Measuring Cognition And Self Care Ability In Multiple Sclerosis Using the Expanded Disability Status Scale

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Introduction

- **Multiple Sclerosis (MS)** is an autoimmune disease that affects physical and cognitive functions (Pirko & Noseworthy, 2007).
- **Expanded Disability Status Scale (EDSS)** is the most widely used scale for measuring level of disability in people with MS (Francis et al., 1991). However, it is criticized for overlooking several critical functions impacted by MS, such as activities of daily living (ADL) and cognition (Lorefice et al., 2023).
- Previous research on the EDSS score's ability to indicate ADL function shows mixed results, with clinician-reported ADL measures correlating more strongly with EDSS scores than self-reported ADL measures (Cohen et al., 2021; Hobart et al., 2000; Meyer-Moock et al., 2014; Pugliatti et al all., 2008).
- Previous research on cognition and EDSS shows that EDSS scores correlate weakly with cognitive measures, and are insensitive to cognitive decline (Ontaneda et al., 2017; Ozakbas et al., 2004).

Project Aim:
Explore the correlations between EDSS scores with measures of ADL ability and cognition

Method

Participants

Inclusion Criteria:
- Clinical diagnosis of MS
- 18 years of age or older
- No comorbid neurologic disease or active cancer
- Not pregnant

Measures

NeuroTrax	EDSS	Physical Self Maintenance Scale (PSMS)
Cognitive test of 7 domains (NeuroTrax Innovative Science for Brain Health, n.d.)	A measure of disability on a scale of 0-10 (Kurtzke, 1983) • Mild disability: 0-2.5 • Moderate disability: 3-4.5 • Severe disability: 6-10	An 8 item self-report ADL measure on a scale of 8-24 (Lawton et al., 1982)

Procedure

1. IRB approval by Solutions IRB (IORG0007116)
2. Data collection in South Shore Neurologic Associates during routine care
3. Data imported to Excel followed by SPSS and prepared for analysis
4. Data analysis (Pearson correlation, Spearman correlation, Variability)

Results

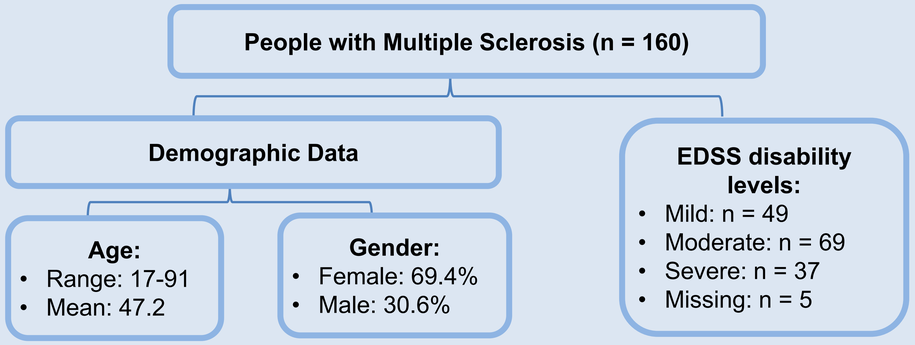

Table 1. EDSS and ADL Relationship

EDSS Disability Group	Spearman Correlation with PSMS	Variability of PSMS Score
Mild	r = -.31*	0.7
Moderate	r = -.16	4.4
Severe	r = -.40*	12.6
All groups	r = -.39**	5.77

* Correlation is significant at the 0.05 level (2-tailed);
**Correlation is significant at the 0.01 level (2-tailed)

Outcomes: Correlations ranged from weak to moderate. Variability of PSMS scores was greatest for those in the severe disability group.

Table 2. EDSS and Cognition Relationship

NeuroTrax Cognitive Domain	Pearson Correlation with EDSS
Attention	r = -.30**
Information processing speed	r = -.27**
Executive function	r = -.31**
Memory	r = -.21**
Visual spatial	r = -.22**
Motor skills	r = -.24**
Verbal function	r = -.07
Global Cognitive Score[1]	r = -.29**

**Correlation is significant at the 0.01 level (2-tailed); [1]Average of the 7 domains

Outcomes: Correlations were weak or not significant in all cognitive domains.

Conclusion

- Outcomes support past findings of weak correlations between EDSS scores and patient-reported measures of ADL ability, as well as EDSS scores with a computerized cognitive measure.
- Variability in PSMS scores for the severe disability group shows a deficit in the EDSS ability to capture ADL ability for those with progressed stages of MS.

EDSS scores fail to account for critical aspects of disability (ADL ability and cognition), thereby calling its validity into question.

Limitations

- Sample may not represent MS population due to limited size and diversity of participants
- Potential errors in PSMS scores due to self-report method
- Potential errors in NeuroTrax scores due to technical problems or motor/visual impairments

Future Research

- Develop an ADL measure specific to MS
- Examine why self-report and clinician-report ADL measures correlate differently with EDSS scores

Recommendations

- ***Clinicians and therapists should use additional tests of cognition and ADL ability, instead of relying on EDSS scores, to convey disability.***

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References