SDMT Performance Predicts Real-World Functioning in Adults with MS

Margaret Kasschau, Leigh Charvet, Wendy Fang, Michael Shaw, Maria Amella, Patricia Melville, Lauren Krupp
Department of Neurology, Stony Brook Medicine

Objective
Using the Modified MS TIADLs to demonstrate in MS that deficits on the Symbol Digit Modalities Test (SDMT), a measure of speeded information processing, correspond to a real-world measure of day-to-day functioning.

Background
Cognitive impairment affects up to 75% of all individuals with MS. It often compromises the ability to function successfully at work and at home, and is associated with a major reduction in quality of life, and increased risk of unemployment and caregiver burden.

Information processing speed is the most common area of cognitive impairment for individuals living with MS. The Symbol Digit Modalities Test (SDMT), a measure of speeded information processing, has been established as an effective screen for impairment. However, its prediction of real-world functioning is unclear.

The TIADLs task measures performance of daily activities. It was designed to be sensitive to the detection of cognitive impairment and has strong test-retest reliability. TIADLs completion time has demonstrated sensitivity in MS, normal aging, and in mild cognitive impairment cases. Completion time is measured in five common daily tasks, with materials shown in Figure 1: finding a telephone number (communication), making change (finance), reading the first three ingredients on a can of food (food), finding two items on a shelf (shopping), and reading the directions on a medicine bottle (medication management).

To increase difficulty and sensitivity, we added an additional five items to create the Modified MS TIADLs (MMS TIADLs) version: buying grocery items within a set budget amount, cross-referencing a telephone number with an address, finding a pizza delivery number, locating items not on a food shopping list, and recalling the maximum dose on prescription bottle directions. The tasks are structured to require only minimal motor use.

Methods
As part of three separate studies of cognitive impairment in MS, adults with MS were administered a battery of measures including the SDMT and the MMS TIADLs assessment.

Results
Participants were 71 adults with MS (83% RRMS, 15% SPMS), ages 21 to 69 (mean age 48.4 ± 12.2 years) and 72% female. Median EDSS was 3.5 with a range of 0.0 to 8.0. Mean years of education were 15.1 ± 2.5 years. Oral SDMT raw scores ranged from 26 to 84 (mean 49.25 ± 11.03) corresponding to a mean normative comparison z score of -0.90 ± 1.12.

To evaluate the relation between the SDMT and MMS TIADLs within the sample, SDMT raw scores were computed using the sample's mean and SD. Similarly, MMS TIADLs total completion time and overall error were also converted to z scores and then averaged for a single representative score.

Conclusion

- The MMS TIADLs version provides a sensitive measure of real-world functioning in adults with MS.
- SDMT significantly predicts MMS TIADLs and the real life daily consequences of cognitive impairment in MS.

References
