Cleveland Clinic
Neurological Institute

Behavioral Medicine in Multiple Sclerosis:
Exploring Changes in Emotional and Physical Functioning

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Abstract

Patients (n = 505) who were diagnosed with multiple sclerosis (MS) and seen by health psychology at the Mellen Center for Multiple Sclerosis at the Cleveland Clinic from 2010-2015 were retrospectively included in this study. Paired t-tests, multivariable linear regression, and visual inspection of box plots with confidence intervals were used to evaluate if participation in at least 3 sessions with health psychology resulted in improvements in patients' emotional well-being. Results from the analyses revealed that although participation in health psychology helped reduce anxiety and depression, this did not hold true for generalized quality of life and disability due to pain. Additionally, participants' course of MS was non-significant as a predictor of their improvement in depression, anxiety, quality of life, or disability from pain.

Background

MS is a disease in which approximately 50% of the individuals will experience a depression and 40% an anxiety at some point during their disease, which is four times as high as in any other neurologic condition. (1-2). The completed suicide rate is 7.5 times as high as the general population (2). In addition, anxiety is reported more often than depression in neurology clinics and has been linked to the presence of exacerbations and psuedoexacerbations and if left untreated, can worsen MS symptoms by increasing functional impairment, decrease adherence to treatment, worsen quality of life and may lead to suicidal ideation and completion (3). Mind-body interventions such as exercise, relaxation, stress management and cognitive-behavioral therapy have been helpful in managing these symptoms and in the prevention of brain lesions (4). This has highlighted the benefits of psychotherapy post-treatment or at months following end of treatment; however, a report of MS patients' change in emotional and physical functioning over time in patients who chose to receive health psychology services versus those who do not, is missing. In addition, no study has examined if the disease course has any significance in the outcome of behavioral medicine interventions.

Objectives

1) Identify how emotional and physical functioning changes over time in patients who choose to receive health psychology (HP) services at Mellen Center versus those who do not
2) Determine if the MS disease course has any significant impact on the outcomes

Method

Data Pull
Data for this study was retrospectively gathered from electronic medical records kept by the Cleveland Clinic as part of the Knowledge Program (Katzan, et al., 2011).

Participants
Patients who were diagnosed with MS, were at least 18 years old, and who seen by Behavioral Medicine (BM) at the Mellen Center for Multiple Sclerosis between 2010 and 2015 were included in the initial data pull. This resulted in a total of 505 eligible patients Descriptive statistics for included measures are listed below grouped by participants who had fewer than 3 sessions or 3 or greater sessions of psychotherapy as an approximation of patients being engaged in therapy.

		1-2 visits		3+ visits	
		Frequency	%	Frequency	%
Sex	Female	228	73.3	148	76.3
	Male	83	26.7	46	23.7
Course	Relapsing remitting	239	76.8	157	80.9
	Secondary progressive with relapses	17	5.5	11	5.7
	Secondary progressive without relapses	34	10.9	18	9.3
	Primary progressive	12	3.9	4	2.1
	Progressive relapsing	9	2.9	4	2.1
Marital status	Single	110	35.4	77	39.7
	Married	165	53.1	98	50.5
	Other	32	10.3	15	7.7
	NA	4	1.3	4	2.1
Race	White	255	82.0	144	74.2
	Black	50	16.1	44	22.7
	Other	2	.6	4	2.1
	NA	4	1.3	2	1.0

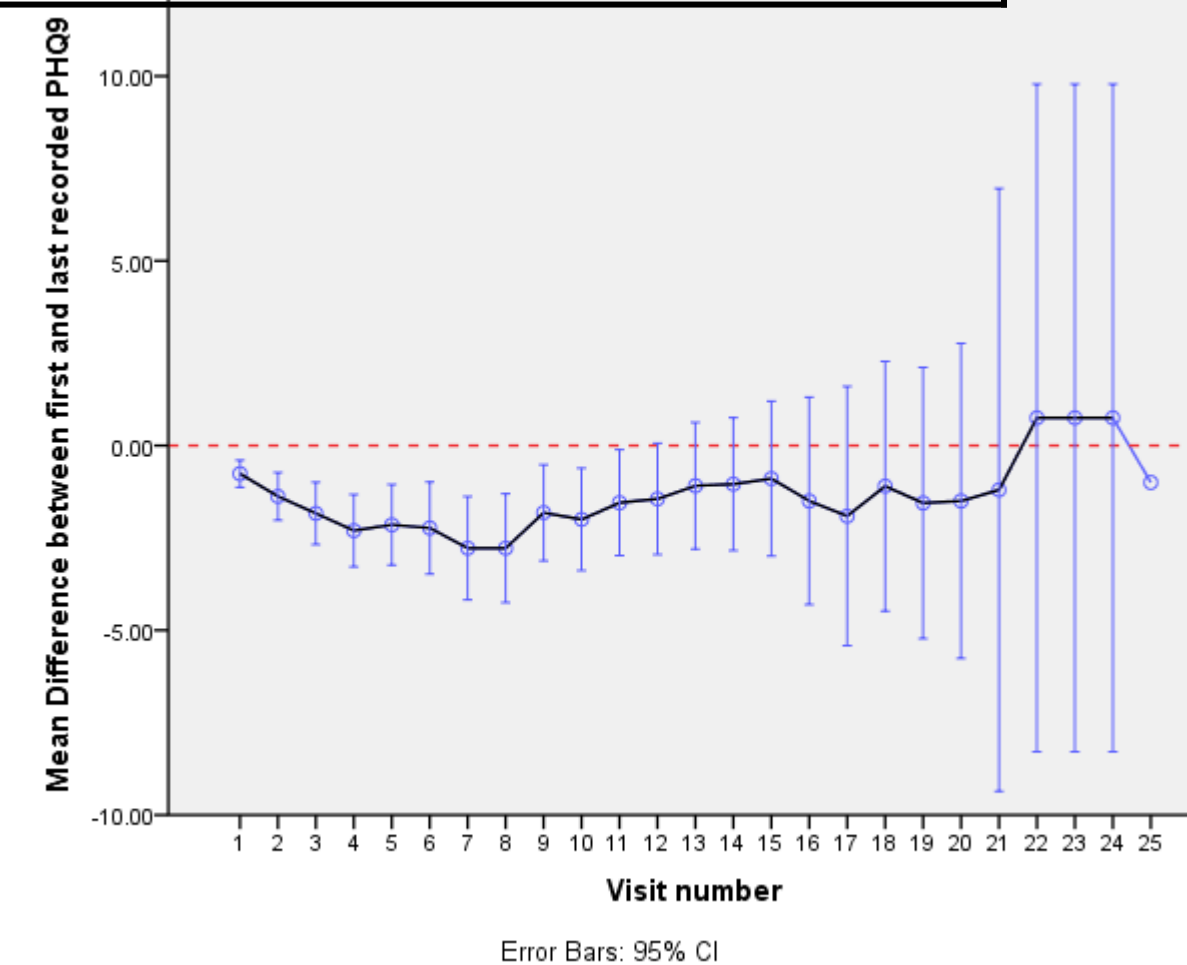|	1-2 Visits		3+ Visits	
	M ± SD	Median (Q1, Q3)	M ± SD	Median (Q1, Q3)
# of Psy Visits	1.29 ± 0.46	1 (1, 2)	7.2 ± 5.32	5 (9, 3)
EQ5D	0.66 ± 0.21	0.71 (0.51, 0.81)	0.64 ± 0.2	0.71 (0.8, 0.53)
EQ5DDiff	0.01 ± 0.08	0 (0, 0)	0.01 ± 0.19	0 (0.1, -0.07)
PHQ9	9.74 ± 6.92	8 (4, 15)	11.21 ± 6.02	10 (16, 7)
PHQ9Diff	-0.13 ± 2.34	0 (0, 0)	-1.84 ± 5.61	-1 (2, -4)
GAD7	7.74 ± 5.91	6 (3, 12)	8.96 ± 5.68	7 (13, 5)
GAD7Diff	-0.26 ± 1.91	0 (0, 0)	-1.12 ± 5.59	-1 (2, -4)
PDI	26.4 ± 18.88	26.5 (10, 41.75)	27.97 ± 17.03	27 (41, 14.5)
PDIDiff	-0.71 ± 5.88	0 (0, 0)	-1.73 ± 14.23	-1 (6, -11)

Results

A series of paired t-tests were conducted to compare participants' first and last recorded values for the EQ5D, PHQ9, GAD7, and PDI from their completed HP sessions. Only participants who received at least 3 sessions with HP were included in the analysis to ensure participants were actively involved in treatment.

			95% CI			
	M	SD	Lower	Upper	t	p
EQ5D	0.01	0.19	-0.02	0.04	0.83	.408
PHQ9	-1.84	5.61	-2.68	-0.99	-4.28	.000
GAD7	-1.12	5.59	-1.93	-0.32	-2.75	.007
PDI	-1.73	14.23	-4.38	0.93	-1.29	.200

Additionally, a series of multivariable linear regressions were conducted to evaluate the impact of the course of MS on the difference scores between the first and last values of the EQ5D, PHQ9, GAD7, and PDI while controlling for the baseline value of each measure.

Course vs. RRMS		B	Std. Error	t	p
EQ5D	1	.004	.028	.147	.883
	2	.012	.021	.584	.559
	3	.002	.033	.045	.964
	4	-.030	.037	-.802	.423
PHQ9	1	.372	.792	.470	.639
	2	.124	.618	.201	.841
	3	.682	1.009	.676	.500
	4	-.194	1.081	-.179	.858
GAD7	1	-.369	.739	-.500	.618
	2	.199	.573	.348	.728
	3	2.307	1.136	2.031	.043
	4	-.488	1.088	-.449	.654
PDI	1	.964	2.481	.389	.698
	2	4.591	1.825	2.515	.012
	3	1.925	3.856	.499	.618
	4	-1.669	3.166	-.527	.598

Course:

1 = Secondary Progressive MS without relapses

2 = Secondary Progressive MS with relapses

3 = Primary Progressive MS

4 = Progressive Relapsing MS

All shown compared to Relapsing Remitting MS

Error Bars: 95% CI

Discussion

Patients with MS who participated in at least 3 sessions of HP experienced a statistically significant reduction in both anxiety and depression between their first and last sessions. On average, their depression scores on the PHQ9 decreased by 1.84, while their anxiety scores on the GAD7 decreased by 1.12. However, there was considerable interpersonal variability in the amount that scores decreased, as evidenced by the high standard deviation for each measure. Despite the statistically significant reductions in anxiety and depression, a similar trend was not found in quality of life measured by the EQ5D or perceived disability due to pain measured by the PDI. These findings suggest that participation in HP is beneficial for participants' emotional well being, but may have less of a direct effect on other measures of functioning.

While there was a significant difference between primary progressive MS and relapsing remitting MS on the GAD7, and a difference between secondary progressive MS with relapses and relapsing remitting MS on the PDI, these results may be likely due to chance rather than a true finding as they were not observed consistently between courses of MS for each outcome measure.

Examination of first to last differences on the PHQ9 and GAD7 revealed that participation in additional sessions, up to a point, resulted in improved reduction in depression and anxiety. However, further sessions (after approximately 10 total sessions) did not have this effect. This may indicate that individuals with MS who receive further sessions may have more persistent emotional distress requiring management.