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Short Communication

Functional Outcomes of Peer Support for Veterans on Long-Term Opioids for Chronic Pain

Barbara J. Turner[1,2]*, Shruthi Vale Arismendez[2], Yuanyuan Liang[2,3], Maureen J. Simmonds[2,4], and Mary Jo Pugh[2,5,6]

[1]*Department of Medicine, University of Texas Health San Antonio (UT Health San Antonio), USA*
[2]*Research to Advance Community Health Center (ReACH Center), USA*
[3]*Department of Epidemiology and Public Health, University of Maryland School of Medicine, USA*
[4]*Department of Physical Therapy, UT Health San Antonio, USA*
[5]*Veterans Evidence-based Research Dissemination and Implementation Center (VERDICT), South Texas Veterans Health Care System, USA*
[6]*Department of Epidemiology and Biostatistics, UT Health San Antonio, USA*

***Corresponding author**
Barbara J. Turner, Department of Medicine, University of Texas Health San Antonio (UT Health San Antonio), 7411 John Smith Rd. Suite 1050, San Antonio, TX 78229, USA, Tel: 210-562-5551; Fax: 210-562-5560, Email: turner@uthscsa.edu

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Abstract

Patients with chronic non-cancer pain receive little education or support for self-management of this debilitating condition. Peers with chronic non-cancer pain may be able to offer mutual support to incorporate strategies to improve functional outcomes into their daily lives. This peer support study trained veterans to collaborate in living better with chronic pain. From a Veterans Administration primary care clinic, eligible subjects were diagnosed with chronic non-cancer pain and treated for at least 3 months with moderate to high dose opioids. Peer-coaches were recruited after attending focus groups about chronic pain and trained in motivational interviewing. A letter from the clinic director invited eligible subjects to serve as peer-partners. All peers received 2 hours of training in positive goal setting and proactive pain management strategies such as exercise and stretching. Study outcomes included change in physical, cognitive and psychological functional measures from baseline to 6- and 12-weeks (wks) and effects evaluated linear mixed-effects models including all subjects and adjusted for age, sex, and pain level. Of 24 subjects (5 peer-coaches, 19 partners), 16 completed all measures. Analyses including all 24 subjects showed significant improvement in the following outcomes: 5x sit-to-stand test (-7.9 seconds at 6-wks [p=0.005] and -9.6 seconds at 12-wks [p=0.001]; Symbol-Digit Modalities Test (6.4 at 6-wks and 7.0 at 12-wks [both p<0.01]) and Patient Health Questionnaire-9 (-3.6 points at 6-wks [p=0.001] and -2.1 points at 12-wks [p=0.02]). Significant changes in physical, cognitive, and psychological outcomes support the potential value of peer support for chronic non-cancer pain management.

ABBREVIATIONS

U.S.: United States; MED: Morphine Equivalent Dose; 5XSTS: Five-Times-Sit-To-Stand Test; 6MW: 6-Minute Distance Walk Test; 50FTW: 50-Foot Speed Walk Test; SDMT: Symbol-Digit Modalities Test; SCWT: Stroop Color-Word Interference Test; PHQ-9: Patient Health Questionnaire-9; PCS: Pain Catastrophizing Scale; IEQ: Injustice Experience Questionnaire; BPI: Brief Pain Inventory; SD: Standard Deviation

INTRODUCTION

The 2016 National Pain Strategy from the U.S. Department of Health and Human Services endorses non-pharmacologic approaches for first-line management of chronic pain [1]. However, patients with chronic pain often fail to take advantage of these approaches due to lack of training as well as attitudinal, motivational, and logistical barriers [2,3]. Veterans taking long-term opioids for chronic pain complain that they have been poorly supported to self-manage this disease [4], and express interest in partnering with peers to learn how to live better with chronic pain [5]. Peer interventions have had significant beneficial effects on self-management of multiple chronic diseases [6,7], and in increasing healthy behaviors such as physical activity [8]. We conducted a pilot study of a new peer support program for veterans with chronic pain and evaluate defects on multiple functional measures. If peer support produces improvement in objective functional measures, it could offer an important complementary approach to chronic disease management by professionals.

MATERIALS AND METHODS

Study subjects

Study subjects were recruited from a Veterans Health Administration Primary Care Clinic in San Antonio, TX. Five subjects on high dose opioids (>50 mg morphine equivalent dose [MED]) agreed to serve as peer-coaches after participating in a focus group about chronic pain [4]. From the practice's electronic medical record, 209 subjects aged 25 to 70 years on > 30 mg MED were identified as eligible to serve as peer-patients after excluding those with cancer pain, inability to exercise, and not English speaking. Of these, 50 subjects were randomly selected for a recruitment letter and 19 (38%) completed onsite consent. The study was approved by the Institutional Review Board of the

University of Texas Health San Antonio.

Peer support program

Peer support training was adapted from the Centers for Disease Control and Prevention's Physical Activity guidelines and the Pain Toolkit [9]. Peer-coaches and peer-partners attended separate two-hour lessons about: understanding chronic pain, setting goals, stretching, exercise, relaxation, and tips for success. Each peer-coach was matched with 3 to 4 peer-partners based on sex and schedule availability/flexibility. Peer-coaches were asked to conduct weekly calls (~15-20 minutes) over 12-weeks with peer-partners and, for each, received $15 (up to 6 calls/month).

Peer-coaches also attended a 1.5-hour session to learn motivational interviewing techniques [10], and approaches suggested by veterans in focus groups to improve pain self-management while reducing reliance on drug therapy [4]. Peer-coaches were also provided a list of local resources (e.g. swimming pools). Peer-coaches practiced phone calls with a team member and reviewed progress in monthly calls and 3 group meetings with the team.

Outcome measures were assessed at baseline, 6-weeks, and 12-weeks. We examined five physical functional measures. The *five-times-sit-to-stand test* (5XSTS) assesses both balance and strength and is measured by the mean time from two trials of standing five times from a standard armless chair [11-13]. The *6-minute distance walk test (*6MW*)* assesses strength and stamina based on the distance (feet) that a subject can comfortably walk in six minutes, quantified by a wheel pushed by a research assistant following the subject [14]. The *50-foot speed walk test* (50FTW) evaluates gait velocity [11]. The *Symbol-Digit Modalities Test (SDMT)* assesses attention and psychomotor speed as measures of cognitive function [15]. The *Stroop Color-Word Interference Test (SCWT)* measures selective attention [16]. The *Patient Health Questionnaire (PHQ-9),* [17] *Pain Catastrophizing Scale (PCS)*, [18] and *Injustice Experience Questionnaire (IEQ*, [19] examine the severity of depression, effects of pain on ability to function, and the experience of social injustice, respectively. The *Brief Pain Inventory (BPI)* was also used to assess pain intensity [20].

Analysis

Descriptive statistics were compared for subjects who completed the program and those who did not using two-sample t-tests with unequal variance assumption for continuous measures and Fisher's exact test for categorical measures. Final analyses include all subjects. Mean (SD) of outcome measures at each time point (i.e., baseline, 6-weeks, 12-weeks*)* and change scores at 6- and 12-weeks were compared with paired samples t-tests*.* In linear mixed-effects models including all available data, changes were evaluated taking into account within-person correlations of repeated measures and controlling for sex, age, and mean pain intensity.

RESULTS AND DISCUSSION

Among 24 participants completing baseline assessment (5 peer-coaches and 19 patient-partners), mean age was 54.2 years (SD=9.76 years) and 20 (83%) were men. On average, these participants reported having chronic pain for 19 years (Table 1). The mean score for pain in the past week was 5.7 (moderately severe) for the average pain, 3.8 (mild to moderate) for least pain, and 7.8 (moderate to severe) for the worst pain experienced in the past 24 hours. Baseline scores on the PCS were in the 66th percentile while scores on the IEQwere in the 70th percentile indicating significant disability.

Subjects who continued in the program did not differ significantly from non-completers on any characteristic or measure (Table 1). In unadjusted analyses, subjects walked a mean of 162 feet farther on the 6MW (p=0.47) at 6-weeks and increased that distance 210.2 feet farther at 12-weeks (p-0.16) compared with baseline (Table 2). On the 5XSTS, subjects improved the time to complete this test by 10 seconds at 6 weeks (p=0.02) and 11.3 seconds at 12 weeks (p=0.016). The other physical function measures did not improve significantly.

In regard to cognitive function, performance on the SDMT improved relative to baseline at both 6- and 12-weeks by 6 and 7 points, respectively(both p<.001). In regard to depressive symptoms, the PHQ-9 declined from a mean score of 15.8 to 13.6 at 6 weeks (p=0.019), indicating an improvement, but was not significant at 12-weeks (p=0.07). The SCWT, PCS and IEQ did not change significantly at either time point.

In a fully adjusted model (Table 3), performance on the 5XSTS improved at both 6- and 12-weeks by 7.9 and 9.6 seconds,

Table 1: Comparison of demographics and baseline measures for subjects who did and did not complete study.

Demographic characteristic or baseline measure	Completed study N = 16 Mean (SD)	Did not complete study N = 8 Mean (SD)	p-value[1]
Age	55.31 (8.81)	52.00 (11.76)	0.50
Male n (%)	14 (87.50)	6 (75.00)	0.58
Mean pain intensity	6.07 (1.75)	5.00 (1.69)	0.17
Physical function			
5XSTS (seconds)	27.08 (14.17)	20.17 (6.47)	0.12
6MW (feet)	1054.54 (399.37)	987.15 (469.70)	0.73
50FTW (secs)	16.51 (7.23)	15.34 (4.23)	0.62
Cognitive function			
SDMT	35.56 (8.16)	39.13 (4.12)	0.17
SCWT	34.13 (13.92)	37.88 (6.83)	0.39
Psychological function			
PHQ-9	17.19 (5.87)	13.13 (6.85)	0.18
PCS	27.75 (9.28)	25.38 (14.80)	0.69
IEQ	30.81 (8.76)	24.38 (10.76)	0.17

1. Based on two independent sample t test with unequal variance assumption
2. Based on Fisher's exact test
SD=standard deviation
Physical function measures: Five-times-sit-to-stand test (5XSTS), 6-minute distance walk test (6MW), 50-foot speed walk test (50FTW)
Cognitive function measures: Symbol-Digit Modalities Test (SDMT), The Stroop Color-Word Interference Test (SCWT)
Psychological function measures: The Patient Health Questionnaire (PHQ-9), Pain Catastrophizing Scale (PCS), and the Injustice Experience Questionnaire (IEQ)

Table 2: Change in physical, cognitive, and psychological measures from baseline to 6-weeks and to 12-weeks.

Functional measure	Baseline N= 24	6-week	Change from baseline to 6-weeks			12-week	Change from baseline to 12-weeks		
	Mean (SD)	*Mean (SD)*	*N*	*Mean (SD)*	*P value*	*Mean (SD)*	*N*	*Mean (SD)*	*P value*
Physical function									
5XSTS (seconds)	24.78 (12.44)	17.64 (7.92)	12	-9.96 (12.80)	**0.021**	15.11 (5.70)	13	-11.26 (14.42)	**0.016**
6MW (feet)*	1031.10 (415.66)	1226.42 (873.75)	12	161.68 (754.16)	0.47	1350.15 (593.52)	13	210.16 (506.45)	0.16
50FTW (seconds)	16.12 (6.32)	14.65 (5.23)	12	-1.13 (3.23)	0.25	13.27 (3.89)	12	-0.61 (2.05)	0.33
Cognitive function									
SDMT	36.75 (7.18)	42.36 (7.20)	14	6.64 (5.84)	**0.001**	42.27 (6.39)	15	7.67 (6.24)	**<0.001**
SCWT	35.38 (12.00)	30.93 (8.08)	14	-4.64 (16.25)	0.31	34.93 (8.98)	15	3.33 (9.96)	0.23
Psychological function									
PHQ-9	15.83 (6.37)	13.60 (5.40)	15	-3.20 (4.68)	**0.019**	15.38 (5.86)	16	-1.81 (3.66)	0.07
PCS	26.96 (11.15)	29.27 (9.90)	15	1.40 (10.53)	0.62	28.06 (8.12)	16	0.31 (7.55)	0.87
IEQ	28.67 (9.74)	26.60 (10.01)	15	-2.13 (7.37)	0.28	30.50 (9.92)	16	-0.31 (11.34)	0.91

*one patient did not complete the 6MW at baseline due to physical limitations
SD=standard deviation
Physical function measures: Five-times-sit-to-stand test (5XSTS), 6-minute distance walk test (6MW), 50-foot speed walk test (50FTW)
Cognitive function measures: Symbol-Digit Modalities Test (SDMT), The Stroop Color-Word Interference Test (SCWT)
Psychological function measures: The Patient Health Questionnaire (PHQ-9), Pain Catastrophizing Scale (PCS), and the Injustice Experience Questionnaire (IEQ)

Table 3: Estimated change from baseline physical, cognitive, and psychological measures to 6-weeksn and 12-weeks from mixed effects models.

Functional measure	Change from baseline to 6-weeks			Change from baseline to 12-weeks		
	Coefficient	[95% CI]	P value	Coefficient	[95% CI]	P value
Physical function						
5XSTS (seconds)	-7.94	[-13.54, -2.34]	0.005	-9.57	[-15.00, -4.12]	0.001
6MW (feet)	320.75	[-14.40, 655.90]	0.06	272.77	[-51.48, 597.03]	0.09
50FTW (seconds)	-1.44	[-3.07, 0.18]	0.08	-1.03	[-2.60, 0.55]	0.20
Cognitive function						
SDMT	6.36	[3.29, 9.43]	<0.001	7.00	[4.02, 9.99]	<0.001
SCWT	-3.71	[-10.30, 2.87]	0.27	0.52	[-5.89, 6.94]	0.87
PHQ-9	-3.63	[-5.46, -1.79]	<0.001	-2.12	[-3.90, -0.33]	0.02
PCS	1.21	[-3.81, 6.24]	0.47	0.34	[-4.56, 5.24]	0.89
IEQ	-2.88	[-9.35, 3.59]	0.38	0.87	[-5.47, 7.21]	0.79

Note: mixed model is adjusted for sex, age, and mean pain intensity
Physical function measures: Five-times-sit-to-stand test (5XSTS), 6-minute distance walk test (6MW), 50-foot speed walk test (50FTW)
Cognitive function measures: Symbol-Digit Modalities Test (SDMT), The Stroop Color-Word Interference Test (SCWT)
Psychological function measures: The Patient Health Questionnaire (PHQ-9), Pain Catastrophizing Scale (PCS), and the Injustice Experience Questionnaire (IEQ

respectively (both p<0.01). Although subjects increased the distance covered on the 6MW, it was not significant at 6 weeks (p=0.06) and 12 weeks (0.09). However, the SDMT performance improved significantly at both 6-weeks and 12-weeks (both p<0.001) and the PHQ-9 score was significantly lower at 6 weeks (decreased by 3.6, p<0.001) and at 12 weeks (decreased by 2.1, p=0.02).

In regard to program logistics, study subjects were asked to speak weekly but in actual practice this generally occurred biweekly. In addition, subjects were asked to keep activity logs but usually not completed. At study's conclusion, key informant interviews with peer coaches examined challenges with program. Common themes included: difficult logistics of completing calls with peer-partners, challenges of mental health problems, and

interruptions due to personal vacation travel and poor health.

Peer support to self-manage chronic resulted in significant improvements measures of physical, cognitive, and psychological function. The study subjects were significantly disabled at baseline having had chronic pain for a mean of 19 years and moderately severe daily chronic pain. Compared with other studies of subjects with chronic pain or the elderly, our study subjects performed poorly on the 5XSTS test at baseline. At the beginning of our study, the subjects took an average of 25 seconds to perform the 5XSTS compared with an average of 13 seconds in a study of nearly 100 middle-aged women with fibromyalgia [21] and a mean of 12 seconds among 842 community-based seniors without cognitive impairment [22]. By the 12-week study endpoint, the study subjects performed the 5XSTS an average of 11.3 seconds faster after adjusting for baseline pain and demographics. Because the 5XSTS is a valid measure of dynamic balance and functional mobility [23], this improvement likely increased our subjects' ability to perform activities of daily living. Additionally, performance on the 5XSTS test has been shown to be predictive of future disability and falls [24,25], so this improvement may also reduce the risk of these adverse outcomes.

At baseline on the 6MW, the study subjects walked an average of 1031 feet that is substantially worse compared with the women in the fibromyalgia study who walked an average of 1313.6 feet at baseline [21], or the mean of 1235.9 feet in the study of community elders [22]. Slow gait speed has been associated with poor 10-year survival [26] and performance on the 6MW correlates with endurance and overall health and well-being [27]. Thus, without a targeted intervention to improve physical stamina, our study subjects have a poor prognosis.

Chronic pain also affects cognitive function including attentional deficits [28], cognitive flexibility, and diminished working memory [29]. In regard to depressive symptoms, the PHQ-9 score also improved significantly at 6-weeks and tended to be lower at 12-weeks. However, by the end of the study the mean score remained over 10, indicative of persistent major depression [17]. Nevertheless, a modest improvement in mood can contribute to improved physical function, as reported by research in the elderly [30]. Our subjects also improved significantly on the SMDT at both 6- weeks and 12-weeks, indicating better cognitive function. The SMDT measures processing speed and executive function working memory, both of which have been reported to be compromised to a mild to moderate degree in persons with chronic pain [31].

In comparison, another peer support study of veterans with chronic pain reported a moderate size but non-significant reduction in pain centrality after 4 months [32]. Our project focused on function which was endorsed by community members as essential to improving their lives [33].

In this project, we sought to minimize barriers to effective peer support identified in another qualitative study of veterans with chronic pain [34], such as challenges with communication and motivation to stay engaged. To make communication less cumbersome, we accepted a lower frequency of completed calls than originally planned. In addition, a project coordinator helped to keep peer-coaches and patient-partners engaged and, in interviews with subjects at the end of the study, this individual was deemed to be key to the success of this program.

Study limitations include a small sample, subject attrition, and short-term evaluation. Yet completers did not differ from non-completers. We cannot distinguish whether peer-coaches or their patient-partners improved more in combined analyses similar to other peer support studies [6]. The robustness of our results is reflected by consistent findings in unadjusted and adjusted analyses.

CONCLUSION

Our peer support intervention focused on multiple aspects of living with chronic pain such as: stretching, relaxation, setting goals to live better with chronic pain, and dealing better with setbacks. This approach was adapted from a chronic pain intervention used for low income veterans [9]. This multidimensional program is consistent with objectives of the Department of Defense and the Veterans Health Administration as stated in their joint Pain Management Task Force in 2010 which recommended increased use of diverse non-pharmacologic approaches and less reliance on drugs [35]. To date, effective approaches to operationalize these recommendations through active patient engagement remain elusive.

This pilot study of peer support demonstrates its promise as part of a pain self-management support program with clinically meaningful changes in multiple objective functional measures. Behavioral and motivational support by peers who are dealing with this challenging condition should be examined as a complement to chronic disease management in the context of multidisciplinary chronic pain management [36].

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