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Treatment of Posttraumatic Stress Disorder with Prolonged Exposure for Primary Care (PE-PC): Effectiveness and Patient and Therapist Factors Related to Symptom Change and Retention

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Abstract

Prolonged Exposure (PE) is a first-line treatment for posttraumatic stress disorder (PTSD) available in specialty mental health. PE for Primary Care (PE-PC) is a brief version of PE adapted for primary care mental health integration (PCMHI), comprised of 4–8, 30-minute sessions. Using retrospective data of PE-PC training cases from 155 Veterans Health Administration (VHA) providers in 99 VHA clinics who participated in a 4–6 month PE-PC training and consultation program, we examined patients' PTSD and depression severity across sessions via mixed effects multilevel linear modeling. Additionally, hierarchical logistic regression analysis was conducted to assess predictors of treatment dropout. Among 737 veterans medium-to-large reductions in PTSD (Intent-to-treat, Cohen's $d = 0.63$, completers, Cohen's $d = 0.79$) and small-to-medium reductions in depression (Intent-to-treat, Cohen's $d = 0.40$, completers, Cohen's $d = 0.51$) were observed. The modal number of PE-PC sessions was 5 ($SD = 1.98$). Providers previously trained in both PE and Cognitive Processing Therapy (CPT) were more likely than providers who were not trained in either PE or CPT to have veterans complete PE-PC ($OR = 1.54$). Veterans with military sexual trauma were less likely to complete PE-PC than veterans with combat trauma (OR = 0.42). Asian American and Pacific Islander veterans were more likely than White veterans to complete treatment ($OR = 2.93$). Older veterans were more likely than younger veterans to complete treatment ($OR = 1.11$).

Keywords

PTSD; primary care; veteran; treatment; psychotherapy

Prolonged Exposure (PE) therapy is a first-line PTSD treatment that effectively reduces PTSD and related symptoms (Hamblen et al., 2019). Despite the effectiveness of PE, access and retention are significant obstacles to PTSD treatment. Patient perceived barriers such as stigma, a lack of time, and negative interpersonal/social impact limit veterans' interest in and access to specialty mental health services such as PE (Johnson & Possemato, 2019; Johnson & Possemato, 2021; Possemato, Wray, Johnson, Webster, & Beehler, 2018). While many veterans never seek psychological services, those who do engage in PTSD treatment often do not complete a minimally adequate dose (enough sessions to expect benefit; usually defined as either 6 or 8 sessions for PE) (Hale, Sripada, & Bohnert, 2018; Kehle-Forbes, Meis, Spoont, & Polusny, 2016). Access to PE is further limited by the small numbers of providers who are trained in and use effective PTSD interventions, even in the VA (Maguen et al., 2019; Rosen et al., 2016; Rosen, et al., 2017). Barriers to PE are not exclusive to the VA and veterans. Finley and colleagues (Finley et al., 2015) found that less than 20% of community mental health providers reported using guideline-recommended treatments for PTSD such as PE.

In addition, people with PTSD present in primary care (PC) and specialty mental health (Calhoun, Bosworth, Grambow, Dudley, & Beckham, 2002; Schnurr et al., 2013) and few who first present with PTSD in PC go on to receive care in specialty mental health clinics (Bohnert, Sripada, Mach, & McCarthy, 2016; Rodriguez et al., 2003). A recent study of

barriers and facilitators of the use of evidence-based mental health care in primary care practice concluded that flexible and brief models of proven interventions developed for the PC setting, combined with flexible training that fits the PC model is needed to ensure PC patient access to effective interventions (Shepardson et al., 2022). In recognition of the need for mental health care to start in primary care, the VA established the primary care mental health integration program (PCMHI) that includes embedded mental health providers in primary care who provide brief interventions for mental and behavioral health (Pomerantz, 2017). Until recently, treatment options for PTSD in primary care have been limited to non-evidence-based psychotherapy, medications and referral to specialty mental health for first line psychotherapy (VA/DOD, 2017). As such, PCMHI providers did not have feasible PTSD-specific psychotherapy options prior to development of PE-PC (Pomerantz, 2017).

PE-PC is a brief, individual, manualized, trauma-focused therapy developed specifically for use by embedded mental health providers in primary care and fills the need for effective PTSD services in a setting with constraints on session length and number of sessions (Cigrang et al, 2017; VA/DOD, 2017; Cigrang et al., 2015; Cigrang et al., 2011; Pomerantz, 2017; Rauch et al., 2017). PE-PC is not intended to replace specialty mental health PTSD treatment but expands the reach of PTSD intervention to a new setting and larger population with PTSD (Rauch, Cigrang, Austern, Evans, & Consortium, 2017). Treating PTSD directly in primary care provides access to care at the time the need is identified, reduces the duration of treatment and number of sessions required to get results, and avoids the stigma of seeking specialty mental health care, all of which are prominent factors in veteran resistance to these treatments (Possemato et al., 2018; Rodriguez et al., 2003). Additionally, the introduction of mental health services in the primary care setting improves treatment initiation and retention among veterans (Bohnert et al., 2016; Johnson & Possemato, 2019).

In a pilot study, PE-PC showed significant and large reductions in PTSD from pre- to post-treatment that were maintained at six-month follow-up (Cigrang et al., 2015). A randomized clinical trial comparing PE-PC to minimal attention control (MAC) showed significantly larger reductions in self-reported PTSD severity and general distress in PE-PC than MAC at posttreatment that were maintained at 6-month follow-up (Cigrang et al., 2017). Further, when the MAC patients received PE-PC, they showed comparable reductions in PTSD to those patients who received PE-PC at randomization and maintained the gains to the 6-month follow-up as well (Cigrang et al., 2017). Following this demonstration of efficacy, we successfully implemented PE-PC in the Atlanta VA Healthcare System (Rauch, Wilson, Jungerman, Bollini, & Eilender, 2022) while also establishing the VHA PE-PC provider training program.

Of note, Written Exposure Therapy (WET) is another brief exposure-based intervention for PTSD that has been used in specialty mental health settings and has shown effectiveness in reducing PTSD (Sloan et al., 2022). Both interventions provide efficiency through the use of written trauma exposure with both showing significant reductions in PTSD severity though WET has longer session duration. Given that the study populations differ between WET (specialty mental health) and PE-PC (primary care) studies to date, direct comparison of the outcomes of these interventions is inappropriate.

The current retrospective study extends previous research by examining patient and provider characteristics related to PE-PC treatment response and retention. Using data collected during training cases completed in the VHA PE-PC provider training program, we examined factors that may influence provider effectiveness and patient response to PE-PC including demographics, trauma type, and previous provider training in PTSD treatment. Based on previous efficacy trials supporting PE-PC (Cigrang et al., 2017), we hypothesized that PE-PC would significantly reduce PTSD and depression symptoms. Previous research has not found gender differences in full PE magnitude of treatment change (Mouilso, Tuerk, Schnurr, & Rauch, 2016) and as such we did not expect gender to impact magnitude of treatment response. We did hypothesize a smaller magnitude of treatment response (change in PTSD/depression from pre to post) for military sexual trauma (MST) than other trauma types based on previous studies that have found this pattern (i.e., Khan et al., 2020; Sripada et al., 2019). Based on previous PE studies with veterans, we did not expect race or ethnicity to impact magnitude of treatment response (Kline, Feeny, & Zoellner, 2020; Rauch et al., 2021) and as such hypothesized no difference in magnitude of change for overall race or ethnicity differences. Consistent with findings from McClendon et al., 2020 and Rauch et al., 2020 that Black veterans report higher symptom severity across all timepoints in treatment than White veterans, we hypothesized that Black veterans would report higher symptom severity across all timepoints in treatment (McClendon et al., 2020; Rauch et al., 2020). Previous research has not examined the impact of previous therapist training on the effectiveness of newly learned interventions. As such, when examining therapist training, we based our hypothesis on the idea that those providers who already knew full PE may more easily implement PE-PC, and this may be reflected in larger symptom reductions and/or better veteran retention than those who were not previously trained in PE. We hypothesized that veterans seen by providers who were previously trained in PE or trained in both PE and in another first-line PTSD intervention (i.e., Cognitive-Processing Therapy [CPT; Resick, Monson, & Chard, 2017]) would show a larger reduction in PTSD severity scores than veterans seen by providers with training in CPT only or with no training in either PE or CPT. Finally, based on previous studies examining retention in full PE, we hypothesized that treatment retention would be related to previous provider training (more training is related to higher retention than no training), veteran age (higher age is related to higher retention), veteran trauma type (MST is related to lower retention than combat trauma), veteran gender (men will have higher retention than women), veteran race (Whites veterans will have higher retention than all other racial groups), and veteran ethnicity (non-Hispanic/Latinx will have higher retention than Hispanic/Latinx) (Eftekhari, Crowley, Mackintosh, & Rosen, 2020; Kehle-Forbes et al., 2016).

Method

Study Design

The current data was gathered without identifiers as part of the VHA PE-PC provider training program from 155 VHA mental health providers in 99 VHA clinics. The Atlanta VA Healthcare System Research and Development Committee approved the current analyses as a retrospective study. The Emory University (affiliate that serves as IRB for Atlanta VA)

Human Subject Committee determined it as exempt from IRB review as non-human subjects research. No procedures or measures were administered as a part of this study.

Procedures

This retrospective data analysis used data extracted from a secure clinical program evaluation database. Data examined included patient demographics, treatment process (e.g., number of sessions, telehealth or face-to-face), and symptom data for all veterans seen as training cases with VHA providers in the provider training program between June 2018 and May 2020. Previous provider training was pulled from program applications that providers submitted at the time of training program registration just prior to the start of the program.

Prolonged Exposure for Primary Care (PE-PC)

PE-PC consists of four to eight, 30-minute weekly sessions from a mental health provider in primary care. At the start of PE-PC, veterans complete a brief assessment of PTSD symptoms and if appropriate (see inclusion below) they begin the first PE-PC session. Per the PE-PC protocol, the assessment may be completed as part of session one or in a separate session depending on the clinic's PCMHI design. Treatment follows a standardized PE-PC provider manual and patient workbook (Cigrang et al., 2017). PE-PC includes all the components of PE delivered in a brief format: exposure to the trauma memory and processing, in vivo exposure, and psychoeducation (Foa, Rothbaum, Hembree, & Rauch, 2019). For some patients additional PTSD intervention is not required after receiving the brief PE-PC intervention. Other patients may find that PE-PC serves as an introduction to approaching the trauma, though they may need more or longer sessions than the brief format can provide, making referral to specialty mental health to complete treatment indicated.

Veteran or patient-centered care is built into the PE-PC model. If a veteran/patient presents in primary care and wants to address symptoms of PTSD and they are not in imminent risk of harm to self or others, then discussion of all available treatment options (including offering PE-PC) occurs to allow the veteran/patient to decide what care they want to receive in what setting. PE-PC provides quick access and veteran/patient choice for setting as an evidence-based option in PC. If treatment is initiated and the veteran/patient is not responding to the brief intervention or more resources are necessary, referral to a higher level of care is initiated. This model provides choice and the widest reach to veterans/patients and is consistent with findings that veterans/patients with PTSD want to be involved in treatment decisions (i.e., Harik et al, 2016). A potential downside to this ease of entry is that this model may also increase the number of veterans/patients who decide not to follow through after initial interest. PE-PC is provided face-to-face or via telehealth based on provider and veteran/patient preference and public health requirements (a portion of the final training cohort occurred during the COVID-19 pandemic). Modality discussions are modeled in the training program and providers are encouraged to follow patient preferences for desired level and modality of care whenever possible.

VHA PE-PC Provider Training Program

With support from the VA Center for Integrated Healthcare and the VA Office of Rural Health, Drs. Rauch & Cigrang developed a PE-PC provider training program for VA PCMHI

providers. In this VA program as well as parallel civilian and DOD programs, 155 VHA mental health providers in 99 VHA clinics, 15 Federally Qualified Health Center therapists (Sripada et al., 2022), 12 Employee Assistance Program counselors, as well as several DOD and community-based PCMHI providers have been trained in the past three years. Only VA provider data is included in these analyses. The training model includes a 4-hour webinar that introduces the components of PE-PC and session content with video and role play practice included. All trainees then work with training cases and attend weekly consultation calls for 4–6 months where they learn while doing PE-PC. The model emphasizes quick access to care for patients/veterans who screen positive for PTSD and report that they want treatment in primary care. In addition, the model allows for provision of training to a wide range of expertise of PCMHI providers in trauma and PTSD treatment. The training model is built to fit the PCMHI setting with 30-minute, weekly consultation calls and brief webinars that can be accessed remotely by providers.

Participants

The sample comprised 737 veterans who completed brief PC assessment and at least one but no more than nine PE-PC sessions (as per PE-PC protocol) from VA PCMHI providers in the VHA PE-PC training program. The VHA PE-PC protocol is built within the PCMHI model of care that limits the total number of sessions and thus patients who received more than 9 sessions were not receiving PCMHI and PE-PC consistent care. As a retrospective examination of clinical data, all veterans who had started PE-PC (had an assessment and PE-PC session one) were included in the Intent-to-Treat (ITT) sample. Veterans were seen in standard PCMHI clinical care in a VA setting, and inclusion and exclusion criteria were minimized to those used in this setting. Inclusion criteria were self-reported PTSD symptoms that the veteran wanted to receive treatment for in PC, completion of initial assessment and one session of PE-PC, and no clinical contraindications (such as imminent risk to self or others, substance abuse requiring primary treatment focus, or other primary psychiatric issue that required primary treatment focus). Most participants were male (84.4%), and White (67.4%), and more served during Operation Enduring Freedom, Operation Iraqi Freedom, and/or Operation New Dawn (OEF/OIF/OND; 46.5%) than any other conflict. Just over half of participants reported a primary trauma related to combat (51.8%). The average age of the sample was 49.95 years (SD=15.12, range=21–86 years). See Table 1 for the full distribution of target trauma types and other veteran demographics.

Measures

Patient demographics were collected as part of the VHA PE-PC training program in trainee reports. Pre-treatment measures were completed prior to the first PE-PC session. Post-treatment measures were completed prior to the final session. The PTSD Checklist for DSM-5 (PCL-5) is a 20-item self-report measure of all 20 DSM-5 symptoms of PTSD and is used to monitor symptom change in treatment (Weathers et al., 2013). The measure was administered prior to each session and items are totaled to obtain the total PTSD severity. The most commonly used clinical cut score is 33 (Bovin et al., 2016).

The Patient Health Questionnaire (PHQ-9) is a well validated, nine-item self-report measure of general depression and distress. While it is not a diagnostic measure, the PHQ-9 is often

used to screen for depression in the PC setting. A score of 10 or higher indicates moderate depressive symptoms (Kroenke, Spitzer, & Williams, 2001). Change of 5 points or more is considered clinically significant. The measure was administered prior to each session and items are totaled to obtain the total PHQ-9 score.

Previous provider training was obtained from the VHA PE-PC training program application materials that all trainees submitted on entry to the program noting any prior experience with PE or CPT and whether they had obtained VA provider status for either or both protocols.

Time in treatment was defined as the number of PE-PC sessions completed for each veteran as recorded in the training case database. The last session was determined in discussion with the veteran and based on either reduction in PTSD symptoms below diagnostic threshold, veteran decision that they had benefited enough and wanted to end PE-PC, or the veteran and provider deciding referral to different mental health services or a higher level of PTSD care in specialty mental health was needed.

Data Analyses

Analyses used deidentified data from the VHA PE-PC training program and cases were defined as those who completed at least one assessment session and one PE-PC session (N = 737). A series of mixed effects multilevel linear models (MLM) was fit to examine study hypotheses (Raudenbush & Bryk, 2002). Missing data were handled by listwise deletion. Models were fit to all available participant data across all available session time points to examine overall treatment response and response over time. One set of models examined PTSD using PCL-5 as the outcome variable. Another set of models examined depression using PHQ-9 as the outcome variable. Time in treatment (i.e., pre, post) was entered at Level 1 as the within-participant level. Participant level variables that did not differ over time (i.e., gender, race, ethnicity, trauma type, provider training) were entered at Level 2 as the between-participant level. Age was considered for entry in the model but did not correlate with change in PCL-5 or PHQ-9 and as such was not included in the model. All analyses included a random intercept and time slope.

A total of six models were fit in the present analyses. To examine overall correlations between categorical variables, Spearman's Rho correlations were conducted between predictors (see Supplementary Table 1). First, unconditional models [i.e., Model 1 (PCL-5) and Model 4 (PHQ-9)] were fit in order to assess the overall change in PTSD and depression scores for all participants during PE-PC. Intraclass correlation coefficients were calculated using between- and within-individual variance estimates in order to determine the proportion of variance in each model accounted for by participant level factors. Next, models with time in treatment entered at Level 1 [i.e., Model 2 (PCL-5) and Model 5 (PHQ-9)] were fit to assess change in PTSD and depression scores from pre-treatment to post-treatment. Then, models with time in treatment entered in Level 1 and all predictors entered simultaneously in Level 2 [i.e., Model 3 (PCL-5) and Model 6 (PHQ-9)] were fit to assess the impact of gender, race, ethnicity, trauma type, and provider training on the change in PTSD and depression scores over time during PE-PC. Interaction terms were included to assess the impact of Level 2 predictors (i.e., gender, race, ethnicity, trauma type, provider training) on the rate of improvement in PCL-5 and PHQ-9 scores across treatment (i.e., slope). For these

analyses, the gender variable initially had three levels (i.e., male, female, other). As there was only one participant who defined their gender as "other," this participant's data were removed from the models. The race variable had four levels (i.e., White or Caucasian, Black or African American, Asian American or Pacific Islander, and Unknown or Other Racial Identity). The ethnicity variable had three levels (i.e., Hispanic/Latinx, Non-Hispanic/Latinx, and Unknown). The trauma type variable had five levels (i.e., combat, military sexual trauma, other military trauma, non-military trauma, and childhood abuse). The provider training variable had four levels (i.e., trained in PE only, trained in CPT only, trained in both PE and CPT, and no training). Separate ITT and completer Cohen's *d* (Cohen, 1992) effect sizes were calculated for PCL-5 and PHQ-9 change from pre- to post-treatment to illustrate the magnitude of effect. Cohen's *d* of .20, .50, and .80 are considered small, medium and large, respectively.

Finally, a hierarchical logistic regression analysis was completed to assess predictors of treatment completion. Predictors including provider training, trauma type, gender, race, ethnicity, and age were entered simultaneously into the regression equation. To characterize these effects, frequencies and percentages of completion and non-completion are included in Table 5. All analyses were conducted using SPSS Statistics 26.

Results

Completion was defined per protocol as completing at least 4 sessions of PE-PC and about two thirds of participants completed treatment (63.9%). The modal number of PE-PC sessions completed was 5 (M = 4.82, SD=1.98, Range = 2–9). The pre-treatment PCL-5 mean score was 46.77 (N=737, SD=13.83, Range = 9–79). The post-treatment PCL-5 mean score was 37.60 (N=737, SD=18.12, Range = 0–80). Most of the present sample (84.8%) reported a pre-treatment PCL-5 score greater than 33 (probable PTSD; Bovin et al., 2016). Clinically significant change on PCL-5 was defined as 15 points or more change (Marx et al., 2022) and 31.9% of the ITT sample met the criterion. At posttreatment, 40.1% of veterans were below the PCL-5 clinical cut score of 33 (Bovin et al., 2016). The pre-treatment PHQ-9 mean score was 13.34 (N=729, SD=5.48, Range = 1 –27). The post-treatment PHQ-9 mean score was 11.40 (N=737, SD=6.09, Range = 0–27). For depression, we examined the number of veterans who were depressed at baseline (75.1% had PHQ-9 of 10 or greater; Katz et al, 2021) who no longer passed the criterion for clinical depression at posttreatment. With this definition, 81.1% of veterans who were depressed at baseline were not depressed at posttreatment. Spearman's Rho correlations between ordinal predictors are presented in Supplementary Table 1.

Multilevel Linear Modeling Analyses

For PTSD symptoms (PCL-5 total score), results from the unconditional model (Model 1) indicated significant patient-level effects on PCL-5 (Wald Z = 11.634, $p < .001$). The ICC for between-patient variability was calculated to be 0.4750, which indicates that 47.50% of the variance in PCL-5 total scores was accounted for by participant level factors. A second model (Model 2) was run to assess improvement in PTSD symptoms over the course of PE-PC treatment. Time was entered as the level 1 variable. Results indicate that time in

treatment predicted PCL-5 scores ($t = -17.172$, $df = 735$, $p < .001$; ITT, *Cohen's d* = 0.63; completers, *Cohen's d* = 0.79), with scores decreasing by an average of 9.19 points from pre- to post-treatment. A third model was run to assess variation in PCL-5 score across treatment attributable to provider training, trauma type, gender, race, and ethnicity (Model 3). The effect for time remained significant ($t = -3.932$, $df = 728$, $p < .001$), but no other significant effects emerged. When change in PCL-5 scores across treatment (i.e., slope) was assessed, no significant interactions emerged between time and gender, time and race, time and ethnicity, time and trauma type, or time and provider training. Findings from Models 1, 2, and 3 are shown in Table 2.

For depression symptoms (PHQ-9 total score), results from the unconditional model (Model 4) indicate significant patient-level effects on PHQ-9 (Wald Z = 13.737, $p \leq .001$). The ICC for between-patient variability was calculated to be 0.5920, which indicates that 59.20% of the variance in PHQ-9 total scores was accounted for by participant level factors. A second model (Model 5) was run to assess improvement in depression symptoms over the course of PE-PC treatment. Time was entered as the level 1 variable. Results indicate that time in treatment predicted PHQ-9 scores ($t = -10.649$, $df = 727$, $p \leq .001$; ITT, *Cohen's d* = 0.40; completers, *Cohen's d* = 0.51), with scores decreasing by an average of 1.95 points from pre to post-treatment. A third model was run to assess variation in PHQ-9 score across treatment attributable to provider training, gender, race, and ethnicity (Model 6). The effect for time remained significant, ($t = -2.058$, $df = 721$, $p = .040$), but no other significant effects emerged. When change in PHQ-9 scores across treatment (i.e., slope) was assessed, no significant interactions emerged between time and gender, time and race, time and ethnicity, or time and provider training. Findings from Models 4, 5, and 6 are shown in Table 3.

Logistic Regression Analyses

The overall logistic regression model to test whether PE-PC treatment completion was predicted by provider or patient demographic variables was significant, $\chi^2(14, N = 736) = 41.545$, $p \leq .001$). Significant effects emerged for provider training, trauma type, racial background and age. Providers who were trained in both PE and CPT were more likely to have veterans complete treatment than providers who were not trained in either PE or CPT (*OR* = 1.54). This means that veterans treated by providers trained in both PE and CPT were 1.54 times more likely to complete PE-PC than veterans treated by providers who were not trained in either PE or CPT. Veterans who focused on military sexual trauma during treatment were less likely to complete than veterans who focused on combat trauma (*OR* = 0.42). This means that veterans who focused on MST in treatment were slightly more than half as likely to complete PE-PC than veterans who focused on combat trauma in treatment. Asian American and Pacific Islander veterans were significantly more likely to complete treatment than White veterans (*OR* = 2.93), though Asian American veterans represented only a small portion of the sample (*N*=30, 4.1%). This means that Asian American veterans almost three times as likely to complete PE-PC than White veterans. As age increased, likelihood of completing treatment also increased significantly (*OR* = 1.11). All other findings are non-significant. Logistic regression findings are summarized in Table 4.

Discussion

The current study described outcomes of a VHA PE-PC training program and examined patient and provider characteristics related to PE-PC treatment response and retention. The current analyses of training case data from 737 veterans demonstrates as expected that PE-PC produced clinically significant reductions in PTSD in four to eight 30-minute sessions provided in primary care. It is significant that improvements in PTSD were clinically meaningful outside of the controls of a randomized clinical trial. In a recent large clinical trial comparing PE and CPT in veterans, 73% of veteran responded to PE (PCL-5 reduction of at least 10 points) with a pre to post Cohen's *d* effect size of 1.32 (Schnurr et al., 2022). Based on a more conservative PCL-5 clinically significant difference standard (15-point reduction; Marx et al., 2022), 31.9% of veterans who started PE-PC showed a clinically significant reduction with a pre to post Cohen's d effect size of 0.63. In addition, 45.2% showed at least a 10-point reduction in PCL-5. As intended, PE-PC does not replace full PE but does provide an option that results in clinically significant change for some while also providing an accessible entry to PTSD treatment for others who can be referred on for additional care in specialty mental health. Of note, since this is a PC sample and diagnosis of PTSD was not required, veterans with lower severity overall are likely overrepresented compared to specialty mental health. Starting lower on PCL-5 could have impacted their ability to meet the 15 point clinically significant change criterion. Some veterans may have fallen below the PCL-5 cut point for likely PTSD with much less than 15 points change even though they may no longer meet for PTSD diagnosis. Even with this caveat, our results support that having PE-PC available can increase access to effective care for people who prefer to receive mental health care in primary care as well as people suffering with PTSD who will never have access to or complete a referral for specialty mental health care options. Further, the reduced session length and number of sessions for PE-PC (4 to 8 sessions of 30 minutes) compared to full protocol PE or CPT (8 to 12 sessions of 60 to 90 minutes) suggests a benefit for efficiency in those veterans who fully respond to PE-PC.

Of note, contrary to our hypotheses, we did not find differences in magnitude of reduction in PTSD across gender, race, ethnicity, and previous provider training status. We also observed significant reductions in depression across these demographic groups, although the magnitude of improvement was smaller than for longer PTSD interventions. As a brief intervention focused specifically on PTSD and not depression, it is not surprising that the magnitude of change in depression is small. Together, these results are consistent with the RCT (Cigrang et al., 2017) that supports PE-PC is an effective primary care based PTSD treatment. In addition, our findings support that PE-PC can be widely disseminated and demonstrates significant reductions of PTSD symptoms across demographically diverse populations in the VA.

When examining retention, several interesting findings emerged. First, contrary to our expectation that providers with PE training would show better retention with PE-PC, we found that providers who had training in both PE and CPT (noting expertise in working with manualized trauma-focused PTSD interventions) were more likely to have their training cases complete PE-PC than providers who did not have previous training in either PE or CPT. There was no additive benefit on retention for providers trained in either PE alone or

CPT alone. This effect may be a proxy for experience with trauma treatment more generally where providers who have more comfort and experience working with PTSD are better able to connect with the patient and manage avoidance while also validating emotional experience of distress even when using a new intervention. Indeed, it is possible that this difference may disappear as providers get more experience with the protocol. Additional research to examine provider training/experience with PTSD treatment on retention is warranted.

In addition, consistent with previous research (Gilmore et al., 2016), veterans who worked on military sexual trauma as their target trauma for PE-PC were less likely to complete 4–8 sessions of PE-PC. Additional research is needed to inform why retention is lower for MST target trauma veterans. Finally, contrary to hypothesis, Asian American veterans, though a small proportion of the overall sample, were more likely to complete PE-PC than White veterans. Given the small number of Asian Americans in this sample this requires replication. In addition, contrary to hypothesis, Black veterans did not differ from White veterans in retention. Consideration for how to enhance the webinar training content to address retaining patients may impact these differential outcomes.

PE-PC training, using a web-based didactic and weekly phone or video consultation, shows promise as an effective and efficient training model for providers to implement PE-PC designed to accommodate the time constraints of busy PCMHI providers. The effectiveness of the efficient and web-based training model was similar across providers regardless of previous trauma intervention training on either PTSD or depression outcomes. Thus, providers new to trauma treatment could easily get up to speed with this brief training model (12 hours total of didactic for those new to trauma treatment and 4 hours for those who are already trained in PE or CPT followed by 16 weekly 30-minute consultation calls). This is brief in comparison to the time required for PE, CPT, and Eye Movement Desensitization and Reprocessing (EMDR) that all require multiple days of didactic training along with other requirements. Given the shortage of providers trained in effective psychotherapy for PTSD, an efficient training program is critical because it allows more providers to be trained and thus more patients to be served. When PCMHI providers are able to deliver effective PTSD interventions, specialty mental health can be reserved for those patients who are inappropriate for PE-PC or do not fully respond to PE-PC and require additional treatment.

As expected, PE-PC demonstrated a “voltage drop” when delivered in standard clinical practice (i.e., outside of study controls for patient inclusion/exclusion and therapist oversight). It is well documented that interventions delivered in effectiveness studies or real-world practice have smaller effect sizes than those delivered in efficacy studies (Beets et al., 2020; Chambers et al., 2013; Glasgow et al., 2003). In this case, Cigrang et al 2017 found an effect size of .82 on PCL-S and .56 on PHQ-9. In our full sample, the PCL-5 effect size was .63 and PHQ-9 effect size was .40. Some of the factors contributing to this discrepancy may include attrition and therapist effects. Factors that may have contributed to voltage drop are level of therapist training, supervision, and dedicated time to deliver interventions. In Cigrang et al., (2017), therapists were all PE-certified doctoral level behavioral health providers who were closely supervised by the PE-PC developers. Samples recruited in regular clinical practice often tend to be more heterogeneous than those recruited in clinical

trials and this could also lead to voltage drop. Finally, the current sample effect sizes of reduction in PTSD severity and depression in PE-PC are higher than those found in VA PC usual care in the RESPECT-PTSD trial from baseline to 3 months (PTSD, $d = .25$; depression, $d = .27$) suggesting this intervention is beneficial in reducing PTSD symptoms over usual care in VA PC (Schnurr et al., 2013).

While these findings are compelling, several limitations are apparent. First, given that these data were collected in clinical practice outside the controls of a clinical trial, we do not have a comparison group to show cause and effect. Thus, additional randomized controlled intervention studies are needed to examine efficacy. In addition, we do not have specific PE-PC provider fidelity data. As noted previously, we also do not know how many patients stepped up to specialty PTSD care and if they benefited from stepping up. As an added important caveat for PE-PC, during training providers are encouraged to consider moving patients who are struggling with the brief model (as noted in missing sessions, not completing between session practice, or not including emotionally engaging content in the exposures) to a higher level of care where they can continue PE or CPT with a provider in specialty mental health. As a result, some of the patients who are considered dropouts from PE-PC training cases moved on to continue treatment outside of the training program. Data on progress outside the training program is not available given that only deidentified data were collected in the training program. An ongoing clinical trial of PE-PC in the VA under the direction of the first author and another trial in civilian primary care are examining the frequency of patients stepping up to a higher level of care as well as whether patients respond after transition to specialty mental health. Another limitation is that while our sample closely approximates gender, race, and ethnicity data for VHA national patient demographics, some groups that are underrepresented as veterans and as such are underrepresented in our sample, specifically women and some racial groups. Generalization of our findings to these groups requires additional study. Finally, data on training in models of PTSD focused treatment other than PE or CPT was not systematically collected in the training program. We cannot address whether training in other models was helpful.

With growing confidence in the effectiveness of PE-PC and robust impact of the training model employed, we have moved to training additional providers. Specifically, we have trained additional providers in settings where people with PTSD who have low or no access to mental health care may reside. In addition to the VA, these settings include federally qualified health centers (Sripada et al., 2022) and other medical settings. With brief training, providers in the current study were able to provide an effective PTSD treatment to patients in need, making it possible for many more people to access effective treatment for PTSD.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Impact Statement:

Veterans who received PE-PC in primary care from newly trained providers experienced reductions in PTSD and depression symptoms. Providers with training in multiple effective PTSD treatments had higher retention of patients when compared to providers who had no specific PTSD treatment training prior to PE-PC training. In addition, veterans with military sexual trauma as the focus of PE-PC were less likely to complete PE-PC compared to veterans with combat as target trauma.

Table 1:

Demographic variables.

	Number	Percent
Age (N=733)	M=49.95	SD=15.12
Gender (N=737)		
Female	112	15.2%
Male	622	84.4%
Racial Background (N=737)		
White/Caucasian	497	67.4%
Black/African American	165	22.4%
Asian American/Pacific Islander	30	4.1%
Unknown/Declined/Native American/Other/Mixed	43	5.8%
Ethnicity (N=737)		
Not Hispanic/Latinx	611	82.9%
Hispanic/Latinx	104	14.1%
Unknown or Declined	22	3.0%
Service Era (N=737)		
Korea or World War II	1	0.1%
Vietnam	143	19.4%
Post-Vietnam and Pre-Persian Gulf	63	8.5%
Persian Gulf	183	24.8%
OEF/OIF/OND or later	343	46.5%
Trauma Type (N=735)		
Combat	382	51.8%
Military Sexual Trauma (MST)	70	9.5%
Other Military Trauma (non-combat and non-MST)	196	26.6%
Non-Military Trauma	61	8.3%
Childhood Sexual Abuse or Childhood Physical Abuse	26	3.5%
Treatment Completion Status (N=737)		
Completed Treatment	471	63.9%
Non-Completion	266	36.1%
Provider Training Status (N=737)		
Trained in PE Only	64	8.7%
Trained in CPT Only	152	20.6%
Trained in Both PE and CPT	235	31.9%
No Training	286	38.8%
Pre-Treatment Measures		
Patient Health Questionnaire – 9 (PHQ-9; N=729)	M=13.34	SD=5.48
PTSD Checklist – 5 (PCL-5; N=737)	M=46.77	SD=13.83
Pre-Treatment PCL-5 Greater than 33	625	84.8%

Notes: Percent values may not add to 100 due to rounding. OEF/OIF/OND is an abbreviation for Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn service era.

Table 2:

Summary of Multilevel Linear Modeling Unconditional, Time in Treatment, and Time in Treatment by Predictor Models for PCL Total Score (Models 1–3)

	Model 1 (Unconditional Model)			Model 2 (Time in Treatment)			Model 3 (Time in Treatment by Predictors)		
Fixed Effects	**β**	**SE**	**t**	**β**	**SE**	**t**	**β**	**SE**	**t**
Intercept	42.192	.530	79.540**	55.973	.962	58.183**	56.939	3.690	15.429**
Level 1									
Time				−9.188	.535	−17.172**	−9.654	2.455	−3.932**
Level 2									
Gender							1.476	2.261	.653
Race							.265	1.042	.799
Ethnicity							1.463	1.868	.784
Trauma Type							−1.161	.630	−1.842
Training							−.602	.834	−.722
Interactions									
Time*Gender							−1.363	1.504	−.906
Time*Race							1.238	.693	1.787
Time*Ethnicity							−1.319	1.242	−1.061
Time*Trauma Type							.275	.419	.655
Time*Training							.454	.555	.818
	Model 1			**Model 2**			**Model 3**		
Random Effects	**Estimate**	**SE**	**Wald Z**	**Estimate**	**SE**	**Wald Z**	**Estimate**	**SE**	**Wald Z**
Level 1									
Variance	147.406	7.684	19.183**	105.344	5.495	19.170**			
Variance Time 1							37.753	7.535	5.010**
Variance Time 2							172.744	11.612	14.876**
Level 2									

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Variance	133.386	11.465	11.634**	154.417	11.147	13.853**	151.861	10.781	14.086**
Parameters	3			4			15		
AIC	12,290.129			12,041.277			11,896.059		
BIC	12,300.716			12,051.863			11,911.909		

* $p < .05$

** $p < .001$

Table 3:

Summary of Multilevel Linear Modeling Unconditional, Time in Treatment, and Time in Treatment by Predictor Models for PHQ Total Score (Models 4–6)

	Model 4 (Unconditional Model)			Model 5 (Time in Treatment)			Model 6 (Time in Treatment by Predictors)		
Fixed Effects	**β**	**SE**	**t**	**β**	**SE**	**t**	**β**	**SE**	**t**
Intercept	12.373	.194	63.697**	15.297	.336	45.482**	16.108	1.440	11.182**
Level 1									
Time				−1.949	.183	−10.649**	−1.732	.842	−2.058*
Level 2									
Gender							−1.557	.880	−1.769
Race							−.230	.407	−.564
Ethnicity							−.311	.736	−.673
Trauma Type							−.279	.246	−1.135
Training							.484	.324	1.493
Interactions									
Time*Gender							.239	.514	.465
Time*Race							.381	.238	1.603
Time*Ethnicity							.016	.430	.038
Time*Trauma Type							−.026	.144	−.181
Time*Training							−.218	.189	−1.149
	Model 4			**Model 5**			**Model 6**		
Random Effects	**Estimate**	**SE**	**Wald Z**	**Estimate**	**SE**	**Wald Z**	**Estimate**	**SE**	**Wald Z**
Level 1									
Variance	14.078	.738	19.079**	12.195	.639	19.066**			
Variance Time 1							8.673	1.055	8.222**
Variance Time 2							15.753	1.262	12.483**
Level 2									

Variance	20.430	1.487	13.737**	21.372	1.476	14.481**	21.095	1.462	14.425**
Parameters	3			4			15		
AIC	8,978.165			8,874.195			8,841.821		
BIC	8,988.731			8,884.760			8,857.642		

* $p < .05$

** $p < .001$

Table 4:

Logistic Regression Predicting Treatment Completion

Variable	*B*	*SE B*	Wald	*OR*	95% CI
Provider Training Status					
Trained in PE	−.434	.291	2.217	.648	.366 – 1.147
Trained in CPT	.063	.216	.084	1.065	.697 – 1.626
Trained in Both PE and CPT	.433	.193	5.013*	1.542*	1.055 – 2.253
Gender					
Male	−.308	.265	1.352	.735	.437 – 1.235
Trauma Type					
Military Sexual Trauma	−.862	.318	7.347*	.422*	.227 – .788
Other Military Trauma	.036	.192	.034	1.036	.711 – 1.509
Childhood Trauma	−.253	.436	.337	.776	.330 – 1.826
Non-Military Trauma	.269	.312	.744	1.308	.710 – 2.410
Racial Background					
Black or African American	−.312	.193	2.619	.732	.502 – 1.068
Asian American/Pacific Islander	1.073	.511	4.418*	2.925*	1.075 – 7.959
Unknown, Declined, Native American, Other, Mixed	−.496	.388	1.632	.609	.284 – 1.304
Ethnic Background					
Hispanic/Latinx	.386	.270	2.042	1.471	.866 – 2.498
Unknown/Declined	.074	.503	.022	1.077	.402 – 2.885
Age	.018	.006	10.903**	1.109**	1.008 – 1.030

Note. In the provider training status portion of the analysis, providers without training in PE or CPT served as the reference group. In the gender portion of the analysis, female Veterans served as the reference group. In the trauma type portion of the analysis, combat trauma served as the reference group. In the racial background portion of the analysis, White racial background served as the reference group. In the ethnic background portion of the analysis, non-Hispanic/Latinx ethnic background served as the reference group.

*$p < .05$

**$p < .001$

Table 5:

Demographic breakdown of treatment completers.

	Completed N (%)	Did not complete N (%)
Total Sample (N=734)	470 (63.9%)	266 (36.1%)
Gender		
Male (N=622)	402 (64.6%)	220 (35.4%)
Female (N=112)	67 (59.8%)	45 (40.2%)
Race		
White/Caucasian (N=496)	325 (65.5%)	171 (34.5%)
Black/African American (N=165)	94 (57.0%)	71 (43.0%)
Asian American/Pacific Islander (N=30)	25 (83.3%)	5 (16.7%)
Unknown/Declined/Native American/Other/Mixed (N=43)	25 (58.1%)	18 (41.9%)
Ethnicity		
Not Hispanic/Latinx (N=610)	387 (63.4%)	223 (36.6%)
Hispanic/Latinx (N=104)	71 (68.3%)	33 (31.7%)
Unknown (N=22)	12 (54.5%)	10 (45.5%)
Trauma Type		
Combat (N=381)	247 (64.8%)	134 (35.2%)
Military Sexual Trauma (N=70)	33 (47.1%)	37 (52.9%)
Other Military Trauma (N=196)	130 (66.3%)	66 (33.7%)
Childhood Trauma (N=26)	16 (61.5%)	10 (38.5%)
Non-Military Trauma (N=61)	43 (70.5%)	18 (29.5%)

Notes: Percent values indicate the percent of the subsample. For example, a total of 402 male veterans completed (64.6% of male veterans completed).