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Exploring peer coaches' outcomes: Findings from a clinical trial of patients with chronic pain

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ABSTRACT

Objective: Although peer coaching can help patients manage chronic conditions, few studies have evaluated the effects of peer coaching on coaches, and no studies have systematically examined these effects in the context of chronic pain coaching.
Methods: Peer coach outcomes were assessed as part of a randomized trial of peer coaching for chronic pain. In this exploratory analysis, linear mixed models were used to evaluate changes in peer coaches' pain and related outcomes from baseline to 6 and 9 months. The Šidák method was used to account for multiple comparisons.
Results: Peer coaches (N = 55) experienced statistically significant increases in anxiety and pain catastrophizing from baseline to 6 months, which were no longer significant after adjustment. All other changes were not statistically significant.
Conclusions: Despite prior studies suggesting that peer coaches benefit from serving as a coach, the current study failed to support that conclusion.
Practice Implications: Peer coaching remains a promising model, with high potential for implementation, for a number of chronic conditions requiring self-management. However, to maximize the benefits of such interventions, it is essential to monitor both those being coached and the coaches themselves, and not to assume that serving as a coach is inherently beneficial.

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1. Introduction

Pain affects at least 100 million Americans and has deleterious consequences [1]. Pain self-management strategies, such as stretching, activity pacing, and learning coping skills, are effective in helping to treat chronic pain and have been advocated by organizations such as the National Academy of Medicine [2,3]. However, pain self-management requires provision of information and support to be optimally effective [4–8], which can be challenging in busy clinical settings.

While pain self-management involves adopting behaviors and strategies, an important component of pain self-management that is often overlooked is the need for collaboration and support. Specifically, patients have noted the integral role of support, encouragement, motivation, and accountability in successful self-management [8]. Given the importance of self-management support, and the intensive resource demands such support can place on clinicians and clinic workflow, peer support represents a potentially promising means to deliver pain self-management support without creating significant additional burdens for healthcare teams.

Peer support involves placing "lay individuals with experiential knowledge" into healthcare settings to extend and complement professional healthcare services [9] and has increasingly been used to help individuals manage chronic conditions. Peer support in diabetes care has resulted in significantly lower hemoglobin A1c levels, increased diabetes-specific social support, and increased self-efficacy [10–12]. In addition, patients have reported phone

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calls from peers to be helpful in managing their diabetes symptoms, appreciated that their peer listened to them and addressed their concerns, and learned something new about diabetes management [13]. In mental health care in the U.S. Veterans Health Administration (VHA), veterans served by a case management team that included a peer support specialist improved significantly more on patient activation (self-management self-efficacy) than participants in the control condition (usual care) who did not work with a peer specialist [14]. This finding is important, since highly activated patients with chronic conditions are more likely than less activated patients to adhere to treatment recommendations and self-management activities, and are more likely to report better experiences with care and care coordination [15–17]. In chronic pain, a small pilot study of peer-supported pain self-management found improvements in pain, pain coping, patient activation, and other secondary outcomes, although these improvements were not statistically significant [18].

Despite evidence of potential benefits of a peer support model for patients, little is known about how peers themselves experience these interventions. This is a notable gap in the literature, because it is important to understand whether coaching helps peers or places additional burdens on them that negatively affect their own health. This question is especially important because peer coaches are also patients who have the same condition as patients with whom they work, but are (presumably) managing their condition effectively. Despite this question, few studies have systematically examined peer coaches' outcomes.

Qualitative evaluations of peer coaches' experiences in the context of cardiovascular disease have found that serving as a peer coach reinforced individuals' own healthy lifestyle changes, [19] increased personal understanding of and confidence in their ability to manage their own illness, [20,21] and provided a feeling of "giving back" to the community and to their health care providers [19,21]. In chronic pain, Arnstein and colleagues evaluated the experiences of eight graduates of a chronic pain management program who went on to serve as peer coaches. They found that these coaches' average pain intensity scores decreased after participation in the pain management program, increased slightly before peer training, dropped after training, then dropped again after beginning to serve as a peer coach. Qualitatively, these researchers found that peer coaches valued "making a connection" with other patients with pain, and volunteering helped the peer coaches feel as though they had a "sense of purpose" [22].

While these positive effects of being a peer coach are promising, evidence is scant. Qualitatively capturing peer coaches' experiences is important, but there is a notable lack of data on measurable health outcomes for peer coaches. Although the study by Arnstein and colleagues is encouraging, only eight peer coaches were evaluated. Consequently, as peer coach interventions continue to gain traction in chronic pain and other areas of disease management, it is imperative to better assess and understand the effects serving as a peer coach have on the coaches themselves. This is especially true if peers experience negative effects that may need to be attended to and mitigated by the healthcare team to prevent any declines in peers' health.

The purpose of this article is to better understand the potential effects of peer coaching on coaches by exploring the outcomes of peer coaches who participated in a 6-month peer-coach-led self-management intervention for chronic pain.

2. Methods

Evaluation of a Peer Coach-Led Intervention to Improve Pain Symptoms (ECLIPSE) was a 2-arm randomized controlled trial to test a peer-led pain self-management intervention for patients with chronic pain. Patients were either randomized to a 6-month long peer coaching intervention or a control group, which offered a 2 -h class in pain self-management. All procedures were approved by the local Institutional Review Board, and all study participants provided informed consent.

2.1. Setting and participants

This study was conducted in a Veterans Affairs (VA) medical center in the US. Peer coaches all had chronic (≥3 months in duration) musculoskeletal pain, confirmed by ICD-9 codes in the medical record. Peer coaches were recruited primarily from 1) completers of the intervention arm of a previous study involving pain self-management, and 2) patients recommended by their primary care providers because their providers judged that they were successfully managing their pain. As the trial progressed, peer coaches were also recruited from completers of the ECLIPSE intervention.

2.2. The peer coach intervention

Peer coaches attended a 2–3 hour training session taught by one of the study's peer coach facilitators (a registered nurse and a Bachelor's-level exercise scientist). As they were recruited, coaches were trained in small cohorts of 3–8 individuals. Training consisted of didactic portions focusing on chronic pain and pain self-management strategies, and role-playing. Peer coaches were given a manual that included a section on pain self-management, which was identical to the manual given to patients, and a section on "how to be a peer coach." Peer coaches were also asked to participate in monthly "booster" sessions led by peer coach facilitators; these informal sessions included offering advice, troubleshooting when questions or problems arose, and providing motivation and encouragement to peer coaches regarding their coaching roles.

After completing training, peer coaches were paired with a patient with chronic pain randomized to the study's intervention arm. All pairs were matched on gender and efforts were made to match based on pain location when possible. Coaches were able to decide how many patients they wanted to work with. The intervention lasted 6 months, and coaches were asked to talk, either by phone or in person, with their patients at least twice per month. Additional details on study protocol and training content can be found elsewhere [23].

2.3. Measures

This study was powered for patient outcomes (N = 215). However, all measures administered to the patient participants were also administered to peer coaches to ascertain the effect of coaching on the peers. Outcome assessments were administered at baseline (i.e., after they were consented, but before they began coaching), 6 months, and 9 months after baseline.

Sociodemographic characteristics were collected at baseline and included age, sex, race, education, marital status, employment status, and income.

Study measures, including psychometric properties, are described in detail elsewhere. [23] Overall pain was measured with the Brief Pain Inventory (BPI) total score, which is the average of 4 pain intensity ratings (BPI severity subscale) and 7 items rating interference with general activity, mood, walking, normal work, relations with other people, sleep, and enjoyment of life (BPI interference subscale). All 11 items are rated from 0 (no pain/no interference) to 10 (pain as bad as imaginable/interferes completely) [24].

Self-efficacy was measured with a 6-item modified version of the Arthritis Self-Efficacy Scale [25]. Participants respond to each item with their degree of confidence on a scale ranging from 1 (not at all confident) to 10 (totally confident) to questions about their ability to manage their pain. Pain coping was measured with the Pain Catastrophizing Scale, a 13-item scale that assesses catastrophizing—a pain belief consisting of rumination, magnification, and helplessness—that has been found to be a strong predictor of treatment response [26]. Higher scores indicate greater catastrophizing. The Multi-Dimensional Scale of Perceived Social Support [27] was used to assess perceptions of social support. This scale includes 12, 7-point Likert-scale items, with higher scores indicative of stronger social support. Patient activation, a measure of knowledge and confidence self-manage, was measured with the 13-item Patient Activation Measure (PAM) [28]. PAM scores range from 0 to 100 with higher scores indicating higher activation. General perceptions of health were measured with item 1 of the General Health Perceptions question from the Rand SF-36, developed as part of the Medical Outcomes Study [29], with higher scores indicative of better perceptions of one's health. Anxiety was measured with the GAD-7 [30], and depression was measured with the PHQ-8 [31]. In both scales, high scores represent higher anxiety and depression, respectively.

2.4. Statistical analysis

Baseline demographics and baseline outcome measures were compared between peer coaches and patients. Chi-square tests were used to compare categorical variables, and two-sample t-tests were used to compare continuous variables. A p-value < 0.05 was considered statistically significant. All analyses were completed in SAS V9.4 (Cary, NC).

As planned a priori, for each peer coach outcome, a linear mixed model with a fixed effect of time as categorical (baseline, 6 months, and 9 months) was fit to all time points assuming a compound-symmetry covariance structure for the repeated measurements from the same participant. From the fitted model, the mean change at 6 and 9 months relative to baseline was estimated, along with associated 95 % confidence intervals. Both the raw p-values and p-values adjusted for multiple comparisons (for the number of outcomes at a given time point) using the Šidák method are reported.

Since peer coaches' outcomes may depend on how much each peer coach actually participated, the linear mixed models were also fit to include the additional covariate of the number of patients each coach was assigned. The interaction term of time and number of patients was included but was not statistically significant for any outcomes; thus this variable was removed from the model. Effect sizes were calculated as the estimated mean change divided by the standard deviation of the residuals. Ninety-five percent confidence intervals were obtained by bootstrapping the data 1000 times, refitting the model for each bootstrap sample, and taking the 2.5th and 97.5th percentiles of the distribution of the effect sizes.

3. Results

Sixty-eight peer coaches were enrolled. However, 13 coaches either withdrew from the study or never made contact with their assigned patients. Reasons for withdrawal included health issues (either their own or those of a family member) and not having the time. That left 55 coaches who participated in the intervention and were included in this analysis. Almost half of these peer coaches (N = 26, 47.3 %) coached just one patient; another 26 coached between 2 and 4 patients, while 3 coaches (5.5 %) coached between 5 and 9 patients during the study.

Demographic characteristics and baseline outcome measures for peer coaches and patients are summarized in Table 1. Education level significantly differed between coaches and patients, with a greater percentage of coaches being college-educated. At baseline, peer coaches had significantly lower mean BPI interference and BPI total scores, although there was not a significant difference in BPI severity. Additionally, peer coaches had significantly lower depression (PHQ-8) and lower pain catastrophizing than patients. Coaches also displayed significantly higher perceptions of general health, self-efficacy, and patient activation at baseline than patients. There were no significant differences in income, perceived social support, or anxiety between peer coaches and patients.

Estimated mean changes and associated 95 % confidence intervals in peer coach outcomes obtained from the linear mixed model with and without adjusting for the number of patients assigned are presented in Table 2 and Table 3, respectively. Because results are similar, we focus on the adjusted model (Table 3).

Relative to baseline, anxiety (GAD-7 scores) increased from 4.7 to 5.4 at 6 months (p = .036, effect size = .16) and 5.5 at 9 months (p = .019, effect size = .18). These changes were no longer statistically significant after adjusting for multiple comparisons. Pain catastrophizing scores increased significantly from 12.6 at baseline to 16.5 at 6 months (p = .005, effect size = .34), then dropped to 15.7 at 9 months. After adjusting for multiple comparisons, none of these changes remained significant, although the change from baseline to 6 months was marginally significant (p = .051).

4. Discussion and conclusion

4.1. Discussion

Although peer coaching is recognized as a potentially important adjunct to care provided by traditional healthcare providers, little is known about the effects of peer coaching on the coaches themselves. Baseline comparisons indicate that peer coaches in ECLIPSE were healthier overall than the patients whom they coached. This finding is consistent with what one would expect from a peer coach whose task is to provide information and support to patients.

Most of the peer coach outcomes remained relatively unchanged over the course of the intervention. The two exceptions were anxiety and pain catastrophizing, which increased during the study. Increases in anxiety could potentially reflect the complexity of being both a patient and a peer coach. Luna and Rotheram-Borus, [32] in their study of peer coaching in youths with HIV, suggested that the shift from a patient role to a "provider" role as a peer coach imparts high expectations that the coach is to provide advice and serve as an example for others, which may lead to confusion and "substantial anxiety." Although that study involved a very different population (youths with HIV), coaches in the current study might have experienced similar role confusion and pressure as a result of being placed in a "provider" role in which they were expected to be a positive example for pain self-management and coping. However, it is also important to note that in the current study, effect sizes for these increases in anxiety were small (.16 from baseline to 6 months, .18 from baseline to 9 months), and coaches' anxiety at 6 and 9 months was still relatively low. GAD-7 scores of 5, 10, and 15 are considered cutoff points for mild, moderate, and severe anxiety, respectively; [30] thus, at baseline coaches were just below the cutoff for mild anxiety (mean GAD-7 = 4.7), and just above this point at 6 and 9 months (mean GAD-7 = 5.4 and 5.5, respectively). As a result, the clinical relevance of these changes is questionable.

Pain catastrophizing increased by a greater degree than anxiety, but was still characterized by a small effect size (.34

Table 1
Comparison of Peer Coach and Patient Baseline Characteristics.

			Peer Coach n = 55	Patient n = 213	p-value
Age	N	268	55	213	
	Mean ± SD	57.1 ± 12.6	58.1 ± 10.9	56.8 ± 13.0	0.489
	Median (Min, Max)	59.1 (25.7, 90.5)	60.6 (32.8, 73.3)	58.8 (25.7, 90.5)	
Gender	Male	213 (79.5)	40 (72.7)	173 (81.2)	0.164
	Female	55 (20.5)	15 (27.3)	40 (18.8)	
Race	White	165 (61.8)	34 (63.0)	131 (61.5)	0.844
	Not White	102 (38.2)	20 (37.0)	82 (38.5)	
	missing	1	1	0	
Education	High School or less	58 (21.7)	9 (16.4)	49 (23.1)	0.026
	2 year College/Technical	144 (53.9)	25 (45.5)	119 (56.1)	
	College: 4 year or more	65 (24.3)	21 (38.2)	44 (20.8)	
	missing	1	0	1	
Marital Status	No Partner	125 (46.8)	23 (41.8)	102 (48.1)	0.405
	Partner	142 (53.2)	32 (58.2)	110 (51.9)	
	missing	1	0	1	
Employment Status	Employed at all	108 (40.4)	22 (40.0)	86 (40.6)	0.943
	Retired	86 (32.2)	17 (30.9)	69 (32.5)	
	Other	73 (27.3)	16 (29.1)	57 (26.9)	
	missing	1	0	1	
Income	Comfortable	131 (48.9)	30 (54.5)	101 (47.4)	0.248
	Just enough to make ends meet	90 (33.6)	17 (30.9)	73 (34.3)	
	Not enough to make ends meet	45 (16.8)	7 (12.7)	38 (17.8)	
	Refused to answer	1 (0.4)	1 (1.8)	0 (0.0)	
	missing	1 (0.4)	0 (0.0)	1 (0.5)	
BPI Severity [0–10]	N	266	55	211	
	Mean ± SD	6.0 ± 1.8	5.7 ± 2.2	6.1 ± 1.6	0.281
	Median (Min, Max)	6.1 (1.5, 10.0)	5.7 (1.5, 10.0)	6.3 (1.5, 10.0)	
BPI Interference [0–10]	N	266	55	211	
	Mean ± SD	5.5 ± 2.5	4.8 ± 2.6	5.7 ± 2.4	0.017
	Median (Min, Max)	5.8 (0.0, 10.0)	5.1 (0.0, 10.0)	6.3 (0.6, 10.0)	
BPI Total [0–10]	N	266	55	211	
	Mean ± SD	5.7 ± 2.0	5.1 ± 2.2	5.8 ± 1.9	0.022
	Median (Min, Max)	5.8 (0.8, 9.9)	5.2 (0.8, 9.9)	6.1 (1.1, 9.7)	
SF-36 General Health Perceptions [0–100]	N	266	55	211	
	Mean ± SD	54.8 ± 21.6	63.6 ± 22.0	52.5 ± 20.9	0.001
	Median (Min, Max)	55.0 (0.0, 100.0)	65.0 (0.0, 100.0)	50.0 (5.0, 100.0)	
Perceived Social Support [12–84]	N	266	55	211	
	Mean ± SD	62.8 ± 17.8	64.4 ± 19.8	62.3 ± 17.2	0.448
	Median (Min, Max)	68.0 (12.0, 84.0)	72.0 (12.0, 84.0)	66.0 (12.0, 84.0)	
Self-Efficacy [0–10]	N	264	55	209	
	Mean ± SD	6.4 ± 2.3	7.1 ± 2.3	6.1 ± 2.2	0.004
	Median (Min, Max)	6.5 (0.0, 10.0)	7.7 (0.0, 10.0)	6.3 (0.0, 10.0)	
GAD-7 anxiety [0–21]	N	266	55	211	
	Mean ± SD	5.8 ± 5.4	4.7 ± 5.3	6.1 ± 5.3	0.076
	Median (Min, Max)	4.0 (0.0, 21.0)	3.0 (0.0, 21.0)	4.0 (0.0, 21.0)	
PHQ-8 depression [0–24]	N	266	55	211	
	Mean ± SD	8.6 ± 6.3	6.6 ± 6.4	9.2 ± 6.2	0.008
	Median (Min, Max)	7.5 (0.0, 24.0)	5.0 (0.0, 24.0)	8.0 (0.0, 24.0)	
Pain Catastrophizing Scale [0–52]	N	267	55	212	
	Mean ± SD	19.4 ± 13.4	12.6 ± 11.8	21.1 ± 13.2	<.001
	Median (Min, Max)	17.0 (0.0, 52.0)	10.0 (0.0, 52.0)	21.0 (0.0, 52.0)	
Patient Activation Measure [0–100]	N	258	55	203	
	Mean ± SD	61.4 ± 14.4	68.8 ± 14.7	59.4 ± 13.7	<.001
	Median (Min, Max)	60.0 (31.0, 100.0)	70.8 (32.2, 100.0)	56.4 (31.0, 100.0)	

from baseline to 6 months, .28 from baseline to 9 months). It is possible that talking about pain with other patients who had worse pain, coping, and psychological functioning at baseline fostered a greater awareness of coaches' own pain, potentially leading to higher pain catastrophizing. However, similar to their anxiety scores, peer coaches' catastrophizing scores (16.5 at 6 months, 15.7 at 9 months) were well below the cutoff of 30 for clinical significance, [26] suggesting that this change also might not be clinically relevant. Also of note, relative to their patients, peer coaches were generally healthier at baseline on all measures, and the higher levels of anxiety and catastrophizing in the coaches at 6 and 9 months were still lower than the patients' baseline levels of these measures. It is plausible that some of the coaches' changes simply represent the natural fluctuation of symptoms that many patients with chronic conditions experience.

This study's results do not support the small body of mostly qualitative research noting benefits of peer coaching for coaches. It is possible that coaches in the current study did indeed feel good about "giving back" or "making connections," as prior studies have found, despite not improving on measured outcomes. Because qualitative and quantitative methods tap into distinct aspects of patients' experiences [33], different methods may lead to different conclusions. As a result, future research should, when possible, employ mixed methods to more broadly capture the potential complexity peer coaches' experiences in the coach role. In addition, future research on peer coaching, even when focused on patients' outcomes, should measure peer coach outcomes to continue to advance our understanding of the effects of such interventions on peer coaches.

Some limitations to this study should be acknowledged. First, this study was largely exploratory, with a sample of 55 peer

Table 2
Changes in Peer Coach Pain and Associated Outcomes (Unadjusted).

			Change from Baseline			
	Month	Mean +/- SD	Estimate (Std Error)	95 % CI	p-value	Sidak p-value
BPI Total [0–10]	0	5.1 ± 2.2			.	
	6	5.1 ± 2.2	0.06(0.20)	(-0.34,0.45)	0.777	0.999
	9	5.0 ± 2.4	0.00(0.20)	(-0.40,0.39)	0.985	0.999
BPI Severity [0–10]	0	5.7 ± 2.2			.	
	6	5.4 ± 1.9	−0.27(0.18)	(-0.64,0.09)	0.138	0.774
	9	5.3 ± 2.0	−0.33(0.18)	(-0.69,0.03)	0.072	0.524
BPI Interference [0–10]	0	4.8 ± 2.6			.	
	6	4.9 ± 2.6	0.20(0.26)	(-0.31,0.72)	0.435	0.997
	9	4.8 ± 2.8	0.14(0.26)	(-0.37,0.66)	0.587	0.999
SF-36 General Health Perceptions [0–100]	0	63.6 ± 22.0			.	
	6	60.8 ± 24.6	−2.24(2.15)	(-6.50,2.02)	0.299	0.971
	9	61.1 ± 22.7	−1.92(2.15)	(-6.18,2.35)	0.374	0.991
Perceived Social Support [12–84]	0	64.4 ± 19.8			.	
	6	63.3 ± 17.7	−0.97(2.24)	(-5.41,3.47)	0.665	0.999
	9	65.8 ± 15.7	1.57(2.24)	(-2.87,6.01)	0.484	0.999
Self-Efficacy [0–10]	0	7.1 ± 2.3			.	
	6	6.9 ± 2.4	−0.29(0.37)	(-1.02,0.43)	0.425	0.996
	9	6.5 ± 2.6	−0.64(0.37)	(-1.37,0.08)	0.082	0.577
GAD-7 anxiety [0–21]	0	4.7 ± 5.3			.	
	6	5.4 ± 5.5	0.89(0.42)	(0.06,1.72)	0.036	0.308
	9	5.5 ± 5.7	1.00(0.42)	(0.17,1.82)	0.019	0.175
PHQ-8 depression [0–24]	0	6.6 ± 6.4			.	
	6	7.9 ± 6.9	1.21(0.63)	(-0.03,2.45)	0.055	0.435
	9	7.6 ± 6.4	0.91(0.63)	(-0.33,2.15)	0.15	0.803
Pain Catastrophizing Scale [0–52]	0	12.6 ± 11.8			.	
	6	16.5 ± 13.4	4.25(1.51)	(1.26,7.24)	0.006	0.056
	9	15.7 ± 13.2	3.46(1.51)	(0.47,6.44)	0.024	0.215
Patient Activation Measure [0–100]	0	68.8 ± 14.7			.	
	6	67.9 ± 17.7	−1.19(2.02)	(-5.20,2.82)	0.558	0.999
	9	68.9 ± 16.6	−0.34(2.01)	(-4.32,3.64)	0.866	0.999

Table 3
Peer Coach Estimated Change Adjusted for Number of Patients Assigned.

			Change from Baseline					
	Month	Mean +/- SD	Estimate (Std Error)	95 % CI	p-value	Sidak p-value	Effect Size	Effect Size 95 % CI
BPI Total [0–10]	0	5.1 ± 2.2			.			
	6	5.1 ± 2.2	0.07(0.20)	(-0.33,0.46)	0.746	0.999	0.03	(-0.12, 0.19)
	9	5.0 ± 2.4	0.00(0.20)	(-0.39,0.40)	0.983	0.999	0.00	(-0.20, 0.21)
BPI Severity [0–10]	0	5.7 ± 2.2			.			
	6	5.4 ± 1.9	−0.27(0.18)	(-0.63,0.09)	0.142	0.783	−0.13	(-0.30, 0.02)
	9	5.3 ± 2.0	−0.33(0.18)	(-0.69,0.03)	0.074	0.534	−0.16	(-0.34, 0.01)
BPI Interference [0–10]	0	4.8 ± 2.6			.			
	6	4.9 ± 2.6	0.22(0.26)	(-0.30,0.73)	0.404	0.994	0.09	(-0.10, 0.28)
	9	4.8 ± 2.8	0.16(0.26)	(-0.36,0.67)	0.551	0.999	0.06	(-0.18, 0.31)
SF-36 General Health Perceptions [0–100]	0	63.6 ± 22.0			.			
	6	60.8 ± 24.6	−2.30(2.15)	(-6.57,1.96)	0.287	0.966	−0.10	(-0.34, 0.11)
	9	61.1 ± 22.7	−1.98(2.15)	(-6.24,2.29)	0.36	0.988	−0.09	(-0.25, 0.06)
Perceived Social Support [12–84]	0	64.4 ± 19.8			.			
	6	63.3 ± 17.7	−0.87(2.24)	(-5.32,3.57)	0.697	0.999	−0.05	(-0.33, 0.22)
	9	65.8 ± 15.7	1.67(2.24)	(-2.77,6.11)	0.457	0.998	0.09	(-0.23, 0.36)
Self-Efficacy [0–10]	0	7.1 ± 2.3			.			
	6	6.9 ± 2.4	−0.33(0.36)	(-1.05,0.40)	0.371	0.990	−0.14	(-0.48, 0.15)
	9	6.5 ± 2.6	−0.68(0.36)	(-1.40,0.05)	0.066	0.497	−0.29	(-0.62, 0.02)
GAD-7 anxiety [0–21]	0	4.7 ± 5.3			.			
	6	5.4 ± 5.5	0.89(0.42)	(0.06,1.72)	0.036	0.306	0.16	(0.03, 0.31)
	9	5.5 ± 5.7	1.00(0.42)	(0.17,1.83)	0.019	0.173	0.18	(0.01, 0.36)
PHQ-8 depression [0–24]	0	6.6 ± 6.4			.			
	6	7.9 ± 6.9	1.22(0.63)	(-0.03,2.46)	0.055	0.432	0.19	(-0.03, 0.40)
	9	7.6 ± 6.4	0.91(0.63)	(-0.33,2.15)	0.149	0.800	0.14	(-0.05, 0.34)
Pain Catastrophizing Scale [0–52]	0	12.6 ± 11.8			.			
	6	16.5 ± 13.4	4.31(1.51)	(1.32,7.30)	0.005	0.051	0.34	(0.12, 0.59)
	9	15.7 ± 13.2	3.51(1.51)	(0.52,6.50)	0.022	0.199	0.28	(0.04, 0.56)
Patient Activation Measure [0–100]	0	68.8 ± 14.7			.			
	6	67.9 ± 17.7	−1.32(2.02)	(-5.33,2.69)	0.516	0.999	−0.08	(-0.37, 0.16)
	9	68.9 ± 16.6	−0.45(2.00)	(-4.43,3.53)	0.822	0.999	−0.03	(-0.34, 0.23)

coaches, 15 of whom were female; as a result, these findings should be interpreted with caution until a study is conducted with a larger sample. Second, because the primary purpose of ECLIPSE was to evaluate the effects of peer coaching on patients (i.e., those receiving the coaching), there is not a comparator group for peer coaches. As a result, some of the changes these coaches experienced might be the result of factors external to the ECLIPSE intervention that we were unable to account for, or simply the result of natural fluctuations in symptoms. Third, this study was conducted at one U.S. VA medical center, and all coaches (and patients) were veterans. Thus, results might not generalize to a non-veteran population.

4.2. Conclusion

This is the first study to systematically evaluate potential effects of a peer coaching intervention on peer coaches. In contrast to many prior studies of peer coaching that have indicated that serving as a peer can be beneficial, [10,12–14] most of which were qualitative and/or had very small sample sizes, we saw no improvements in outcomes among peer coaches in the current study. Despite the exploratory nature of this study, our results indicate that further study of peer coaches' outcomes is needed to better understand the effects of such interventions on the coaches.

4.3. Practice implications

The results from this study underscore the need for peer coaches, whether as part of research or in clinical practice, to be regularly monitored for potential worsening of symptoms, both physical and psychological, and procedures should be in place to address any worsening of symptoms experienced during their time as peer coaches. Peer coaching remains a promising model, with high potential for implementation, for a number of chronic conditions that require self-management. However, to maximize the benefits of such interventions, it is essential to monitor both those being coached and the coaches themselves, and not to assume that serving as a coach is inherently beneficial.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

CRediT authorship contribution statement

Marianne S. Matthias: Funding acquisition, Data curation, Investigation, Methodology, Project administration, Writing - original draft, Writing - review & editing. **Joanne Daggy:** Formal analysis, Writing - review & editing. **Susan Ofner:** Formal analysis, Writing - review & editing. **Alan B. McGuire:** Data curation, Investigation, Methodology, Project administration, Writing - review & editing. **Marina Kukla:** Data curation, Investigation, Methodology, Project administration, Writing - review & editing. **Matthew J. Bair:** Data curation, Investigation, Methodology, Project administration, Writing - review & editing.

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