Brain Health Program Clinically Improves Quality of Life Outcomes for Patients with MS

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Introduction

Multiple Sclerosis (MS) is an autoimmune demyelinating disease that results in progressive motor and sensory weakness. Currently available immune modulatory therapies offer a variety of benefits including relapse reduction, prevention of accumulation of disability as well as progression on MRI outcomes. However, these strategies do not improve all domains of Brain Health.

Goal

The purpose of this study was to determine if participation in a personalized, multidisciplinary Brain Health Program would improve Brain Health measured by 9 outcomes related to neurological quality of life.

Methods

19 patients with MS (Table 1) participated in a virtual 5-week brain health program. Each session included discussions lead by experts in the fields of Exercise, Occupational and Physical Therapy, Music Therapy, Nutrition, Neuropsychology and Neurology. The sessions were organized to provide a comprehensive review of MS pathophysiology, disease-modifying therapies, exercise, symptom management, and nutrition (Figure 1). Each participant completed NeuroQoL questionnaires before beginning the program and again 2 months after completion. The following 9 variables were measured: upper extremity function, lower extremity function, physical function, positive affect/well-being, sleep, depression, anxiety, fatigue, and cognitive function.

Table 1. Self-Reported Participant Demographics

Characteristic	Total Population (N = 16)*	MS Subtype RRMS (N = 10)	SPMS (N = 3)	PPMS (N = 3)
Age – yrs				
Mean	52.5	49.9	57.6	56.0
Median (range)	51.5 (32-71)	51.0 (32-71)	61.0 (48-64)	63.0 (38-67)
Female Sex – no. (%)	15 (93.7%)	10 (100%)	3 (100%)	2 (66.7%)
Disease Duration – yrs				
Mean	14.9	15.6	26.3	1.3
Median (range)	17.5 (1-38)	18.5 (1-32)	24.0 (17-38)	1.0 (1-2)
Current DMT – no. (%)	10 (62.5%)	7 (70.0%)	0 (0.0%)	3 (100%)
Type of DMT – no. (%)**				
Ocrelizumab	5 (50.0%)	3 (42.8%)	0 (0.0%)	2 (66.7%)
Ofatumumab	2 (12.5%)	1 (14.3%)	0 (0.0%)	1 (33.3%)
Interferon β-1a	1 (6.3%)	1 (14.3%)	0 (0.0%)	0 (0.0%)
Alemtuzumab	1 (6.3%)	1 (14.3%)	0 (0.0%)	0 (0.0%)
Diroximel fumarate	1 (6.3%)	1 (14.3%)	0 (0.0%)	0 (0.0%)

*3 participants not included due to incomplete self-reported data
** Percentage excludes participants not undergoing current DMT

Table 2. Difference in Participant Self-Reported Outcomes Before and After Intervention

Measure	N	Mean Difference	Standard Deviation	P-value (<0.05)
Upper Extremity	19	0.94	2.01	0.06
Lower Extremity	19	0.68	2.26	0.20
Cognition	19	-1.84	3.98	0.06
Positive Affect	19	-0.63	3.90	0.48
Anxiety	19	1.10	5.49	0.39
Depression	19	0.57	3.48	0.47
Fatigue	19	1.26	4.80	0.27
Sleep	19	0.47	2.71	0.45
Physical Function	19	-2.05	5.90	0.15

Figure 1. Overview of the Brain Health Program

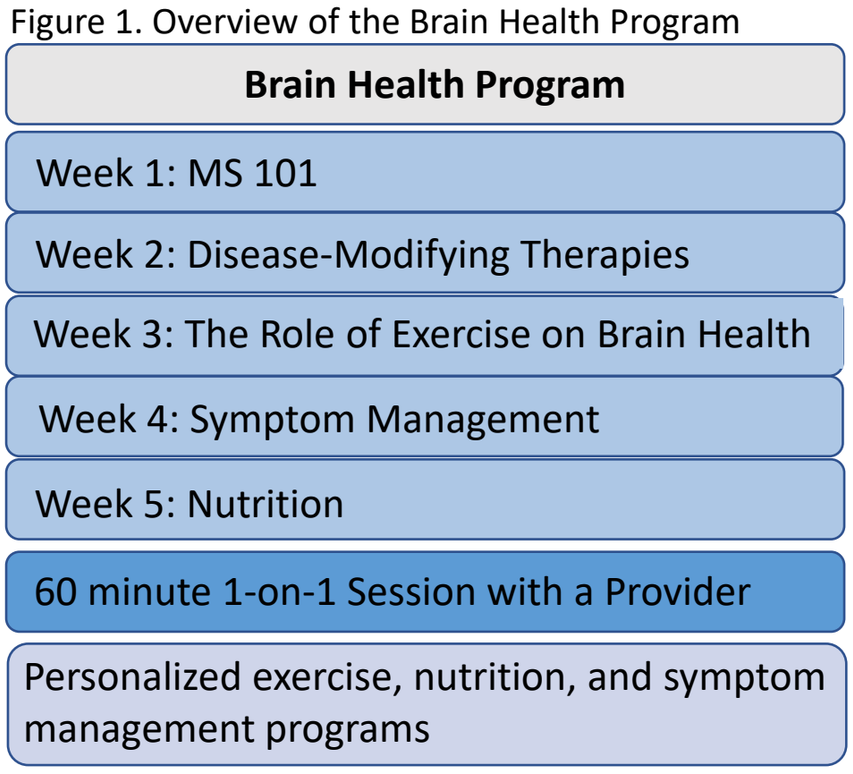
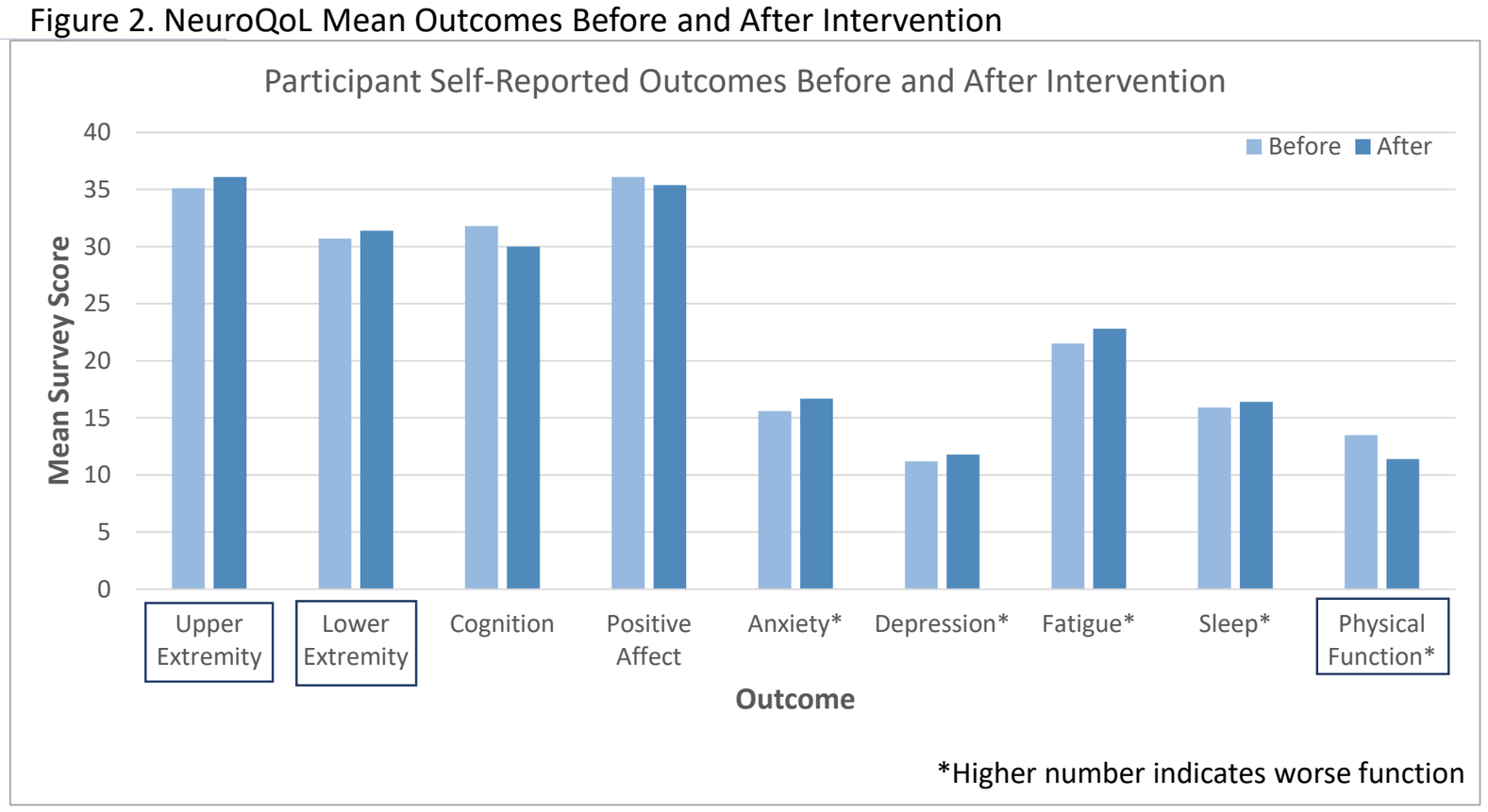


Figure 2. NeuroQoL Mean Outcomes Before and After Intervention



Results

As seen in Table 2, there were no statistically significant differences among the pre and post-test measures ($p < 0.05$). However, there were several clinically significant improvements (Figure 2). Upper extremity function, lower extremity function, and physical function improved by a mean difference of 0.94, 0.68, and 2.05, respectively. The upper extremity and lower extremity function questionnaires were 5 category Likert-scales meaning that an improvement of ~1 indicates the participant moved from one category to the next. An example of one of the lower extremity function improvements was a participant going from being able to get in and out of the car with some difficulty to without any difficulty. Similarly, the physical function questionnaire was a 10 category Likert-scale. An example of a physical function improvement was a participant going from moderate to mild balance difficulty.

Conclusions

Our results demonstrated that the Brain Health Program contributed to clinically significant improvements in physical function and movement. These variables were the focus of the personalized aspects of the Brain Health Program suggesting that patient education in combination with a more individualized approach is favorable for treatment and should be expanded to include other domains.

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