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Development and psychometric evaluation of a fatigability index for full-time wheelchair users with Spinal Cord Injury

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The Problem: A prevalent symptom associated with Spinal Cord Injury (SCI) is fatigue, which is a perceived lack of physical and/or mental energy. About 25% of individuals with SCI report fatigue severe enough to affect daily functioning and well-being. The purpose of this study is to develop and evaluate psychometrically a self-reported instrument assessing Physical Fatigability (PF) and Mental Fatigability (MF) in adults with SCI.

Methodology: Cross-sectional study among community-dwelling adults in the United States. The dimensional structure was assessed by confirmatory factor analysis. The relationship between item responses and fatigability was measured with item response theory (graded response model). Reliability was measured with test information functions. Differential item functioning was evaluated with Wald Chi-Square tests and the weighted area between the curves. Construct validity was assessed using the known group's method.

Findings: An 82-item pool was developed from prior qualitative research and consultations with rehabilitation experts. A non-probability sample (N=464) was used to evaluate the psychometric properties of the PF and MF scales. The item pool was reduced to 75 based on factor loadings and R². Both scales are primarily unidimensional, despite moderate multidimensionality. There is good discrimination overall: 18 PF items and 26 MF items have high or very high discrimination power (slopes > 1.35). The measurement precision in the theta range -2.0 to 2.5 is the equivalent of 0.94 reliability for PF and 0.91 for MF. For both measures, F statistics P values were significant at P<.01, and means were higher for those with paraplegia vs quadriplegia and for those with incomplete paraplegia.

Conclusion & Significance: The Fatigability Index is the first instrument designed to assess physical and mental fatigability in adults with SCI. The index highlights the causes of fatigue and areas requiring immediate intervention. Development of short-forms and further research on representative samples are necessary.

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