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Authors

Carmody, Timothy P
Duncan, Carol L
Huggins, Joy
et al.

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Telephone-Delivered Cognitive–Behavioral Therapy for Pain Management Among Older Military Veterans: A Randomized Trial

Timothy P. Carmody, Carol L. Duncan, Joy Huggins, Sharon N. Solkowitz, Sharon K. Lee, Norma Reyes, Sharon Mozgai, and Joel A. Simon
San Francisco VA Medical Center and University of California, San Francisco

This study investigated the effectiveness of telephone-delivered cognitive–behavioral therapy (T-CBT) in the management of chronic pain with older military veterans enrolled in VA primary-care clinics. We conducted a randomized clinical trial comparing T-CBT with telephone-delivered pain education (T-EDU). A total of 98 military veterans with chronic pain were enrolled in the study and randomized into one of two treatment conditions. Study participants were recruited from primary-care clinics at an urban VA medical center and affiliated VA community-based outpatient clinics (CBOCs). Pain management outcomes were measured at midtreatment (10 weeks), posttreatment (20 weeks), 3-month follow-up (32 weeks), and 6-month follow-up (46 weeks). No significant differences were found between the two treatment groups on any of the outcome measures. Both treatment groups reported small but significant increases in level of physical and mental health, and reductions in pain and depressive symptoms. Improvements in all primary outcome measures were mediated by reductions in catastrophizing. Telephone-delivered CBT and EDU warrant further study as easily accessible interventions for rural-living older individuals with chronic pain.

Keywords: pain, chronic pain, cognitive–behavioral therapy, pain management, telemen health

Persistent pain in older adults is often associated with disability, emotional distress, and increased health-care utilization and cost (United States Department of Health and Human Services, Centers for Disease Control; CDC, 2005; Gureje, Von Korff, Simon, & Gater, 1998; Jensen, Wilson, & Rise, 2003). Estimates of chronic pain in older adults accompanied by significant disability range from 34% to 66% (Thomas, Peat, Harris, Wilkie, & Croft, 2004). Since an increase in the number of older adults is anticipated over the next two decades, the problem of chronic pain in this age group will take on increased importance (Turner, Ersek, & Kemp, 2005). Among military veterans enrolled in the Veterans Health Administration (VHA), nearly one half of patients seen in primary-care settings report disabling pain symptoms, and many of these veterans represent older age groups (Kerns, Otis, Rosenberg, & Reid, 2003). Chronic pain in these older veterans is often associated with degenerative disk disease, musculoskeletal problems, radiculopathy, and peripheral neuropathy (AGS Panel, 2002). As time passes, personal coping and social support resources may wear thin (Revenson, 1994). Studies of chronic pain in older adults are limited compared with the extensive research on younger individuals with chronic pain (Ersek, Turner, & Kemp, 2006).

The effectiveness of CBT for pain management has been examined in several treatment-outcome studies (Morley, Eccleston, & Williams, 1999; Nicholas, Wilson, & Goyen, 1991; Philips, 1987; Turner & Chapman, 1982). CBT has been shown to be a key component in interdisciplinary pain-management programs (Brox et al., 2003; Brox et al., 2006; Gatchel & Okifuji, 2006; Jensen, Turner, & Romano, 2001; McCracken & Turk, 2002; Turk, 2002; Turk & Gatchel, 2002). Similarly, educational interventions have been shown to be helpful for individuals suffering from chronic pain (e.g., Moseley, 2004).

Unfortunately, access to effective psychoeducational interventions such as CBT is limited for military veterans, who must often travel long distances to see health-care providers, making it difficult or even impossible for them to access medical, rehabilitation, and mental-health services (Fortney, Rost, Zhang, & Warren, 1999; Lew et al., 2009; Mohr et al., 2010). Many VA community-based outpatient clinics (CBOCs) have minimal mental-health staffing, with extremely limited resources and limited ability to conduct CBT for pain management (Hankin, Spiro, Miller, & Kazis, 1999). Illness and disability increase the difficulty for

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Timothy P. Carmody, Carol L. Duncan, Joy Huggins, Sharon N. Solkowitz, Sharon K. Lee, Norma Reyes, and Sharon Mozgai, San Francisco VA Medical Center and Department of Psychiatry, University of California, San Francisco; Joel A. Simon, San Francisco VA Medical Center and Departments of Medicine and Epidemiology and Biostatistics, University of California, San Francisco.

Sharon K. Lee is now at the UCLA/RAND Prevention Research Center, University of California, Los Angeles; Norma Reyes is now at the Department of Psychology, Loyola University Chicago; and Sharon Mozgai is now at Harvard Business School.

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Correspondence concerning this article should be addressed to Timothy P. Carmody, VA Medical Center (116B), 4150 Clement Street, San Francisco, CA 94121. E-mail: timothy.carmody@va.gov

veterans with chronic pain to attend the regularly scheduled appointments (Yuen, Gerdes, & Gonzales, 1996). Given these barriers to access, it is not surprising that the dropout rate in studies of face-to-face CBT for chronic pain detracts from its impact in pain management (Richmond & Carmody, 1999). For this reason, some primary-care clinics have begun to explore the feasibility of placing behavioral medicine specialists on site to improve access to psychological treatments (Hedrick et al., 2003), but such programs remain quite rare.

A telephone-delivered version of CBT overcomes distance-related barriers to access (Pyne et al., 2010). There is growing evidence that attrition is much lower for telephone-administered psychotherapy than for face-to-face psychotherapy (Mohr, Hart, & Marmar, 2006; Mohr, Vella, Hart, Heckman, & Simon, 2008; Simon, Ludman, Tutty, Operskalski, & Von Korff, 2004). In relation, studies of telephone-administered psychotherapy have yielded attrition rates that are much lower than those observed for face-to-face psychotherapy in primary-care settings (Mohr et al., 2005; Mohr et al., 2000). Preliminary evidence for telephone-delivered problem-solving treatment (Lynch, Tamburrino, & Nagel, 1997) and interpersonal therapy (Miller & Weissman, 2002) has also emerged. Patients receiving telephone-delivered psychotherapy report that they have benefited from these services (Mohr et al., 2010). The results of a recent meta-analysis of telephone-delivered CBT for individuals with chronic illness supported its efficacy for this population and positive impact on reducing attrition (Muller & Yardley, 2011).

The primary purpose of this study was to investigate the efficacy of telephone-delivered CBT in facilitating pain management among older military veterans suffering from chronic pain. Specifically, we hypothesized that telephone-delivered CBT would be significantly more effective than telephone-delivered pain education in reducing depressive symptoms, increasing use of coping self-statements, and increasing mental and physical health (well-being). We used the age range starting with 55 rather than 65 because of the demographics of the patient population in the target clinics and prevalence of neurodegenerative and musculoskeletal pain disorders and greater disability that are known to emerge in this age group before the age of 60 (Berman, Iris, Bode, & Drengenberg, 2009). The secondary aim of this study was to determine the role of coping self-statements and catastrophizing as covariates of treatment gains. Reductions in catastrophizing and increases in the use of coping self-statements and self-efficacy have been shown to be associated with improvements in pain-management outcomes among individuals with chronic pain who have participated in CBT (e.g., Jensen et al., 2001; Thorn et al., 2007). In a randomized controlled trial of CBT for chronic temporo-mandibular disorder pain, Turner, Holtzman, and Mancel (2007) found that changes in pain beliefs (control over pain, disability, and pain signals harm), catastrophizing, and self-efficacy for managing pain mediated the effects of CBT on pain, activity interference, and jaw-use limitations at one year. More empirical research is needed to identify mechanisms of change in effective psychosocial treatments. We hypothesized that a decrease in catastrophizing and increase in use of coping self-statements would be positively associated with treatment outcome measures reflecting improved adjustment to chronic pain. We also hypothesized that attrition would be low and satisfaction high in both treatment groups.

Method

Overview of Study Design

The study design involved a randomized trial comparing telephone-delivered cognitive–behavioral therapy (T-CBT) with telephone-delivered pain education (T-EDU). A cohort of older chronic pain patients (ages 55 or older) was recruited from the primary-care clinics at a university-affiliated urban-located VA medical center and affiliated VA CBOCs. Outcome assessments of mental and physical functioning, pain behavior, pain intensity, pain-coping strategies, and affective distress were conducted at 10 weeks (midtreatment), 20 weeks (posttreatment), 32 weeks (3-month follow-up), and 46 weeks (6-month follow-up).

Study Participants

The study participants were military veterans enrolled in a VA primary-care clinic, ages 55 or older, with documented chronic pain for at least one year, and having access to a telephone. In addition, their pain conditions must have been stable, with no clear indication for specific medical/surgical interventions. Most common pain diagnoses included low back and cervical pain, with and without radiculopathy, sciatica-related leg pain, musculoskeletal problems, arthritis-related pain, degenerative disk disease, and peripheral neuropathy. Most common pain locations included the back ($N = 50$), upper limbs ($N = 19$), and lower limbs ($N = 16$). Patients were excluded who were psychotic, cognitively impaired, at significant risk for suicide (history of multiple suicide attempts or actively suicidal), and currently abusing or dependent on alcohol or other drugs, including prescribed opioid pain medications. Eligibility criteria were assessed by means of self-report, review of the VA electronic medical record (EMR), and telephone-structured diagnostic interviews, and cognitive screening.

Power Analysis

We took the conservative approach of basing our power analysis on the outcome measure with the smallest effect size. Previous studies showed moderate–large pre-post effect sizes of $d = 1.1$–1.2 for the primary outcome measures. Meta-analysis of 12 studies of CBT for chronic pain yielded large effect sizes for measures of pain symptoms and moderate effect sizes for measures of affective distress and level of functioning. Thus, we conservatively predicted a moderate effect size of .50 in the proposed study. Pain education (pain school) can produce significant changes of $d = .41$–$.60$. We used intent to treat (ITT) mixed-model analyses, which can account for missing data and subjects lost to follow-up. Given a power of .90, and an alpha of .05, we estimated that we would need to recruit 80 participants per treatment arm.

Recruitment and Screening

The study was advertised in all of the outpatient clinics at the San Francisco VA Medical Center (SFVAMC) and affiliated VA CBOCs. Invitation letters were sent to 464 veterans who were 55 years old or older and had documentation of chronic pain in their EMR. The results of each step in the recruitment and screening procedures are presented in Figure 1. Of those who were sent

invitation letters, 98 expressed an interest in learning more about the study and another 73 veterans responded to flyers or direct referral by their primary-care providers.

A total of 171 individuals were administered a brief telephone screening to evaluate inclusion and exclusion criteria. The telephone version of the Mini-International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) was used to determine lifetime and current psychiatric disorders. Patients were also screened for cognitive impairment using the Telephone Interview for Cognitive Status (TICS), which has been shown to be an effective screen for dementia from both stroke and Alzheimer's (Debanne et al., 1997; Desmond, Tatemichi, & Hanzawa, 1994). Patients were instructed to be alone in a room with no distractions and no writing implements within reach. The telephone-delivered cognitive assessment lasted approximately 20 minutes. On the basis of the screening procedures, 147 patients were found to be eligible to enroll. Reasons for ineligibility included schizophrenia/psychosis ($n = 6$), substance abuse ($n = 6$), age < 55 ($n = 5$), no pain ($n = 2$), no phone ($n = 2$), pain diagnosis ($n = 1$), surgical intervention ($n = 1$), and dementia ($n = 1$).

Informed Consent and Randomization

Eligible patients ($N = 101$) who agreed were verbally consented over the telephone using procedures approved by the SFVAMC internal review board (clinicaltrials.gov identifier: NCT00371267). Written consent was then obtained by mail. As shown in Figure 1, a total of 101 individuals completed the baseline assessment and were randomized. Three of the veterans who were randomized declined treatment. Thus, the study sample of 98 veterans received either T-CBT or T-EDU. One fifth of the sample ($N = 20$) received their care at one of the CBOCs. Mean distance to the nearest VA clinic for study participants was 20 miles ($SD = 27.6$). Randomization was stratified on the basis of baseline assessment of major depressive disorder (lifetime or none) and duration of their most bothersome and disabling chronic-pain problems ($\leq$5 years or $\geq$5 years). Stratification was used to ensure adequate numbers of participants with and without major depression and with chronic pain $\leq$ or $\geq$5 years in both treatment conditions. Patients were compensated for participating in the study.

Assessment Procedures

Demographic baseline variables. The following variables were derived from a brief structured interview conducted at baseline: age (years), gender, race/ethnicity (white, black, other), marital status (married, not married), employment status (employed full-time, employed part-time, unemployed), socioeconomic status (determined by years of education), medical diagnosis for the most bothersome and disabling pain problems, use of pain medications (mean number of medications), and duration of chronic pain.

Primary outcome measures. The primary outcome measures were administered at baseline, midtreatment, posttreatment, and at the two follow-up assessments (32 and 46 weeks).

Short Form 12v2 Health Survey (SF-12v2). The SF-12v2 (Ware, Kosinski, & Keller, 1995; Ware, Kosinski, Turner-Bowker, & Gandek, 2007) was mailed to participants at each assessment to measure health-related quality of life. The mental- and physical-health summary scores were used in the present study. The SF-

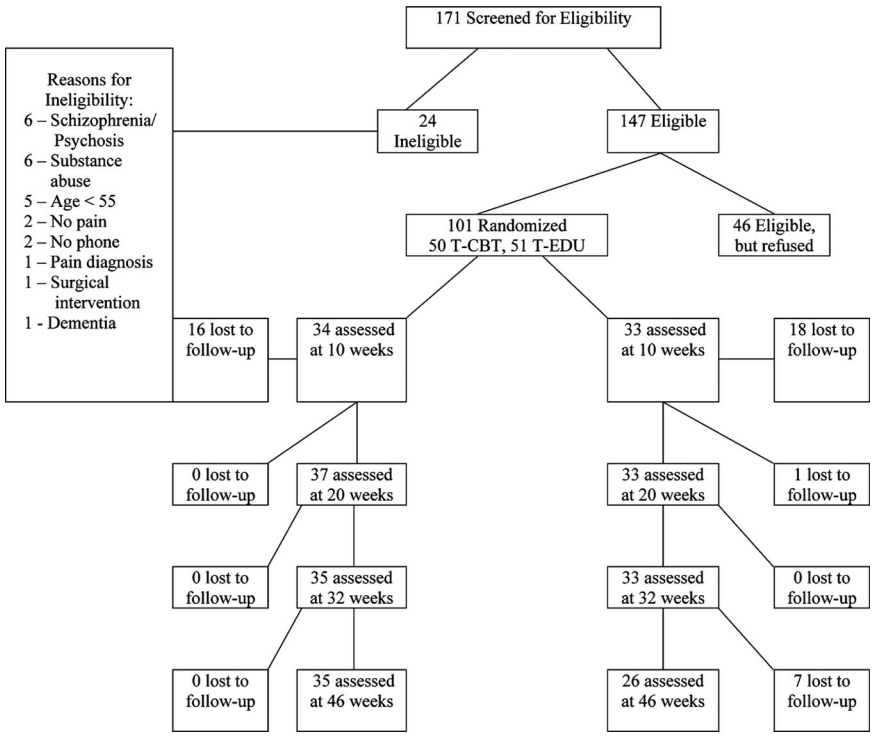

Figure 1. Study flowchart.

12v2 items were drawn from the eight scales of the SF-36, including physical functioning, role physical, bodily pain, vitality and energy level, social functioning, role emotional, mental health, and general health. These items reflect what respondents are able to do functionally, how they feel, and how they evaluate their health statuses. Detailed evidence of the internal stability, retest reliability, and validity of the SF-12v2 scales has been reported by Ware et al. (2007). Multiple studies have examined internal stability for the mental and physical health summaries, with Cronbach's alphas generally exceeding 0.80. Test–retest reliability coefficients generally exceeded 0.70. The discriminant validity of these summary scores has been investigated in over 270 studies comparing groups differing in physical and/or mental-health status. In the present study, Cronbach's alpha for both the mental and physical health scores was 0.83.

Pain Behavior Checklist (PBCL). The PBCL (Kerns et al., 1991) consists of 18 items and measures various aspects of pain behavior, including distorted ambulation, affective distress, facial/audible expressions, and seeking help. This instrument has been shown to discriminate reliably between categories of pain behaviors. Kerns et al. (1991) reported that the reliability estimates for the subscales ranged from .63 to .83 and the alpha coefficient for the PBCL total score was .85. Stability coefficients for the four subscales ranged from .70 to .87, and the stability coefficient for the PBCL total score was .80, indicating that the PBCL is stable over time. (Kerns et al., 1991). The total score on the PBCL was used as one of the primary outcome variables and mailed to participants at each assessment. Cronbach's alpha for the PBCL total score in the present study was 0.88.

Beck Depression Inventory (BDI-II). The 21-item BDI-II (Beck, Steer, & Brown, 1996) was mailed to participants to assess participants' levels of depression. Scores range from 0 to 63, with 0 to 13 indicating minimal depression, 14 to 19 mild depression, 20 to 28 moderate depression, and 29 to 63 severe depression. Beck et al. (1996) reported a split-half reliability of .93 and established external validity through a correlation with clinical judgments of depression of .65. Cronbach's alpha for the BDI-II total score in the present study was 0.91.

Pain intensity (PI). Each participant completed a self-monitoring diary tracking pain intensity over a 2-week period at each of the assessment points. Each day, individuals rated their primary pain problema on a 6-point scale ranging from 0 (*no pain*) to 5 (*incapacitating pain*). These pain-intensity ratings were then averaged to determine a mean pain intensity level for each participant over a 2-week period.

Covariates of Change

Coping Strategies Questionnaire–Revised (CSQ-R). The CSQ-R (Riley & Robinson, 1997) was mailed to participants at each assessment to assess catastrophizing and use of coping self-statements as covariates. This self-report questionnaire consists of 27 items and assesses the extent to which an individual with chronic pain uses various cognitive and behavioral coping strategies when they feel pain. The CSQ-R consists of the following scales: use of distraction, ignoring pain, praying, catastrophizing, and use of coping self-statements. The results of confirmatory factor analysis (Riley & Robinson, 1997) indicate acceptable indices of goodness of fit and a more robust and stable factor structure for the CSQ-R subscales than those in the original CSQ. The scales measuring catastrophizing and use of coping self-statements were used to investigate mediators of change in the primary analyses. This questionnaire has been shown to be an internally reliable instrument. Cronbach's alpha in the present study was 0.85 for the catastrophizing subscale and 0.77 for the coping self-statement subscale.

Training of the Assessment Technicians (ATs)

The study ATs were given thorough instruction and training in all of the screening, baseline, and outcome-assessment procedures. A library of audio tapes was used to calibrate AT ratings during training. ATs began assessments only after reliability criteria had been reached ($>.90$).

Maintaining the Blind

ATs remained blinded to treatment assignment until the trial was completed. ATs began each follow-up interview with a brief instruction to the patient to refrain from discussing anything about his or her treatment. The primary investigator and study coordinator were not blinded and maintained codes for unblinding the study.

Interventions

Telephone-delivered CBT (T-CBT). The T-CBT condition consisted of 12 telephone sessions over 20 weeks. The first eight sessions were scheduled on a weekly basis. The next two sessions were scheduled biweekly and the final two sessions were to be scheduled a month apart. T-CBT is a manualized form of CBT for pain management, adapted from the treatment protocol developed by Thorn (2004), and adapted for low-literacy rural populations based on the protocol developed by Kuhajda, Thorn, Gaskins, Day, and Cabbil (2011). The T-CBT intervention included all of the training modules that were included in the original Thorn (2004) treatment protocol. The primary goal of T-CBT was to facilitate adjustment to chronic pain by teaching methods of managing negative emotions and maladaptive thought patterns, improving social functioning, and improving coping with stressful life events. The first six sessions were devoted to presenting the stress–pain–judgment model of chronic pain (Thorn, 2004) and identifying and challenging unhelpful automatic thoughts and underlying core beliefs. The last six sessions (in order of presentation) included skills training in relaxation, coping self-statements, expressive writing, assertive communication, maintaining change, coping with setbacks, and overall review. Patients were provided with handouts for each session that served to focus the treatment, to remind the patient between sessions of the relevant topics covered in therapy, and to guide outside task assignments. Each session followed the same structure, beginning with the therapist setting an agenda, reviewing the patient's completion of task assignment from the previous week, asking for feedback from the patient, and concluding with a summary of key points and the development of clear task assignments. As the therapy progressed, patients were encouraged to take an increasing role in setting the agenda and tailoring homework.

Telephone-delivered education (T-EDU). The T-EDU condition based on a pain education intervention developed by Ehde and

colleagues (Ehde, Jensen, Engel, Hanley, Raichle, & Osborne, 2005) consisted of 12 telephone sessions over a 20-week period. As with the T-CBT group, the first eight sessions of T-EDU were scheduled on a weekly basis. The next two sessions were scheduled biweekly and the final two sessions were scheduled one month apart. The T-EDU condition utilized manualized education regarding chronic pain and pain management administered over the telephone. Topics during the first six sessions (in order of presentation) included basic concepts about chronic pain, gate control theory, costs of chronic pain, sleep hygiene, acute versus chronic pain, depression and pain. During the last six sessions, topics included (in order of presentation) communication regarding pain, assertiveness, working with health-care providers, principles of behavior change, and maintaining change (two sessions). As with T-CBT, the content was adapted to a low-literacy level in a rural population. Sessions were educational and interactive, but included no cognitive restructuring or skills training.

Therapist training, monitoring, and supervision. The therapists ($N = 4$) for both the T-CBT and T-EDU interventions had masters' level educational backgrounds, a range of 6–12 years of experience, and received a total of 20 hours of training that consisted of didactic explanations of the principles of each intervention, followed by role plays and feedback. The training focused on the content of the interventions, basic skills for telephone therapy, and structure of the sessions (e.g., setting the agenda, conducting behavioral rehearsal of coping skills, checking homework, assigning homework). Strategies for maintaining focus, redirecting tangential discussions, helping patients set aside time in a private part of the home, and scheduling time for the intervention appointments were reviewed. A random sample of treatment sessions were audio taped using a telephone recording device that allowed both sides of the conversation to be recorded. The project coordinator randomly selected 25% of the audiotapes for adherence and competence ratings, using a modified version of the T-CBT adherence and competence scale (T-CACS) derived from the Beck Institute's CBT adherence and competence scale (Vallis, Shaw, & Dobson, 1986). To ensure treatment fidelity for both the T-CBT and T-EDU treatment protocols, therapists attended a weekly supervision group led by the supervising research psychologist. Acceptable levels of adherence and competence ratings (>80%) were achieved for both treatment protocols. During supervision, therapists discussed difficult cases and obtained suggestions on how to proceed. They were also provided with feedback on the ratings of their audio taped sessions.

Patient adherence and satisfaction. Patient adherence and satisfaction in both treatment groups were assessed on treatment questionnaires administered by mail at 10 weeks (midtreatment) and 20 weeks (posttreatment). Participants in the T-CBT group were asked to rate use and helpfulness of specific intervention components and skills taught and overall helpfulness of the intervention. Participants in the T-EDU group were asked to rate use and helpfulness of each of the 12 topics included in that intervention and overall helpfulness of the intervention.

Facilitation of patient adherence and retention. Empirically validated methods for reducing attrition in substance-use disorder cohorts were utilized based on the engagement, verification, maintenance, and confirmation (EVMC) protocol (Scott, 2004). The follow-up methods aimed at facilitating retention included collecting, validating, updating, and confirming locator information on alternate contacts. The locator form completed at baseline was updated at each assessment, including changes of address and additional significant others to include on the locator list.

Statistical Analyses

Primary analyses were performed by intent to treat (ITT). All participants were analyzed in the treatment group to which they were randomly assigned. Data were analyzed using a linear mixed-model methodology, allowing us to use all available data rather than ignoring participants with missing data. Separate analyses were run for each of the outcome measures. The models included terms for treatment assignment, time, time squared, Treatment × Time, and any necessary controls. Adjusted mixed models that controlled for number of treatment sessions attended, baseline diagnosis of major depression, change in the use of coping self-statements, and change in catastrophizing, were used to examine covariates of change in each of the primary outcome variables. Each model generated beta coefficients (estimates of effect size), confidence intervals (CIs), and p values for time, treatment, Treatment × Time, and quadratic parameters.

Results

Participant Characteristics at Baseline

Demographic and pain-background characteristics of the study sample are presented in Table 1. The participants were mostly Caucasian, and predominantly male. Their mean age was 66 for the T-CBT group and 69 for the T-EDU treatment condition ($p < .15$, *n*s). Approximately one third of the participants was married. Mean duration of chronic pain was 18 years for participants in the T-CBT condition and 17 years for those randomized to the T-EDU group. The percentage of participants with a diagnosis of current major depression was 31% in the T-CBT group and 22% in the T-EDU condition.

Mean (*SD*) scores on the standardized baseline pain measures are presented in Table 2 for both treatment groups. The two treatment groups were significantly different on only one baseline measure, with the CSQ-R praying scale higher for the T-CBT group than for the T-EDU group ($p < .05$).

Participation (Attendance), Adherence, and Rated Helpfulness

Participants attended an average of 9.5 sessions in the T-CBT group and 9.4 sessions in the T-EDU group (no significant difference). A total of 66 participants (67%), 33 participants (69%) in the T-CBT group and 33 (66%) in the T-EDU condition, attended 10 or more of the treatment sessions.

On the measure of overall helpfulness, mean helpfulness ratings (10-point scale) were 7.54 ($SD = 2.13$) for the T-CBT group and 5.83 ($SD = 2.90$) for the T-EDU group (no significant difference). For specific intervention components/topics, the mean percent of participants who rated intervention components as helpful was 82.7% for the T-CBT group (range of 69.2% to 94.1% across items) and 68.9% for the T-EDU group (range of 54.9% to 80.8% across session topics). The mean percent of participants who indicated that they made use of specific intervention components/topics was 95.5% for the T-CBT group (range of 87.9% to 100%

Table 1
Participant Demographic Characteristics by Treatment Group

	Treatment groups			
	T-CBT (N = 48)		T-EDU (N = 50)	
Participant demographic characteristics	Mean/*N*	*SD*/%	Mean/*N*	*SD*/%
Age (Mean/*SD* years)	66	9	69	10
White (*N*/%)	33	69	34	72
Women (*N*/%)	2	4	1	2
Married/partnered (*N*/%)	23	48	20	40
Divorced (*N*/%)	11	23	18	36
Employed (*N*/%)	9	19	5	10
Disabled (*N*/%)	20	42	21	42
Education (Mean/*SD* years)	14	2	15	2
Current major depression (*N*/%)	15	31	11	22
Duration of pain (Mean/*SD* years)	18	18	17	15
Pain intensity (Mean/*SD* rating)	4.3	1.1	4.1	1.2
Pain medications (Mean/*SD*)	1.8	1.2	1.7	1.5

Note. T-CBT = telephone-delivered cognitive–behavioral therapy; T-EDU = telephone-delivered pain education.

across items) and 94.4% for the T-EDU group (range from 83.9% to 100% across session topics). Mean prevalence levels for reported use and helpfulness of intervention components/topics were not significantly different between the two treatment groups.

Follow-Up Assessment Completion Rate

As shown in Figure 1, at midtreatment (10 weeks), assessments were completed on 34 participants (68%) in the T-CBT group and 33 participants (65%) in the T-EDU condition. At posttreatment (20 weeks), assessments were completed on 37 participants (74%) in the T-CBT group and 33 participants (65%) in the T-EDU condition. Outcome data by treatment group are listed in Table 3 for each follow-up assessment. At 3-month follow-up (32 weeks), assessments were completed on 35 participants (70%) in the T-CBT group and 33 participants (65%) in the T-EDU condition. At 6-month follow-up (46 weeks), assessments were completed on 35 participants (70%) in the T-CBT group and 26 participants (51%) in the T-EDU condition. The follow-up assessment completion rate for the T-CBT group was significantly greater than for the T-EDU group at 46 weeks ($\chi^2 = 4.56$, $df = 1$, $p < .033$).

Comparisons of Treatment Outcomes

Physical health (SF-12v2). Significant improvements in physical health were observed in both treatment groups over 46 weeks, with a significant effect for time ($\beta = 0.16$, 95% CI = 0.034 to 0.289, $p = .01$). As shown in Figure 2, the Treatment × Time interaction was not significant, suggesting that the trajectory of change was similar in both groups. The results of the adjusted mixed model showed that a decrease in catastrophizing over time was independently associated with changes in physical health ($\beta = -1.514$, 95% CI = −2.225 to −0.803, $p = .0001$), whereas the number of sessions and change in use of coping self-statements showed very little association with changes in physical health. After controlling for these same covariates, physical health continued to show an

Table 2
Baseline Measures by Treatment Group

	T-CBT (N = 48)		T-EDU (N = 50)		
Measure	Mean	*SD*	Mean	*SD*	*p*
SF-12v2					
Physical	42	8	39	8	.06
Mental	43	13	42	13	.65
BDI-II Total score	16	11	17	10	.60
PBCL					
Distorted ambulation	2.9	1.5	3.2	1.3	.32
Affective distress	2.6	1.6	2.5	1.5	.77
Facial/audible expression	3.0	1.8	3.3	1.7	.41
Seeking help	3.1	1.4	3.0	1.3	.60
Total score	2.8	1.2	3.0	1.1	.59
Pain intensity	4.3	1.1	4.1	1.2	.10
CSQ-R					
Catastrophizing	2.0	1.4	1.8	1.4	.49
Coping self-statements	3.7	1.5	3.5	1.4	.44

Note. T-CBT = telephone-delivered cognitive–behavioral therapy; T-EDU = telephone-delivered pain education; BDI-II = Beck Depression Inventory; PBCL = Pain Behavior Checklist.

Table 3
Primary Outcome and Covariate Variables by Treatment Group

Outcome and covariate measures	Baseline		10 weeks		20 Weeks		32 Weeks		46 Weeks	
	T-CBT *M* (*SD*)	T-EDU *M* (*SD*)	T-CBT *M* (*SD*)	T-EDU *M* (*SD*)	T-CBT *M* (*SD*)	T-EDU *M* (*SD*)	T-CBT *M* (*SD*)	T-EDU *M* (*SD*)	T-CBT *M* (*SD*)	T-EDU *M* (*SD*)
SF-12v2 physical	42 (8)	39 (8)	43 (8)	41 (10)	42 (9)	42 (9)	44 (12)	43 (11)	44 (9)	41 (9)
SF-12v2 mental	43 (13)	42 (13)	43 (12)	43 (13)	45 (12)	44 (12)	46 (9)	44 (12)	45 (9)	46 (10)
BDI-II total score	16 (11)	17 (10)	15 (12)	16 (9)	14 (10)	13 (11)	11 (9)	14 (11)	13 (11)	14 (9)
PBCL total score	2.8 (1.2)	3.0 (1.1)	2.5 (1.2)	2.7 (1.2)	2.5 (1.1)	2.5 (1.0)	2.2 (1.2)	2.5 (1.3)	2.3 (1.3)	2.4 (1.3)
Pain intensity	4.3 (1.1)	4.1 (1.2)	3.8 (1.1)	3.9 (1.2)	3.7 (1.1)	3.5 (1.3)	3.7 (1.4)	3.8 (1.2)	3.6 (1.3)	3.4 (1.3)
CSQ-R coping self-statements	3.7 (1.5)	3.5 (1.4)	4.5 (3.0)	3.6 (1.3)	3.9 (1.4)	3.4 (1.4)	3.8 (1.5)	3.6 (1.2)	3.9 (1.3)	3.5 (1.5)
CSQ-R catastrophizing	2.0 (1.4)	1.8 (1.4)	1.7 (1.4)	1.5 (1.4)	1.3 (1.2)	1.4 (1.4)	1.5 (1.5)	1.3 (1.2)	1.9 (1.7)	1.6 (1.4)

Note. T-CBT = telephone-delivered cognitive–behavioral therapy; T-EDU = telephone-delivered pain education; BDI-II = Beck Depression Inventory; PBCL = Pain Behavior Checklist.

increase over time. The overall treatment difference was not significant in the original model. After controlling for change in catastrophizing, the treatment difference increased slightly, but did not reach statistical significance.

Mental health (SF-12v2). In both treatment groups, significant gains in mental health were achieved over 46 weeks, with a significant effect for time (β = 0.050, 95% CI = 0.002 to 0.098, p = .04). As shown in Figure 2, the Treatment × Time interaction was not significant, suggesting that the trajectory of change was similar in both treatment groups. The adjusted mixed model showed that presence of major depression at baseline and decrease in catastrophizing over time were independently associated with change in mental health (β = −8.193, 95% CI = −11.432 to−4.955, $p < .0001$ and β = −2.115, 95% CI = −2.938 to −1.291, $p < .0001$, respectively), whereas the number of sessions and change in use of coping self-statements showed little association with change in mental health. Even after controlling for these covariates, mental health continued to show an increase over time. The overall treatment difference was not significant in the original model. After controlling for baseline diagnosis of major depression and change in catastrophizing, the treatment difference increased slightly, but did not reach statistical significance.

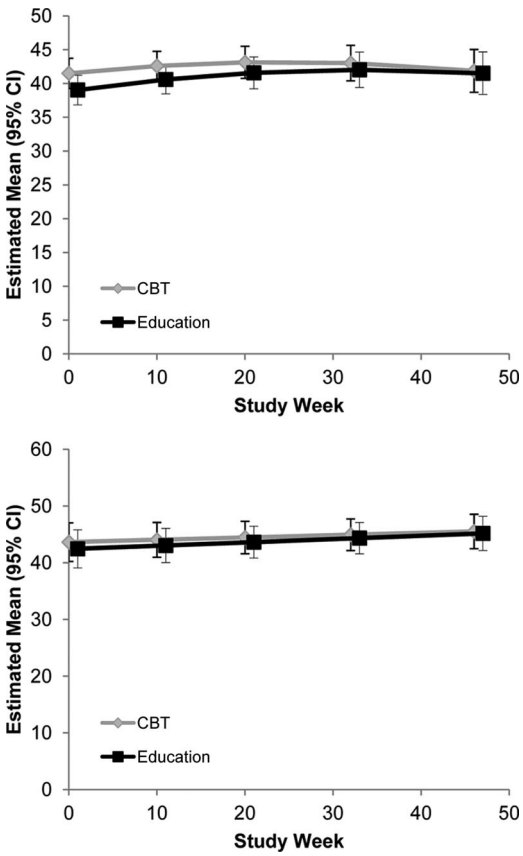

Figure 2. Changes in SF-12v2 physical health (top panel) and mental health (lower panel).

Depressive symptoms (BDI-II). On the BDI-II, there was a decrease in the total score over time (β = −0.201, 95% CI = −0.310 to −0.093, p = .0003), but no statistically significant treatment difference. As shown in Figure 3, the association of time with BDI-II total score was nonlinear (β = 0.003, 95% CI = 0.001 to 0.005, p = .0093). The BDI-II total score decreased from baseline to week 32 and then leveled off. The difference between treatment groups appeared to widen with time, but was not statistically significant at any time point, and the Treatment × Time interaction did not reach statistical significance. The results of the adjusted mixed model showed that presence of major depression at baseline (β = 5.944, 95% CI = 3.034 to 8.854, $p < .0001$) and

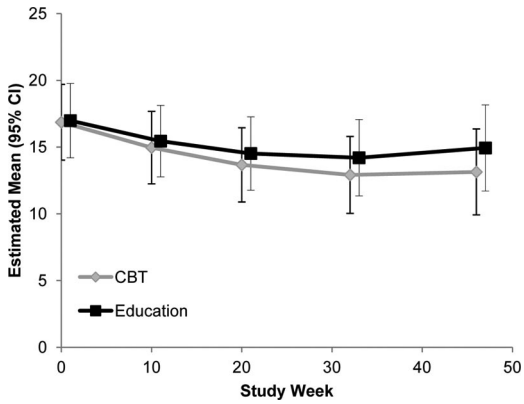

Figure 3. Changes in BDI-II total score.

decrease in catastrophizing over time (β = 2.891, 95% CI = 2.238 to 3.544, $p < .0001$) were independently associated with changes in BDI-II total scores, whereas the number of sessions and change in use of coping self-statements showed little association with changes in BDI-II total scores. Even after controlling for these covariates, BDI-II total scores showed significant decreases over time (β = −0.055, 95% CI = −0.091 to −0.020, $p = 002$). The overall treatment difference was not significant in the original model. After controlling for baseline diagnosis of major depression and change in catastrophizing, the treatment difference increased slightly, but did not reach statistical significance.

Pain behavior (PBCL). On the PBCL total score, as shown in Figure 4, the time effect was statistically significant (β = −0.022, 95% CI = −0.034 to −0.010, $p = .0003$) and nonlinear (β = 0.00, 95% CI = 0.00 to 0.00, $p = .04$). The PBCL total score decreased from baseline and posttreatment (20 weeks) for both treatment groups and then leveled off during follow-up. The Treatment × Time interaction was not significant, and the difference between treatment groups was not statistically significant at any time point. The results of the adjusted mixed model showed that change in catastrophizing over time was independently associated with change in the PBCL total score (β = 0.353, 95% CI = 0.281 to 0.425, $p < .0001$), whereas the other covariates showed very little association with change in the PBCL total score. Even after controlling for the covariates, the effect for time remained significant (β = −0.010, 95% CI = −0.014 to −0.005, $p < .0001$).

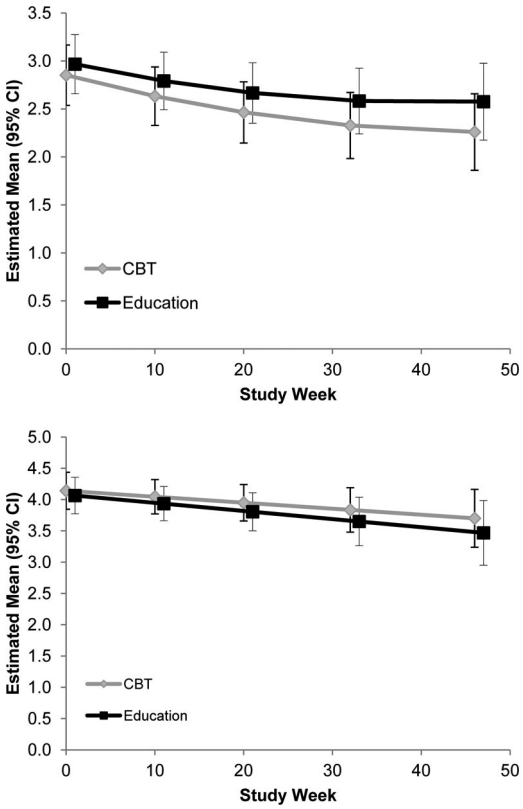

Figure 4. Changes in PBCL total score (top panel) and pain intensity (lower panel).

Pain intensity (PI). On the pain intensity outcome, as shown in Figure 4, the association of time with the pain intensity was significant (β = −0.029, 95% CI = −0.049 to −0.010, $p = .0035$) and nonlinear (β = 0.00, 95% CI = 0.000 to 0.001, $p = .049$). The difference between treatment groups appeared to widen slightly with time, but the Treatment × Time interaction was not significant, and the difference between treatment groups was not statistically significant at any time point. The results of the adjusted mixed model showed that an increase in catastrophizing over time was independently associated with an increase in pain intensity (β = 0.241, 95% CI = 0.140 to 0.342, $p < .0001$), whereas the other control variables showed little association with changes in pain intensity. Even after controlling for this covariate, pain intensity showed a significant decrease over time (β = −0.011, 95% CI = −0.018 to −0.003, $p = 005$).

Discussion

We hypothesized that patients who received telephone-delivered CBT would show significantly greater improvements in physical and mental health, reduced pain behavior and depressive symptoms, compared with those who participated in telephone-delivered EDU. This was the first study to investigate the utility of telephone-delivered versions of both CBT and EDU. Small but significant improvements were reported by participants in both treatment groups on all of the primary study outcomes. The time effects were smaller than those found for most efficacy studies of in-person CBT and suggest a low level of clinical significance. However, as hypothesized, use of lessons learned and perceived helpfulness were highly rated by participants in both treatment groups.

The results indicated that T-CBT was not significantly more effective than T-EDU. Although the T-EDU intervention did not include explicit skills training, several of the topics covered in this group (i.e., acute vs. chronic pain, sleep hygiene, mood, communication skills for assertiveness, communication skills in working with providers, and addressing health-behavior change) were similar to those included in CBT treatments.

CBT has become an important component of interdisciplinary pain-treatment programs (Turk, 2002; Turk & Gatchel, 2002). Educational interventions have also been shown to be helpful for individuals with chronic pain (e.g., Moseley, 2004). Using a qualitative analysis, Day, Thorn, and Kapoor (2011) found that the informational component of both CBT and EDU conducted in a group format was described as helpful by rural-living low-literacy participants with chronic pain. Participants in the CBT group also noted that the assistance provided in identifying and challenging negative thoughts and beliefs was also beneficial. In the treatment outcome literature, when compared with no-treatment or single-treatment approaches, a variety of psychological interventions has been shown to produce significant and clinically meaningful improvements on several indices of coping, activity level, and overall adjustment (Hoffman, Papas, Chartkoff, & Kerns, 2007). In many of the published studies of CBT for pain management, the CBT was implemented within the context of comprehensive pain-rehabilitation programs (Turk, 2002; Turk & Gatchel, 2002). Furthermore, face-to-face individual or group treatment formats may have a greater impact on pain-management outcomes among older individuals than telephone-delivered interventions. In addition, gender may play a role in responsiveness to CBT delivered by

telephone versus face-to-face. In the recent review of telephone-delivered CBT for chronic illness (Muller & Yardley, 2011), a vast majority of patients were women. The present findings suggest that telephone-delivered versions of CBT and pain education warrant further study as valuable interventions for older military veterans with chronic pain.

As hypothesized, engagement in treatment, measured by number of sessions attended, was high for both treatment groups. Approximately 40% of military veterans live in rural areas. Many of these veterans suffer from chronic pain, brain injury, and psychiatric comorbidities. They face unique challenges in obtaining health care because of reduced access to higher quality services, shortages of qualified health-care providers, and limited transportation options (Skupien, 2010). On average, military veterans living in rural areas travel one–two hours for their primary-care appointments and have fewer financial resources than urban-living veterans. At the same time, veterans seen in CBOCs located in urban areas face barriers to access to care involving limited and inconvenient transportation options. Many VA CBOCs, whether located in rural or urban areas, have limited mental-health resources to conduct evidence-based psychotherapy. Telephone-delivered versions of CBT and education for chronic pain overcome many of the barriers to access. Moreover, pain-education intervention can be delivered by nurses and health educators at VA CBOCs.

Regarding mechanisms of change, we hypothesized that a decrease in catastrophizing would be positively associated with treatment-outcome measures reflecting improved adjustment to chronic pain. Both treatment groups showed reductions in catastrophizing between baseline and posttreatment and were maintained during follow-up. Moreover, improvements in all of the primary treatment-outcome measures (i.e., physical health, mental health, depressive symptoms, pain behavior, and pain intensity) were mediated by change in catastrophizing. Burns and colleagues (Burns, Kubilus, Bruehl, Harden, & Lofland, 2003) showed that changes in catastrophic thinking and perceived helplessness early in treatment were significantly associated with later changes in pain severity and functioning. A reduction in catastrophizing likely reflects a helpful reduction in negative thinking that facilitates more adaptive coping for pain management. A surprising finding in the present study was the improvement shown in catastrophizing for participants in the T-EDU group. Although this intervention did not include any cognitive therapy aimed at reducing catastrophizing, the information provided during the telephone sessions in the T-EDU condition appeared to have a beneficial effect on participants' thinking and behavior.

We also hypothesized that an increase in use of coping self-statements would be positively associated with treatment-outcome measures reflecting improved adjustment to chronic pain. The stress–appraisal–coping model of pain (Thorn, 2004) suggests that individuals' thoughts have a direct impact on their adjustment to chronic pain by means of their appraisal of the pain and related stressors, their beliefs regarding their abilities to control their pain, and their choices of coping strategies. Increased use of coping self-statements and perceived control over pain have been shown to be associated with improvements in pain-management outcomes (Jensen et al., 2001; Thorn et al., 2007; Turner et al., 2007). In the present study, use of coping self-statements did not change significantly for participants in either treatment group. The amount of time devoted to the use of coping self-statements may not have been adequate to generate a significant increase in their use.

This was the first study to compare the efficacy of T-CBT and T-EDU among older military veterans with chronic pain. The T-CBT intervention investigated in the present study focused on helping participants to identify and challenge thoughts and beliefs that interfered with pain management. Older veterans might benefit more from an alternative version of T-CBT, which provides increased opportunities for training in pacing, relaxation, management of pain flares, social support, mood monitoring, and behavioral activation. Comprehensive face-to-face CBT interventions that include these components have been shown to yield significant improvements in pain management, coping, and quality of life (Gatchel & Okifuji, 2006; Morley, Eccleston, & Williams, 1999). In addition to the telephone, the use of the Internet may provide an additional way of increasing access to CBT for pain management for veterans with chronic pain, particularly those veterans who face distance, transportation, and other barriers to participation in those evidence-based psychological interventions that require several visits scheduled weekly or more frequently.

There are a number of limitations in the present study. The positive changes shown for both treatment conditions in the primary outcomes were significant, but small. The magnitude and clinical meaning of these improvements may be better demonstrated when T-CBT and T-EDU are implemented as part of a comprehensive interdisciplinary pain-management intervention (Gatchel & Okifuji, 2006). Second, due to the lack of a true control condition, we were unable to rule out the impact of confounding and nonspecific factors. Third, the effects of telephone-administration of assessments may have influenced outcomes. However, the AT-administered assessments were validated for telephone administration. Furthermore, if there were any effects from telephone administration, these effects would have been equally distributed across treatment arms. Fourth, the low completion rates for the follow-up assessments indicated that participants had difficulty completing and returning assessment instruments by mail and limited our ability to assess the long-term efficacy of the telephone-delivered interventions. Fifth, we conducted this study across several VA primary-care clinics in the Northern California area. The results may not generalize to non-VA patient populations, which would likely include more women and greater diversity in race/ethnicity. Although the sample size was relatively small, the study sample represented a broad range of clinics and patients. Nevertheless, given that the entire study was conducted in Northern California, external validity may be limited when applying these findings to the nationwide VA system. Fourth, since we did not include a measure of acquired knowledge resulting from the T-EDU intervention, we were not able to determine the association between lessons learned and changes in the primary outcomes. Finally, as shown in Figure 1, completion rates for mailed follow-up assessments were lower than anticipated and limited our ability to determine treatment efficacy.

Increasing numbers of younger Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND) veterans are enrolling in the VHA. Future studies are needed to examine the efficacy of T-CBT and T-EDU with these younger veterans with and without posttraumatic stress disorder (PTSD), traumatic brain injury (TBI), postconcussive syndrome (PCS), or other psychiatric comorbidities (Gatchel & Rollings, 2008; Walker

et al., 2010). Given changes occurring in the United States with health-care reform, these studies should not only investigate efficacy of these interventions, but include cost-effectiveness analyses to better inform policy regarding the inclusion of telephone-delivered interventions in pain-management programs.

In conclusion, T-CBT was not shown to be more effective than T-EDU as a pain-management intervention. Improvements for both treatment groups were significant, but modest in terms of clinical significance. Given the present findings, the next step in this line of study might be to develop and test a more comprehensive T-CBT that includes more of the components included in evidence-based face-to-face CBT for pain management. A recent meta-analysis of telephone-delivered CBT for individuals with chronic illness (Muller & Yardley, 2011) indicated that such interventions show promise in facilitating positive health outcomes, but also indicated a high degree of variability in outcomes across trials. Further studies are needed to develop more effective telephone-delivered interventions that increase access to evidence-based pain-management treatments and acceptability for older military veterans suffering from chronic pain.

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Correction to Carmody et al. (2012)

In the article "Telephone-Delivered Cognitive–Behavioral Therapy for Pain Management Among Older Military Veterans: A Randomized Trial" by Timothy P. Carmody, Carol L. Duncan, Joy Huggins, Sharon N. Solkowitz, Sharon K. Lee, Norma Reyes, Sharon Mozgai, and Joel A. Simon (*Psychological Services*, Advance Online Publication, Dec 17, 2012, np), the copyright attribution was incorrect. The article is in the public domain. All versions of this article have been corrected.

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