Psychometric Characteristics and Validity of the PROMIS Cancer Function Brief 3D Profile

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The PROMIS Cancer Function Brief 3D Profile
Psychometric Characteristics and Validity
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Cancer Rehabilitation Physician
Senior Clinic Manager
Clinic Supervisor
To develop a patient reported outcome (PRO) measure specifically designed and calibrated to assess cancer patient function.
Background

• Cancer rehabilitation medicine lacks a targeted psychometrically validated PRO functional measure for cancer patients.

• Existing measures of function do not provide:
  o An adequate “snapshot” of global function
  o Serve to focus rehab interventions
  o Provide longitudinal disability outcomes
Methods

- Identified functional domains pertinent to global patient function
  - Physical function
  - Fatigue
  - Social participation
- Selected candidate items
- Created a 21-item questionnaire
Methods

- Administered the 21-item pilot QNR to 616 cancer rehab patients

Data analysis:

- Descriptive statistics
- Regression models
- Item response theory (IRT)
### Item Response Theory vs. Classical Test Theory

<table>
<thead>
<tr>
<th>Item response theory (IRT)</th>
<th>Classical test theory (CTT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- <em>Item-level</em> focus</td>
<td>- <em>Test-level</em> focus</td>
</tr>
<tr>
<td>- Measurement outcome is based on the <em>unique contribution of each item</em></td>
<td>- Measurement outcome is based on the <em>combination of all items</em></td>
</tr>
<tr>
<td>- Scores built on the <em>properties</em> of individual items</td>
<td>- Scores built on the <em>number of items</em> answered correctly</td>
</tr>
<tr>
<td>- Yields individual trait level scores <em>independent of a normative sample</em></td>
<td>- Yields a total score based in <em>comparison to a normative sample</em></td>
</tr>
</tbody>
</table>
Item Response Theory vs. Classical Test Theory

- **Item response theory (IRT)**
  - Like loose LEGO blocks (items) that can be put together in many ways (unique measures) to conform to the clinical need

- **Classical test theory (CTT)**
  - Like a LEGO structure (measure) with blocks (items) already fixed in place – little flexibility to meet a specific clinical need
Results

• 12 of 21 candidate items selected (IRT analysis)
  o High information density
  o Unimodal distributions
  o Nonredundant

• Validity (regression modeling)
  o Strong associations with anchoring items (KPS & ECOG) across trait ranges, multiple domains and multiple subdomains
The PROMIS Cancer Function Brief 3D Profile

3 Domains, 12 Items

• Selected functional domains
  o Physical function (6 items)
  o Fatigue (3 items)
  o Social participation (3 items)
Implementation

• MyChart question sample:

PROMIS Fatigue
For an upcoming appointment with David Zucker on 7/7/2021
In the past 7 days
How often did you have to push yourself to get things done because of your fatigue?

Never
Rarely
Sometimes
Often
Always

Continue  Cancel
### Epic Synoptic View

#### Pro Promis Cancer Function Brief 3d Profile

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>Previous</th>
<th>Latest</th>
<th>10/29/2021-3/31/2022</th>
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</thead>
<tbody>
<tr>
<td><strong>Physical Function</strong></td>
<td>17.9-58.9</td>
<td>49</td>
<td>49</td>
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<tr>
<td><strong>Fatigue Domain Score</strong></td>
<td>38.5-77.2</td>
<td>62</td>
<td>59</td>
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<tr>
<td><strong>Social Participation</strong></td>
<td>28.1-63.4</td>
<td>44</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

• This psychometric investigation:
  o Demonstrates that the Brief 3D Profile has high information density.
  o Adds no significant burden to patients or clinics (<5 min to complete).
  o Validates the use of the 12-item PROMIS Cancer Function 3D Profile in outpatient cancer rehabilitation clinics.

• The PROMIS Cancer Function 3D Profile:
  o Meets unique assessment and clinical decision-making needs of clinicians caring for cancer patients.
  o Is, to our knowledge, the first specialized Short Form of its kind.
Continued Work

• A further validation study\(^3\) entitled “Responsiveness and Interpretation of the PROMIS Cancer Function Brief 3D Profile” has accepted for publication by the journal *Cancer* pending revisions.

• Another psychometric investigation to establish cut points is pending.

• The QNR is being piloted in the Cancer Rehabilitation Medicine Clinic at the Swedish Cancer Institute, Seattle.
Publications


Thank you