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Cognitive Behavioral Therapy for Chronic Pain in Veterans: Evidence for Clinical Effectiveness in a Model Program

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The U.S. Department of Veterans Affairs (VA) has been training clinicians in its cognitive behavioral therapy for chronic pain (CBT-CP) structured protocol since 2012. The aim of this project was to review patient outcomes to determine the effectiveness of the VA's CBT-CP treatment. From 2012–2018, 1,331 Veterans initiated individual CBT-CP treatment as part of the training program. Patient outcomes were assessed with measures of patient-reported pain intensity, pain catastrophizing, depression, pain interference, and quality of life (physical, psychological, social, and environmental). Mixed models of the effects of time indicated significant changes across pretreatment, midtreatment, and treatment conclusion on all outcomes. There was a large effect size (Cohen's $d = 0.78$) for pain catastrophizing, and there were medium to large effect sizes ($d > 0.60$) for worst pain intensity, pain interference, depression, and physical quality of life. Systematic training of therapists and implementation of the VA's CBT-CP protocol yielded significant patient improvements across multiple domains. This offers strong support for the VA's CBT-CP as an effective, safe treatment for Veterans with chronic pain and highlights it as a model to increase the availability of training in standardized, pain-focused, evidence-based, behavioral interventions. The findings suggest that the broad dissemination of such training, including in routine, nonpain specialty settings, would improve patient access to effective, nonpharmacological treatment options in both the public and private sectors.

Impact Statement
Clinical guidelines recommend cognitive behavioral therapy (CBT) as a first-line treatment for individuals with chronic pain, but the availability of trained clinicians remains less than adequate. This evaluation of 1,331 Veterans who initiated cognitive behavioral therapy for chronic pain (CBT-CP) treatment as part of the U.S. Department of Veterans Affairs National Evidence-Based Psychotherapy Training Program found significant improvements in patient outcomes. There is a need to increase access to evidence-based nonpharmacological approaches

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for pain management, and these findings suggest that the broad dissemination of clinician training in CBT-CP would help improve outcomes for individuals with chronic pain conditions in both the public and private sectors.

Keywords: cognitive behavioral therapy, chronic pain, Veterans, training

Chronic pain is a widespread problem in the United States and worldwide, and evidence suggests that it is even more pervasive among military Veterans (Goulet et al., 2016; Kerns, Philip, Lee, & Rosenberger, 2011; Nahin, 2017; Yu et al., 2003). The biopsychosocial model is recognized as the best approach for understanding and treating chronic pain because of the complex factors that affect the pain experience. Despite this, historically, there has been a strong emphasis on biomedical factors and treatments. Psychological interventions for pain often have been relegated to the status of last resort or reserved for those with significant mental health concerns. In recent years, concerning trends in opioid-related morbidity, mortality, and misuse have spurred interest in nonpharmacological approaches. The Centers for Disease Control and Prevention (CDC) and others released updated guidance (Dowell, Haegerich, & Chou, 2016; U.S. Department of Veterans Affairs [VA] & U.S. Department of Defense, 2017; U.S. Department of Health and Human Services, 2019) offering a more conservative approach to the use of opioids for chronic pain and emphasizing evidence-based nonpharmacological options as first-line treatments.

Cognitive behavioral therapy (CBT) is considered the gold-standard psychosocial intervention for chronic pain (Ehde, Dillworth, & Turner, 2014; Skelly et al., 2018; Williams, Eccleston, & Morley, 2012). CBT for chronic pain (CBT-CP) is about changing one's response to and relationship with pain so that it has a less deleterious impact on functioning and quality of life (Knoerl, Lavoie Smith, & Weisberg, 2016). The focus is on how one's thoughts, beliefs, emotions, physiological responses, and behaviors affect the pain experience. Although CBT-CP protocols vary somewhat across studies and clinical usage, they emphasize three components: (a) cognitive restructuring for unhelpful thoughts, (b) paced behavioral activation to increase movement and engagement, and (c) relaxation training to improve sympathetic nervous system responses.

There is ample evidence of the effectiveness of CBT-CP in patient outcomes, reflecting improvements in pain intensity, cognitions such as pain-related catastrophizing, physical functioning, coping skills, and self-efficacy (Darnall, 2018; Ehde et al., 2014; Schütze et al., 2018; Stewart et al., 2015). A 2012 Cochrane review (Williams et al., 2012) that included 4,788 participants found that CBT-CP had moderate-size effects on mood and catastrophizing and small effects on pain and disability at treatment conclusion. A 2015 review of randomized controlled trials (RCTs; Richmond et al., 2015) that included 3,359 participants with nonspecific chronic lower back pain (cLBP) found that cognitive behavioral treatments yielded moderate to large effects for pain and disability in both the short and long term versus guideline-based active treatments. The Agency for Health Care Research and Quality (Skelly et al., 2018) conducted a review to evaluate which noninvasive, nonpharmacological treatments for common chronic pain conditions (i.e.,

chronic low back and neck pain, fibromyalgia, osteoarthritis, chronic tension headache) improved pain and function for at least 1 month after treatment. Although there was a moderate strength of evidence for psychological therapies on the whole, CBT was most consistently associated with pain-related improvements. The use of CBT-CP for conditions such as fibromyalgia, rheumatoid arthritis, and orofacial pain has shown relatively small but robust effects that are equally effective or better when compared with other treatments (Ehde et al., 2014).

Despite evidence and recommendations for CBT-CP as a first-line treatment for chronic pain (Dowell et al., 2016; U.S. Department of Health and Human Services, 2019; U.S. Department of Health and Human Services, Office of the Assistant Secretary for Health (2016); U.S. Department of Veterans Affairs & U.S. Department of Defense, 2017), the availability of clinicians with competence in CBT-CP remains less than adequate (Darnall et al., 2016). The VA has been a leader in implementing systematic training to ensure that Veterans have access to evidence-based psychotherapeutic approaches, including CBT-CP. In 2012, the VA developed a CBT-CP protocol and training program that includes didactic attendance, recording and evaluation of treatment sessions, and ongoing expert consultation (Stewart et al., 2015). Therapists from all settings are eligible for training, including mental health clinics, primary care, and medical clinics. Each therapist provides CBT-CP to two Veterans, with the goal of improving pain-related functioning. Data from the first two training cohorts were reported previously by Stewart et al. (2015), who found that trained therapists were competent and effective in the delivery of CBT-CP, as assessed through a structured rating process. Given that, this project focused on effectiveness in Veteran outcomes for subsequent cohorts of the CBT-CP training program between 2012 and 2018.

The objective of this program-evaluation report was to determine the clinical effectiveness of CBT for chronic pain for military Veterans in routine clinical settings. We expected that CBT-CP treatment provided by newly trained clinicians would be associated with statistically significant decreases in pain intensity, pain catastrophizing, pain interference, and depressive symptoms. We also expected that the VA's CBT-CP treatment would be associated with statistically significant increases in quality of life.

Materials and Methods

Patients and Procedures

A total of 1,331 Veterans who presented to a variety of settings in the VA health-care system with complaints of chronic pain and pain-related impairments entered the treatment. To be included in the program, they agreed to recording of sessions by therapists in CBT-CP training between 2012 and 2018. Only those Veterans

who initiated treatment were included; information regarding those who declined participation is unknown. Those with all pain locations and conditions were included, and the presence of other mental health comorbidities was acceptable as long as they agreed to pain as the focus for the current treatment. Patients were excluded from CBT-CP only if they had active untreated psychotic symptoms, were abusing substances, or had current suicidal ideation or other psychiatric issues requiring acute stabilization. Patient outcome data were collected as a part of the routine program evaluation for the VA National Evidence-Based Psychotherapy Training Program. Data collection and statistical analyses were reviewed and determined to be consistent with nonresearch quality-improvement activities by the chief consultant of the VA Office of Mental Health and Suicide Prevention.

CBT-CP VA Protocol and Manual

The CBT-CP protocol was developed by a group of subject-matter experts following an extensive review of the literature. Core content areas were incorporated into sessions. CBT-CP is a structured, time-limited intervention that teaches patients how to better manage chronic pain and improve their quality of life. The VA's CBT-CP *Therapist Manual* was completed in early 2014 (Murphy et al., 2014) and became the primary resource for the training initiative as well as for implementation of CBT-CP across the VA health-care system (trainings in 2012–2013 utilized slides containing the same protocol presented in the manual, maintaining continuity across training cohorts). Part 1 of the manual (Murphy et al., 2014) includes foundational information about chronic pain, such as types of pain, treatment options, evidence review, case examples, and critical elements for CBT-CP. Part 2 of the manualized protocol (Murphy et al., 2014) includes the 11 core CBT-CP sessions and 1 follow-up booster session, which is recommended but optional (see Table 1). Detailed content for each session is provided (Murphy et al., 2014) and includes agenda setting, subject-matter review, patient materials for learning and home practice, and examples of therapist scripting. In addition, therapeutic interactions in this sample were recorded with Veteran consent and rated by CBT-CP consultant experts using a standardized rating scale to ensure fidelity, accuracy, and clinical acumen (Stewart et al., 2015).

Measures

All patient outcome measures were reported at the beginning (Session 1), middle (Session 7), and conclusion (Session 11) of treatment.

Pain intensity. Pain intensity was assessed using the 11-point Pain Numeric Rating Scale (NRS; Von Korff, Jensen, & Karoly, 2000), with 0 = *no pain* and 10 = *worst pain imaginable*. Patients rated their "worst pain," "average pain," and "least pain" for the past week. The NRS is used throughout VA and other health-care systems and has been validated as a treatment outcome measure (Jensen & Karoly, 2001; Jensen, Karoly, & Braver, 1986). Minimally, moderately, and substantially important clinical change are represented by a decrease in score of 10–30%, ≥ 30%, and ≥ 50%, respectively (Dworkin et al., 2008).

Pain catastrophizing. The Pain Catastrophizing Scale (PCS; Sullivan, Bishop, & Pivik, 1995) is a 13-item self-report measure

Table 1

VA Cognitive-Behavioral Therapy for Chronic Pain (CBT-CP) Session Information

Session	Content
1	Interview and Assessment: Clinical pain evaluation and baseline assessment measures
2	CBT-CP Orientation: Pain education and familiarization with the CBT-CP approach to treatment
3	Assessment Feedback and Goal Planning: Clinical implications of assessment and development of treatment goals
4	Exercise and Pacing: Importance of movement and thoughtful approach to physical activities
5	Relaxation Training: Relaxation benefits and techniques
6	Pleasant Activities 1: Identification of meaningful and pleasurable activities
7	Pleasant Activities 2: Implementation of selected valued activities
8	Cognitive Coping 1: Understanding automatic negative thoughts and how they affect the pain experience
9	Cognitive Coping 2: Monitoring and challenging automatic thoughts
10	Sleep: Strategies for improving sleep despite pain
11	Discharge Planning: Plan for flare-ups and review CBT-CP skills
12	Booster Session: Reviewing implementation of CBT-CP and troubleshooting issues

Note. VA = U.S. Department of Veterans Affairs.

of the tendency to ruminate, magnify, or feel hopeless (i.e., catastrophize) about pain. Each item is rated on a 5-point scale ranging from 0 = *not at all* to 4 = *all the time*, with a total summed scale score ranging from 0 to 52. A score of 30 or above is suggestive of clinically relevant levels of catastrophizing (Sullivan et al., 1995).

Pain interference. Pain-related interference was assessed using the Interference Subscale of the West Haven–Yale Multidimensional Pain Inventory (WHYMPI-INT; Kerns, Turk, & Rudy, 1985). It assesses the impact of pain in multiple areas, such as work, daily activities, and relationships with others. The level of interference is calculated as the mean of nine items rated from 0 = *no interference/change* to 6 = *extreme interference/change*, with higher scores indicating greater pain interference. The psychometric adequacy of this interference subscale has been evaluated for various pain conditions, and a mean decrease of 0.6 points is consistent with clinically important change (Dworkin et al., 2008).

Depression. Over the course of the CBT-CP cohorts reported in this sample, two measures of depression were used. From 2012 to 2014 (i.e., Cohorts 3–8), the Beck Depression Inventory–II (BDI-II; Beck, Steer, & Brown, 1996) was used. In 2015 (i.e., Cohorts 9–36), the program shifted to using the Patient Health Questionnaire–9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) to assess depression severity. The BDI-II is a 21-item self-report measure where each item is scored on a 0–3 scale and the total score is calculated by summing the items (range = 0–63), with higher scores indicating greater symptom severity. Severity is reflected in the total score, from minimal (range = 0–13) to mild (range = 14–19), moderate (range = 20–28), or severe depression (range = 29–63; Beck et al., 1996). The PHQ-9 (Kroenke et al., 2001) is a nine-item measure that indicates the severity of depression using each of the nine *Diagnostic and Statistical Manual of*

Mental Disorders (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) depression criteria. Items are scored from 0 to 3 (i.e., *not at all* to *nearly every day*), with total scores greater than 4 indicating depression from mild (range = 5–9) to moderate (range = 10–14), moderately severe (range = 15–19), or severe (≥ 20). The psychometric properties as both reliable and valid measures of depressive severity have been well established for the BDI-II and PHQ-9 (Kroenke et al., 2001; Wang & Gorenstein, 2013).

Quality of life. The World Health Organization Quality of Life–BREF (WHOQOL-BREF; WHOQOL Group, 1998) is an abbreviated version of the WHOQOL-100 that has 26 items and has been shown to have good validity and reliability. There are 24 items that assess four quality-of-life domains (physical health, psychological well-being, social relationships, and environment) and two overall health and satisfaction domains. Total scores for each domain range from 4 to 20, with higher scores indicating the perception of a better quality of life on that domain (WHOQOL Group, 1998).

Analysis Plan

All analyses were conducted with SAS Version 9.4 software. We first calculated descriptive statistics and frequencies. Outcome variables were plotted using histograms to evaluate their distributions. Treating clinicians coded treatment completion dichotomously, and we used logistic regression of baseline sociodemographic and symptom variables to evaluate predictors of treatment completion. To evaluate change over time, we estimated mixed-effects models for all patient-level outcome measures, with intercept modeled as a random effect. We coded the initial (Session 1), midpoint (Session 7), and final (Session 11) evaluations as 0, 0.6, and 1.0, respectively. Missing data were estimated using the full-information maximum-likelihood method so that all patients could be used in estimates of effect presented in the results. Simulation research has found that maximum-likelihood estimation provides a good estimate of the intent-to-treat effect of an intervention (Wit-

kiewitz et al., 2014). We modeled outcome scores as a function of session for within-treatment estimates of effect. We calculated within-subjects effect sizes (Cohen's d) by dividing the slope estimate of the treatment effect by the standard deviation (SD) of the relevant measures at Session 1.

Results

Sample Characteristics

Table 2 presents baseline sociodemographic data for the 1,331 Veterans who initiated treatment and provided data on treatment outcomes. Generally, the sample was made up of Veterans who were male (81%) and Caucasian/White (69%), with a mean age of 52.3 years old (SD = 12.4). The most common military service eras were Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (24%), the Vietnam era (13%), and the post-Vietnam era (22%).

Treatment Completion

Of the 1,331 patients providing outcome data, 775 (58%) completed treatment, as indicated by attending 11 or more treatment sessions (i.e., all CBT-CP treatment sessions). A total of 1,059 (80%) completed five or more sessions, 188 (14%) completed two to four sessions, and 84 (6%) completed zero sessions or one session. Reasons for not completing treatment included disinterest, logistics (e.g., scheduling conflicts, time), and health crises/comorbidities. Logistic regression analyses found that treatment completion was more likely in Veterans of more advanced age, (odds ratio [OR] = 1.01, 95% confidence interval [CI: 1.002, 1.023]) and in Veterans with lower Session 1 pain-related interference (OR = 1.19, 95% CI [1.06, 1.34]). No other sociodemographic, military service, or Session 1 values of the outcome variables predicted odds of treatment completion.

Table 2
Patient Demographics (N = 1,331)

Gender	Male	Female	Unknown		
	1,084 (81%)	236 (18%)	11 (1%)		
Age	Mean (*SD*)	Range			
	52.3 (12.4)	21–87			
Race	Caucasian/White	African American/Black	Other	Unknown	
	923 (69%)	304 (23%)	43 (3%)	61 (5%)	
Ethnicity	Non-Hispanic/Latino	Hispanic/Latino	Unknown		
	796 (60%)	85 (6%)	450 (34%)		
Education	≤High school graduate	Some college	College graduate	Attended/Completed graduate school	Unknown
	282 (21%)	324 (24%)	215 (16%)	60 (5%)	450 (34%)
Service era	Vietnam	Post-Vietnam	Persian Gulf War	OEF/OIF/OND	Other	Unknown
	175 (13%)	289 (22%)	100 (8%)	323 (24%)	145 (11%)	450 (34%)

Note. OEF/OIF/OND = Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn. Data on ethnicity, education, and service era were not collected in early training cohorts, resulting in some Veterans for which these data are listed as "Unknown." Some Veterans indicated that they served in multiple eras.

Outcomes

Mixed-effects models with random intercept and maximum-likelihood estimation of missing data were used to test the effect of time (pretreatment/Session 1, midtreatment/Session 7, treatment conclusion/Session 11) on each outcome variable. Descriptive statistics for primary outcomes over time are displayed in Table 3. Results for mixed-effects models of change over time are displayed in Table 4.

The results showed improvement across time on all outcome measures. There were significant effects of time on NRS ratings for "worst pain," $F(1, 1,837) = 220.28$, $p < .001$, indicating a medium to large effect size (Cohen's $d = 0.65$). Based on the last observation of "worst pain" collected for each patient, minimally important clinical change was reported by 314/1,277 (25%) patients who provided any "worst pain" rating data, moderately important clinical change was reported by 69/1,277 (5%) patients, and substantially important clinical change was reported by 52/1,277 (4%) patients. Based on end-of-treatment "worst pain" for patients providing data at Session 11, minimally important clinical change was reported by 264/775 (34%) patients, moderately important clinical change was reported by 61/775 (8%) patients, and substantially important clinical change was reported by 44/775 (6%) patients. There were significant effects of time on NRS ratings for "average pain," $F(1, 1,758) = 141.83$, $p < .001$, indicating a medium effect size (Cohen's $d = 0.43$). Based on the last observation of "average pain" collected for each patient, minimally important clinical change was reported by 282/1,277 (22%) patients who provided any "average pain" rating data, moderately important clinical change was reported by 85/1,277 (7%) patients, and substantially important clinical change was reported by 91/1,277 (7%) patients. Based on end-of-treatment "average pain" for patients providing data at Session 11, minimally important clinical change was reported by 230/775 (30%) patients, moderately important clinical change was reported by 76/775 (10%) patients, and substantially important clinical change was reported by 82/775 (11%) patients. Finally, there was a statistically significant effect of time for "least pain," $F(1, 1,717) = 39.67$, $p <$ .001, indicating a very small effect size (Cohen's $d = 0.20$). Based on the last observation of "least pain" collected for each patient, minimally important clinical change was reported by 148/1,244 (12%) patients who provided any "least pain" rating data, moderately important clinical change was reported by 102/1,244 (8%) patients, and substantially important clinical change was reported by 159/1,244 (13%) patients. Based on end-of-treatment "least pain" for patients providing data at Session 11, minimally important clinical change was reported by 122/775 (16%) patients, moderately important clinical change was reported by 82/775 (11%) patients, and substantially important clinical change was reported by 143/775 (18%) patients.

There was also a significant effect of time on pain interference (WHYMPI-INT), $F(1, 1,623) = 490.47$, $p < .001$, indicating a medium to large effect size (Cohen's $d = 0.70$). Based on the last observation of pain interference collected for each patient who provided any pain-interference data, clinically important change (i.e., decrease of ≥ 0.6 points) was reported by 440/1,154 (38%) patients. Based on end-of-treatment pain interference for treatment completers, clinically important change (i.e., decrease of ≥ 0.6 points) was reported by 388/775 (50%) patients.

There was a significant effect of time on pain catastrophizing (PCS), $F(1, 1,762) = 751.14$, $p < .001$, indicating a large effect size (Cohen's $d = 0.78$). Significant effects of time on depression were found both for patients who completed the BDI-II, $F(1, 221) = 95.16$, $p < .001$, indicating a medium to large effect size (Cohen's $d = 0.66$) and for those who completed the PHQ-9, $F(1, 1,667) = 527.82$, $p < .001$, indicating a medium to large effect size (Cohen's $d = 0.70$). Finally, significant effects of time on all four quality-of-life domains (WHOQOL-BREF) were found, including physical health, $F(1, 1,669) = 464.08$, $p < .001$, indicating a medium to large effect size (Cohen's $d = 0.65$); psychological well-being, $F(1, 1,639) = 334.47$, $p < .001$, indicating a medium effect size (Cohen's $d = 0.48$); social relationships, $F(1, 1,653) = 138.71$, $p < .001$, indicating a small effect size (Cohen's $d = .33$); and environment, $F(1, 1,634) = 172.14$, $p < .001$, indicating a small effect size (Cohen's $d = .34$).

Table 3

Descriptive Statistics for Primary Outcome Measures

Variable	Session 1 mean (*SD*), *n* = 1,331	Session 7 mean (*SD*), *n* = 983	Session 11 mean (*SD*), *n* = 775
NRS			
Worst (past week)	8.51 (1.30)	8.02 (1.64)	7.68 (1.86)
Average (past week)	6.55 (1.64)	6.22 (1.81)	5.78 (1.98)
Least (past week)	4.49 (2.03)	4.33 (2.06)	4.02 (2.18)
Pain Catastrophizing Scale	31.54 (11.81)	25.84 (12.44)	21.71 (12.91)
WHYMPI-INT	4.53 (1.08)	4.13 (1.25)	3.71 (1.36)
Depression			
BDI-II	27.00 (11.48)	22.28 (11.61)	18.82 (10.98)
PHQ-9	15.37 (5.97)	12.78 (6.18)	10.97 (6.31)
WHOQOL			
Physical	32.52 (15.88)	38.96 (17.15)	43.14 (18.50)
Psychological	43.04 (18.21)	48.67 (17.93)	52.02 (18.91)
Social	43.66 (22.14)	47.93 (22.49)	51.32 (23.31)
Environmental	62.47 (16.73)	66.32 (16.59)	68.26 (16.63)

Note. NRS = Pain Numeric Rating Scale; WHYMPI-INT = West Haven–Yale Multidimensional Pain Inventory, Interference Subscale; BDI-II = Beck Depression Inventory–II; PHQ-9 = Patient Health Questionnaire–9; WHOQOL = World Health Organization Quality of Life measure.

Table 4
Mixed-Effects Models of Change Over Time in Primary Outcome Measures (N = 1,331)

Variable	Coefficient	SE	t (approximate d)	p value	Cohen's d
NRS					
Worst (past week)					
Intercept	8.51	0.04	189.51 (1,970)	<.001	
Time	−0.84	0.06	−14.84 (1,837)	<.001	0.65
Average (past week)					
Intercept	6.56	0.05	127.06 (1,761)	<.001	
Time	−0.70	0.06	−11.91 (1,758)	<.001	0.43
Least (past week)					
Intercept	4.50	0.06	74.68 (1,654)	<.001	
Time	−0.40	0.06	−6.30 (1,717)	<.001	0.20
Pain Catastrophizing Scale					
Intercept	31.55	0.36	88.57 (1,513)	<.001	
Time	−9.18	0.34	−27.41 (1,762)	<.001	0.78
WHYMPI-INT					
Intercept	4.56	0.04	125.53 (1,487)	<.001	
Time	−0.75	0.03	−22.15 (1,623)	<.001	0.70
Depression					
BDI-II					
Intercept	27.68	0.98	28.11 (181)	<.001	
Time	−7.52	0.77	−9.76 (221)	<.001	0.66
PHQ-9					
Intercept	15.34	0.18	85.68 (1,565)	<.001	
Time	−4.16	0.18	−22.97 (1,667)	<.001	0.70
WHOQOL					
Physical					
Intercept	32.68	0.49	66.28 (1,542)	<.001	
Time	10.29	0.48	21.54 (1,669)	<.001	0.65
Psychological					
Intercept	43.05	0.54	80.41 (1,467)	<.001	
Time	8.78	0.48	18.29 (1,639)	<.001	0.48
Social					
Intercept	43.63	0.66	66.16 (1,522)	<.001	
Time	7.36	0.63	11.78 (1,653)	<.001	0.33
Environmental					
Intercept	62.57	0.49	128.43 (1,463)	<.001	
Time	5.68	0.43	13.12 (1,634)	<.001	0.34

Note. SE = standard error; NRS = Pain Numeric Rating Scale; PCS = Pain Catastrophizing Scale; WHYMPI-INT West Haven–Yale Multidimensional Pain Inventory, Interference Subscale; BDI-II = Beck Depression Inventory–II; PHQ-9 = Patient Health Questionnaire–9; WHOQOL = World Health Organization Quality of Life measure. Intercept is the estimated mean initial value for each measure; time is the estimated mean change in score over the course of treatment. Cohen's *d* was calculated as the slope estimate of change over time divided by the standard deviation of the relevant measure at the initial measurement time point. Initial, midpoint, and final (Sessions 1, 7, and 11) are indicated as times 0, 0.6, and 1.0, respectively, in the mixed-effects analyses.

Discussion

Chronic pain is highly prevalent in the Veteran population, complicates the management of comorbid medical and mental health conditions, and has a profound impact on Veterans' quality of life and on the VA health-care system. Given updates in treatment guidelines for chronic pain and the substantial evidence base for nonpharmacological, behavioral approaches to pain management, there is a tremendous need for effective treatment protocols that can be widely disseminated and implemented in clinical practice. To our knowledge, this report represents the largest evaluation of CBT-CP outcomes in a real-world clinical setting. In addition, it is set apart from much other CBT-CP pragmatic research because therapy was guided by a manualized protocol and was closely monitored and rated to ensure clinical adherence and competence. This is of particular importance because there has been a noted need in the literature to improve the quality and consistency of the delivery of psychological therapies for chronic pain (Williams et al., 2012).

Veterans showed improvement on all outcomes across the course of treatment with CBT-CP. Reductions in pain-intensity ratings for "worst pain" and "average pain" in the past week were statistically significant and reflected medium to large effect sizes, with a very small effect size for reductions in "least pain." The magnitude of these changes represented a 10–20% reduction, which is less than minimal in the context of guidelines for clinical significance. Despite this modest reduction in pain ratings, patients experienced robust improvement on measures of psychosocial functioning. Pain catastrophizing, a risk factor for disability and distress in patients with chronic pain (Leung, 2012), showed an almost 10-point drop from baseline to treatment conclusion; this large effect was also clinically significant; scores at treatment conclusion were well below the clinical cutoff (i.e., 30) at the

group level (Sullivan et al., 1995). Similarly, pain interference, reflective of the extent to which pain posed an obstacle to daily functioning, was reduced by an effect size of $d = 0.70$, reflecting an effect that was also clinically significant (i.e., $>.6$) at the group level. Medium to large, clinically significant effects were also found on both measures (BDI-II, PHQ-9) of depression; for example, mean BDI-II scores dropped from moderate to mild severity. Finally, quality of life showed improvement from baseline to treatment conclusion, with small to medium-large effect sizes with regard to physical, psychological, social, and environmental indices. Thus, treatment provided by newly trained therapists in the VA's CBT-CP program effectively helped Veterans change their relationship with, response to, and management of chronic pain. Overall, the treatment effect sizes observed in this program-evaluation project were similar to or greater than the small to moderate effect sizes found in a review that compared CBT-CP interventions to waitlist or usual control (Williams et al., 2012). Although the current project did not have a comparison group, the effect sizes observed in this project support the effectiveness of CBT-CP when provided in routine clinical settings by clinicians receiving formal training.

CBT-CP is recommended as a first-line treatment for chronic pain; however, there remains a general shortage of clinicians who are trained to competence to provide behavioral interventions for chronic pain (Dowell et al., 2016; U.S. Department of Health and Human Services, 2019; U.S. Department of Veterans Affairs & U.S. Department of Defense, 2017). The VA National Evidence-Based Psychotherapy Training Program initiative represents a model for how to increase clinician competence and patient access to these needed behavioral modalities for pain. Because those providing treatment were newly trained, it is reasonable to surmise that the noteworthy patient gains might only increase with additional therapist experience. Unfortunately, access to health-care professionals who can provide CBT-CP remains highly limited in the private sector, and numerous barriers remain regarding this issue. First, no similar large-scale, systematic training programs exist for mental health providers outside of the VA. Because there is no standardization of what constitutes training in pain psychology, identifying a clinician who is adequately trained to assist an individual with chronic pain is challenging. In addition, when prescribing providers want to make such a referral, they often do not have clear guidance on how to access this clinical pathway. Finally, reimbursement from third-party payers remains problematic. Despite ample evidence to support the use of behavioral treatment for chronic pain, it is not recognized by some insurance companies as a core component of treatment. These unfortunate realities must shift so that individuals with chronic pain can incorporate needed behavioral medicine into their treatment and feel empowered to live a full and rewarding life despite pain.

This project had a number of strengths, including the large clinical sample, the pragmatic in vivo application of the intervention, and the clearly defined CBT-CP protocol that was used and evaluated. However, this project also had several limitations. First, there was substantial attrition, such that 58% ($n = 775$) of the 1,331 Veterans who initiated the treatment were coded by their clinicians as treatment completers. Although this is not surprising in the context of an effectiveness trial with this complex patient population, and although the final sample did not demographically differ from noncompleters on any variable other than age, it does

suggest the need for careful attention to strategies for patient selection and retention in the implementation of CBT-CP. It may also indicate the need for briefer behavioral options for those who are not best suited to this form of CBT-CP or are not yet ready to engage in it. Future research examining implementation factors that may have affected engagement in treatment would be beneficial for this population. Second, ideally, the entire patient cohort would have completed a single depression measure, but there was a shift in the latest cohorts as a result of a shift in VA screening practices. On a positive note, both the BDI-II and the PHQ-9 yielded large effects. Regarding generalizability, the population reflects the Veteran population versus the U.S. population, and therefore males are overrepresented. Having said that, the percentage of females in the group, at 18%, was higher than that of females in the general VA population, at 7.5% (Frayne et al., 2018). Finally, because this report involved a retrospective analysis of program evaluation data, it was not randomized and did not include a control group, which would have strengthened the findings. In the future, examining potential moderators and mediators to outcomes to elucidate what works best for whom, as well as evaluating briefer versions of CBT-CP for application at an earlier step of care, would be useful.

Our findings on the effectiveness of the VA's CBT-CP program are in line with previous studies, despite the higher rates of chronic pain and impairment levels in the military population. The model program in the VA not only highlights the need for increased access to behavioral medicine for chronic pain in Veterans but also reinforces the need to expand the network of training and accessibility for options such as CBT-CP to all of those with chronic pain conditions. Working together, the private sector and VA health-care system should aim to enhance the broad-based dissemination of behavioral medicine approaches as a public health strategy to optimally address chronic pain.

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