Parameters associated with Adherence to Anti-Retroviral Therapy in HIV-infected adults: the PAART study

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  - consultancy fees
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- AC
  - research funding
  - consultancy fees
  - lecture / travel sponsorships
  - advisory boards

Background

- UNAIDS global targets of 90-90-90
- HIV treatment cascade – requires additional information on long term outcomes, lost to follow-up

Treatment cascade - Australia

- Futures¹
  - anonymous online survey of 1,058 HIV+ adults
  - 37.6% report difficulty taking ART
  - 27.9% of those on ART had taken a break from ART
  - 49.9% said they were taking ART as prescribed 100% of the time
  - no clinical / virological endpoints
- AHOD adherence²
  - post-2006 ART interruption associated with higher pill burden, specific regimens, ART requiring fasting / food
- SVH IBAC Patient Survey³
  - 335 HIV+ adults
  - ART copayment associated with delaying / stopping medications

Methods

- 500+ patients at multiple Australian GP, sexual health and hospital sites
- Eligibility
  - HIV+ adult ≥18 years of age
  - on stable ART for previous 3 months (minimum)
  - plasma HIV-RNA <50 cp/mL

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<thead>
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<th>12</th>
<th>18</th>
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<td>Questionnaire</td>
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<td>Cogstate</td>
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Questionnaire

- 90-item questionnaire
  - Socio-demographics
  - Physical health
  - Mental health and emotional wellbeing
  - Life stressors and social supports
  - HIV disclosure, stigma and discrimination
  - HIV healthcare access
  - Health and treatment perception
  - Financial / employment status
  - HIV treatment, adherence and side effects

Cognitive Function
- CogState brief battery
  - electronic card games to assess neurocognitive domains affected by HIV-Associated Neurocognitive Disorders (HAND): identification, detection, back memory, visual learning
  - 4 domain z-scores used to generate a Global Deficit Score (GDS; impairment defined by GDS ≥ 0.5)
  - sensitive in detecting cognitive impairment
  - adequate specificity for diagnosis of HAND

Outcome & Pharmacy Data
Case Report Form
- Demographics
- Current ART
- Current concomitant medications
- Pathology
  - HIV RNA
  - CD4 count
  - haemoglobin
eGFR
- ALT
Pharmacy
- ART dispensing in preceding 12 months
- ARV medication(s)
- dates of dispensing
- amounts dispensed
- clinical trial medication / not
- cost to patient (out-of-pocket)

Outcome & Pharmacy Data
Demographics and ART
- Site (n, %)
  - Sexual health clinic 144 (41%)
  - Hospital outpatient clinic 114 (33%)
  - High caseload GP 92 (26%)
- Patients
  - Male (n, %) 332 (95%)
  - Age (mean) 50 years
  - Self-identified homosexual (n, %) 275 (79%)
  - HIV duration (mean) 14 years
  - Cognitive impairment (n, %) 96 (27%)
- Income (median) $600 /wk
- Drug use (n, %)
  - Major depressive disorder (PHQ-9) 48 (14%)
  - Alcohol dependence (CAGE) 137 (39%)
  - Recreational drug use ≥ monthly 137 (39%)
- ART
  - Duration (mean) 12 years
  - Once-daily dosing (n, %) 211 (63%)
  - One pill a day (n, %) 105 (31%)
  - Paid pharmacy co-payment (n, %) 210 (60%)

Analysis
- Outcome variable = self-reported adherence
  - previous week - any missed dose
  - previous 3 months - ≥3 doses
- Each variable assessed for association with each adherence outcome
- Variables significantly associated in univariate analysis (p≤0.05) were then included in a forward, stepwise logistic regression model

Self-Reported ART Adherence
<table>
<thead>
<tr>
<th>Dose missed last week</th>
<th>Doses missed previous 3 months</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥3</td>
<td>&lt; 3</td>
</tr>
<tr>
<td>≥1</td>
<td>29 (8.3%)</td>
<td>14 (4%)</td>
</tr>
<tr>
<td>None</td>
<td>13 (3.7%)</td>
<td>294 (84%)</td>
</tr>
<tr>
<td>Total</td>
<td>42 (12%)</td>
<td>308 (88%)</td>
</tr>
</tbody>
</table>

sensitivity 70%; specificity 95%

Risk factors for non-adherence
- previous week

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>AOR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not born in Australia</td>
<td>4.9</td>
<td>1.5-15.7</td>
<td>0.007</td>
</tr>
<tr>
<td>Living alone</td>
<td>3.8</td>
<td>1.5-9.6</td>
<td>0.004</td>
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<tr>
<td>Major depression (PHQ-9)</td>
<td>2.7</td>
<td>1.1-7.1</td>
<td>0.038</td>
</tr>
<tr>
<td>ART interruption in previous 12 months</td>
<td>13.3</td>
<td>3.0-68.8</td>
<td>0.001</td>
</tr>
<tr>
<td>No previous AIDS diagnosis</td>
<td>3.6</td>
<td>1.5-8.6</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Relationship status (single/partnered), length living AUS, living in subsidized housing, private health insurance, income can affect social welfare, weekly income, ≥1,000, financial barriers to obtaining services/amenities, cost of HIV healthcare, seeing other medical specialists at previous 12 months, employed, self-rated health at 1/10, any bed day in previous year for those ≥ 20, major stressor events in previous 12 months, problematic alcohol/illegal substances use, injecting speed, injecting ice, non-disclosure of HIV status to casual sexual partners, prior non-adherence to ART, prior non-adherence to concomitant therapy, missing ≥3 appointments in past 12 months, difficulty accessing ART, ART readiness, ART side effects, ≥1 ART pill per day.
<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>AOR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not born in Australia</td>
<td>6.0</td>
<td>1.6-22.0</td>
<td>0.007</td>
</tr>
<tr>
<td>Medicare Safety Net reached</td>
<td>0.29</td>
<td>0.11-0.78</td>
<td>0.014</td>
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<tr>
<td>Currently in a sexual relation</td>
<td>7.9</td>
<td>2.3-26.9</td>
<td>0.001</td>
</tr>
<tr>
<td>ART interruption ever</td>
<td>3.9</td>
<td>1.4-10.7</td>
<td>0.007</td>
</tr>
<tr>
<td>Marijuana ≥ monthly</td>
<td>0.17</td>
<td>0.06-0.48</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Relationship status, sexual relationship, length of time in Australia, private health insurance, living alone, income source, income amount, employment, health status, bed days, depression, major stress events, social support, NGO / support group, smoking, marijuana, benzos, speed (injected), ICE (injected), disclosure to casual sexual partners, ART readiness, ART side effects, ART access, previous ART non-adherence, previous concomitant therapy interruption. Doctor aware of ART interruption, missing ≥3 appointments in past 12 months previous AIDS. *1 ART pill per day

Other variables

- No univariate association
  - Cognitive function
  - Copayment
- Univariate analysis (last week and last 3 months)
  - ≥1 ART pill / day: OR ≥ 2.3 p= 0.014
  - side effects: OR ≥ 1.9 p= 0.038
  - not well informed about ART: OR ≥ 2.4 p= 0.001
  - Income: various social welfare: OR ≥ 2.6 p= 0.001
  - ≥1 bed day for illness (12 months): OR ≥ 3.0 p= 0.001
  - major depressive disorder: OR ≥ 3.0 p= <0.001
  - ≥ 3 major stress events (12-months): OR ≥ 3.0 p= <0.001
  - problematic cigarette use: OR ≥ 2.3 p= 0.003
  - problematic benzoy use: OR ≥ 2.3 p= 0.025
  - non-disclosure to casual sex partners: OR ≥ 2.4 p= 0.003
  - interrupted ART (12 months): OR ≥ 4.2 p= <0.001
  - interrupted ART (12 months): OR ≥ 2.6 p= 0.002
  - interrupted conc meds (12 months): OR ≥ 3.0 p= <0.001
  - interrupted conc meds (ever): OR ≥ 2.4 p= 0.010
  - No prior AIDS diagnosis: OR ≥ 3.3 p= 0.014

Summary & Conclusions

- Suboptimal adherence
  - 12% in past week, and past 3 months
  - mainly associated with background characteristics
- Longitudinal data
  - rate of ART failure
  - components of ART failure
  - risk factors for ART failure

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