MEMS-defined treatment interruptions independently predict HIV RNA controlling for average adherence in rural Uganda

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Background

• Adherence (dose-taking execution\(^1\)) closely predicts HIV RNA viral suppression\(^2,3\)

• Recent studies suggest treatment interruptions (lack of persistence\(^4\)) contribute to virologic failure\(^5,6\)

• Treatment interruptions due to structural & economic barriers are a common pattern of adherence in resource limited settings\(^7,8\)

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1 Urquhart, Clin Pharmacokinet 1997
2 Bangsberg, AIDS 2000
3 Paterson, Annals 2000
4 Bae, AIDS 2011
5 Parienti, PLoS ONE 2008
6 Genberg, AIDS 2012
7 Ware, PLoS Med 2009
8 Oyugi, AIDS 2004
Study aim

- To compare the relative contribution of average adherence vs. non-structured treatment interruptions to virologic failure among patients initiating ART in a rural, resource-limited setting
The UARTO Cohort
Uganda AIDS Rural Treatment Outcomes

• Treatment-naïve HIV-infected adults initiating ART in rural, southwest Uganda
• Followed with quarterly structured interviews and HIV RNA determinations
• ART adherence measured with MEMS
• Study commenced in 2005 and is currently ongoing
Statistical analysis

• Dependent variable is viral failure, defined as HIV RNA viral load >400 copies/mL

• Primary exposures, based on a 90-day time window
  – Average adherence (percentage of doses taken)
  – Any treatment interruption lasting >10 d (binary)

• Logistic regression with cluster-correlated robust estimates of variance
Participant characteristics

- 466 persons living with HIV/AIDS
- Mean age 35 y, 71% women, 42% married, baseline CD4 count 162 (±113)
- One year’s worth of MEMS adherence data
- Average 90-day adherence was 85%
- 101 treatment interruptions among 38 (8.2%) participants, lasting a median of 11 d (IQR, 8-21 d)
## Associations with VL suppression

<table>
<thead>
<tr>
<th></th>
<th>AOR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average adherence only</td>
<td>0.83 (0.75-0.92)</td>
</tr>
<tr>
<td>Treatment interruption only</td>
<td>3.66 (1.92-6.98)</td>
</tr>
<tr>
<td>Both variables together</td>
<td></td>
</tr>
<tr>
<td>Average adherence</td>
<td>0.88 (0.78-0.99)</td>
</tr>
<tr>
<td>Treatment interruption</td>
<td>2.61 (1.30-5.22)</td>
</tr>
</tbody>
</table>

All estimates adjusted for age, sex, marital status, education, employment, household asset wealth, distance to clinic, AUDIT-C screen for hazardous drinking, CD4+ count, Hopkins depression score, and duration of treatment.
Limitations

• MEMS may misclassify dose-taking execution
  – Stopping MEMS may not signify stopping ART
  – MEMS use may not signify ART ingestion

• MEMS data were reconciled with clinic visit notes, unannounced pill counts, pharmacy visits, and participant self-report
  – However, misclassification could still occur
Discussion

• More research on the individual, interpersonal, and structural determinants of treatment interruptions are needed.

• In contrast to MEMS-based measurements, new wireless technologies may hold promise for detecting interruptions and offering possibilities for intervention *before* viral failure occurs.  

  

  9 Haberer, AIDS Behav 2010; AIDS Behav 2012
Conclusions

• This analysis provides support for examining patterns of adherence beyond average dose-taking
• Treatment interruptions have additional predictive power even in the setting of high average adherence
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