Individualized Texting for Adherence Building (iTAB) Improves cART adherence in HIV-infected Persons with Co-occurring Bipolar Disorder

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Among HIV+, ART adherence has improved with less complex regimens, but is still a problem.

40 - 60% of BD are non-adherent to psychotropics; nonadherent BD pts. are at higher risk of:

- Relapse/Recurrence of mood episode
- Hospitalization

Risks for increased non-adherence in HIV+/BD+ include:

- Increased # of medications, mood instability, substance abuse/dependence, cognitive difficulties, etc.

Public health importance of HIV+/BD+:
Poor adherence $\rightarrow$ Worse health outcomes

Parienti et al., CID, 2009; Scott and Pope, Am. J. Psych., 2002; Li et al., 2002; Scott and Pope, JCP, 2002
Texting Improves ART Adherence

- SMS (texting) interventions for improving ART adherence show promise.
- In a 2012 Cochrane report, two RCTs shown to be efficacious for ART improvement:
  - 1X week text over a 12-month interval decreased non-adherence and virologic failure (Lester et al., 2010)
  - 1X week versus 1X day text messages; at 48-weeks, weekly messages were more likely to reduce non-adherence and treatment interruptions (Pop-Eleches et al., 2011)
- Optimal texting systems for adherence improvement in difficult-to-treat populations in US still evolving.

Horvath et al., Cochran Report, 2012; Lester et al., 2010; Pop-Eleches et al. 2011
AIM:

- To compare individualized texting for adherence building (iTAB) vs. active control (CTRL) on antiretroviral (ARV) and psychotropic (PSY) medication adherence among HIV-infected persons with co-occurring bipolar disorder (HIV+/BD+)

HYPOTHESIS:

- Participants assigned to iTAB will show superior ARV and PSY adherence and better therapeutic coverage as compared to CTRL
Personalized iTAB intervention

• Both iTAB and CTRL received:
  • Adherence psychoeducation (~30 min)
  • A daily text message asking about mood
  • Process of medication reminder creation
  • Identify sentinel med for MEMS: **ARV:** Mostly fixed-dose combination medication; **PSY:** Primary mood stabilizer

  - iTAB – Pts create personalized med reminder texts:
    • Description of medications
    • Personalized reminder stems (e.g., “remember to take your meds, they make you healthy”)
    • Preferred name
    • Ideal time for reminders each day by med
iTAB Intervention Stems

Stems of personal reminder messages reflect different themes:

» Celebrate Health
  • Stay healthy! It’s time 2 take ur meds, pls take ur...

» Time and Focus
  • It’s pill time! Take ur...

» Control Disease
  • Taking ur meds helps control ur disease. Rmber 2 take ur...

» Empowering
  • It’s med time, only u can control this. Rmber 2 take ur...

» Importance of Adherence
  • Adherence is impt. Pls take ur...
Other iTAB components:
- 3 consecutive days of non-responses get a “noncompliance” text
- 5 consecutive days of non-responses, call from RA
- Adherence Targets: “Ur current adherence: xx%. Adhr when u take ur next dose: xx% (x/x doses)”
- Personalized Reinforcer
iTAB Inclusion Criteria

- 18 years or older at time of enrollment
- HIV-infected and on ART
- Current bipolar diagnosis as determined via diagnostic interview (i.e., CIDI) and taking a psychotropic medication to treat BD
- Willingness to receive daily text messages
- Willingness to track medication via MEMS for 30 days
Sample to Date

HIV+/BD+  
N=42

Visit 1

iTAB

30-day MEMS f/u (n=20)

CTRL

30-day MEMS f/u(n=22)

Visit 2
<table>
<thead>
<tr>
<th>Demographics</th>
<th>CTRL (n=22)</th>
<th>ITAB (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>46.3 (10.7)</td>
<td>49.3 (9.2)</td>
<td>0.38</td>
</tr>
<tr>
<td>Education</td>
<td>13.3 (3.1)</td>
<td>13.6 (2.1)</td>
<td>0.70</td>
</tr>
<tr>
<td>Ethnicity (% White)</td>
<td>45.5</td>
<td>70.0</td>
<td>0.11</td>
</tr>
<tr>
<td>Sex (% Male)</td>
<td>81.8</td>
<td>95.0</td>
<td>0.17</td>
</tr>
<tr>
<td>Global Deficit Score</td>
<td>0.74 (0.76)</td>
<td>0.51 (0.41)</td>
<td>0.49</td>
</tr>
<tr>
<td>Estimated Verbal IQ</td>
<td>100.3 (17.9)</td>
<td>98.3 (17.0)</td>
<td>0.62</td>
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</tbody>
</table>
# Psychiatric Characteristics

<table>
<thead>
<tr>
<th></th>
<th>CTRL (n=22)</th>
<th>ITAB (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime Substance Dependence, %</td>
<td>77.3</td>
<td>55.0</td>
<td>0.13</td>
</tr>
<tr>
<td>Current Substance Dependence, %</td>
<td>4.6</td>
<td>5.3</td>
<td>0.92</td>
</tr>
<tr>
<td>Euthymic during study period, %</td>
<td>68.2</td>
<td>70.0</td>
<td>0.90</td>
</tr>
<tr>
<td>Beck Depression Inventory–II</td>
<td>17.9 (10.8)</td>
<td>14.7 (10.3)</td>
<td>0.26</td>
</tr>
<tr>
<td>Young Mania Rating Scale</td>
<td>5.6 (4.6)</td>
<td>5.8 (6.3)</td>
<td>0.54</td>
</tr>
<tr>
<td>GAF</td>
<td>66.6 (10.9)</td>
<td>69.7 (8.9)</td>
<td>0.27</td>
</tr>
</tbody>
</table>
## Medical Characteristics

<table>
<thead>
<tr>
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<th>CTRL (n=22)</th>
<th>ITAB (n=20)</th>
<th>P-value</th>
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</thead>
<tbody>
<tr>
<td>Current CD4 Count</td>
<td>655.8 (324.2)</td>
<td>603.4 (392.8)</td>
<td>0.56</td>
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<tr>
<td>Nadir CD4 Count</td>
<td>225.7 (153.1)</td>
<td>281.2 (258.2)</td>
<td>0.73</td>
</tr>
<tr>
<td>HIV RNA Detectable, %</td>
<td>9.5</td>
<td>25.0</td>
<td>0.18</td>
</tr>
<tr>
<td>AIDS Status, %</td>
<td>63.2</td>
<td>60.0</td>
<td>0.85</td>
</tr>
<tr>
<td>HCV Status, %</td>
<td>31.8</td>
<td>25.0</td>
<td>0.63</td>
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## Medication Characteristics

<table>
<thead>
<tr>
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<th>CTRL (n=22)</th>
<th>ITAB (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration ARV regimen, months</td>
<td>49.2 (43.1)</td>
<td>30.5 (22.3)</td>
<td>0.40</td>
</tr>
<tr>
<td>Total No. of pills per day, all meds</td>
<td>14.7 (8.8)</td>
<td>18.3 (10.8)</td>
<td>0.13</td>
</tr>
<tr>
<td>Once daily ARV, %</td>
<td>90.9</td>
<td>85.0</td>
<td>0.55</td>
</tr>
<tr>
<td>Once daily PSY, %</td>
<td>86.4</td>
<td>85.0</td>
<td>0.90</td>
</tr>
</tbody>
</table>
Overall MEMS Adherence by Group

MEMS % of Prescribed Doses Taken

ARV
- CTRL: N=22
- iTAB: N=20
- p = 0.057
- Cohen's d = 0.49

PSY
- CTRL: N=22
- iTAB: N=20
- p = 0.194
- Cohen's d = 0.46
Time from Target Dose by Group

Absolute Time from Target Dose (min.)

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<thead>
<tr>
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<tr>
<td>ARV</td>
<td>N=20</td>
<td>N=16</td>
</tr>
<tr>
<td>PSY</td>
<td>N=20</td>
<td>N=16</td>
</tr>
</tbody>
</table>

ARV
- $p = 0.010$
- Cohen's $d = -0.84$

PSY
- $p = 0.005$
- Cohen's $d = -0.94$
Time of ARV and PSY dose was significantly more clustered around target time for iTAB group.
All: Mood Responsiveness & Adherence

Spearman’s $\rho = 0.327$
$p = 0.04$

Spearman’s $\rho = 0.352$
$p = 0.02$
iTAB: Mood Responsiveness & Adherence

- % ARV Adherence
  - Spearman’s $\rho = 0.629$
  - $p < 0.01$

- % PSY Adherence
  - Spearman’s $\rho = 0.605$
  - $p < 0.01$
CTRL: Mood Responsiveness & Adherence

% ARV Adherence
Spearman’s ρ = -0.122
p = 0.59

% PSY Adherence
Spearman’s ρ = 0.084
p = 0.71
Conclusions & Future Directions

- **iTAB** as compared to **CTRL** in difficult-to-treat HIV+/BD+:
  1. Trend toward improved ARV adherence; medium effect size
  2. Significantly better dose timing → improves therapeutic coverage
  3. Daily mood text message not associated with improved adherence in the CTRL group, arguing for the value of personalized reminders

- **Future studies with iTAB will:**
  1. Evaluate the utility in HIV+ active METH users
  2. Assess the intervention over longer periods of time & assess frequency of reminders
  3. Determine the utility of iTAB for PrEP
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