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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

Collaborators

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Purpose

- 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:**
 - An adequate “snapshot” of global function
 - Serve to focus rehab interventions
 - Provide longitudinal disability outcomes

Methods¹

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

Methods²

- **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

- **Item response theory (IRT)**

- *Item-level* focus
- Measurement outcome is based on the *unique contribution of each* item
- Scores built on the *properties* of individual items
- Yields individual trait level scores *independent of a normative sample*

- **Classical test theory (CTT)**

- *Test-level* focus
- Measurement outcome is based on the *combination* of all items
- Scores built on the *number of items* answered correctly
- Yields a total score based in *comparison to a normative sample*

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)**
 - High information density
 - Unimodal distributions
 - Nonredundant
- **Validity (regression modeling)**
 - Strong associations with anchoring items (KPS & ECOG) across trait ranges, multiple domains and multiple subdomains

The PROMIS Cancer Function Brief 3D Profile²

3 Domains, 12 Items

- **Selected functional domains**

- Physical function (6 items)
- Fatigue (3 items)
- 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

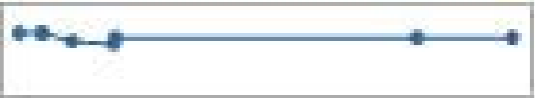


Often

Always

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Epic Synoptic View

Pro Promis Cancer Function Brief 3d Profile

	Range	Last 2 scores		10/29/2021-3/31/2022
		Previous	Latest	
PHYSICAL FUNCTION DOMAIN SCORE	17.9-58.9	49	49	
FATIGUE DOMAIN SCORE	38.5-77.2	62	59	
SOCIAL PARTICIPATION DOMAIN SCORE	28.1-63.4	44	44	

Discussion

- **This psychometric investigation:**
 - Demonstrates that the Brief 3D Profile has high information density.
 - Adds no significant burden to patients or clinics (<5 min to complete).
 - Validates the use of the 12-item PROMIS Cancer Function 3D Profile in outpatient cancer rehabilitation clinics.
- **The PROMIS Cancer Function 3D Profile:**
 - Meets unique assessment and clinical decision-making needs of clinicians caring for cancer patients.
 - Is, to our knowledge, the first specialized Short Form of its kind.

Continued Work

- A further validation study³ 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

1. Smith SR, Vargo M, Zucker DS, Shahpar S, Henderson M, Shahpar S, Wisotzky E, Custodio C, Basford J, Jay G, Gerber L, Cheville A. “The Cancer Rehabilitation Medicine Metrics Consortium: A Path to Enhanced, Multi-Site Outcome Assessment to Enhance Care and Demonstrate Value.” *Front Oncol.* 2021;10:625700
doi:10.3389/fonc.2020.625700
2. Smith SR, Vargo M, Zucker D, Shahpar S, Gerber L, Henderson M, Jay G, Lee M, Cheville A. “Psychometric Characteristics and Validity of the PROMIS Cancer Function Brief 3D Profile.” *Archives of Physical Medicine and Rehabilitation.* Published online February 2021:S0003999321001337. doi:10.1016/j.apmr.2020.12.027.
3. Smith SR, Vargo M, Shahpar S, Zucker DS, Henderson M, Gerber L, Jay G, Cheville A. “Responsiveness and Interpretation of the PROMIS Cancer Function Brief 3D Profile.” *Cancer.* Accepted pending revisions.

Thank you