


Evaluation of a Peer Led Chronic Pain Self-Management Program in a Rural Population

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Abstract

Background: The Chronic Pain Self-Management Program is an evidence-based intervention that has been shown to be efficacious in reducing symptoms of chronic pain. However, there is a paucity of research examining CPSMP in a predominantly rural population. The purpose was to evaluate patient-reported outcomes of in-person peer-led CPSMP workshops offered in a rural region in 2018 and 2019. **Methods:** Participants were surveyed at baseline and 6 months post-workshop. Descriptive statistics were used to describe characteristics of CPSMP completers. Paired t-tests were used to analyze change in depression score (PHQ-8), disability (modified Roland-Morris Disability Questionnaire), self-efficacy, and patient activation (PAM-10). Analysis of variance was used to detect differences over time by age group, education, insurance type, self-rated health, and comorbidities. **Results:** Among the 327 adults who enrolled in a workshop, 73.1% completed. Of completers, 74.9% were female, average age was 65. Significant improvements were observed in pain disability ($P = .0008$), patient activation ($P = .0362$), depression ($P < .0001$), and self-efficacy ($P < .0001$), at 6 weeks; and pain disability ($P = .0030$), depression ($P = .0015$), and self-efficacy ($P = .0064$) at 6 months post-program. Individuals who rated their health as fair/poor at baseline reported greater improvements in depression scores than individuals who rated their health as good or better ($P < .0002$). There were also distinct patterns of change in pain disability among the different age groups. No other differences between groups were noted. **Conclusions:** The CPSMP appears to improve pain self-efficacy, disability, and depression regardless of age, gender, insurance status, education, or comorbidities. Healthcare and community organizations should consider investing in and offering chronic pain workshops in rural areas in order to promote health and wellness.

Keywords

pain management, rural health, health outcomes, community-based program, health promotion, pain disability, self-efficacy

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Introduction

Chronic pain, defined as pain on most days or every day in the past 6 months, is pervasive in the United States affecting between 11% and 40% of adults and accounting for more than \$560 billion annually in direct and indirect costs. Rural populations have a higher prevalence of chronic pain than non-rural populations.¹ The etiology of chronic pain is complex and multifactorial and therefore the treatment of chronic pain is also complex. Recommendations for treating chronic pain advocate for a team approach and include a significant reliance on self-management and patient-centered care² as outlined by the chronic care models (CCM).³⁻⁶ Within this model, health systems and community resources act synergistically to develop productive

interactions between activated patients and prepared, proactive healthcare teams.

Self-management education programs have shown promise in demonstrating short-term reductions of some chronic pain symptoms, including pain catastrophizing,

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pain disability, function, depression, and quality of life.⁷⁻⁹ One of the most well-known and well-studied programs is the Chronic Disease Self-Management Program (CDSMP), developed by Kate Lorig and colleagues at Stanford University's Patient Education Center (now licensed through the Self-Management Resource Center [SMRC]). In 2015, the Chronic Pain Self-Management Program (CPSMP) was added to the suite of offerings. These self-management programs are based in Bandura's self-efficacy and social cognitive theories.^{10,11} Through persuasion, skill mastery, reframing, and group support, people develop the confidence to successfully manage their conditions.^{12,13} These group-based process-oriented programs are offered over the course of 6 weeks and are led by 2 trained peer leaders.¹⁴

Very few studies have been conducted to examine the effects of the evidence-based CPSMP on improving chronic pain outcomes since the seminal study that provided the initial evidence base for the program.⁹ In that study, 110 individuals were randomly assigned to either the intervention arm or the wait-listed control arm. The sample was predominantly female, Caucasian, with a mean age of 40. The findings from this randomized controlled trial (RCT) indicated short term improvements in self-reported outcomes on pain severity and impact, physical role functioning, life satisfaction, dependency, and vitality. There was no difference in depression scores as measured by the Beck Depression Inventory between the 2 groups post-intervention. A recent proof-of-concept evaluation of a virtually delivered CPSMP demonstrated improvement in pre/posttest pain status, depression, and self-efficacy.¹⁵ Mehlsen et al and colleagues conducted both a prospective evaluation and a RCT in a Danish population. The findings from the prospective study indicated significant improvements in physical disability, pain catastrophizing, depression, and pain self-efficacy at 6 months.¹⁶ However, there were no reported effects of the CPSMP on pain intensity, disability, self-efficacy, or cost in the RCT.¹⁷

Other RCTs using similar pain self-management interventions have shown mixed results regarding pain outcomes. Nost et al compared a 6-week pain self-management intervention against a low-impact physical control group with the primary outcome measure being patient activation. After 3 months there was no difference between groups regarding patient activation.¹⁸ Another trial testing a chronic pain self-management intervention with older adults reported no significant differences between groups post-program or at 6-month or 12-month follow-up.¹⁹ Nicholas et al also investigated long-term pain outcomes in older adults and did find a significant difference between the self-management group and those randomized to an exercise attention control group in pain disability scores between baseline and 1 year follow up. Significant improvements

were also found in depression, pain related distress, usual pain intensity, and fear avoidance.²⁰ An intervention that used a combination of group and individually-based self-management education and support over a period of 6 weeks demonstrated significant improvement in function, pain, catastrophic thinking, and self-efficacy at the 12-week post-program follow up.²¹ It is important to note that all of the above studies used healthcare professionals (eg, physical therapists or psychologists) as program facilitators instead of peer facilitators as required by SMRC's programs. The use of professional facilitators in community-based self-management programs could be a barrier in rural areas due to the scarcity of healthcare providers, particularly mental health providers.²²

In addition to a healthcare provider shortage, rural populations generally have limited access to specialized treatment options, including non-pharmacological treatments for chronic pain.²³ Rural populations also tend to define health and expectations about health differently than urban populations.^{24,25} For example, rural residents tend to be more self-reliant, fatalistic, and stoic than non-rural populations.²⁶⁻²⁹ Furthermore, rural populations tend to distrust outsiders, including medical experts, preferring to rely on their own social networks for assistance.^{30,31} These characteristics translate into being more accepting of chronic illness and less likely to seek help from professionals unless it interferes with work or social activities.²⁴

Chronic disease self-management programs have demonstrated positive effects in rural populations in terms of self-efficacy and patient activation.³² While studies have examined chronic pain self-management interventions in rural areas, our study team could only identify one that was peer-led and that program used a one-to-one telephone intervention.³³ Therefore, it is unclear if the group-based CPSMP can influence pain-related outcomes in a rural population.

The objective of this analysis was to determine the relationship between peer-led pain self-management program completion and patient reported outcomes over 6 months, and to assess whether there is any presence of sociodemographic interaction effects on these outcomes.

Methods

Design

This analysis is an outcome evaluation of a 2-year project. The intervention took place between September 2018 and November 2019. The study team had intended to continue the in-person intervention through 2021, but the pandemic required a conversion to novel remote delivery modes of programs which are not necessarily comparable to the in-person workshops. The plan for evaluation was determined

to meet federal criteria for exemption from further review by the hospital's Institutional Review Board. Participants provided written informed consent to participate in the program and share their de-identified data for evaluation and dissemination purposes.

Setting and Participants

The setting for the project was a 6-county region in rural central New York. The region is served primarily by one integrated healthcare organization. The suite of self-management programs has been offered through the healthcare organization's Center for Rural Community Health since 2012. However, formal evaluations of the programs did not begin until 2017 and CPSMP was not added until 2018. Participants were recruited to enroll in the program through a multimodal recruitment strategy including traditional print media, targeted print and electronic communication, provider referrals, and social media advertisements. Participants were eligible to enroll if they lived within the healthcare network service region and were 18 years or older. Participants did not need to have a formal diagnosis of chronic pain. However, this analysis is limited to those who self-reported that they had chronic pain on the baseline survey.

Intervention

The intervention has been described in more detail elsewhere.³⁴ Briefly, this specific project was implemented in response to a Health Resources and Services Administration rural healthcare services outreach program intended to improve self-efficacy for pain management, reduce pain intensity and pain-related disability, and improve mental health. The Chronic Pain Self-Management Program (CPSMP) and Chronic Disease Self-Management Program (CDSMP) are evidence-based interventions that meet in small groups (ideally 12-16 participants) for 2½ hours per week for 6 weeks. Two trained peer leaders facilitate the workshops. For this project, workshops were held in a variety of locations, including churches, healthcare clinics, senior centers, libraries, and community centers across the 6 counties.

The workshops focus on improving self-efficacy in pain management through a process-oriented curriculum. Participants are exposed to and practice action planning, problem solving, and decision making. Physical activity, communication and emotional regulation skills are also introduced in the curriculum. Pain specific content in the CPSMP focuses on pacing and planning, participating in a gentle stretching program, and medication use. The disease-agnostic CDSMP also addresses pain management and medication use. It is expected that there is high level of group participation during the workshop sessions.

Measures

The primary outcome measure for this evaluation was pain disability, measured by the 24-item Modified Roland-Morris Disability Questionnaire (M-RMDQ). The original RMDQ instrument was designed for patients with low back pain³⁵ but has since been validated with heterogeneous pain populations, by replacing "because of my back" with "because of my pain."³⁶ Scores range from 0 to 24. A score of 4 or less had previously been established as a clinical cut point for functionality, and a change of 5 or more points has been noted as being clinically significant.³⁷

Secondary outcomes measures include assessing 6 month change in Patient Health Questionnaire-8 (PHQ-8), the Patient Activation Measure (PAM-10), and pain self-efficacy. The PHQ-8 is a validated diagnostic measure for depressive disorder³⁸ using a 4-point Likert scale (0-3). Possible scores range from 0 to 24, with higher scores indicating higher levels of depression. Kroenke et al suggested that a score ≥ 10 is considered clinically significant. The PAM-10, licensed by Insignia Health (Minnetonka, MN) has demonstrated ability in predicting health outcomes equivalent to the 22- and 13-items versions.³⁹⁻⁴² The PAM-10 was only administered during the 2019 workshops. Pain self-efficacy is a 5-item self-efficacy pain scale which is part of the arthritis self-efficacy scale.⁴³ This scale was adapted by Mehlsen et al¹⁶ to be more generic and this study uses that adapted scale.

Survey instruments were administered immediately before the first session of the intervention (T1), at the last session of the intervention (T2) and 6 months post-intervention (T3).

Statistical Methods

Comparisons between program completers and non-completers were conducted using the student's t-test for continuous measures and chi-square for categorical measures. Pre-post program comparisons were conducted using the paired t-test. Comparison of change in patient-reported outcomes over time across groups (age, education, insurance status, self-reported health, number of comorbidities, presence of depression, presence of arthritis, workshop type) used two-way analysis of variance (ANOVA). The proportion of program completers meeting clinical cut-points for depression and pain disability were compared pre- and post-program using McNemar's test for discordant pairs.

Results

Sample Characteristics

Between 2018 and 2019, 327 participants with chronic pain enrolled in either a CDSMP or CPSMP workshop. Of those,

Table 1. Participant Characteristics.

All Subjects	N	Total N = 327	Non-completers N = 88	Completers N = 239	P-value
		Mean (SD)	Mean (SD)	Mean (SD)	
Roland-Morris Disability Questionnaire	326	13.20 (5.52)	13.56 (5.42)	13.06 (5.56)	.4692
PAM score*	227	64.69 (16.26)	63.78 (16.08)	65.05 (16.36)	.5927
PHQ8	309	8.94 (6.03)	9.40 (6.39)	8.77 (5.89)	.4297
Self-Efficacy	322	25.63 (10.58)	24.64 (11.88)	26.00 (10.06)	.3451
Pain in past week (0-10)	225	6.36 (2.11)	6.54 (2.12)	6.28 (2.10)	.4172
Count of chronic conditions	327	4.35 (2.27)	3.98 (2.10)	4.49 (2.32)	.0587
Age	323	64.07 (12.42)	61.29 (14.28)	65.11 (11.52)	.0259
	N	%	N (%)	N (%)	
Age under 50	33	10.22	13 (14.77)	20 (8.51)	.1371
50-64	124	38.39	37 (42.05)	87 (37.02)	
65-79	139	43.03	34 (38.64)	105 (44.68)	
80+	27	8.36	4 (4.55)	23 (9.79)	
Male	87	26.61	27 (30.68)	60 (25.10)	.3114
Female	240	73.39	61 (69.32)	179 (74.90)	
Not Hispanic	309	96.87	82 (98.90)	227 (96.19)	.4632
Hispanic	10	3.13	1 (1.20)	9 (3.81)	
American Indian or Alaskan Native	8	2.45	1 (1.14)	7 (2.93)	.6873
Asian	1	0.31			—
Black or African American	6	1.83	2 (2.27)	4 (1.67)	.6619
Native Hawaiian or Other Pacific Islander	0	0			—
White	307	93.88 [^]	83 (94.32)	224 (93.72)	.8423
Less than HS	19	5.85	8 (9.20)	11 (4.62)	.2277
HS graduate/GED	80	24.62	18 (20.69)	62 (26.05)	
Some college/technical school	142	43.69	42 (48.28)	100 (42.02)	
College graduate 4 years +	84	25.85	19 (21.84)	65 (27.31)	
CDSMP	55	16.82	12 (13.64)	43 (17.99)	.3504
CPSMP	272	83.18	76 (86.36)	196 (82.01)	
Medicaid/Dual	94	28.75	29 (32.95)	65 (27.20)	.0452
Medicare	154	47.09	36 (40.91)	118 (49.37)	
Other	49	14.98	19 (21.59)	30 (12.55)	
Unknown	30	9.17	4 (4.55)	26 (10.88)	
Self-rated health					
Excellent	6	1.89	4 (4.65)	2 (0.87)	.1904
Very good	32	10.09	6 (6.98)	26 (11.26)	
Good	145	45.74	39 (45.35)	106 (45.89)	
Fair	105	33.12	28 (32.56)	77 (33.33)	
Poor	29	9.15	9 (10.47)	20 (8.66)	
Self-reported anxiety/depression	154	47.98	40 (45.98)	114 (48.72)	.6622
Used opioid drugs	31	9.48	11 (12.50)	20 (8.37)	.2580

*Collected in 2019 only.

[^]Percentages do not add up to 100 because participants could choose more than one option.

239 (73.1%) completed the workshop series (attended at least 4 of the 6 sessions). Three-quarters of the participants were female; mean age was 64 years, and over 70% had at least some college education. Participant characteristics for completers and non-completers can be found in Table 1.

Compared to those who did not complete the program (attended <4 sessions), program completers were significantly older and more likely to be enrolled in Medicare.

No other differences were noted at baseline. Of those who completed the post-program survey (T2), there were significant improvement in self-reported pain disability ($P = .0008$), patient activation ($P = .0362$), depression ($P = < .0001$), and pain self-efficacy ($P < .0001$). For those who completed 6-month surveys (T3), these changes were sustained for pain disability ($P = .0030$), depression ($P = .0015$), and self-efficacy ($P = .0064$).

Table 2. Changes in Participant Reported Outcomes among Program Completers.

Measure	6 weeks follow-up					6 months follow-up			
	N	Pre	Post	Change (post minus pre)		N	Post	Change (post minus pre)	
		Mean	Mean	Mean	P-value		Mean	Mean	P-value
Roland-Morris disability questionnaire	225	13.11	12.28	-0.83	.0008*	126	11.70	-1.13	.0030
PAM score	156	65.32	68.51	3.19	.0362	88	67.40	1.83	.3994
PHQ8	209	8.89	7.04	-1.84	<.0001	121	7.45	-1.18	.0015
Self-efficacy	220	25.93	30.85	4.92	<.0001	121	28.86	2.14	.0064

*The change in RMDQ is not considered clinically significant.

The vast majority of participants (92%) reported a baseline score >4 on the RMDQ indicating some loss of functionality at baseline. Among those who completed the T3 survey, 88.1% reported a score >4 . Therefore, although the change in RMDQ was statistically significant, the vast majority of the participants still reported some loss of functionality. In addition, while 15% of those reporting at T3 indicated at least a 5 point decrease in their RMDQ score, a clinically significant finding for those individuals, the overall mean change among all participants at T3 was only -1.13 .

There were also significant changes in depression status (defined as <10 or ≥ 10 on the PHQ-8) among those who completed the 6-month surveys. Of those who changed status between baseline and 6 months ($n=32$, or 26% of the sample), 26 (81.3%) went from scoring as having clinically significant depression to no longer scoring as having clinically significant depression ($P=.0004$).

The multivariate analyses (not shown) indicated that the significant changes from baseline to 6 weeks to 6 months in patient-reported pain disability outcomes persisted after controlling for insurance status, presence of arthritis, presence of depression, number of comorbidities, or workshop type (CDSMP vs CPSMP). There was a trend in the change of pain disability score at 6 months (T3) between those who reported anxiety and those who did not with those reporting anxiety seeing a greater reduction in disability ($P=.07$). In addition, those who had at least some college education reported a greater reduction in disability versus those who had a high school degree or less ($P=.05$) at T3. The various age groups demonstrated distinct patterns of change in score over 6 months with those who were <50 or >80 years seeing slight increases in disability, whereas those between 50 and 79 saw slight improvements in disability ($P=.04$).

Changes in depression outcomes over time differed by health status. Those reporting fair or poor health reported a significantly greater improvement in depression score compared to those who reported good or better health ($P=.0002$). This effect was seen across the three time points, as well as overall change at T3.

Changes in pain self-efficacy scores differed by number of comorbidities. While both groups ultimately saw an improvement in self-efficacy, those with ≥ 3 comorbidities saw a greater initial improvement and then an attenuation, whereas those with fewer comorbidities reported a slight decrease of self-efficacy at T2 and then an improvement above baseline at T3. The interaction was therefore significant ($P=.0007$). Overall from T1 to T3, those meeting the clinically significant threshold for depression ($\text{PHQ8} \geq 10$) saw greater improvement in self-efficacy compared to those with $\text{PHQ} < 10$, who reported essentially no change in self-efficacy from baseline ($P=.03$).

Finally, longitudinal changes in patient activation did not differ by any of the aforementioned groupings. However, it is interesting to note that in many cases, PAM increased (improved) at T2 and then decreased to below baseline values by T3, suggesting that changes in patient activation are not sustained. Overall changes in participant-reported outcomes can be found in Table 2.

A sub-analysis of outcomes at T2 limited to complete cases (ie, those who completed both T2 and T3) showed similar findings as all T2 respondents; statistically significant improvements in pain disability, pain self-efficacy, and depression were noted for complete cases at T2. However, patient activation did not show statistically significant improvement among complete cases at T2.

Discussion

We examined post-program and 6-month post-program pain-related outcomes from chronic disease and chronic pain self-management workshops delivered in the community setting between 2018 and 2019 in rural New York. The purpose was to evaluate how the program may have impacted pain disability as well as other pain-related outcomes over time in a rural population.

It is important to recognize that with the exception of age, program completers did not differ significantly from non-completers by gender, level of education, self-reported health, number of chronic conditions, or insurance status.

Individuals who were older were more likely to complete, which is in agreement with the national literature on self-management programs.⁴⁴

Our findings indicate at least short-term (6 months) improvements in pain disability, pain self-efficacy and depression among those who completed the intervention. While patient activation (PAM) improved from T1 to T2, these improvements were not sustained at 6 months (T3).

The interaction effects could be explained by a basement effect, particularly for depression scores. Those reporting good or better health did not have, on average, clinically significant depression at baseline and so it is not unexpected that their scores as a group did not change. Meanwhile, those who rated their health as poor or fair had an average PHQ-8 score at baseline that was clinically significant for depression. The presence of depression and/or anxiety also impacted change in pain disability scores significantly ($P = .05$) whereby those who endorsed depression and/or anxiety saw a better improvement in function over time than those who did not endorse depression and/or anxiety. These findings are not unexpected due to the relationship between chronic pain disability, depression, and pain self-efficacy that has been established in the literature.^{45,46} In other words, if a program was successful at improving self-efficacy, then depression scores and pain disability would also improve.

One of the mechanisms at play for the observed improvements may be the social interaction and support. This may also be why RCTs evaluating non group-based pain self-management interventions have demonstrated mixed results, particularly those studies that included a time-and-attention control group. Brunner et al⁴⁷ found that people enrolled in a chronic pain course were more likely to be lonely than those enrolled in other types of self-management courses. Research has suggested that essential elements of peer-facilitated pain self-management programs include the value of making interpersonal connections, facilitating the use of pain self-management strategies, and providing/receiving encouragement or support.⁴⁸ A qualitative meta-analysis identified 3 themes that were enablers of chronic pain self-management: self-discovery (eg, the ability to separate the self from the pain); feeling empowered; and supportive environment.⁴⁹

Offering peer-led community-based chronic pain self-management programs has important implications for practitioners in rural areas. Our previous work and that of others has recognized that clinicians, while generally supportive of their patients' self-management efforts, do not have the time or resources to provide self-management education themselves, or even to refer patients to available community-based programs unless the referral is integrated into the electronic health record.^{34,50-52}

In addition, the literature suggests that one of the barriers to chronic pain self-management for patients is the unsupportive relationship they may feel with providers. There is

often a disconnect between patients and providers about what it means to self-manage, in which providers are recommending ways to manage the condition well, whereas people often want to learn how to live well with their condition.^{53,54} In a qualitative meta-analysis on chronic pain self-management interventions, Devan et al⁴⁹ found that patients reported that they felt their concerns were not taken seriously by their providers, or they found discordance between different providers' explanations for the pain symptoms. Therefore, even if there were enough healthcare providers in rural areas, it may make more sense to utilize self-management interventions that rely on trained peer leaders in the community, rather than health professionals. It is important to note that in this project, the peer leaders did communicate with the patients' provider that the patient completed the program.

This study has several limitations which must be noted. First, the non-experimental design precludes us from making strong causal inferences regarding the impact of the intervention on pain outcomes. Also, our analysis was limited to those program completers who responded to the surveys at 6 weeks and 6 months, and therefore selection bias is a threat. Future research needs to include more rigorous study designs to validate these findings. Longer term follow up (eg, >1 year) is also needed to see if the improvements are sustained.

Despite these limitations, our analysis further supports the literature regarding the effectiveness of the CPSMP and CDSMP on pain disability, self-efficacy, and depression, particularly in rural populations where there are relatively few alternatives to non-medication based therapies. In resource-scarce settings, having a community-based pain management resource that does not rely on healthcare providers for delivery is important. However, healthcare providers do need to be aware of such resources in their communities and refer their patients so that a truly collaborative approach to chronic pain management can be sustained in rural areas.

Declaration of Conflicting Interests

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