A Novel Pharmacological Adherence Measure in Pregnant and Postpartum Kenyan Women

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BACKGROUND

Antiretroviral therapy (ART) adherence among pregnant and postpartum women living with HIV (PWLH) is critical to promote maternal health and prevent vertical HIV transmission.

Tenofovir diphosphate (TFV-DP) in dried blood spots (DBS) is an objective assessment of long-term drug exposure and adherence that is associated with viral suppression.

Tenovofir disoproxil fumarate (TDF) is part of the first-line regimen for PWLH in Kenya, providing the opportunity to quantify ART adherence. Pharmacokinetics of TDF show lower levels in pregnancy than in the postpartum period.

A TFV-DP level of ≥ 700 fmol/punch was associated with HIV viral load <1000 copies/ml in South African women[1] and equivalent to ≥4 doses/week in healthy US volunteers.[2]

METHODS

PWLH ≥ 18 years enrolled in the Mother and Infant Visit Adherence and Treatment Engagement (MOTIVATE) study who had been on TDF-based ART regimens for a minimum of 10 weeks were recruited from 24 health facilities in southwestern Kenya.

150 PWLH provided DBS samples at three time points (pregnancy/early postpartum (PP), 6 months PP, and 9-12 months PP).

DBS were analyzed at the Colorado Antiviral Pharmacology Laboratory using a previously validated LC-MS/MS method.

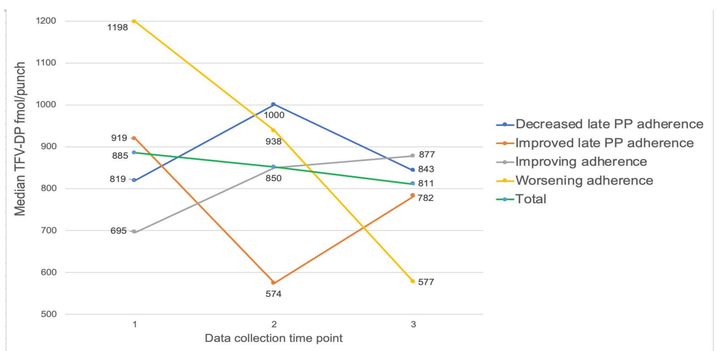


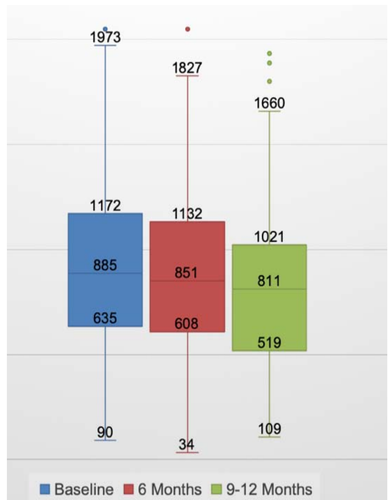
Figure 1. Adherence phenotypes of PWHIV: Median TFV-DP fmol/punch among 150 pregnant and postpartum women with HIV at three time points (pregnancy/early PP, 6 months PP, and 9-12 months PP).

TFV dried blood spot levels indicate decreasing ART adherence over time among pregnant and postpartum women living with HIV in Kenya.

RESULTS

- 419 DBS samples were collected from 150 PWLH
- Four discrete adherence phenotypes in PWHIV were identified (Figure 1):
  1. **Worsening adherence**: those whose TFV-DP level consistently decreased across time (19%)
  2. **Improving adherence**: those whose TFV-DP level consistently increased across time (15%)
  3. **Decreased late PP adherence**: those who improved but then worsened (35%)
  4. **Improved late PP adherence**: those who worsened initially but then improved (30%)
- Those with consistently decreasing TFV-DP had the lowest median late PP adherence levels (577 fmol/punch).
- Median (IQR) TFV-DP levels were (see Figure 2)
  - Pregnancy/early PP: 885 fmol/punch (IQR 635, 1172)
  - 6 months PP: 851 (IQR 608, 1132)
  - 9-12 months PP: 811 (IQR 519,1012)

Figure 2. Median TFV-DP fmol/punch during pregnancy/early PP (baseline), 6 and 9-12 months PP in Kenyan PWHIV (Interquartile range (IQR), and 95% CI)



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RESULTS Cont.

- Using a conservative estimate of adherence, TFV-DP ≥700 fmol/punch, adequate adherence was detected in 68%, 65% and 60% of PWHIV at baseline, 6 months PP and 9-12 months PP, respectively.
- Around 47% of women had TFV-DP levels consistently ≥700 fmol/punch at all time points, while 18% were consistently below this level and the remainder (36%) varied during pregnancy and PP.

CONCLUSIONS

- Cumulative ART exposure in PWHIV, quantified by TFV-DP in DBS, demonstrated a trend towards decreased concentrations (i.e., adherence) over time from pregnancy into the PP period.
- Over half of PWHIV showed decreasing adherence postpartum. This raises concern for higher likelihood of poor adherence and viremia in the critical PP period during breastfeeding.
- The use of TFV-DP in DBS as a measure of ART adherence in PWHIV in sub-Saharan Africa could be an important tool to optimize health outcomes.
- Further work to assess correlation of TFV-DP levels with viral suppression in PWHIV is needed.

ADDITIONAL KEY INFORMATION

For more information, contact Lisa Abuogi, MD at
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We acknowledge the support of the Director KEMRI, the Director CMR, and study participants. The MOTIVATE study is supported by the National Institute of Child Health and Human Development., Award Number 3R01HD080477-04S1. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Child Health and Human Development or the National Institutes of Health.

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