The Role of Non-Injection Substance Use in Depression, ART Adherence, and Viral Load among Men Living with HIV (HPTN 063)

Kiyomi Tsuyuki, PhD MPH
Division of Global Public Health, School of Medicine, University of California, San Diego (UCSD)

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Substance Use and HIV Management

• Substance use ↑ HIV transmission risk among PLH
  – Sexual risk; mental health; access and adherence; HIV replication

• Gaps: 1. Substance use profiles of PLH internationally
  2. TasP in PLH substance users

Study Aims

1. Characterize substance use, ART adherence, depression & viral load among HIV+ men in Thailand and Brazil

2. To elucidate the association between substance use, ART adherence / depression, & undetectable viral load (VL)
Methods

• **HPTN 063 Data**
  – HIV+ men Thailand (HM=93, MSM=66) & Brazil (HM=52, MSM=78)

• **Measures**
  – **Substance use:**
    • **Stimulants & Cannabis:** # days used in past 3 months
    • **Alcohol Use:** AUDIT score ≥# is Harmful/Hazardous drinking
    • **Poly-substance Use:** # of substances used past 3 months
  – **ART Adherence:** Ability (≥good-Thailand) & Yes/No (Brazil)
  – **Depression:** CES-D scale score ≥ 16
  – **Viral Load:** Undetectable using country-specific criteria

• **Statistical Analysis**
  – Generalized Mixed Effects Models (Logistic)
  – ART Adherence/Depression mediate effect of substance use on VL
  – Stratified by country & Sub-group (MSM vs. Heterosexual)
### AIM 1: Substance Use

#### THAILAND

<table>
<thead>
<tr>
<th>%TOTAL (N=107)</th>
<th>HM (N=63)</th>
<th>MSM (N=44)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (n=107)</td>
<td>2 (n=22)</td>
<td>1 (n=63)</td>
</tr>
<tr>
<td>2 (n=63)</td>
<td>1 (n=16)</td>
<td>2 (n=44)</td>
</tr>
<tr>
<td>1 (n=44)</td>
<td>2 (n=6)</td>
<td></td>
</tr>
</tbody>
</table>

#### BRAZIL

<table>
<thead>
<tr>
<th>% TOTAL (N=75)</th>
<th>HM (N=26)</th>
<th>MSM (N=49)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (n=75)</td>
<td>2 (n=60)</td>
<td>3 (n=49)</td>
</tr>
<tr>
<td>2 (n=60)</td>
<td>3 (n=15)</td>
<td>4 (n=49)</td>
</tr>
<tr>
<td>3 (n=15)</td>
<td>4 (n=8)</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**
- Alcohol
- Cannabis
- Meth
- Alcohol
- Cannabis
- Powder Cocaine
- Ecstasy
AIM 1: ART Adherence, Depression, Viral Load

**Thailand**

- **Adherence Ability**:
  - TOTAL: 67%
  - Heterosexual: 74%
  - MSM: 50%

- **Depressed**:
  - TOTAL: 23%
  - Heterosexual: 20%
  - MSM: 26%

- **Undetectable VL**:
  - TOTAL: 77%
  - Heterosexual: 76%
  - MSM: 79%

**Brazil**

- **ART (Yes)**:
  - TOTAL: 86%
  - Heterosexual: 71%
  - MSM: 61%

- **Depressed**:
  - TOTAL: 48%
  - Heterosexual: 47%
  - MSM: 49%

- **Undetectable VL**:
  - TOTAL: 53%
  - Heterosexual: 67%
  - MSM: 43%
**AIM 2A: GENERALIZED MIXED EFFECTS MODELS OF SUBSTANCE USE ON ADHERENCE & VIRAL LOAD**

<table>
<thead>
<tr>
<th>Substance Use</th>
<th>THAILAND</th>
<th></th>
<th>BRAZIL</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ART Adherence Ability (≥ Good)</td>
<td>Undetectable Viral Load*</td>
<td>Took ART In Past 3 Months</td>
<td>Undetectable Viral Load*‡</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HM (n=93)</td>
<td>MSM (n=66)</td>
<td>HM (n=93)</td>
<td>MSM (n=66)</td>
<td>HM (n=52)</td>
</tr>
<tr>
<td>Stimulants</td>
<td>0.95 (0.89 - 1.03)</td>
<td>0.86 (0.50 - 1.50)</td>
<td>0.92 (0.83 - 1.02)</td>
<td>0.97 (0.35 - 2.69)</td>
<td>0.97 (0.92 - 1.02)</td>
</tr>
<tr>
<td>Marijuana</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.01 (0.96 - 1.07)</td>
</tr>
<tr>
<td>Alcohol Abuse</td>
<td>0.83 (0.39 - 1.78)</td>
<td>0.47 (0.19 - 1.17)</td>
<td>0.90 (0.33 - 2.47)</td>
<td>0.97 (0.29 - 3.18)</td>
<td>0.24 (0.05 - 1.25)</td>
</tr>
<tr>
<td># Substances (yes/no)</td>
<td>0.84 (0.43 - 1.61)</td>
<td>0.76 (0.38 - 1.53)</td>
<td>0.50 (0.20 - 1.25)</td>
<td>1.31 (0.47 - 3.66)</td>
<td><strong>0.27 (0.09 - 0.80)</strong></td>
</tr>
</tbody>
</table>

* Adjusted for adherence; ‡ Only among ART users; No significant sub-group diffs.
AIM 2B: GENERALIZED MIXED EFFECTS MODELS OF SUBSTANCE USE ON DEPRESSION & VIRAL LOAD

<table>
<thead>
<tr>
<th>Substance Use</th>
<th>THAILAND</th>
<th>BRAZIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depression (C-ESD ≥ 12)</td>
<td>Depression (C-ESD ≥ 12)</td>
</tr>
<tr>
<td></td>
<td>HM (n=93)</td>
<td>MSM (n=66)</td>
</tr>
<tr>
<td>Stimulants</td>
<td>1.05 (0.96 - 1.15)</td>
<td>1.30 (0.76 - 2.24)</td>
</tr>
<tr>
<td>Marijuana</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alcohol Abuse</td>
<td>1.09 (0.52 - 2.27)</td>
<td><strong>3.33</strong> (1.44 - 7.69)‡</td>
</tr>
<tr>
<td># Substances</td>
<td>1.65 (0.84 - 3.26)</td>
<td>1.48 (0.76 - 2.90)</td>
</tr>
</tbody>
</table>

* Adjusted for depression; ‡Significant differences between HM & MSM
Study Implications

• Context matters – variability by site

• TasP may be feasible among substance users in international settings

• HIV risk reduction interventions need to focus on PLH with drug & alcohol use disorders

• Tailor HIV interventions in international settings for:
  – MSM with alcohol use disorders
  – Heterosexual men who are polysubstance
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