Validation of An Abbreviated Activities-Specific Balance Confidence Scale In Multiple Sclerosis

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Background
- Fear of falling and lack of balance confidence are important disabling consequences ultimately leading to functional decline in people with Multiple Sclerosis (MS).
- Activities-specific balance confidence scale (ABC-16) is a known reliable and valid measure to assess balance confidence and fall risk in various populations but it may take up to 20 minutes to complete.
- Thus, an abbreviated version of ABC-16 is required for time-efficient screening and evaluation for a ‘potential faller’, and for a quick quantification of the intervention in clinic and research settings for people with MS.

Objectives
- To develop, establish and compare the reliability and internal consistency of an abbreviated version of ABC-16 in people with MS.
- To determine the relationship between the short-version of ABC-16 and various balance and mobility outcome measures for initial validation.

Methods
- Pilot, retrospective.
- Sample of convenience (n=73).
- Criteria for inclusion: Clinically definite MS, complete ABC-16 questionnaire.

Table 1: Sample description (Mean ± SD)

| Age (yr) | 54.2 ± 23.9 |
| Gender (M/F) | 47/26 |
| Disease duration (yr) | 5.4 ± 2.8 |
| Time since diagnosis (yr) | 14.0 ± 4.1 |

Assessments
- The ABC scale is a valid measure of balance confidence in elderly, where participants rate their balance confidence on a scale of 0% (not confident) to 100% (completely confident) for a series of 6 balance-challenging risk-related questions.
- Clinical balance and mobility measures:
  - Berg Balance Test (MBT)
  - Functional Reach (FR)
  - Timed-Up and Go (TUG)
  - Twenty-Foot Walk Test (20FWT)
  - Stair Test (ST)
  - Six-Minute Walk Distance (6MWD)
  - Physical activity monitoring (SAMatep): usual physical activity monitored up to two weeks.
- Retrospective fall history in the past year (falls/yr)

Results

Derivation of the short-version ABC-8 (Item Reduction)
- Using the 25th percentile as a cut-off point, 8 lowest scoring items were identified as having low balance confidence forming an eight-item ABC (ABC-8) questionnaire reflecting the most challenging situations.

Figure 2: 25% values of each item of the ABC-16 scale

Reliability, Internal Consistency
- The internal consistency of both the instruments was extremely high as determined by the Cronbach's alpha (ABC-8 = 0.924; ABC-16 = 0.966). The relationship between both versions of ABC was found to be high (ICC=0.907).

Validation of ABC-8
- Strong and highly significant correlations of the ABC-8 scores with balance and mobility performance measures were found. Similar high correlations with the above-mentioned measures have been reported for the ABC-16. Thus, despite the narrowed spectrum of activities assessed by ABC-8, better balance and mobility was found to be associated with higher balance confidence and vice versa.
- Both versions were found to be significantly correlated with the number of falls in the past year. Thus, both the instruments were able to identify the ‘high fall-risk’ individuals.

Table 2: The MS-specific ABC-8 scale

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Corresponding MBT Item No.</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Valsalva (balance on one foot)</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Forward reach</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Stair climbing</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Step over a block</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Chair stand</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Get up from chair</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Balance walking</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>Balance on one leg</td>
</tr>
</tbody>
</table>

The mean score on ABC-8 was found to be significantly lower than the ABC-16 (mean ± SD = 11.05 ± 7.5, t(72) = -12.92, p = 0.000, ES = 0.685).

Figure 3: Mean differences between ABC-8 and ABC-16

Limitations
- Retrospective research design.
- Small sample size for reliability and validity study.
- Some degree of redundancy still exists in the abbreviated questionnaire.

Conclusions
- The short version (ABC-8) has similar psychometric properties as the parent questionnaire (ABC-16), and can be used as a reliable and valid measure of balance confidence in MS.
- The ABC-8 can demonstrate its utility in time-efficient screening, evaluation and management for impaired balance in people with MS.

References