Adaptation of the Cognitive Symptom Management and Rehabilitation Therapy (CogSMART) Program for Individuals with Multiple Sclerosis

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Introduction

- Cognitive impairment is present in up to 70% of people with multiple sclerosis (MS)[1]
- Even subtle cognitive difficulties have a big impact on quality of life[2]
- The Cognitive Symptom Management and Rehabilitation Therapy (CogSMART) program was developed by Elizabeth Twamley to provide a compensatory approach to the cognitive rehabilitation of individuals with traumatic brain injury (TBI) and has been successful at improving cognitive and psychosocial outcomes[3]
- The cognitive dysfunction present in those with MS is comparable to that observed in those with TBI and thus a similar intervention may be beneficial

Objectives

- The goals of the present study were:
  - to adapt the CogSMART program for use with those with MS
  - to conduct a program evaluation of the adaptation to begin to evaluate efficacy

Methods

Participants:

- Five participants: 4 females and 1 male; 4 with RRMS and 1 with PPMS; mean age 51.40 (11.63); mean education 14 (2.12); mean duration of illness 13 (7.24); mean PDDS 1.80 (1.48)

Procedures:

- Session content was modified by two neuropsychologists with expertise in MS to reflect the associated physical and cognitive symptoms of the disease
- Pre and post intervention assessments evaluated objective cognition, subjective cognition, mood, fatigue and quality of life
- All participants completed once weekly 2-hour CogSMART for MS group sessions on 10 subsequent evenings

Analysis:

- Cognitive impairment on the various neuropsychological tests was defined as any score equal to, or lower than 1.5 SD below the mean
- Reliable change index (RCI) that accounted for practice effects was calculated at the level of each participant, to assess individual change in objective cognition, mood and fatigue over time
  - A change of scores is considered reliable if the RCI value lies outside +/- 1.64
- Paired sample t-tests evaluated change in prospective memory, subjective cognition, fatigue and quality of life variables

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Table 1. Reliable change indices evaluating objective cognitive change over time

Measure	MS01	MS02	MS03	MS05	MS06
SDMT	1.25	-0.33	0.94	0.94	-1.91
CVLT-II total score	0.19	1.58	0.74	3.40	-0.23
BVMT-R total score	-0.77	1.07	1.07	0.28	0.02

RCI = individuals who show RCI-confirmed improvement (> +1.64)
= individuals who show RCI-confirmed decline (< -1.64)

Table 2. Reliable change indices evaluating mood change over time

Measure	MS01	MS02	MS03	MS05	MS06
PHQ-9	-0.81	-2.65	0.10	-0.81	-2.96
HADS-D	2.17	-0.74	1.68	1.94	-3.17
GAD-7	2.04	-1.80	-1.21	-2.10	-0.33
HADS-A	0.73	-2.90	-0.07	-5.73	0.73

RCI = individuals who show RCI-confirmed improvement (< -1.64)
= individuals who show RCI-confirmed decline (> +1.64)

Table 3. Reliable change indices evaluating fatigue change over time

		Participants (N=5)			
Measure	MS01	MS02	MS03	MS05	MS06
mFIS-5	-0.50	-0.78	0.08	-0.21	-2.79*

RCI = individuals who show RCI-confirmed improvement (< -1.64)
= individuals who show RCI-confirmed decline (> +1.64)
*Participant started Alertec during the program

Table 4. Means and standard deviations of neuropsychological and subjective measures pre and post intervention

Measure	Mean pre-intervention (SD)	Mean post-intervention (SD)
SDMT	40.80 (11.30)	48.00 (11.98)
CVLT-II total score	49.40 (18.96)	57.20 (15.56)
BVMT-R total score	22.80 (8.07)	24.80 (5.76)
RPA-ProMem total score	6.60 (3.85)	9.60 (1.67)
Short-term	3.00 (1.87)	4.80 (1.30)
Long-term	3.60 (2.30)	4.80 (1.30)
Event-based	3.60 (2.30)	5.80 (0.45)
Time-based	3.00 (2.34)	3.80 (1.64)
PDQ total	39.80 (3.83)	34.80 (5.80)
MSNQ self	32.60 (3.58)	26.60 (5.81)
MSNQ informant	28.80 (11.50)	23.00 (14.65)
CPSA problems	32.40 (7.83)	25.40 (7.02)
CPSA strategies	50.40 (4.34)	60.40 (8.44)
PHQ-9 total	12.80 (1.79)	6.80 (4.76)
GAD-7 total	10.00 (4.24)	6.80 (4.87)
HADS total	16.60 (3.21)	12.60 (4.16)
HADS-D	5.00 (3.31)	5.40 (1.95)
HADS-A	11.60 (3.91)	7.20 (3.42)
SF-36 phys	39.36 (8.90)	37.72 (12.73)
SF-36 ment	42.36 (6.55)	44.82 (8.50)
mFIS total	56.60 (6.58)	45.60 (15.63)
NFI-MS total	21.00 (4.90)	20.00 (5.43)

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Results

- Level of impairment varied with the majority of participants being impaired on information processing speed and attention
  - SDMT 60% at pre-intervention, 60% at post-intervention
  - CVLT-II 20% at pre-intervention, 20% at post-intervention
  - BVMT-R 20% at pre-intervention, 0% at post-intervention
- Besides two exceptions, reflective of an improvement in verbal memory and a decline in information processing speed, most aspects of objective cognition remained stable from pre to post intervention (Table 1)
- An improvement in short-term prospective memory was observed
  - RPA-ProMem: pre-intervention (M= 3.00, SD=1.87) and post-intervention (M=4.80, SD= 1.30); $t(4) = -3.67$, $p = 0.021$, $d = 1.13$
- Subjective ratings of cognition improved from pre- to post-intervention
  - PDQ: pre-intervention (M=39.80, SD=3.83) and post-intervention (M=34.80, SD=5.80); $t(4) = 6.71$, $p = 0.003$, $d = 4.23$
- An increase in strategy use was noted
  - CPSA strategies: pre-intervention (M=50.4, SD=4.34) and post-intervention (M=60.4, SD=8.44); $t(4) = -3.56$, $p = 0.024$, $d = 1.56$
- Individual changes in anxiety were observed and both group and individual changes in depression were noted (Table 2)
  - PHQ-9: pre-intervention (M=12.8, SD=1.79) and post-intervention (M=6.8, SD=4.76); $t(4) = 3.12$, $p = 0.036$, $d = 1.83$
  - HADS-D: pre-intervention (M=5, SD=3.31) and post-intervention (M=5.4, SD=1.95); $t(4) = -1.18$, $p = 0.862$
- No significant group changes were demonstrated across quality of life and fatigue variables, although one individual reported less fatigue (Table 3)

Discussion

- Similar to previous studies[3, 4], improvements were noted in prospective memory (short-term)
- Lack of more widespread changes in objective cognition can be explained by ceiling effects and the nature of a compensatory-based cognitive rehabilitation program
- Improvements in subjective cognition suggest that individuals are learning new strategies and making better use of strategies, creating a perception of improved cognition
- An overall significant decrease in depression severity was noted suggesting positive impact of the intervention on mood
- The lack of any notable improvements in quality of life may suggest that that quality of life ratings may take longer to change[5]
- The intervention did not lead to any appreciable differences in fatigue
- The program was rated quite highly by participants, as all participants completed the program and anecdotally reported how much the program meant to them and how helpful it was
- The present feasibility study provides important first steps towards establishing the efficacy of the CogSMART for MS program and initial support for the continuation of this program for people living with MS