DEVELOPMENT OF A RASCH-BASED AMBULATION SYMPTOM SCALE

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Background: Using the Expanded Disability Status Scale (EDSS) to measure multiple sclerosis (MS) disease progression is standard for clinical trials; however, it has limited utility in rehabilitation because of the training required and the time required for administration. The EDSS has measurement issues that include limited sensitivity in measuring small changes in ambulation and early mobility impairment.

Objective: Develop a self-report ambulation symptoms scale using Rasch modeling that is able to accurately measure early-stage walking impairment and has the sensitivity to measure small ambulation changes across walking levels.

Methods: A total of 371 participants with MS completed the scale. The new scale contains 15 ambulation-related symptoms from the Symptom Inventory (SI), and it was evaluated using the Rasch Rating Scale Model for response option structure, model data fit, item difficulty, item separation and reliability indices, and a Wright item-person map.

Results: Response options were analyzed for order and to ensure that each response option was the most probable at some point on the metric. The initial response structure using the SI 5-point Likert scale functioned poorly, with all of the options not being utilized. Optimization categorization procedures were used to determine the best number of response options. A 3-point Likert scale was selected, and all results are based on this scale. The model fit the data well, with 13 of 15 items having acceptable properties. Two items had marginal statistics but were included because of content and item difficulty. The item difficulties ranged from –2.59 (easy) to 3.57 (hard) logits. Item separation was 13.75, and item reliability was 0.99. The Wright item-person map showed good matching of items with person ability levels. The average participant's ability was –1.58 ± 2.4 logits; lower scores indicate less severe ambulation symptoms. The correlation with the Patient Determined Disease Steps scale was 0.83.

Conclusions: This newly developed ambulation scale has good psychometric properties and the ability to measure early-stage ambulation impairment and small changes in ambulation. This scale holds significant promise for use in survey-based research and for tracking disease progression in a clinical setting where EDSS assessments are not regularly conducted.