PrEP initiation and continuation among PPW in a maternal PrEP cohort in Cape Town, South Africa. We also evaluated the impact of POC STI testing on time to receipt of STI results and treatment compared with laboratory-based STI testing.

METHODS

Study Population

The PrEP in Pregnant and Postpartum women (PrEP-PP) study was an open prospective cohort study that enrolled pregnant, adolescent girls and women not living with HIV at their first antenatal care (ANC) visit. Participants were recruited from a primary ANC clinic, the Gugulethu Midwife Obstetrics Unit, located in the urban township of Gugulethu in Cape Town, South Africa. In 2018, the HIV prevalence among women who used ANC services at the Gugulethu Midwife Obstetrics Unit was 27%.[23] Participants were followed through 12 months after delivery. Women were eligible to participate if they (1) were 16 years or older; (2) were confirmed HIV negative through a fourth-generation antigen/antibody combination HIV test (Abbott, Tokyo, Japan); (3) were confirmed pregnant; (4) intended to stay in Cape Town, South Africa through the postpartum period; and (5) did not have contraindications to PrEP.

Study Procedures

At baseline, participants self-collected a lateral vaginal wall swab that was tested for CT, NG, and TV using a POC test from August 2019 to November 2020 (Cepheid Inc., Sunnyvale, CA). Treatment of STI was provided according to the South African National Sexually Transmitted Infection Guidelines[11] on the same or following day if the participant did not wait for the results in the clinic. From November 2020, because of supply chain issues as a result of the COVID-19 pandemic, Cepheid was unable to continue to support research studies with the provision of POC STI testing kits, and the self-collected vaginal swabs were sent to the Department of Pathology (University of Cape Town) for CT and NG testing using TaqMan Vaginal Microbiota assays as per the manufacturer's instructions (ThermoFisher Scientific, Johannesburg, South Africa). The TaqMan Vaginal Microbiota Amplification Control was used as a positive control. Upon receipt of the STI test results from the laboratory study, staff contacted women diagnosed with an STI and asked them to return to the clinic for treatment. Because the laboratory tests did not screen for TV, we restricted our definition of being diagnosed with an STI to women who were diagnosed with NG or CT to compare the effects of POC versus laboratory-based STI testing on PrEP initiation and continuation.

Trained study interviewers conducted a sociodemographic and behavioral questionnaire at baseline and follow-up visits. The baseline interview took 30 to 45 minutes to complete. Study data were collected and managed using Research Electronic Data Capture, a secure Web-based platform hosted at the University of Cape Town.[24] Survey measures included information on (1) basic demographics and obstetric history, (2) partner HIV status, (3) sexual behaviors, (4) HIV risk perception, (5) experience of intimate partner violence (IPV), and (6) relationship with partner.

All women, regardless of mode of STI testing, received HIV risk reduction counseling by trained study staff and were offered PrEP at baseline. The study interviewer asked the participant whether they were interested in starting PrEP, noting that any hesitancy or disinterest in PrEP initiation would not impact study participation. For women who were interested in initiating PrEP, the study nurse drew blood to measure baseline creatinine levels. Participants who got a POC STI test and stayed for their results received additional counseling on their STI result and were again given the option to start PrEP if they had declined PrEP before receiving their STI test results. Women who left before receipt of their STI results were called the following day to come in for treatment and were again given an option to start PrEP if they had declined. The study nurse provided the woman with a 30-day supply of oral tenofovir disoproxil fumarate/emtricitabine (Truvada, Gilead, CA) at baseline and an invitation card to return in 1 month for a refill prescription if interested. Preexposure prophylaxis uptake was assessed through participant self-report and pill count at the 1-month visit. Women who returned after 1 month and agreed to continue PrEP were given a 2-month prescription and an invitation to return after 2 months for a quarterly study visit. Women who did not initiate PrEP at baseline were invited to return in 3 months for a quarterly study follow-up visit with HIV testing and received additional counseling on PrEP with an offer of PrEP initiation. For the primary analysis, PrEP initiation was defined as accepting the PrEP prescription at baseline, and PrEP continuation was defined as receiving a PrEP prescription at both the baseline and the 3-month follow-up visit. We also conducted a sensitivity analysis after redefining PrEP initiation as initiating PrEP at the baseline or the 3-month visit and compared the proportion of women who initiated PrEP with results obtained from the primary analysis.

To evaluate the effect of STI testing modality on PrEP initiation, we included all women who underwent STI testing (POC or laboratory-based testing) at the baseline visit. For the evaluation of PrEP continuation, we included all women who were not censored because of pregnancy loss (miscarriage, stillbirths) or lost-to-follow-up before the 3-month visit.

Ethics

The PrEP-PP study was approved by the Human Research Ethics Committee at the University of Cape Town (no. 297/2018) and by the University of California, Los Angeles Institutional Review Board (IRB no. 18–001622). Written informed consent was provided by all participants in English or their local language, isiXhosa.

RESULTS

Analytical Sample

Between August 2019 and October 2021, the PrEP-PP study enrolled 1200 pregnant women, and 99% (1194) underwent STI testing and were offered PrEP at baseline. Our analysis evaluating factors associated with PrEP initiation was restricted to 1009 of 1194 women (85%) for whom we could confirm PrEP initiation.

Of the 1009 women, 3.5% (35) were censored because of infant death, miscarriage, or pregnancy loss after their baseline visit; 18% (185) did not initiate PrEP at baseline; and 3.4% (34) were lost-to-follow-up and did not return for their 3-month visit, leaving 940 women (93% of 1009 PrEP baseline initiators) for the evaluation of PrEP continuation at the 3-month visit.

Demographics

The median age of all pregnant women was 26 years (interquartile range [IQR], 22–31 years), and the median gestational age at baseline was 21 weeks (IQR, 15–31 weeks). Most women (66%) had at least one prior pregnancy. Almost half of the women (49%) had less than a grade 12 level of education, the majority was unemployed (64%), and most (63%) did not live with their partner. Employment status was the only significant demographic difference by the STI testing group, with a higher proportion of women employed among the POC (39%) compared with the laboratory STI testing group (32%; Table 1).

Almost all women (97%) reported being sexually active during pregnancy. Among women who reported being in a sexual relationship in the last 3 months (n = 1160), 69% reported having sex without a condom during the last sexual act. Seventy-one percent of women reported that their partner had tested for HIV in the past 12 months—2% reported having a partner living with HIV. Most women reported perceiving themselves to have no chance of HIV acquisition (54%), 34% reported a low chance, and 11% reported a high chance of HIV acquisition. Twelve percent of women reported experiencing IPV in the past 12 months.

A similar proportion of women were tested for STIs with a POC (54%) or laboratory-based test (46%) following self-collection of a vaginal swab. The proportion of women testing positive for any STI (CT/NG) was the same among POC-tested (28%) and laboratory-tested (28%) women. Overall, 24% of women were diagnosed with CT—25% of POC-tested women and 23% of laboratory-tested women ($P = 0.35$). A smaller proportion of women overall were diagnosed with NG (8%)—7% among POC-tested and 9% among laboratory-tested women ($P = 0.11$).

STI Treatment Outcomes

Seventy-nine percent of POC-tested women were treated on the same day as their STI diagnosis, whereas this was not the case for any women undergoing laboratory-based STI testing. The mean (SD) time to STI treatment for POC-tested women was 3 (12) days compared with 38 (43) days for laboratory-tested women. A higher proportion of laboratory-tested women diagnosed with an STI never returned for treatment (28%) compared with POC-tested women diagnosed with an STI (4%; $P < 0.001$). Among laboratory-tested women who were diagnosed with an STI and treated, 19% (n = 29) were treated after giving birth compared with 2% (n = 4) among POC-tested women. The median gestational age was 21 (IQR, 14–29) weeks for POC- and 22 (IQR, 15–32) weeks for laboratory-tested women.

PrEP Initiation

A higher proportion of POC-tested women (90%) initiated PrEP at baseline compared with laboratory-tested women (78%; $P < 0.001$). Although a small proportion of women initiated PrEP at a follow-up visit among POC-tested (6%) and laboratory-tested (3%) women, 11% of all women never initiated PrEP. Among women who never initiated PrEP, more than two-thirds (68%) were among laboratory-tested women. In a multivariable model evaluating the association of STI testing modality on PrEP initiation at baseline, POC-tested women were more likely to initiate PrEP compared with laboratory-tested women (adjusted odds ratio [aOR], 2.07 [95% confidence interval {CI}, 1.47–2.91), after adjusting for maternal age, gravidity, any STI diagnosis (CT or NG), experience of IPV in the last 12 months, gestational age, employment status, HIV risk perception at baseline, and cohabitation status (Table 2). After redefining PrEP initiation as initiating PrEP at either the baseline or the 3-month visit, the overall proportion of women initiating PrEP increased to 89%. There was still a higher proportion of POC-tested women (93% [n = 604]) who initiated PrEP compared with laboratory-tested women (84% [n = 463]; $P < 0.001$).

Among women who initiated PrEP at baseline and were invited to return 1 month later for a refill prescription (n = 1009), 83% (n = 841) returned and 98% were confirmed to have started PrEP through self-report and/or pill count. Among laboratory-tested women, 91% (n = 389) returned at 1 month and 98% were confirmed to have started PrEP, whereas 78% of POC-tested women returned at 1 month and 98% were confirmed to have started PrEP.

PrEP Continuation

A high proportion of women (79%) returned to their 3-month study visit, but this proportion was lower among laboratory-tested (75%) compared with POC-tested women (82%; $P = 0.005$). Despite a higher proportion of POC-tested women returning to their 3-month follow-up visit, a higher proportion of laboratory-tested (64%) compared with POC-tested (54%) women continued PrEP (aOR, 0.65; 95% CI, 0.49–0.85). Women with a gestational age of >20 weeks at baseline had a lower odds of PrEP continuation at 3 months compared with women with a gestational age ≤20 weeks (aOR, 0.98; 95% CI, 0.96–0.99; Table 3).

DISCUSSION

In this study, we demonstrated the feasibility and benefit of implementing POC STI testing during pregnancy in a maternal PrEP cohort in Cape Town, South Africa. In addition to decreasing time to receipt of STI results and treatment, our findings suggest that POC STI testing might lead to higher levels of PrEP initiation when compared with laboratory-based testing.

Prior studies have demonstrated the benefits of POC STI testing, particularly when compared with syndromic STI management, which is the standard-of-care in South Africa. Etiological STI testing has been shown to reduce postnatal STI prevalence compared with antenatal STI prevalence among pregnant women[17] and reduce genital inflammation among young women in South Africa.[25] These findings suggest that etiological POC STI testing may provide an effective intervention to reduce the high STI burden among pregnant women in South Africa. Etiological STI testing has also been shown to have higher sensitivity and specificity in detecting genital infections when compared with syndromic management[16] and is able to detect STIs among asymptomatic women.

In our study, the proportion of POC-tested women who were treated for an STI was also higher compared with laboratory-tested women. Providing same-day STI results and/or treatment is important in decreasing the risk of adverse birth outcomes due to delayed or no STI treatment among PPW. Point-of-care STI testing promises to circumvent both diagnosis and treatment delays associated with laboratory testing and provide an etiological STI diagnosis that is absent from the standard syndromic STI approach. It is, however, important to note that even among POC-tested women, a minority (n = 39 [21%]) of women were not treated on the same day, despite all women having their STI results available on the same day. This suggests that any waiting period, even a relatively short one, can serve as a barrier to same-day STI treatment for some women and should be considered when implementing STI testing in the flow of the antenatal or general healthcare visit.

In this cohort, POC-tested women had higher odds of initiating PrEP compared with laboratory-tested women, after controlling

TABLE 1. Characteristics of Pregnant Women Offered Preexposure Prophylaxis in Antenatal Care by Sexually Transmitted Infection Test in Cape Town, South Africa (N = 1194)

	Overall		Laboratory STI Testing (Nov 12, 2020–Oct 5, 2021)			Point-of-Care STI Testing (Aug 23, 2019–Nov 11, 2020)			
	n	% of Total	n	% of Laboratory Tested	(%)	n	% of POC Tested	(%)	*P*
Total	1194	(100)	548	(100)	(46)	646	(100)	(54)	
Maternal age, y									
Median, IQR	26	(22–31)	27	(22–31)		26	(22–30)		
<24	399	(33)	183	(33)	(46)	216	(33)	(54)	0.99
Education <grade 12	580	(49)	267	(49)	(46)	313	(48)	(54)	0.93
Employed	428	(36)	174	(32)	(41)	254	(39)	(59)	**0.01**
Gravidity									
Primigravida	405	(34)	180	(33)	(44)	225	(35)	(56)	0.47
Multigravida	789	(66)	368	(67)	(47)	421	(65)	(53)	
Gestational age, wk									
Median (IQR)	21	(15–31)	22	(15–32)		21	(14–29)		
<20	504	(42)	219	(40)	(43)	285	(44)	(57)	0.15
Cohabiting with partner	441	(37)	211	(39)	(48)	230	(36)	(52)	0.30
Initiated PrEP at baseline	1009	(85)	427	(78)	(42)	582	(90)	(58)	**0.00**
Confirmed PrEP uptake following prescription* (n = 1009)									
No	15	(1)	7	(2)	(47)	8	(1)	(53)	**0.00**
Yes	826	(82)	382	(89)	(46)	444	(76)	(54)	
Unconfirmed/lost-to-follow-up	168	(17)	38	(9)	(23)	130	(22)	(77)	
Never initiated PrEP	131	(11)	89	(16)	(68)	42	(7)	(32)	
Initiated PrEP at a follow-up visit	54	(5)	32	(6)	(59)	22	(3)	(41)	
Any STI diagnosis (CT and/or NG)	334	(28)	152	(28)	(46)	182	(28)	(54)	0.87
CT and NG coinfection	48	(4)	24	(4)	(50)	24	(4)	(50)	0.56
CT diagnosis	285	(24)	124	(23)	(43)	161	(25)	(56)	0.35
NG diagnosis	97	(8)	52	(9)	(54)	45	(7)	(46)	0.11
TV diagnosis†	75	(6)	N/A			75	(12)	(100)	
Timing of STI treatment									
Treated on different day as diagnosis	140	(42)	109	(72)	(73)	31	(17)	(27)	**<0.001**
Treated on same day as diagnosis	143	(43)	0	(0)	(0)	143	(79)	(100)	
Not treated	51	(15)	43	(28)	(79)	8	(4)	(21)	
Median (IQR) days to STI test result	0	(0–24)	26	(18–33)		0	(0–0)		
Mean (SD) days to STI test result	12	(15)	26	(11)		0	(0–0)		
Median (IQR) days to STI treatment	0	(0–18)	23	(11–49)		0	(0–0)		
Mean (SD) days to STI treatment‡	16	(33)	38	(43)		3	(12)		
Sexually active in pregnancy	1161	(97)	534	(97)	(46)	627	(97)	(54)	0.69
Used condom at last sex§	362	(31)	162	(30)	(45)	200	(32)	(55)	0.56
Experienced intimate partner violence in last 12 mo	147	(12)	58	(11)	(39)	89	(14)	(61)	0.09
Partner HIV status in past 12 mo									
Known living without HIV	823	(69)	370	(68)	(45)	453	(70)	(55)	0.18
Known living with HIV	20	(2)	13	(2)	(65)	7	(1)	(35)	
Don't know/no partner	351	(29)	165	(30)	(47)	186	(29)	(53)	
Perceived risk of HIV acquisition									
No chance	649	(54)	277	(51)	(43)	372	(58)	(57)	**0.01**
Low chance	411	(34)	195	(36)	(47)	216	(33)	(53)	
High chance	134	(11)	76	(14)	(57)	58	(9)	(43)	

Bold font indicates significance at $P < 0.05$.

*PrEP initiation was confirmed at 1-month follow-up visit among those who initiated PrEP at baseline.

†Only women who underwent point-of-care STI testing were tested for *Trichomonas vaginalis*.

‡Among women who were diagnosed with an STI and returned for treatment.

§Among women in a sexual relationship in past 3 months.

CT indicates *Chlamydia trachomatis*; NG, *Neisseria gonorrhoeae*; STI, sexually transmitted infection; TV, *Trichomonas vaginalis*.

for maternal age, gravidity, any STI diagnosis (CT or NG), experience of IPV in the last 12 months, gestational age, employment status, HIV risk perception at baseline, and cohabitation status. This observation that may be related to the availability of same-day STI results and treatment for the majority (79%) of POC-tested women. Point-of-care–tested women received timely feedback on whether they had a curable STI and could consider this information when assessing their risk of HIV acquisition and potential benefit of initiating PrEP. Point-of-care–tested women also had a shorter interval between counseling before STI testing and counseling after receipt of their STI results compared with laboratory-tested women. During both encounters, the counselor had an opportunity to offer PrEP to the participant in relatively short succession. The discussion with the counselor regarding the STI test result, regardless of the outcome, could also facilitate a provider "nudge" to discuss sexual behaviors and risk of STI and HIV acquisition with the participant. Nudges are interventions that shape the way that options are presented,[26] hopefully enabling individuals to make the best decision.

TABLE 2. Correlates of Preexposure Prophylaxis Initiation at Baseline Among Pregnant Women in Antenatal Care (N = 1194) in Cape Town, South Africa

	Univariable Model			Multivariable Model		
	Odds Ratio	**95% CI**	***P***	**Odds Ratio**	**95% CI**	***P***
STI testing method						
Laboratory test	Ref		—	Ref		—
Point-of-care test	2.07	1.50–2.84	**<0.01**	2.07	1.47–2.91	**<0.01**
Maternal age ≥24 y	1.34	0.97–1.84	0.07	1.15	0.72–1.81	0.56
Employed	1.07	0.77–1.49	0.67	1.11	0.77–1.60	0.58
Multigravida	1.52	1.11–2.08	**0.01**	1.68	1.08–2.62	**0.02**
Cohabiting with partner	0.97	0.70–1.35	0.87	0.81	0.56–1.17	0.26
Gestational age >20 wk	1.00	0.98–1.01	0.52	1.00	0.98–1.02	0.95
STI diagnosis (CT and/or NG)	1.05	0.75–1.48	0.77	1.11	0.76–1.61	0.60
Perceived risk of HIV acquisition at baseline						
No chance	Ref		—	Ref		—
Low chance	0.81	0.58–1.12	0.20	0.78	0.55–1.10	0.16
High chance	1.19	0.71–2.02	0.50	0.98	0.56–1.71	0.94
Experienced intimate partner violence in last 12 mo	1.63	0.95–2.79	0.07	1.65	0.93–2.94	0.09

Bold font indicates significance at $P < 0.05$.

CT indicates *Chlamydia trachomatis*; NG, *Neisseria gonorrhoeae*; Ref, reference value; STI, sexually transmitted infection.

Same-day STI results and treatment may have influenced women by facilitating discussion around sexual health, more accurately reflecting HIV risk, and driving intention around behavior change to reduce STI/HIV risk including PrEP initiation. Studies have shown a risk-reducing effect of a treatment consultation, such as an STI test, and/or positive test result on both behavioral and psychological characteristics related to sexual health.[27]

Despite having increased odds of initiating PrEP at their baseline visit, a smaller proportion of POC-tested women continued PrEP at 3 months compared with laboratory-tested women. The same factors promoting PrEP initiation may also serve as factors influencing PrEP discontinuation at 3 months. Behavioral economic theories have shown that individuals tend to make decisions based on information received more recently,[28] and although this effect might have been beneficial to get women initiated on PrEP, it may have biased women against fully considering the implications and demands of PrEP continuation. This finding supports several studies that show that barriers to PrEP initiation are different to barriers to PrEP continuation,[29–31] and suggest that, although POC STI testing might improve PrEP initiation in PPW, PrEP adherence and continuation counseling is critical to improve long-term outcomes in this population. This study did not include a biomarker for PrEP adherence and relied on self-report and pill count, which is an imperfect measure of PrEP adherence.

The study was conducted during the COVID-19 pandemic and a 21-day nationwide lockdown (March 26–April 16, 2020) in South Africa, which in part necessitated the switch from POC to laboratory-based STI testing, thereby providing investigators with an opportunity to compare the effect of STI testing modalities on PrEP uptake. However, given this context, we are unable to fully adjust for any changes in participant behavior over this time that may have impacted their likelihood of PrEP initiation and/or continuation. COVID-19 and the consequent mitigation measures implemented adversely impacted health-seeking behaviors including access to ANC. During this time, the study implemented home visits and conducted follow-up interviews telephonically to facilitate study participation and continuation. Although we do not think that COVID-19 had a differential impact on the baseline visit

TABLE 3. Correlates of Preexposure Prophylaxis Continuation at 3 Months Among Pregnant and Postpartum Women (n = 940) in Antenatal Care in Cape Town, South Africa

	Univariable Model			Multivariable Model		
	Odds Ratio	**95% CI**	***P***	**Odds Ratio**	**95% CI**	***P***
STI testing method at baseline						
Laboratory test	Ref		—	Ref		—
Point-of-care test	0.64	0.49–0.84	**0.00**	0.65	0.49–0.85	**0.00**
Maternal age ≥24 y	1.06	0.80–1.39	0.70	0.93	0.64–1.34	0.70
Employed	0.73	0.55–0.96	**0.02**	0.63	0.47–0.84	**0.00**
Multigravida	1.26	0.96–1.66	0.10	1.19	0.83–1.69	0.34
Cohabiting with partner	0.94	0.72–1.23	0.67	0.79	0.59–1.07	0.13
Gestational age >20 wk	0.98	0.96–0.99	**0.00**	0.98	0.96–0.99	**0.00**
STI diagnosis (CT and/or NG)	0.93	0.70–1.23	0.60	0.90	0.67–1.21	0.49
Perceived risk of HIV acquisition at baseline						
No chance	Ref		—	Ref		—
Low chance	0.97	0.73–1.29	0.85	0.94	0.70–1.26	0.68
High chance	1.75	1.13–2.71	**0.01**	1.70	1.08–2.68	**0.02**
Experienced intimate partner violence in last 12 mo	1.52	1.02–2.28	**0.04**	1.35	0.89–2.05	0.16

Bold font indicates significance at $P < 0.05$.

CT indicates *Chlamydia trachomatis*; NG, *Neisseria gonorrhoeae*; Ref, reference value; STI, sexually transmitted infection.

by STI testing group (POC vs. laboratory-based), it may have differentially impacted loss-to-follow-up across the groups and subsequently PrEP continuation. Furthermore, women were not randomized to their STI testing modalities, which were carried out over different periods, so we cannot rule out the possibility of selection bias impacting the validity of our findings. Future work could evaluate the effect of STI testing modality on PrEP initiation and continuation in the context of a randomized controlled trial among PPW in South Africa.

In South Africa, PPW are at high risk of both HIV and STI acquisition. Preexposure prophylaxis programs have not only been successful at reducing HIV prevalence at the population level but also offer a platform on which to integrate STI services such as testing and treatment. Although it has previously been shown that POC STI testing allows for etiological STI diagnosis and same-day treatment, reducing the risk of adverse birth and reproductive outcomes,[13] our findings that women who underwent a POC STI test were more likely to initiate PrEP suggests a synergistic relationship between these 2 initiatives.

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