Examination of the PROMIS-29 v1.0 health scales in patients with human immunodeficiency virus (HIV)

Benjamin D. Schalet¹, John Devin Peipert¹, Terry Nakazono², William Cunningham²

Institution Affiliations: ¹Department of Medical Social Sciences, Feinberg School of Medicine; ²Department of Health Policy and Management, UCLA Fielding School of Public Health

June 6, 2019
Background

• Advancements in anti-retroviral therapy have significantly reduced the morbidity and mortality for HIV+ persons (Chopra & Lim, 2019, *Microbiol Infect Dis*)

• Achievement has turned some focus away from mortality and toward outcomes like health-related quality of life (HRQOL)
Background

• Living longer, HIV+ persons are increasingly likely to develop comorbid conditions

• These compromise HRQOL, especially physical aspects

• Stigma associated with HIV has a consistently significant negative impact on mental HRQOL (Rueda et al., 2015, BMJ Open)
Background

• Relatively few studies have reported on the Patient Reported Outcomes Measurement Information System (PROMIS) measures in people living with HIV (Exception: Schnall et al., 2017, AIDS PATIENT CARE and STDs)

• Test-retest reliability and validity with HIV symptom index (Schnall et al.)

• We examined data from an HIV+ sample who completed the PROMIS-29 v1.0 (Cella et al., in press, Value in Health)

• Aim: exploratory descriptive statistics, comorbid conditions, and analysis of factor structure
Method

- Baseline assessment of a randomized controlled trial aiming to increase care retention among HIV+ patients
- Effectiveness of Peer Navigation and Contingency Management on Retention in HIV Care (Cunningham et al., 2018, *JAMA Internal Medicine*)
- Participants recruited from publically-funded clinics providing HIV Care in Los Angeles County
Method

- 450 patients prior to the peer navigation intervention (recruitment ongoing)
- Medical comorbidities (“Has a doctor told you...?”)
- PROMIS-29 v1.0 profile measure (Cella et al., in press, *Value in Health*)
Method

- We then estimated PROMIS-29 scores for HIV+ participants with comorbid conditions
- Differences of more than 1/3 of a standard deviation (3 T-score points) were interpreted as meaningful
- Exploratory factor analysis in R (psych package; Revelle, 2019)
  - Assume a mental and physical factor based on T-scores
  - Allowed the factors to correlate
## Results: Descriptive Statistics

<table>
<thead>
<tr>
<th>Participant characteristics</th>
<th>%</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>78</td>
<td>349</td>
</tr>
<tr>
<td>Female</td>
<td>18</td>
<td>81</td>
</tr>
<tr>
<td>Transgender</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Black</td>
<td>44</td>
<td>198</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>43</td>
<td>191</td>
</tr>
<tr>
<td>White</td>
<td>9</td>
<td>41</td>
</tr>
<tr>
<td>Age (m, IQR)</td>
<td>48 (38-56)</td>
<td></td>
</tr>
<tr>
<td>Homeless (last 12 months)</td>
<td>26</td>
<td>118</td>
</tr>
<tr>
<td>Ever been arrested</td>
<td>57</td>
<td>257</td>
</tr>
<tr>
<td>Mean monthly income ($)</td>
<td>1435</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comorbid Condition</th>
<th>%</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>38</td>
<td>170</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>14</td>
<td>65</td>
</tr>
<tr>
<td>Diabetes</td>
<td>14</td>
<td>64</td>
</tr>
<tr>
<td>Asthma</td>
<td>17</td>
<td>74</td>
</tr>
<tr>
<td>Neuropathy of the hands</td>
<td>33</td>
<td>147</td>
</tr>
<tr>
<td>Arthritis of the hip (or hand)</td>
<td>22</td>
<td>100</td>
</tr>
<tr>
<td>Depression</td>
<td>59</td>
<td>264</td>
</tr>
<tr>
<td>Anxiety Disorder</td>
<td>39</td>
<td>173</td>
</tr>
</tbody>
</table>
PROMIS 29 v1.0 Mean T-Scores

HIV+ Overall (N = 450)

- Anxiety: 54.4
- Depression: 52.6
- Fatigue: 51.8
- Sleep: 52.0
- Pain Int: 54.7
- Social Sat: 46.9
- Physical Funct: 45.3
PROMIS 29 v1.0 Mean T-Scores


- Anxiety: 55.3
- Depression: 55.3
- Fatigue: 54.4
- Sleep: 53.7
- Pain Int: 52.9
- Social Sat: 50.1
- Physical Funct: 48.9

HealthMeasures
TRANSFORMING HOW HEALTH IS MEASURED
PROMIS 29 v1.0 Mean T-Scores

HIV+ Overall (N = 450)

- Anxiety: 54.4
- Depression: 52.6
- Fatigue: 51.8
- Sleep: 52.0
- Pain Int: 54.7
- Social Sat: 46.9
- Physical Funct: 45.3

HealthMeasures
TRANSFORMING HOW HEALTH IS MEASURED
PROMIS 29 v1.0 Mean T-Scores

HIV+ Women (n = 81)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean T-Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>53.6</td>
</tr>
<tr>
<td>Depression</td>
<td>50.9</td>
</tr>
<tr>
<td>Fatigue</td>
<td>54.7</td>
</tr>
<tr>
<td>Sleep</td>
<td>52.8</td>
</tr>
<tr>
<td>Pain Int</td>
<td>58.7</td>
</tr>
<tr>
<td>Social Sat</td>
<td>44.5</td>
</tr>
<tr>
<td>Physical Funct</td>
<td>40.7</td>
</tr>
</tbody>
</table>
PROMIS 29 v1.0 Mean T-Scores

HIV+ Overall (N = 450)

- Anxiety: 54.4
- Depression: 52.6
- Fatigue: 51.8
- Sleep: 52.0
- Pain Int: 54.7
- Social Sat: 46.9
- Physical Funct: 45.3
PROMIS 29 v1.0 Mean T-Scores

HIV+ Hypertension (N = 170)

- Anxiety: 54.1
- Depression: 52.6
- Fatigue: 52.6
- Sleep: 52.1
- Pain Int: 57.3
- Social Sat: 45.5
- Physical Funct: 42.8
PROMIS 29 v1.0 Mean T-Scores

HIV+ Overall (N = 450)

- Anxiety: 54.4
- Depression: 52.6
- Fatigue: 51.8
- Sleep: 52.0
- Pain Int: 54.7
- Social Sat: 46.9
- Physical Funct: 45.3
PROMIS 29 v1.0 Mean T-Scores

HIV+ Asthma (N = 74)

- Anxiety: 59.4
- Depression: 55.8
- Fatigue: 55.1
- Sleep: 53.7
- Pain Int: 56.9
- Social Sat: 46.7
- Physical Funct: 44.6
PROMIS 29 v1.0 Mean T-Scores

HIV+ Overall (N = 450)

- Anxiety: 54.4
- Depression: 52.6
- Fatigue: 51.8
- Sleep: 52.0
- Pain Int: 54.7
- Social Sat: 46.9
- Physical Funct: 45.3
PROMIS 29 v1.0 Mean T-Scores

HIV+ Neuropathy of the hands (N = 147)

- Anxiety: 54.3
- Depression: 52
- Fatigue: 53.7
- Sleep: 53.4
- Pain Int: 59.5
- Social Sat: 45.2
- Physical Funct: 41.5
PROMIS 29 v1.0 Mean T-Scores

HIV+ Overall (N = 450)

<table>
<thead>
<tr>
<th>Condition</th>
<th>T-Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>54.4</td>
</tr>
<tr>
<td>Depression</td>
<td>52.6</td>
</tr>
<tr>
<td>Fatigue</td>
<td>51.8</td>
</tr>
<tr>
<td>Sleep</td>
<td>52.0</td>
</tr>
<tr>
<td>Pain Int</td>
<td>54.7</td>
</tr>
<tr>
<td>Social Sat</td>
<td>46.9</td>
</tr>
<tr>
<td>Physical Funct</td>
<td>45.3</td>
</tr>
</tbody>
</table>
PROMIS 29 v1.0 Mean T-Scores

HIV+ Diabetes (N = 64)

- Anxiety: 52.4
- Depression: 52.4
- Fatigue: 53.4
- Sleep: 52.7
- Pain Int: 57.6
- Social Sat: 44.8
- Physical Funct: 41.6
PROMIS 29 v1.0 Mean T-Scores

HIV+ Overall (N = 450)

- Anxiety: 54.4
- Depression: 52.6
- Fatigue: 51.8
- Sleep: 52.0
- Pain Int: 54.7
- Social Sat: 46.9
- Physical Funct: 45.3
PROMIS 29 v1.0 Mean T-Scores

HIV+ Anxiety Disorder (N = 173)

<table>
<thead>
<tr>
<th>Condition</th>
<th>T-Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>59.4</td>
</tr>
<tr>
<td>Depression</td>
<td>56.9</td>
</tr>
<tr>
<td>Fatigue</td>
<td>55.6</td>
</tr>
<tr>
<td>Sleep</td>
<td>54.8</td>
</tr>
<tr>
<td>Pain Int</td>
<td>57.2</td>
</tr>
<tr>
<td>Social Sat</td>
<td>45.3</td>
</tr>
<tr>
<td>Physical Funct</td>
<td>43.3</td>
</tr>
</tbody>
</table>
Results: Factor Analysis

• Exploratory factor analysis selected two factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>0.90</td>
<td>0.06</td>
</tr>
<tr>
<td>Depression</td>
<td>0.86</td>
<td>0.02</td>
</tr>
<tr>
<td>Fatigue</td>
<td>0.61</td>
<td>-0.31</td>
</tr>
<tr>
<td>Sleep</td>
<td>0.37</td>
<td>-0.27</td>
</tr>
<tr>
<td>Physical Funct</td>
<td>0.10</td>
<td>0.86</td>
</tr>
<tr>
<td>Pain Int</td>
<td>0.08</td>
<td>-0.77</td>
</tr>
<tr>
<td>Social Sat</td>
<td>-0.13</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Correlation among the factors: -0.4
Results: Factor Analysis

Hays et al. (2018), *QOLR* report latent trait correlation of .69
Conclusions

• PROMIS-29 scales showed worse health for persons living with HIV, particularly for anxiety and physical function

• Physical and social function, however, were worse than previously reported in an HIV+ online sample (Schnall et al, 2017)

• Comorbid conditions showed variation in T-scores that were reasonable theoretically

• Notable were elevations in Pain Interference for neuropathy and diabetes

• Exploratory: we did not specify and test hypotheses

• Future analyses to examine # of comorbid conditions and comparison with general population
Conclusion

• Factor analyses showed physical and mental HRQOL was moderately correlated in this sample (magnitude of .4)

• Differs from results in general population samples, where this latent trait correlation was 0.69

• Suggests a different relationship between physical and mental health among persons with HIV

• Physical health symptoms are somewhat independent of mental health

• Additional analyses on the full sample need to be conducted