Binge drinking decreases weekend adherence in a RCT from low and middle income countries

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Adherence

• cART effectiveness relies on adherence

• Different patterns of adherence (not only averages)
  – Consecutive interruptions may have a greater impact on HIV-RNA than the same number of sporadically missed doses
  – Adherence was consistently lower during weekends compared to weekdays
    • Longitudinal study (US, n=116, FU=12m)
  – Method is a limitation
    • Self-reports may not be accurate to detect subtle differences
    • MEMS costs may restrict duration of its use/use in resource limited settings

Genberg et al. AIDS. 2012; Bachhuber et al. JAIDS. 2011
Alcohol

- Alcohol use is associated with non-adherence

- Associated with weekend cART gaps
  - exploratory cross-sectional study (n=43)

- Binge drinking
  - easy to screen, highly prevalent
  - associated with unprotected sex and alcohol dependence


5 or more drinks in a single occasion (men)/
4 or more (women)
Objectives

• To evaluate

  1. if there is a difference in weekday vs. weekend adherence
  2. the predictors of this difference
Method

• Secondary analysis of the ACTG 5234 clinical trial

• Directly observed therapy (mDOT) increase adherence in LMIC
  • Brazil, Botswana, Haiti, Peru, South Africa, Uganda, Zambia, and Zimbabwe

• 257 HIV-infected switching to a second regimen (emtricitabine /tenofovir 200/300 mg once daily and lopinavir /ritonavir 400/100 mg twice a day)

• No statistical/clinical differences on virological failure were found between treatment arms

Study Population

- 255 who have adherence measured through MEMS were included in the present analysis
Measures and Definitions

- Adherence
  - MEMS (MWV Healthcare) on the lopinavir/ritonavir bottle
  - MEMS data was summarized
    - % of prescribed doses taken on weekends
    - % of prescribed doses taken on weekdays
      - For each participant, in 4 successive 12-week period (quarters)

- Outcome = differences of % doses taken on weekdays and % doses taken on weekends

Weekend= Friday, Saturday and Sunday
Independent variables

• Measured at baseline
  – Binge drinking 30 days prior study entry
  – Demographics
    • Sex, age, site location
  – Treatment arm
  – Clinical characteristics
    • years on cART before entry, CD4 count (cells/mm³), viral load (log₁₀ copies/ml)
  – Substance use 30 days prior study entry
  – Self-perception of health
Statistical Analysis

• Differences between % of doses taken on weekdays and weekends in each quarter
  – Wilcoxon signed rank tests

• Predictors of the differences between % of doses taken on weekdays and weekends
  – Generalized Estimating Equations (GEE) to account for the repeated measures

• SAS 9.2 was used to analyze data
RESULTS

Median (Q1-Q3): % doses taken on weekdays and weekends within quarters

Wilcoxon signed rank test = P<0.001 in all quarters
### Binge drinking

Overall prevalence = 22.3%

<table>
<thead>
<tr>
<th>Variable</th>
<th>(N=57)</th>
<th>(N=198)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>Male</td>
<td>43 (75.4%)</td>
<td>84 (42.4%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Mean (s.d.)</td>
<td>37.54 (8.35)</td>
<td>38.95 (10.44)</td>
</tr>
<tr>
<td><strong>Site in Haiti</strong></td>
<td>Yes</td>
<td>18 (31.6%)</td>
<td>55 (27.8%)</td>
</tr>
<tr>
<td><strong>Treatment arm</strong></td>
<td>mDOT</td>
<td>31 (54.4%)</td>
<td>96 (48.5%)</td>
</tr>
<tr>
<td><strong>Years on ART before entry</strong></td>
<td>Median (Q1, Q3)</td>
<td>2.97 (1.89, 4.56)</td>
<td>3.17 (2.04, 5.08)</td>
</tr>
<tr>
<td><strong>CD4 Count (cells/mm³)</strong></td>
<td>Median (Q1, Q3)</td>
<td>213.50 (112.50, 320.00)</td>
<td>169.5 (89.5, 263.0)</td>
</tr>
<tr>
<td><strong>Viral load (log₁₀ copies/ml)</strong></td>
<td>Median (Q1, Q3)</td>
<td>4.23 (3.76, 4.84)</td>
<td>4.29 (3.79, 4.92)</td>
</tr>
<tr>
<td><strong>Any substance use last 30 days</strong></td>
<td>Yes</td>
<td>6 (10.5%)</td>
<td>1 (0.5%)</td>
</tr>
<tr>
<td><strong>Self-perception of health</strong></td>
<td>Excellent, very good, good</td>
<td>48 (84.2%)</td>
<td>145 (73.2%)</td>
</tr>
</tbody>
</table>

(a) Chi-Square Test (b) T-Test with Unequal Variance (c) Wilcoxon Test (d) Fisher's Exact Test
Univariate analysis

• Variables with statistically significant association with difference in the percent of doses taken during weekdays and weekends:
  – being male
  – binge drinking in the past 30 days
  – self-perception of health
  – later quarter on study
Adjusted Estimates for predictors of difference on %doses taken on weekdays and weekends using GEE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adjusted Estimates (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male vs. female</td>
<td>0.89 (-0.61-2.39)</td>
</tr>
<tr>
<td>Age</td>
<td>Per 10 year increase</td>
<td>-0.54 (-1.19-0.10)</td>
</tr>
<tr>
<td>Treatment arm</td>
<td>mDOT vs. standard of care</td>
<td>0.80 (-0.43-2.03)</td>
</tr>
<tr>
<td>Site</td>
<td>Haiti vs. other</td>
<td>-1.88 (-3.42-0.34)</td>
</tr>
<tr>
<td>Binge drinking</td>
<td>Yes vs. No</td>
<td></td>
</tr>
<tr>
<td>Self-perception of health</td>
<td>Fair/poor vs. Excellent/Very good/Good</td>
<td>-2.26 (-3.49-1.04)</td>
</tr>
<tr>
<td>Time</td>
<td>Per quarter increase</td>
<td>0.42 (0.11-0.74)</td>
</tr>
</tbody>
</table>

Difference on weekday and weekend decreases

Factors with p<0.1 in the univariate analysis were evaluated in the multivariable models and the most parsimonious model was selected. Sex, age, and treatment arm were included a priori.
Conclusions

- Adherence to cART
  - Worse on weekends compared to weekdays in LMIC sample
  - Difference increased over time
  - Important pattern to consider in the new interventions

- Binge drinking
  - Modifiable determinant of drop-offs in weekend adherence
  - Should be screened among HIV infected individuals
Acknowledgments

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