Measurement Characteristics and Clinical Utility of the Short Physical Performance Battery Among Community-Dwelling Older Adults

Andrea W. Westman, PT, DPT, Stephanie Combs-Miller, PT, PhD, NCS, Jennifer Moore, PT, DHS, NCS, Linda Ehrlich-Jones, PhD, RN

With the continued population increase of adults aged 65 and older, it is imperative to ensure that older adults are able to maintain their independence as long as possible. Maintenance of physical function is central to preserving independence for older adults because declines in physical function result in the loss of mobility and activities of daily living. Early detection of decline in physical function in older adults is critical and allows for early interventions to improve function or prevent further decline. The Short Physical Performance Battery (SPPB) is a clinician-rated physical performance measure that evaluates physical function in older adults. This assessment consists of 3 subscales: standing balance, gait, and rising from a chair. The assessment is scored on a 0-12 scale, with higher scores indicating better function. The SPPB does not require any formal training, is free to use, and requires only a stopwatch and chair. Psychometric studies of the SPPB have demonstrated excellent test-retest reliability, predictive validity, and convergent validity with the Nagi Disability Scale. Information is available to support using the test results in clinical decision making including cutoff scores, standard error of measurement, minimum detectable change scores, and the minimum clinically important difference values.

This abbreviated summary provides a review of the psychometric properties of the SPPB in community-dwelling older adults. A full review of the SPPB and reviews of more than 400 other instruments for patients with various health conditions can be found at: www.sralab.org/rehabilitation-measures.

Please address correspondence to rehabmeasures@sralab.org.

This instrument summary is designed to facilitate the selection of outcome measures by clinicians. The information contained in this summary represents a sample of the peer-reviewed research available at the time of this summary’s publication. The information contained in this summary does not constitute an endorsement of this instrument for clinical practice. The views expressed are those of the summary authors and do not represent those of authors’ employers, instrument owner(s), the Archives of Physical Medicine and Rehabilitation, the Rehabilitation Measures Database, or the United States Department of Health and Human Services. The information contained in this summary has not been reviewed externally.

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Measurement characteristics and clinical utility of SPPB

<table>
<thead>
<tr>
<th>Measure Name:</th>
<th>Short Physical Performance Battery</th>
</tr>
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<tbody>
<tr>
<td>Acronym:</td>
<td>SPPB</td>
</tr>
<tr>
<td>Summary Authors:</td>
<td>A. Westman, S. Combs-Miller, J. Moore, &amp; L. Ehrlich-Jones</td>
</tr>
<tr>
<td>Items:</td>
<td>5</td>
</tr>
</tbody>
</table>

**Populations Reviewed:** Community dwelling older adults
**Training Required:** None
**Admin Time:** 10 minutes
**Score:** 0/12 (min/max)
**Required Equipment:** Chair, stopwatch

**Purpose and Administration Instructions:**
The SPPB assesses physical function in older persons. There are three subscales in the SPPB:
1. Balance: Ability to stand for 10 sec with feet in 3 different positions (together side-by-side, semi-tandem, and tandem)
2. Gait speed test: Two timed trials of a 3-m or 4-m walk (fastest recorded)
3. Chair stand: Time to rise from a chair five times

**Scoring Instructions:**
There are three balance subsets:
1. Side by side stand scored from 0-1
2. Semi-tandem stance scored from 0-1
3. Tandem stance scored from 0-2
Gait and chair subtests scored from 0-4, cut-off scores provided to categorize the score based on time to complete the task

**Scoring Interpretation:**
Score of ≤10 indicates a mobility disability defined by the inability to walk 400 meters

**Validity:**
**Predictive validity:**
- Scores of 7-9 (OR = 1.5), 4-6 (OR = 2.14), and 0-3 (OR = 3.25) were associated with progressively greater risk of all-cause mortality when compared to a score of 10-12

**Convergent validity:**

<table>
<thead>
<tr>
<th>Nagi items</th>
<th>Able SPPB total score (SD)</th>
<th>Nagi item, difficult unable, PPB total score (SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulling or pushing a large object, such as a chair</td>
<td>10.02 (1.36)</td>
<td>9.22 (2.57)</td>
<td>0.015</td>
</tr>
<tr>
<td>Bending, stooping or kneeling</td>
<td>10.24 (1.27)</td>
<td>9.28 (2.32)</td>
<td>0.003</td>
</tr>
<tr>
<td>Carrying weight less than 5 kg, such as a bag of potatoes</td>
<td>9.98 (1.68)</td>
<td>8.90 (2.52)</td>
<td>0.003</td>
</tr>
<tr>
<td>Going up or down a flight of stairs of at least 10 steps without rest</td>
<td>10.20 (1.40)</td>
<td>9.00 (2.43)</td>
<td>0.000</td>
</tr>
<tr>
<td>Walking 5 blocks (400 m)</td>
<td>9.97 (1.73)</td>
<td>8.64 (2.52)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**MCID:**
- MCID (decline) with anchor of climbing one flight of stairs = 1.88 points
- MCID (decline) with anchor of walking one block = .99 points

**Reliability:**
**Test-retest Reliability**
- **Excellent** test-retest reliability (Norwegian translation, ICC=0.92)²
- **Excellent** test-retest reliability (Quebec sample; ICC=.89)³
- **Excellent** test-retest reliability (Brazil sample; ICC=.83)⁴
- **Excellent** test-retest reliability (ICC=.87)⁵
- **Excellent** test-retest reliability (ICC=.81)⁶

**Internal Consistency:**
- **Poor** (Cronbach’s alpha 0.63–0.66)⁷

**Standard Error of Measurement:**
- SEM = 1.42 pts³
- SEM (Norwegian translation) = 0.68 pts²
- SEM = 1.2 pts⁶

**Floor / Ceiling Effects:**
In high functioning older adults, a ceiling effect may occur⁸

**Professionals Considerations**
- SPPB may not be able to distinguish performance in high functioning patients
- The 400-m walk test may be a better test for high functioning patients

**Abbreviations:**
 ICC: Intraclass Correlation
 OR: Odds ratio
 SD: Standard Deviation
 Sec: Seconds

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<th>Cut-off Criteria:</th>
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<tbody>
<tr>
<td><strong>Excellent</strong></td>
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<tr>
<td><strong>Adequate</strong></td>
</tr>
<tr>
<td><strong>Poor</strong></td>
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