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Recent alcohol use is associated with increased Pre-exposure Prophylaxis (PrEP) continuation and adherence among pregnant and post-partum women in South Africa

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Abstract

Background: South African women experience high levels of alcohol use and HIV infection during the perinatal period. Oral pre-exposure prophylaxis (PrEP) is highly effective at reducing

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HIV risk. We examined associations between alcohol use and PrEP use during pregnancy and postpartum.

Methods: PrEP-PP is a prospective observational cohort of 1200 HIV-negative pregnant women enrolled at first antenatal care visit and followed through 12 months postpartum in Cape Town, South Africa. The analytic sample comprised pregnant women who initiated PrEP at baseline and were not censored from study follow-up prior to 3 month follow-up. We examined associations between any or hazardous alcohol use (AUDIT-C score ≥ 3) in the year prior to pregnancy and PrEP continuation and adherence during pregnancy (self-report of missing <2 doses in past 7 days, and biomarker-confirmed with tenofovir diphosphate in dried blood spots).

Results: Of 943 women on PrEP (median age 26 years), 50% reported alcohol use prior to pregnancy and 33% reported hazardous use. At 3 month follow-up, 58% of women were still using PrEP; 41% reported recent adherence and 23% were biomarker-confirmed adherent. In multivariable models, hazardous alcohol use was associated with increased odds of continuing PrEP (aOR=1.54, 95% CI: 1.16–2.06), self-reported PrEP adherence (aOR=1.41, 95% CI: 1.07–1.87), and biomarker-confirmed PrEP adherence (aOR=1.35 95% CI: 0.98, 1.87). Associations were similar in models of any alcohol use and PrEP continuation/adherence.

Conclusions: Pregnant and postpartum women who reported recent alcohol use had increased odds of continuing to take PrEP, indicating that higher risk women may continue on oral PrEP.

Keywords

Pre-exposure Prophylaxis; alcohol use; pregnancy; South Africa; HIV

Introduction

HIV prevalence among pregnant women in South Africa is high (29%)¹ and the pregnancy and postpartum period represents a time of increased risk of incident HIV infection². The high viral load experienced during the acute phase of HIV infection also increases risk of maternal transmission to the fetus (across the placental barrier) or child (via breastfeeding), underscoring the importance of effective HIV prevention among pregnant and breastfeeding women³. When taken as prescribed, pre-exposure prophylaxis (PrEP) is a highly effective HIV prevention method⁴. Modelling suggests that widespread adoption of PrEP among pregnant women in South Africa could avert between 13% and 41% of projected vertical transmission cases in the coming decade⁵. The World Health Organization (WHO) and the South African Department of Public Health recommend offering PrEP to pregnant and postpartum women who are at high risk of HIV acquisition, and a recent systematic review identified no safety-related reasons for not offering PrEP to this population⁶. As an individually-controlled (and when used by women, female-initiated) HIV prevention method, PrEP also offers user autonomy in a setting where condom use is low (especially during pregnancy⁷) and women may lack agency to advocate for safer sexual practices in their intimate partnerships. Given that PrEP scale-up may be essential to reducing incident HIV cases among pregnant and breastfeeding women—and the elimination of mother to child transmission in this setting—it is critical to identify barriers to optimal PrEP care outcomes.

Perinatal alcohol use is a significant public health problem in South Africa that threatens the well-being of both mother and fetus^{7–10}. In addition, it is well-established that alcohol use is associated with HIV risk behaviors, including multiple sex partners^{11–13} and condomless sex^{11,14}, and results in increased risk of HIV acquisition^{15–18}. A limited body of evidence also suggests alcohol use is also associated with barriers to PrEP initiation, continuation and adherence.¹⁹ A more robust body of evidence has established that alcohol use is a barrier to optimal engagement, retention and adherence in the HIV care cascade among persons living with HIV^{20–24}. More research is needed to further characterize the relationship between alcohol use, PrEP continuation and PrEP adherence among pregnant and postpartum women in South Africa. Since our prior work found no association between alcohol and other substance use and PrEP initiation, we focus here on PrEP continuation and adherence²⁵. This analysis explores associations between self-reported alcohol use in the past year prior to pregnancy (any recent drinking and hazardous drinking, defined as an AUDIT-C score 3) and PrEP continuation and adherence among a cohort of HIV-negative pregnant and breastfeeding women attending antenatal and postpartum care in Cape Town, South Africa who initiated PrEP during antenatal care. Based on the limited existing literature looking at PrEP and alcohol use²⁵, and the more substantive body of evidence linking alcohol use to poor ART continuation, adherence and viral suppression^{20–24}, we hypothesized that maternal alcohol use prior to pregnancy would be associated with poorer PrEP continuation and adherence in women not living with HIV who initiated PrEP during pregnancy.

Methods

Study design and data collection

The PrEP-PP (PrEP in Pregnant and Postpartum women) study is a prospective observational cohort of pregnant adolescents and women (age >16 years) who are not living with HIV. Women were recruited at the first antenatal care (ANC) visit and followed until 12 months postpartum from one public health clinic in Cape Town, Western Cape, South Africa. Recruitment began in August 2019 and concluded in October 2021 for a sample size of N=1200 pregnant women. Study design details have been published previously²⁵.

Study participants: Women were recruited from their first antenatal care visit, without restriction on gestational age at baseline. Study eligibility criteria included: 1) 16 years, 2) confirmed HIV-negative serostatus by a fourth-generation antigen/antibody combination HIV test, 3) confirmed pregnant, 4) intention to stay in Cape Town through the postpartum period, and 5) absence of contraindications to PrEP (e.g., history of renal disease, current hypertension, history of bone fracture not related to trauma). Eligible consenting participants received 120 Rand (~\$8 USD) in grocery vouchers for their time and effort at each study visit as well as remuneration for transportation costs. Participants received counseling about PrEP and could decide to initiate PrEP on the same day, free of charge. Participants were eligible to participate in the cohort study regardless of PrEP initiation.

Data collection: Upon eligibility confirmation and study consent, participants completed the baseline visit survey, which took 30–45 minutes using REDCap, a secure web-based platform. Following the baseline survey, the study interviewer provided information about PrEP and its benefits. If the participant decided to take PrEP, the study nurse provided the

patient with a one-month supply of Truvada[®] (tenofovir disoproxil fumarate/emtricitabine [TDF-FTC]) and an invitation card to return in one month for follow-up HIV testing (after which participants received a three-month prescription to correspond with quarterly study follow-up visits at 3, 6, 9 and 12 months). Participants were followed until 12-months postpartum. Each follow-up visit lasted approximately 20–30 minutes.

Study measures

While our study collected data on alcohol use since learning one was pregnant, we used measures of any alcohol use and hazardous alcohol use in the past year prior to pregnancy as our exposure variables of interest. We report past year alcohol use prior to pregnancy for several reasons: (1) consistency with our prior sensitivity analysis of alcohol use measures among pregnant women²⁶, (2) sensitivity analysis in the present analysis of women who reported continued alcohol use in the sample at 3 months follow up which was very small (5%), (3) the high potential for underreporting alcohol use while pregnant due to social desirability bias (4) additional prior work suggesting that alcohol use prior to pregnancy is a good predictor of continued alcohol use during pregnancy²⁷, and (5) the late median gestational age at first ANC visit of 21 weeks (the 5th month of pregnancy) and high prevalence of unplanned pregnancies reported in prior analyses of this cohort, both of which suggest participants were unaware they were pregnant for several months of the pregnancy and may have continued drinking during this time²⁸. The Alcohol Use Disorders Identification Test – Consumption (AUDIT-C)²⁹ was used to measure recalled and self-reported alcohol use in the year prior to pregnancy (range 0–12). We used an AUDIT-C score of zero to measure any past year alcohol use prior to pregnancy (versus none) and a cut-off of 3 for past year hazardous alcohol use prior to pregnancy (versus persons with AUDIT-C scores 0–2). This cut-off has previously been used to classify hazardous alcohol use among pregnant women in South Africa^{7,30}.

Consistent with our prior work²⁵, we measured PrEP continuation at 3 months by participant return to clinic and receipt of a PrEP prescription refill (those who initiated PrEP at baseline and did not return or did not refill when they returned were classified as “discontinued” and placed in the reference group). Self-reported adherence was measured using the question, “In the last 7 days, on how many days did you miss at least one dose of your PrEP?”. We operationalized poor adherence as having missed 2 doses in the prior 7 days, an adherence threshold validated in prior studies and intended to correspond with blood levels of TFV-DP in pregnant and postpartum women taking 6 doses in the past 7 days³¹. In sensitivity analysis, we did not find differences between the 7-day (missed 2 doses) and 30-day (missed 5) self-report adherence measures. Objective PrEP adherence was determined using erythrocyte intracellular tenofovir diphosphate (TFV-DP) levels by liquid chromatography and mass-spectroscopy, a measure of cumulative adherence over several weeks^{32–34}. A cut-off of any detectable TFV-DP (versus below the level of quantification) was used to differentiate between any level of adherence and non-adherence. The reference group for adherence outcomes included those who discontinued PrEP as well as those with poor adherence (based on self-report and objective data).

Other measures collected in the baseline visit survey included age (continuous), education attainment (a categorical measure dichotomized into did not complete secondary school/completed secondary school), employment status (any form of employment/unemployed/student), housing type (informal/formal), relationship cohabitation status (no partner/live with partner/do not live with partner), perceived likelihood partner has other sexual partners (not likely at all/somewhat likely/very likely/I don't know), multiple partners in past three months (yes/no), HIV risk perception in next year if not on PrEP (no chance at all/small chance/moderate chance/great chance), fears or concerns related to PrEP use (yes/no), partner HIV status (positive/negative/don't know/no partner), partner ART use (yes/no), condom use at last sex (yes/no), depression (using the Edinburgh Perinatal Depression Scale (EPDS) with a cut-off of 11 for probable depression³⁵) and experiences of intimate partner violence (items adapted from the WHO IPV scale^{36,37}). We also asked about pregnancy intentions using items adapted from prior studies of fertility intentions in this setting^{38,39}, including feelings about the pregnancy using items from the London Measure for Unplanned Pregnancy (LMUP⁴⁰, previously validated in sub-Saharan Africa^{40,41}), including timing (this pregnancy happened at the right time/this pregnancy happened at the wrong time) and having a baby (I wanted to have a baby/I have mixed feelings about having a baby/I did not want to have a baby). We also report the proportion that were still pregnant at follow-up which was collected at the three-month visit.

Data analysis

Data from baseline study visit and 3-month follow-up were analyzed using prospective logistic regression. Our analytic sample was restricted to participants who initiated PrEP at baseline (n=1,014, 85% of the sample) and then further restricted to those who had not been censored (i.e., pregnancy loss, infant death or HIV seroconversion) and were eligible for the study outcome of PrEP adherence at 3m, leaving us with an analytic sample of n=943. First, sociodemographic and HIV-risk related behavioral variables of interest were analyzed using descriptive statistics, to characterize the sample. To test our hypotheses, we longitudinally explored associations between the two alcohol measures at baseline, and PrEP continuation and adherence after 3-months. Directed acyclic graphs were used to identify the minimally sufficient set of baseline covariates to adjust for to reduce bias from measured confounders. Confounders in adjusted models included age, education level, dwelling type and current sexual partner. Unadjusted and adjusted logistic regression models were built to obtain odds ratios using the proc logistic function in SAS studio⁴². An alpha of 0.05 was used to determine statistical significance.

Results

Description of the study sample

Table 1 shows characteristics of the study sample. At baseline, median age of participants was 26 years [IQR 22–31] and median gestational age was 22 weeks [IQR 15–31]. Half of participants had completed secondary school (51%, n=480), 53.6% were unemployed (n=505), 11% (n=104) were students and 45% resided in a formal dwelling (n=427). Half of women felt the pregnancy timing was wrong (51.0%, n=481) and reported not wanting to have a baby (50%, n=470). Seven and a half percent (n=71) of participants had EPDS scores

indicative of current depression and 13% (n=121) reported recent intimate partner violence. Of those who attended their 3-month follow-up visit, 41% (n=204) had given birth while the remainder were still pregnant.

Among those with a partner (n=872), 60% of participants (n=525) reported not living with their current partner. Of those whose primary partner was the father of their child (n=866), 55% (n=477) reported that it was somewhat or very likely that their partner had other sexual partners. One-quarter reported that their current partner was either living with HIV or they were unaware of their partner's serostatus (25%, n=236). Among participants reporting sex with at least one person in the past three months (n=917), the majority did not use a condom at last sexual intercourse (90%, n=829). Forty-five percent of women (n=427) reported feeling that there was some chance they could become infected with HIV in the next six months if they were not on PrEP, and the majority reported they did not have any fears about PrEP initiation (82%, n=776).

Half of women reported any alcohol use in the past year (50%, n=471), while one-third had AUDIT-C scores indicative of hazardous drinking (33%, n=314). Forty percent (40%; n=378) of women reported three or more drinks on a typical day when drinking while 21% (n=202) reported five or more drinks. Women who reported alcohol use were more likely to feel they were at moderate or high risk of infection compared to women reporting no alcohol use (high risk: 5% vs 2%; moderate risk: 10% vs 7%, for women reporting alcohol use and no alcohol use, respectively, p=0.005).

Bivariate and multivariable regression analysis of any alcohol use and PrEP outcomes

A greater proportion of women reporting any alcohol use prior to pregnancy (relative to no alcohol use) continued PrEP at 3-months follow up (62% (n=290) vs 45% (n=261) (Figure 1). Forty four percent (n=208) of women reporting alcohol use reported high PrEP adherence in the past 7 days and 38% (n=180) of women reporting no alcohol use reported high adherence. Twenty-five percent (n=118) of women reporting alcohol use and 21% (n=98) of women reporting no alcohol use had biomarker confirmed PrEP adherence. In multivariable logistic regression models, women reporting alcohol use prior to pregnancy had 1.3 times greater odds of PrEP continuation at 3 months than women reporting no alcohol use during that same time frame (adjusted OR 1.34, 95% CI 1.03, 1.74). Women reporting alcohol use prior to pregnancy had 1.31 times greater odds of self-reported high PrEP adherence at 3 months than women reporting no alcohol use during that same time frame (adjusted OR 1.31, 95% CI 1.00–1.71), and a non-significant increased odds of biomarker-confirmed PrEP adherence at 3 months than women reporting no alcohol use during that same time frame (adjusted OR 1.33, 95% CI 0.97–1.81). The proportion of women with a discrepant adherence result (self-reported recent PrEP adherence with no detectable TFV-DP in DBS) was 209/943 (22%). Our sensitivity analysis of women who reported continued alcohol use in the sample at 3 months follow up was very small (5%) and found no difference in PrEP adherence at 3m follow up by alcohol use status (in the subset who had started and returned for 3m visits).

Bivariate and multivariable regression analysis of hazardous alcohol use and PrEP outcomes

Figure 2 presents the proportion of pregnant women who continued and adhered to PrEP by self-report of hazardous alcohol use prior to pregnancy as well as adjusted and unadjusted models. At 3-month follow-up, a greater proportion of women reporting hazardous alcohol use prior to pregnancy (relative to lower levels of alcohol use and no alcohol use) continued PrEP (65% (n=204) vs 55.2% (n=347)). Forty seven percent (n=146) of women reporting hazardous alcohol use reported high PrEP adherence in the past 7 days while 39% (n=242) of women who did not report hazardous alcohol use had high adherence. Twenty six percent (n=82) of women reporting hazardous alcohol use and 21% (n=134) of women who did not report hazardous alcohol use had biomarker confirmed PrEP adherence. In adjusted models, women reporting hazardous alcohol use prior to pregnancy had 1.6 times greater odds of PrEP continuation at 3 months follow-up, relative to women reporting no alcohol use during that same time frame after adjusting for covariates (adjusted OR 1.54, 95% CI 1.16–2.06). Women reporting hazardous alcohol use prior to pregnancy had 1.4 times greater odds of self-reported high adherence at 3-months follow-up, relative to women reporting no alcohol use during that same time frame (adjusted OR 1.41, 95% CI 1.07–1.87), and a non-significant increased odds of biomarker-confirmed adherence at 3 months follow-up, relative to women reporting no alcohol use during that same time frame (adjusted OR 1.35, 95% CI 0.98–1.87).

We also examined the association between hazardous alcohol use and PrEP continuation and adherence, among persons reporting any alcohol use (i.e., inclusion in this analysis was conditional on reporting any past year alcohol use prior to pregnancy at baseline, n=471) (see supplemental file 1). In these models, hazardous alcohol use was associated with PrEP continuation (adjusted OR 1.52, 95% CI 1.02–2.25) but not self-reported (adjusted OR 1.33, 95% CI 0.90–1.98) nor objective (adjusted OR 1.20, 95% CI 0.76–1.89) adherence measures.

Discussion

This study addresses an important gap in the evidence base by exploring associations between recent alcohol use prior to pregnancy (any and hazardous levels) and PrEP continuation and adherence in a cohort of oral PrEP using pregnant and breastfeeding women. In our study of pregnant women who initiated PrEP, both any alcohol use prior to pregnancy and hazardous alcohol use prior to pregnancy were associated with increased odds of PrEP continuation and adherence. This finding is consistent with our prior work in this sample where any alcohol use at baseline was associated with moderately increased odds of PrEP continuation²⁵-- but is inconsistent with the limited existing evidence base looking at associations between alcohol use and PrEP¹⁹ and the broader evidence base of studies that link alcohol use to poor ART continuation and adherence^{20–24}. Despite differences in PrEP continuation and adherence by alcohol use status, overall rates of self-reported and objective adherence across groups were low. These findings have important implications for programmatic delivery of PrEP, oral daily and other longer acting methods, among pregnant and postpartum women.

One possible explanation for why these results diverge from the broader literature is that demographics in the present study sample differ from those discussed in extant literature on alcohol use and PrEP. Oldfield et al. conducted a systematic review of studies exploring the association between unhealthy alcohol use and PrEP care outcomes and identified a number of alcohol-related barriers to PrEP continuation and adherence, but only two of the nine included studies for PrEP retention and adherence outcomes were not conducted among men who have sex with men¹⁹. One of these studies⁴³, found that heavy alcohol use was associated with lower adherence among men and women in Kenya and Uganda while the other⁴⁴, conducted among insured persons in the US, found that drug and alcohol use were associated with PrEP discontinuation. Neither of these studies looked at PrEP outcomes by pregnancy status and awareness of increased HIV risk and fears around vertical transmission may explain the high levels of PrEP continuation and adherence observed among women reporting alcohol use in our sample. Perinatal women are a unique population of PrEP users because they have multiple incentives to continue and adhere to PrEP; it is a tool to protect both themselves, and their unborn or recently born child, from HIV infection.

In the present study, sexual risk behaviors were prevalent among pregnant women, which is consistent with our prior work in South Africa⁴⁵ and the larger evidence base examining sexual risk behaviors among pregnant and postpartum women in sub-Saharan Africa^{46–50}. Of note, the relationship between alcohol use and knowledge of partner HIV serostatus was not explored here and it is unclear how this factor may influence the relationship between alcohol use and PrEP use. However, our recently-published study using baseline data from the same study found that pregnant women reporting any alcohol use in the year prior to pregnancy had greater odds of being at high risk for HIV (adjusted OR 1.33, 95% CI 1.05–1.68), using a proxy measure that consisted of several sexual HIV risk factors which included awareness of partner HIV status (as well as presence of an STI, multiple sexual partners and condom use)⁷. In the present study, alcohol use prior to pregnancy was associated with higher perceived risk of HIV acquisition. Pregnant women who use alcohol may thus recognize that they are at increased risk for HIV due to other sexual risk behaviors, and therefore be more likely to adopt PrEP as their preferred prevention strategy and adhere to it well. This awareness of cumulative risk may also explain differences between our study and the existing literature on alcohol use and ART use and adherence among persons living with HIV. Our finding of better PrEP outcomes among those using alcohol, while unexpected, bodes well for targeted intervention development as it suggests that this population of women at elevated risk of HIV is receptive to PrEP uptake and use. Still, it is important to consider these results within the context of overall low use rates of continuation and adherence regardless of alcohol use status. Fifty-eight percent of women who initiated PrEP at baseline continued PrEP at 3-months and while 41% of women self-reported high adherence (missing <2 doses a week), only 23% had biomarker-confirmed adherence. Given that most participants were not adherent in our sample, efforts to improve PrEP uptake and adherence among all pregnant women are needed.

These results suggest a few additional potentially important directions for service delivery and health systems-based intervention. First, it may be particularly beneficial to train health care workers on counseling pregnant women who use alcohol about PrEP. Related, if health care workers have biases about who is most likely to benefit from PrEP, and who is most

likely to be nonadherent, we need concerted efforts to counteract these biases. Second, as countries develop indications for PrEP eligibility, and guidelines around counseling PrEP users, these findings underscore the importance of considering the unique needs and position of pregnant women. Their estimation of risk, and their willingness to engage in activities to reduce this risk, should inform PrEP policies and programs. Third, these results indicate that mental health counseling — from screening for hazardous alcohol use to symptoms of depression — should be integrated into antenatal care, particularly in settings like South Africa where perinatal alcohol use is prevalent. Referrals to appropriate follow-up services, and continuity of care throughout the perinatal period, also must be ensured.

This study had several limitations including the use of self-reported measures for alcohol use, the reliance on report of alcohol use prior to pregnancy (see justification in methods), the high proportion of individuals lost to follow up, potential bias from unmeasured confounders (see DAG in supplemental file 2), and the use of trained staff and nurses for PrEP counseling and prescription provision which may reduce generalizability of findings to PrEP provision during antenatal care clinic visit outside of the study infrastructure. However, this study had several strengths including use of a prospective design, outcomes that lent themselves to the inclusion of those lost to follow-up in the referent group, and inclusion of objective PrEP adherence measures.

Conclusion

In our sample of HIV-negative pregnant and postpartum women, any recent alcohol use and hazardous drinking prior to pregnancy—risk factors for incident HIV—were associated with higher odds of PrEP continuation and adherence at 3 months. Women who reported alcohol use prior to pregnancy were also more likely to perceive that they were at moderate to high risk of acquiring HIV infection than women reporting no alcohol use. These findings suggest that women who use alcohol are aware of their own HIV risk and that daily oral PrEP is an acceptable, and potentially effective, HIV prevention strategy in this high-risk population. Perception of risk may play a role in willingness to continue and adhere to PrEP.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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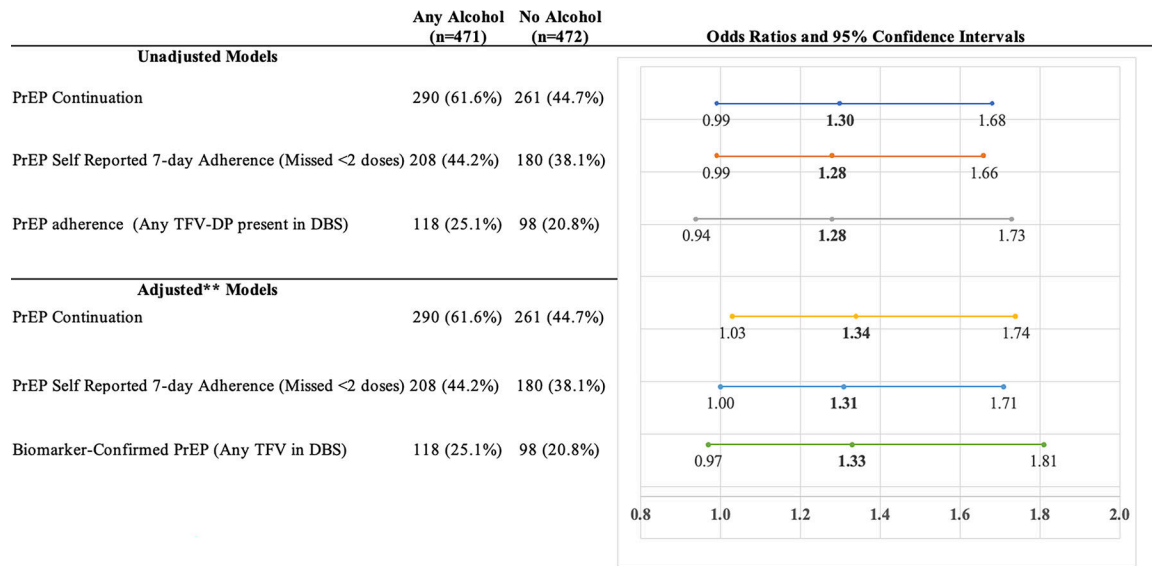
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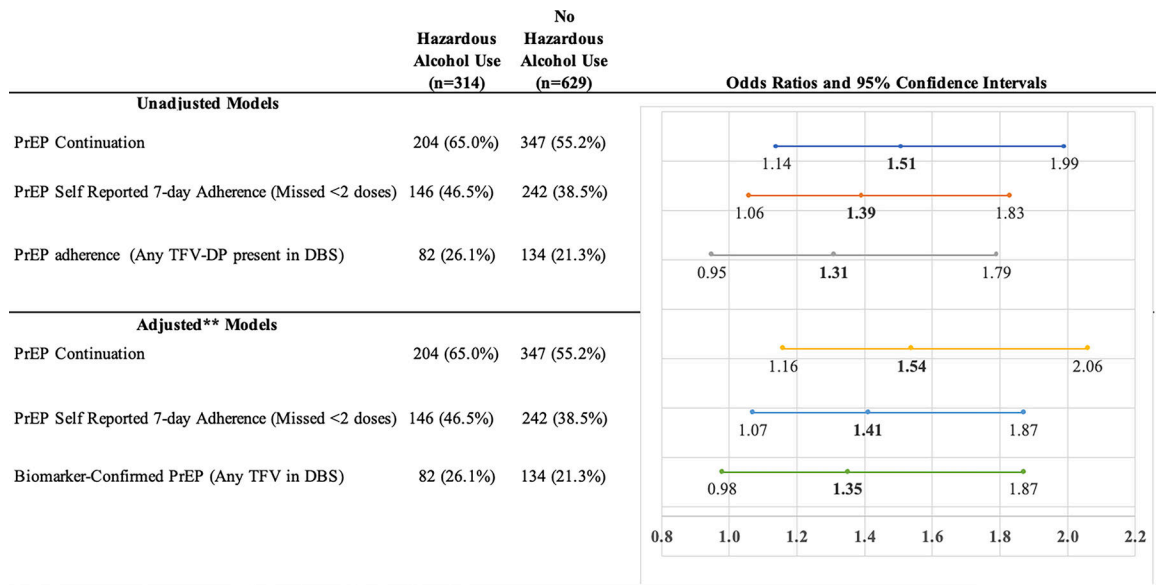
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PrEP: Pre-exposure Prophylaxis; TFV: Tenofovir; DBS: Dried Blood Spot
 **adjusted for age, relationship cohabitation status, dwelling type and education level

Figure 1.

The left-hand side presents the proportion of women continuing and adhering to PrEP by alcohol use status. The forest plot presents the unadjusted (top) and adjusted (bottom) odds ratios and 95% confidence intervals for associations between any alcohol use in the past year prior to pregnancy at baseline and PrEP continuation and adherence at 3 months follow up.



PrEP: Pre-exposure Prophylaxis; TFV: Tenofovir; DBS: Dried Blood Spot
 **adjusted for age, relationship cohabitation status, dwelling type and education level

Figure 2.

The left-hand side presents the proportion of women continuing and adhering to PrEP by alcohol use status. The forest plot presents the unadjusted (top) and adjusted (bottom) odds ratios and 95% confidence intervals for associations between *hazardous* alcohol use in the past year prior to pregnancy at baseline and PrEP continuation and adherence at 3 months follow up.

Table 1.

Baseline sociodemographic and behavioral characteristics of pregnant women who initiated PrEP in Cape Town, South Africa

		Overall (n=943)
Age	Median [IQR]	26 yrs [22–31]
Age	16–24 years	380 (40.3%)
	25+ years	563 (59.7%)
Gestational Age at First ANC ¹ Visit	Median [IQR]	22 weeks [15–31]
Educational Attainment	Did Not Complete Secondary	463 (49.1%)
	Completed Secondary	480 (50.9%)
Employment Status	Employed (full/part-time, formal/informal)	334 (35.4%)
	Student	104 (11.0%)
	Unemployed	505 (53.6%)
Residence Type	Informal Dwelling	516 (54.7%)
	Formal Dwelling	427 (45.3%)
Past year IPV ²	Yes	121 (12.8%)
	No	822 (87.2%)
Depression	Self-report of recent depression (EPDS \geq 11)	71 (7.5%)
	Self-report of no recent depression	872 (92.5%)
Pregnancy Timing	Right time	462 (49.0%)
	Wrong time	481 (51.0%)
Feelings about pregnancy	I wanted to have a baby	335 (35.5%)
	I have mixed feelings about having a baby	198 (14.6%)
	I did not want to have a baby	470 (49.8%)
Cohabitation Status (n=866)	Live with partner	347 (36.8%)
	Do not live with partner	525 (55.7%)
	No current partner	71 (7.5%)
Primary Partner's HIV status	Positive	18 (1.9%)
	Negative	663 (70.3%)

		Overall (n=943)
	Don't know	218 (23.1%)
	No Recent Partner	44 (4.7%)
Partner on ART ³	Yes	17 (94.4%)
	Don't Know	1 (5.6%)
	No	0 (0%)
Multiple partners in past 3 months	Yes	30 (3.2%)
	No	913 (96.8%)
Fears and concerns about using PrEP ⁴	Yes	167 (17.7%)
	No	776 (82.3%)
Perceived chances of getting HIV in the next year if not on PrEP?	No chance at all	516 (54.7%)
	Small chance	314 (33.3%)
	Moderate chance	78 (8.3%)
	Great chance	35 (3.7%)
Partner has other sexual partners (n=866)	Not likely	159 (18.4%)
	Somewhat likely	337 (38.9%)
	Very likely	140 (16.2%)
	Don't know	230 (26.6%)
Condom use at last sex (n=917)	Yes	88 (9.6%)
	No	829 (90.4%)
Any alcohol use prior to pregnancy	Yes	471 (50.0%)
	No	472 (50.0%)
Hazardous alcohol use prior to pregnancy	Yes	314 (33.3%)
	No	629 (66.7%)
Pregnancy Status (collected at 3m follow up, n=501)	Still pregnant	297 (59.3%)
	Gave Birth	204 (40.7%)

¹ antenatal care (ANC)

² intimate partner violence (IPV)

³ antiretroviral therapy (ART)

⁴ pre-exposure prophylaxis (PrEP)