Developing a Cognition Measure Using Items from Three Federally Mandated Assessments in Post-Acute Care for Stroke Survivors

Jennifer Weaver, PhD(ABD), MA, OTR/L1; Alison Cogan, PhD, OTR/L2; Trudy Mallinson, PhD, OTR/L; Leslie Davidson, PhD, OTR/L1
1The George Washington University, Washington, DC; 2Washington DC VA Medical Center, Washington, DC

Research Objective

To create a measure detecting change in cognitive deficits for post-acute care (PAC) stroke survivors

Background

• Stroke is a main cause of disability
• Cognitive impairment occurs in up to 50% of adults post-stroke
• Stroke survivors receive therapy services in post-acute care (PAC) settings:
  - Inpatient Rehabilitation Facility, Skilled Nursing Facility, and/or Home Health Agencies
• Each PAC setting uses different items to measure cognition

Study Design

Prospective, multi-center observational cohort study of 147 stroke survivors receiving rehabilitation from PAC providers from 2005-2010.

Outcome Measure: All participants were scored on three federally mandated assessments:
  - Functional Independence Measure (FIM),
  - Minimum Data Set 2.0 (MDS), and
  - Outcome and Assessment Information Set (OASIS)

Analytic Procedures

Data Cleaning: Rescored some items to reflect the same directionality

Example of Rescoring Using Items Reflected in Cognitive Measure

*MDS Long & Short Term Memory

Original Rating Scale
0=Memory Okay  1=Memory Problem

Rescoring of Rating Scale
0=Memory Problem 1=Memory Okay

Data Analysis: Partial Credit Rasch Model conducted using Winsteps.

- PCM allows for each item to have its own rating scale structure.
- Rasch model estimates the abilities of the persons and the difficulty of the items.

Results

- Participants average age 78.7 ± 0.68
- 65% male, 90% white, 48% widowed >50% lived with others while 40% lived alone
- Six items reflect a unidimensional cognitive measure with a good person separation reliability of 0.87 (Table 1)

- Distinguishes people amongst three ability levels.

Cognitive Measure Items

<table>
<thead>
<tr>
<th>Short Term Memory (MDS)</th>
<th>Harder Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving (FIM)</td>
<td></td>
</tr>
<tr>
<td>Memory (FIM)</td>
<td></td>
</tr>
<tr>
<td>Decision Making (MDS)</td>
<td></td>
</tr>
<tr>
<td>Cognitive Function (OASIS)</td>
<td></td>
</tr>
<tr>
<td>Long Term Memory (MDS)</td>
<td>Easier Items</td>
</tr>
</tbody>
</table>

Table 1. Rasch Summary of the Psychometric Properties

<table>
<thead>
<tr>
<th>Analytic</th>
<th>Rating Scale Steps</th>
<th>Person Mean (SD)</th>
<th>Item Mean (SD)</th>
<th>Person Variability (SD)</th>
<th>Item Variability (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
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<tr>
<td>Item 2</td>
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<td>0.30</td>
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<tr>
<td>Item 3</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
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<tr>
<td>Item 4</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Item 5</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Item 6</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Figure 1. Six Items Define a Cognition Measure with a Score Ranging from 2-23

Figure 2. Items arranged in hierarchical order with rating scale steps and person distribution mapped to the total raw score.

Figure 3. Box & Whisker Plot for Admission & Discharge for each group

Conclusions

- First attempt to delineate a cognitive construct using items in federally mandated assessments
- Advancement in measuring cognition is needed to determine the impact of cognitive training

Funding Source & References

The study was supported in part by a grant from the National Institute on Disability and Rehabilitation Research Rehabilitation Research and Training Center on Measuring Rehabilitation Outcomes and Effectiveness (grant no. H133B040032; PI: Heinemann; 12/1/2004-11/30/2011). Dr. Cogan is supported by a Polytrauma/TBI Advance Fellowship from the Veterans Health Administration Office of Academic Affairs. This study was supported in part by a grant from the National Institute on Disability and Rehabilitation Research Rehabilitative Research and Training Center on Measuring Rehabilitation Outcomes and Effectiveness (grant no. H133B040032; PI: Heinemann; 12/1/2004-11/30/2011). Dr. Cogan is supported by a Polytrauma/TBI Advance Fellowship from the Veterans Health Administration Office of Academic Affairs. This study was supported in part by a grant from the National Institute on Disability and Rehabilitation Research Rehabilitative Research and Training Center on Measuring Rehabilitation Outcomes and Effectiveness (grant no. H133B040032; PI: Heinemann; 12/1/2004-11/30/2011). Dr. Cogan is supported by a Polytrauma/TBI Advance Fellowship from the Veterans Health Administration Office of Academic Affairs. This study was supported in part by a grant from the National Institute on Disability and Rehabilitation Research Rehabilitative Research and Training Center on Measuring Rehabilitation Outcomes and Effectiveness (grant no. H133B040032; PI: Heinemann; 12/1/2004-11/30/2011). Dr. Cogan is supported by a Polytrauma/TBI Advance Fellowship from the Veterans Health Administration Office of Academic Affairs. This study was supported in part by a grant from the National Institute on Disability and Rehabilitation Research Rehabilitative Research and Training Center on Measuring Rehabilitation Outcomes and Effectiveness (grant no. H133B040032; PI: Heinemann; 12/1/2004-11/30/2011). Dr. Cogan is supported by a Polytrauma/TBI Advance Fellowship from the Veterans Health Administration Office of Academic Affairs.