Prevention effective adherence to oral PrEP among pregnant and postpartum women in South Africa

Background

- **High HIV incidence** during pregnancy and breastfeeding
- **Risk of vertical transmission high** in acutely infected women
  - Half of new child infections are in East and Southern Africa
  - >35,000 infant HIV infections from incident HIV during pregnancy or breastfeeding
  - ~22,000 infant infections in E. And Southern Africa

**PROBLEM**

South Africa expects >76,000 new infant HIV infections in the next decade (without effective PrEP)

~1/3 of all infant HIV infections attributed to acute maternal HIV during pregnancy/postpartum

**APPROACH**

Improve access and use of HIV prevention strategies, incl. PrEP to prevent new HIV throughout pregnancy and postpartum period →

Support elimination of vertical HIV transmission

Sources: UNAIDS, 2022; Thembisa model, https://www.thembisa.org/, 2022
Barriers to daily oral PrEP use in Pregnant and postpartum women

Logistical
- forgetting to take PrEP daily
- being away from home when PrEP should be taken
- logistics around PrEP collection esp when not in care
- transport and financial barriers

Daily Pill-related
- pill side effects
- pill burden during pregnancy/postpartum

Sociocultural
- anticipated PrEP stigma
- limited disclosure of PrEP use & concealment of PrEP particularly more challenging postpartum period (when not taking prenatal vitamins, in ANC)

Sources:
Moran, A. et al, AIDS and Behavior (2020)
Beesham, I. et al, AIDS and Behavior (2021)
Methods: PrEP-PP cohort study

**Setting:** Cape Town in one community health center in a diverse urban townships w/ high HIV incidence

**Observational cohort** of 1200 HIV-pregnant & postpartum women (16+ yrs old)
- Counsellors provide HIV counseling incl. PrEP quarterly
- Followed thru 12m postpartum to evaluate:
  1. % pregnant women who initiate PrEP
  2. % of women on oral PrEP who continue
  3. % of women on oral PrEP who adhere over time

Mixed methods evaluation that allows women to start or stop PrEP at any time
Objective Adherence Evaluation: Methods

• Recruited women on PrEP who returned for PrEP-PP study visit at 3+ months
• Obtained blood for dried blood spots to quantify tenofovir diphosphate (TFV-DP)*
  – Compared with self-reported adherence in those reporting taking PrEP in the past 30-days
• Assessed TFV-DP levels (≥2 doses/week compared with <2 doses/week) by pregnancy vs. postpartum status – to evaluate predictors of low/no PrEP use
• Logistic regression models using generalized estimating equations to evaluate associated correlates to estimate odds ratios adjusting for covariates

2314 screened

621 ineligible (27%)

472 declined participation (21%)

1221 women enrolled (53%)

1055 initiated PrEP at 1st ANC visit (86%)

Median age=26
Median gestation age=21 weeks
93% sexually active
90% reported recent condomless sex
60% not married or cohabiting
31% unsure of partner’s serostatus
13% reported IPV in last yr
49% reported substance use in year
26% had heard of PrEP before
Cohort description (for TFV-DP analysis)

• Between Aug 2019-Aug 2021, we included n=382 women who returned for study visits, (n=687 DBS samples)*
  – 241 in pregnancy (35%)
  – 446 in postpartum (65%)
• Median age was 27 years (IQR: 23-32 years)
• 54% were >20 weeks gestation at first antenatal visit
• Median time on PrEP was 168 days (IQR=84-252 days)

* Women who did not return for the visit, or did not report taking PrEP were excluded from analysis
### Objective measures of recent PrEP use (n=687 samples)

*TFV-DP* = tenofovir diphosphate

<table>
<thead>
<tr>
<th></th>
<th>Total (n=687)</th>
<th>Pregnant (n=331)</th>
<th>Postpartum (n=356)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantifiable TFV-DP</td>
<td>52%</td>
<td>67%</td>
<td>60%</td>
</tr>
<tr>
<td>TFV-DP (fmol per punch)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 doses/week</td>
<td>72%</td>
<td>75%</td>
<td>86%</td>
</tr>
<tr>
<td>2-6 doses/week</td>
<td>25%</td>
<td>30%</td>
<td>29%</td>
</tr>
<tr>
<td>7 doses/week</td>
<td>3%</td>
<td>7%</td>
<td>2%</td>
</tr>
</tbody>
</table>

- Overall, 72% had concentrations corresponding to <2 doses/week
- Any quantifiable TFV-DP declined over time from 67% at 3m in pregnant women to 31% of postpartum samples at 12m
- TFV-DP was lower in postpartum vs. pregnancy (aOR=0.44, 95% CI=0.35, 0.54; p<0.01)
Results: Comparison with self-reported adherence

- Self reported adherence on PrEP in pregnancy was high
  - 70-80% who continued said they took 7 doses in past week
- Objective adherence significantly lower… In pregnant women at 3m:
  - 75% of pregnant women had any TFV-DP in DBS, yet:
    - 30% had concentrations consistent with 2-6 doses/wk
    - 7% had concentrations consistent with 7 doses/wk

Correlation coefficient between self report and objective levels low (0.10 [95% CI=0.02, 0.17])
Results: Factors associated with objective levels of PrEP

- Outcome: TFV-DP concentrations levels consistent with ≥2 days/week (vs. <2 days or no TFV-DP)
- Sex activity and HIV risk associated with increased odds of better PrEP adherence

<table>
<thead>
<tr>
<th>Covariate</th>
<th>aOR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (per year)</td>
<td>1.01 (1.00, 1.02)</td>
</tr>
<tr>
<td>Gestational age at first ANC visit (≥20 weeks vs &lt;20 weeks)</td>
<td>1.59 (1.05, 2.41)</td>
</tr>
<tr>
<td>Postpartum vs. pregnant</td>
<td>0.43 (0.31, 0.58)</td>
</tr>
<tr>
<td>Partner living with HIV or unknown serostatus</td>
<td>1.50 (1.01, 2.22)</td>
</tr>
<tr>
<td>Breastfeeding vs not breastfeeding</td>
<td>1.83 (1.04, 3.20)</td>
</tr>
<tr>
<td>Sex frequency (≥5 times/month vs &lt;5 times or none)</td>
<td>2.11 (1.58, 2.82)</td>
</tr>
</tbody>
</table>

* Models adjusted for maternal age at baseline and pregnancy vs. postpartum status at study visit date
Study strengths and limitations

• **Strengths:**
  – **Integration:** Study integrated into ante and postnatal care
  – **Design:** Large cohort with follow up thru 12m postpartum

• **Limitations:**
  – **Generalizability:** study limited to one urban study site
  – **Potential bias:** Results only of those who report using PrEP - potential overestimation of the true proportion of women who took PrEP
  – **Labs:** Did not collect hematocrit, which may be low or variable in pregnant or postpartum women and may underestimate TFV-DP
  – **Retention:** Difficulties with study retention during COVID-19
Conclusion

- Adherence to PrEP using objective measures was poor in pregnant and postpartum women.
- In sexually active & breastfeeding women, recent adherence was higher, indicating the importance of prevention effective adherence in this population.
- Focusing adherence interventions on pregnant & postpartum women at risk remains essential in offering PrEP services.
Thank you to the study participants and study team for their support

Contact: Dvora Joseph Davey
dvoradavey@ucla.edu

Funders: National Institute of Health: Fogarty International (K01TW011187), NIMH (R01MH116771), and NICHD (R01HD106862)

Study support: Gilead (study drug, Truvada) & Cepheid (GeneXpert STI test kits)