Evaluation of the Empower Veterans Program for Military Veterans With Chronic Pain

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ABSTRACT

Objective: The purpose of this quality improvement project was to abstract and analyze previously collected data from veterans with high-impact chronic pain who attended the Empower Veterans Program (EVP) offered by a Veterans Administration facility in the northeastern United States.

Methods: This quality improvement project used data collected from veterans with chronic pain who completed the veterans health care facility's EVP between August 2017 and August 2019. Pre- and post-intervention data on pain intensity, pain interference, quality of life, and pain catastrophizing were compared using paired *t*-tests.

Results: Although data were abstracted from 115 patients, the final sample included 67 patients who completed both pre-and postintervention questionnaires. Baseline measures of completers and noncompleters were similar. Comparison of pre and post mean scores on completers showed statistically significant findings ($P = .004$) based on the Bonferroni correction. The medium and large effect sizes (Cohen's *d*) indicated clinically significant improvements for veterans who completed the program. Veterans reported high levels of satisfaction with the program.

Conclusion: Veterans with chronic high-impact noncancer pain who completed the EVP had reduced pain intensity, pain interference, pain catastrophizing as well as improved quality of life and satisfaction with their health.

Keywords: musculoskeletal pain, Veterans Affairs, complementary and integrative health, acceptance and commitment therapy, mind-body therapies, whole health, multidisciplinary pain management.

More than 100 million American adults suffer from chronic pain; costs associated with managing chronic pain are approximately $635 billion each year.[1] Chronic pain is prevalent among military veterans, affecting one-third of the 9 million veterans who receive care from Veterans Health Administration (VHA) facilities.[2] The biopsychosocial impact of chronic pain on the general population, and specifically on veterans, has been compounded by the opioid crisis. The effects of chronic pain and the opioid crisis have fueled interest in the use of complementary and integrative health (CIH) modalities in the management of chronic noncancer pain. Providers are increasingly developing treatment programs that incorporate CIH in their management of chronic noncancer pain.

One such program is the Empower Veterans Program (EVP). Originally developed at the Atlanta Veterans Affairs Health Care System, the EVP is a CIH modality based on the biopsychosocial model of pain developed by psychiatrist George Engel in 1977.[3] The biopsychosocial model of pain recognizes that pain is a complex, multidimensional, biopsychosocial experience. Under this model, the mind and body work in unison as interconnected entities. Because the model acknowledges biological, psychological, and social components of pain and illness,[4] treatment focuses on all aspects of a person's health, life, and relationships.

The EVP fits into the VHA Pain Management Stepped Care Model and is an adjunctive complement for that model.[5-7] The EVP complements care at the first step, where patient/family provide self-care and where care is provided by patient-aligned primary care teams, at the second step, which includes secondary consultation with multidisciplinary pain medicine specialty teams and

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other specialists, and at the third step, with the addition of tertiary interdisciplinary pain centers.

The The VA Maryland Health Care System (VAMHCS) implemented the EVP as part of a quality improvement project for the management of chronic pain. The objectives of the program were to reduce pain intensity, pain catastrophizing, and pain interference, as well as improve functionality and quality of life among veterans with chronic high-impact noncancer pain. More than 2 years after the program was implemented, collected data had not been analyzed. The purpose of this quality improvement project was to abstract and analyze the previously collected data from veterans with high-impact chronic pain who attended an EVP offered by the VAMHCS. The results of the data analysis were used to inform decisions regarding the future of the program.

Methods

This quality improvement project used the Plan-Do-Study-Act (PDSA) process.[8] The first 2 phases of the PDSA cycle (Plan and Do) were completed by a team of VA employees from the VAMHCS, who donated their time to establish and implement the program at the project site. This team consisted of psychologists, a physical therapist, a social worker, and a chaplain, and included support from medical administrative staff. This team planned and implemented the EVP at the VA facility based on the model developed at the Atlanta VA Health Care System. During the "Do" phase, the team collected data on pain intensity, pain interference, quality of life, and pain negative cognition (catastrophizing) before the intervention and post intervention. They also collected data on program outcome (patient treatment satisfaction) post intervention. Because these employees did not have time to retrieve and analyze the data, they welcomed the opportunity to have the data analyzed by the investigators during the Study phase of the PDSA cycle. Based on the results of the analysis, recommendations for program changes were made during the Act phase of the cycle.

Intervention

The EVP was developed as a 10-week (30 hours) interdisciplinary CIH approach that coached veterans with chronic pain to live fuller lives based on their individual values and what matters to them. EVP is the "What Else" management modality for the 5% of veterans with high-impact chronic pain.[9] The EVP provided functional restoration through its components of whole health, mindfulness training, coaching calls, acceptance and commitment therapy, and mindful movement. It used the Wheel of Health with the 4 key components of me, self-care, professional care, and community.[10,11]

Veterans who had a diagnosis of chronic nonmalignant pain for 3 months or more and who agreed to participate in the EVP at this facility attended 3-hour classes every Tuesday with a cohort of 8 to 12 peers and engaged in one-on-one coaching with interdisciplinary team members. During the class sessions, veterans were coached to understand and accept their pain and commit to maintaining function despite their pain. Mindful movement by the physical therapist emphasized the pivotal place of exercise in pain management. The therapist used the mantra "Motion is Lotion."[9] The guiding principle of the EVP was that small incremental changes can have a big impact on the individual's whole life. Emphasis was placed on increasing self-efficacy and mindful awareness for veterans with high-impact pain by giving them "Skills before Pills."[9]

Outcome Measures

Outcome measures included the Numerical Pain Rating Scale (NPRS), the Multidimensional Pain Inventory (MPI), the World Health Organization Quality of Life assessment (WHOQOL-BREF), the Pain Catastrophizing Scale (PCS), and the Pain Treatment Satisfaction Scale (PTSS). Cronbach alpha coefficients were calculated to assess internal consistency reliability of these measures in the sample of veterans who completed the EVP.

NPRS. The NPRS is ubiquitous as a screening tool in many health care environments and its use is mandated by the VA health care system.[12] The choice of the NPRS as the tool for pain screening in the VA health care system was based on a large body of research that supports the reliability and validity of the NPRS as a single index of pain intensity or severity. Studies suggest that the NPRS is valid for use in the assessment of acute, cancer, or chronic nonmalignant pain and in varied clinical settings.[13] The NPRS has 4 items, each on a scale of 0 to 10. For the purpose of this project, only 3 items were used. The

3 items assessed the worst pain, usual pain, and the current pain (right now). The higher the score, the higher the pain intensity. Cronbach alpha coefficients on the NPRS obtained from the current sample of veterans were 0.85 on both pre- and postintervention assessments.

MPI. The MPI is an easily accessible, reliable, and valid self-report questionnaire that measures the impact of pain on an individual's life, quality of social support, and general activity.[14] This instrument is a short version of the West Haven-Yale MPI.[15] The MPI contains 9 items rated on a scale from 0 to 6. The higher the score, the greater pain interference a person is experiencing. The MPI produces reliable, valid information for diagnostic purposes and for therapy outcome studies.[16] The MPI had a Cronbach alpha of 0.90 on pre-intervention and 0.92 on postintervention assessments in the current sample.

WHOQOL-BREF. The WHOQOL-BREF is a measure of quality of life and is an abbreviated version of the WHOQOL-100. Quality of life is defined by the World Health Organization[17] "as an individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." The WHOQOL-BREF contains 26 items. The first 2 items were examined separately; the first item asks individuals to rate their overall quality of life and the second asks individuals how satisfied they are with their health. The remaining 24 items were used to calculate the following 4 domain scores: physical health, psychological health, social relationship, and environment.[18] Each item is measured on a scale of 1 to 5. Higher scores denote higher or better quality of life. Domain scores have demonstrated good reliability and validity.[19-21] Cronbach alpha coefficients for the domain subscales ranged from 0.63 to 0.84 in the current sample, with the lowest alphas for the 3-item Social Relationships Domain.

PCS. The PCS is a widely used measure of catastrophic thinking related to pain. Catastrophizing has been conceived by Sullivan and colleagues as "an exaggerated negative mental set brought to bear during actual or anticipated painful experience."[22] The PCS provides a total score and scores for the following subscales: rumination, magnification, and helplessness.[23] It has been used in a variety of chronic pain populations and has demonstrated good reliability and validity in clinical as well as nonclinical samples.[24-26] The PCS has 13 items rated on a scale of 0 to 4. Higher scores mean greater negative pain cognition (catastrophizing). In the current sample, the PCS total scale had a Cronbach alpha coefficient of 0.95 and 0.94 on the 2 assessments. The coefficients for the subscales ranged from 0.81 to 0.90.

PTSS. The PTSS is a 5-item tool that measures patient satisfaction with pain treatment. It includes items that address overall satisfaction, staff warmth, staff skill level, ease of scheduling appointments, and recommendation of the program to other veterans. It was derived from the post-treatment version of The Pain Outcome Questionnaire-VA and has demonstrated reliability and validity.[27] The questions are scaled from 0 to 10. High scores on the PTSS denote high patient satisfaction with the EVP. The Cronbach alpha coefficient on the PTSS obtained from the current sample was 0.80.

Data Gathering and Analysis

Prior to starting the Study phase, Washburn University's Institutional Review Board (IRB) and the VA IRB approved the project. The VA IRB, through its affiliate, gave a Not Human Research Determination and granted a waiver of informed consent and the Health Insurance Portability and Accountability Act authorization. The VA facility's Research and Development department also approved the quality improvement project.

Once these approvals were obtained, the Study phase began with the abstraction of retrospective data obtained from veterans who participated in the VA health care facility's EVP between August 2017 and August 2019. Most of the measurement tools changed in August 2019, and for this reason data abstraction was limited to the time period August 2017 to August 2019. The first author (JUU) abstracted data for both program completers and noncompleters. The second (MJ) and third (SW) authors analyzed the data in SPSS 24 and calculated effect sizes.

Veterans who completed the program were compared to veterans who did not complete the program on age, gender, and baseline measures. The investigators used independent samples *t*-tests to compare completers and noncompleters on age, pain intensity, pain interference, quality of life, and pain catastrophizing. They used the

Table 1. **Comparison of Completers and Noncompleters Using Independent Samples *t*-Test**

Measure	Completers, mean (SD) (n=67)	Noncompleters, mean (SD) (n=48)	*t*	*df*	*P* value
Age, y	58.52 (11.00)	58.35 (10.55)	−0.082	113	.935
Numeric Pain Rating Scale	7.05 (1.47)	6.81 (1.68)	−0.786	106	.434
Multidimensional Pain Inventory Scale	4.49 (1.26)	4.69 (1.12)	0.809	106	.420
World Health Organization Quality of Life BREF (WHOQOL)					
WHOQOL Quality of Life Rating	2.98 (0.88)	2.92 (1.02)	−0.327	106	.744
WHOQOL Satisfaction with Health	2.33 (0.98)	2.00 (0.96)	−1.719	107	.088
WHOQOL Physical Health Domain	10.08 (3.01)	9.30 (2.79)	−1.324	103	.188
WHOQOL Psychological Domain	12.30 (3.16)	11.15 (2.81)	−1.860	102	.066
WHOQOL Social Relationships Domain	11.36 (3.73)	10.96 (3.25)	−0.549	101	.584
WHOQOL Environment Domain	13.35 (2.97)	12.73 (3.16)	−1.003	101	.318
Pain Catastrophizing Scale (PCS)					
Total PSC	27.79 (13.03)	27.38 (12.63)	0.156	102	.876
PCS Rumination Subscale	9.82 (4.70)	9.92 (4.94)	−0.111	102	.912
PCS Magnification Subscale	5.95 (3.56)	5.18 (3.17)	1.117	102	.267
PCS Helplessness Subscale	12.02 (5.83)	12.28 (5.92)	−0.218	102	.828

chi-square test of independence to analyze the association between gender and program completion.

Data were included in the pre- and postintervention analysis if the veteran completed the NPRS, MPI, WHOQOL-BREF, and PCS pre and post intervention. This became an important eligibility requirement as some of the tools/measures were changed towards the end of the review period in 2019. Pre- and postintervention data on pain intensity, pain interference, quality of life, pain catastrophizing, and patient satisfaction were compared using paired samples *t*-test at .004 level of significance based on the Bonferroni correction.[28] Data on patient satisfaction with pain treatment were collected at program completion (week 8 or 10) and were analyzed using descriptive statistics.

Effect sizes (Cohen's *d*) were calculated to determine the substantive significance or magnitude of the mean differences in scores. Effect sizes (expressed as absolute values of Cohen's *d*) were calculated as the mean difference divided by the standard deviation. Values of 0.2 were considered a small effect size, 0.5 a medium effect size, and 0.8 a large effect size.[29]

Results

Data were abstracted for 115 veterans who started the EVP. Of these, 48 left the program, leaving 67 veterans (58%) who completed the program. Completers and noncompleters were similar in age, gender, and baseline measures (**Table 1**). Fifty-three (79%) completers and 35 (73%) noncompleters were male. A chi-square test of independence showed no significant association between gender and program completion (χ^2_1 [N = 115] = .595, *P* = .440).

Comparison of pre-and postintervention mean scale scores resulted in statistically significant differences for all comparisons (**Table 2**). These comparisons yielded improvements in the desired direction. For example, the scores on the NPRS, the MPI, and the PCS (along with its subscales) decreased, revealing reductions in pain severity, the impact of pain on the veterans' lives, and pain catastrophizing. The 2 individual item scores on the WHOQOL-BREF increased, indicating improvements in perceived quality of life and satisfaction with health. The domain scores on the WHOQOL-BREF increased, revealing improvements

Table 2. **Summary of Paired Samples *t*-Test Results on Program Completers (n = 67)**

Measure (n)	Pre-intervention, mean score (SD)	Postintervention, mean score (SD)	t	P value	Cohen's d
Numeric Pain Rating Scale[a] (67)	7.05 (1.47)	6.52 (1.66)	3.54	<.001	0.43
Multidimensional Pain Inventory Scale[a] (67)	4.49 (1.26)	3.91 (1.42)	4.85	<.001	0.59
World Health Organization Quality of Life BREF[b] (WHOQOL)					
WHOQOL Quality of Life Rating (66)	2.98 (0.88)	3.52 (0.95)	−4.74	<.001	0.58
WHOQOL Satisfaction with Health (67)	2.33 (0.98)	2.84 (0.98)	−3.96	<.001	0.48
WHOQOL Physical Health Domain (67)	10.08 (3.01)	11.69 (2.77)	−5.57	<.001	0.68
WHOQOL Psychological Domain (65)	12.38 (3.13)	13.80 (2.93)	−5.05	<.001	0.63
WHOQOL Social Relationships Domain (65)	11.36 (3.73)	12.81 (3.44)	−4.41	<.001	0.55
WHOQOL Environment Domain (64)	13.42 (2.94)	14.89 (2.50)	-5.55	<.001	0.69
Pain Catastrophizing Scale[a] (64)					
PCS Total Scale	27.93 (13.08)	21.80 (12.37)	4.34	<.001	0.54
PCS Rumination Subscale	9.88 (4.72)	7.78 (4.34)	4.27	<.001	0.53
PCS Magnification Subscale	5.97 (3.59)	4.73 (3.31)	3.01	.004	0.38
PCS Helplessness Subscale	12.09 (5.86)	9.28 (5.90)	4.11	<.001	0.51

Cohen's *d* = effect size (absolute value of Cohen's *d*).
[a]The greater the mean score on these measures, the greater the pain intensity, pain interference, or pain catastrophizing.
[b]The greater the mean score on this measure, the greater the quality of life.

Table 3. **Pain Treatment Satisfaction Scale Item Statistics (n = 66)**

Questions	Mean (SD)
1. Overall treatment you received?	8.89 (1.99)
2. Staff warmth, respect, kindness, and willingness to listen?	9.64 (0.69)
3. Skills and competence of staff?	9.56 (0.90)
4. Ease of getting appointments, hours of treatment, etc?	9.32 (1.04)
5. Recommend this treatment to someone you know that has a pain problem?	9.55 (0.83)

The greater the mean score, the greater the level of patient satisfaction. Scaled statistics yielded a mean (SD) of 46.95 (4.40) out of a possible score of 50.

in pain-related quality of life. The moderate to large effect sizes indicated clinically significant improvements for veterans with chronic high-impact pain who completed the EVP.

Analysis of data obtained using the PTSS yielded high mean scores for items that focused on patient satisfaction with treatment (**Table 3**). Scaled statistics yielded a mean (SD) of 46.95 (4.40). These results denoted overall patient satisfaction with the EVP.

Discussion

The purpose of this quality improvement project was to abstract and analyze previously collected data from veterans with high-impact chronic pain who attended the EVP. Comparison of pre-intervention and postintervention data obtained from 67 veterans who completed the program revealed improvements in pain intensity, pain interference, negative cognition (catastrophizing), and quality of life. The differences were statistically significant and clinically

meaningful, with medium and large effect sizes. In addition, veterans reported high satisfaction with the EVP.

The EVP includes CIH approaches that have demonstrated effectiveness among veterans and other populations with chronic pain. A wealth of studies, for example, support the effectiveness of CIH approaches among veterans.[30-34] Other studies focus on specific CIH approaches that are components of the EVP. Evidence supports, for example, the efficacy of mindfulness-based stress reduction,[35-39] acceptance and commitment therapy,[40-43] brief peer support intervention,[44] and interdisciplinary biopsychosocial rehabilitation.[45,46]

While empirical evidence supports components of the EVP, only one study focused on the outcomes of the Atlanta VA EVP among veterans with chronic pain. Results of a qualitative study conducted by Penney and Haro[47] described the experience of veterans with the EVP. Those veterans reported adopting new self-care or lifestyle practices for pain management and health, accepting pain, being better able to adjust and set boundaries, feeling more in control, participating in life, and changing their medication use.

The mean baseline scores from the current sample were similar to samples of patients with chronic pain in other studies (NPRS,[48] MPI,[48] and PCS[48-51]). After converting scores on the WHOQOL-BREF from those that ranged from 4 to 20 to those that ranged from 0 to 100,[18] the scores from the current sample were similar to those of other studies of patients with chronic pain.[48,52,53]

Several strengths of the project should be noted. Data were collected using well established measurement tools that had previously demonstrated reliability and validity. All the tools used in data collection demonstrated good internal consistency reliabilities in the current sample of veterans. Weaknesses of the project include the use of a convenience sample of veterans and small sample size. Data were not available on the number of veterans who were offered participation or on how many veterans declined enrollment. The sample of veterans who chose to participate in the EVP may or may not have been representative of the population of veterans with high-impact chronic pain. As a pre- and postintervention design with no comparison group, the results are subject to multiple threats to internal validity, including the Hawthorne effect,

maturation in the form of healing, and attrition. Reasons for leaving the program had not been recorded, so the investigators had no way of knowing factors that may have contributed to attrition. Also, data on when veterans left the program were unavailable. Research is needed with a control group to reduce the effect of confounding variables on the outcome measures. This project used data collected at a single VA facility, which limits its generalizability.

While completers and noncompleters of the EVP were similar on age, gender, and baseline measures, there may have been unidentified characteristics that influenced program completion. The investigators noticed the presence of more missing data among noncompleters compared to completers on the pre-intervention PCS; thus, noncompleters may have scored lower than completers on this instrument simply because there were more individual items that were unanswered/missing among this group of noncompleters.

Data were analyzed using a limited number of outcome measures that had previously been collected. Other outcome measures might include whether EVP participants reduced their use of medications, clinical resources, and personnel. Future projects, for example, could determine whether the EVP is effective in reducing opioid analgesic medication use and decreasing primary care and emergency department visits. Cost-benefit analyses could be completed to determine whether EVP is associated with financial savings.

Because no follow-up assessments were made to determine whether improvements were maintained over time, the project focus was limited to an evaluation of the short-term changes in the outcome measures. Future projects could include a follow-up assessment of the veterans 1- or 2-years post completion of the EVP.

Data for the project were collected prior to the COVID-19 pandemic, when the EVP was implemented through face-to-face meetings with participants and their peers. It is not clear how changes to the delivery of the program (such as offering it through telehealth) might impact veterans' satisfaction with the program, willingness to complete it, and other variables of interest.

The results of this project were made available to stakeholders with recommendations for program expansion both at the current location and at other VA

facilities, including the recommendation to hire additional personnel that would implement the program. As the VA network of facilities expand the EVP program and adapt it for telehealth delivery, the investigators recommended a similar analysis of data be performed following telehealth delivery. If delivery through telehealth is shown to improve outcome measures, the EVP could provide pain management treatment options for patients challenged by transportation barriers, including rural veterans.

Conclusion

This quality improvement project provided evidence of improvement in measures of pain severity, pain interference, negative cognition (catastrophizing), quality of life, and patient treatment satisfaction among veterans with chronic high-impact pain. Findings have been well received by the northeastern VA as well as the Veterans Integrated Systems Network 5. The results of the analyses were used to inform decisions regarding the future of the program.

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