

Multi-dimensional assessment of symptom severity in matched NMO and MS patients.

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SymptoMScreen Domain Scores: NMOSD v. MS

Background: NMOSD and MS are distinct neuro-inflammatory disorders with overlapping symptomatology.

Objectives: To compare self-reported symptom severity in patients with NMOSD and gender-, race-, age- and disease duration- matched MS controls using SymptoMScreen, an in-house developed tool for multi-dimensional symptom assessment.

Participants and Instruments

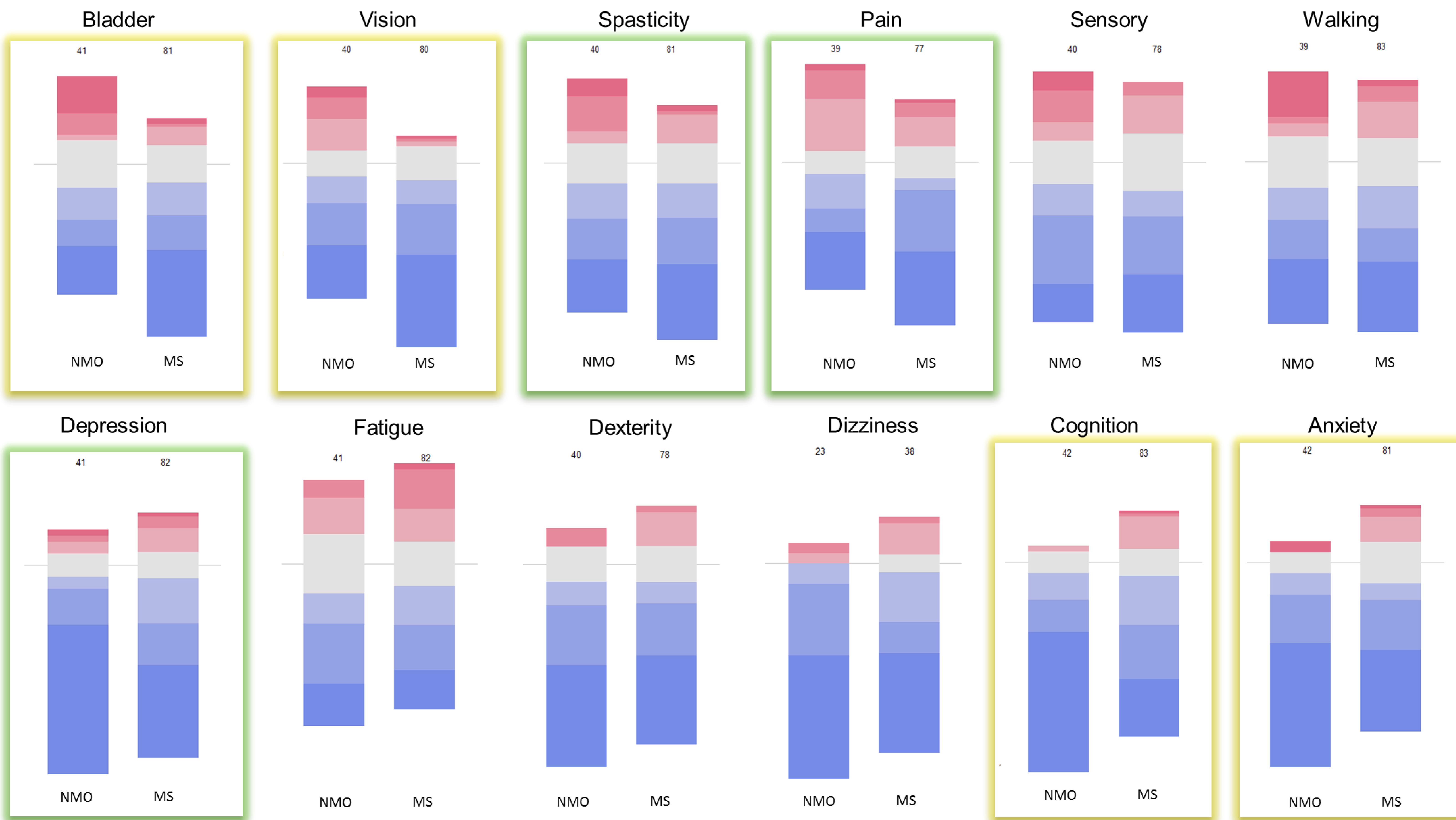
- **SymptoMScreen (SyS)**, see below, comprises of a battery of 7-point Likert scales, assesses symptom severity in 12 neurologic domains: mobility, dexterity, spasticity, body pain, sensation, bladder function, vision, fatigue, cognition, depression, and anxiety.
- SyS has been validated for use in MS populations and has excellent psychometric principles (Green et al. *Applied Neuropsychology: Adult*, 2016 April 14, 1-7)

Methods: Sys was administered to NMOSD and MS patients seen for routine visits at NYU MS Comprehensive Care Center (New York). Subjects were matched via INDEX MATCH software in Microsoft Excel. Symptom severity in each of the 12 SyS domains was compared using Paired samples t-test; p<0.05 was considered significant.

Demographics:

43 NMOSD patients: 97% female, age: 51 +/- 14.4 years, disease duration: 11.0 +/- 8.8 years; 85 matched MS patients: 97% female, mean age: 51.2 +/- 14.7 years. disease duration: 11.0 +/- 8.1 years. Racial distribution: 46% African-American, 33% Hispanic-American, 15% White-American, 5% Asian and 1% other.

Domain	NMOSD Mean (Median), Std. D	MS Mean (Median), Std. D	P value
walking	2.44 (2), 2.15	2.07 (2), 1.72	0.31
dexterity	1.28 (1), 1.52	1.55 (1), 1.58	0.37
spasticity	2.40 (2), 1.98	1.72 (1), 1.61	0.06
pain	2.44 (2), 1.90	1.73 (1), 1.73	0.06
sensory	2.43 (2), 1.89	2.00 (2), 1.58	0.19
bladder	2.68 (3), 2.14	1.53 (1), 1.61	0.03
fatigue	2.17 (2), 1.56	2.52 (2), 1.77	0.29
vision	2.23 (2), 1.91	1.19 (1), 1.34	0.03
dizziness	0.87 (0), 1.32	1.45 (1), 1.55	0.11
cognition	0.76 (0), 1.14	1.75 (2), 1.49	<.001
depression	1.00 (0), 1.60	1.57 (1), 1.63	0.07
anxiety	0.98 (0), 1.51	1.63 (1), 1.65	<.001
SyS total	1.86 (2), 1.21	1.75 (1), 1.21	0.84



- 6- total limitation
- 5- very severe limitation
- 4- severe limitation
- 3- moderate limitation
- 2- mild limitation
- 1- very mild limitation
- 0- not affected

Figures in yellow frames show statistically significant differences ($p<0.05$), and figures in green frames show non- significant trends ($p<0.1$)



Please circle **one** number that best describes how each MS symptom has affected your everyday life activities. For example, if it takes you longer to type or text, your hand function may have a 'mild limitation' (circle '2'), but if you gave up typing or texting completely, your hand function may have a 'severe limitation' (circle '4').

	0 - not affected at all	1 - very mild limitation / I make minor adjustments	2 - mild limitation / I make frequent adjustments	3 - moderate limitation / I reduced my daily activities	4 - severe limitation / I gave up some activities	5 - very severe limitation / I'm unable to do many daily activities	6 - total limitation / I'm unable to do most daily activities
Walking	0	1	2	3	4	5	6
Hand function/Dexterity	0	1	2	3	4	5	6
Poor hand coordination, tremors	0	1	2	3	4	5	6
Spasticity & Stiffness	0	1	2	3	4	5	6
Muscle cramping or muscle tightness	0	1	2	3	4	5	6
Bodily pain	0	1	2	3	4	5	6
Aches, tenderness	0	1	2	3	4	5	6
Sensory	0	1	2	3	4	5	6
Numbness, tingling, or burning	0	1	2	3	4	5	6
Bladder control	0	1	2	3	4	5	6
Urinary urgency, urinary frequency	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Vision	0	1	2	3	4	5	6
Blurry vision, double vision	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Feeling off balance, 'spinning'/vertigo	0	1	2	3	4	5	6
Cognitive function	0	1	2	3	4	5	6
Memory, concentration problems	0	1	2	3	4	5	6
Depression	0	1	2	3	4	5	6
Depressed thoughts, low mood	0	1	2	3	4	5	6
Anxiety	0	1	2	3	4	5	6

Conclusions

SymptoMScreen identified relevant clinical differences between NMOSD and MS:

- Optic neuritis attacks tend to be more severe in NMOSD, which may explain worse **vision** scores in NMOSD compared to MS
- Myelitis attacks in NMOSD tend to cause greater cord damage, which may explain worse **bladder** function and trends for worse **spasticity and pain** in NMOSD
- Better **cognition and anxiety** scores in NMOSD may be due to relative sparing of cerebrum in NMOSD relative to MS

Interestingly, overall symptom burden (total SyS score) was similar in MS and NMOSD

SymptoMScreen is a quick and easy-to-use PRO that should be considered for clinical care and clinical trials in NMOSD. It is freely available to all clinicians and investigators.