Predicting Treatment Dropout Among Veterans Receiving Prolonged Exposure Therapy

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Objective: To examine whether dropout from prolonged exposure (PE) therapy can be predicted from demographic and outcomes data that would typically be available to clinicians. Methods: Dropout was examined in 2,606 patients treated by clinicians in the U.S. Veterans Health Administration PE Training Program. PE typically consists of 8–15 sessions, with 8 sessions being considered a minimum therapeutic dose for most patients. Logistic regression was used to assess the impact of demographics, depression, trauma history, and PE target trauma on risk for dropout. Growth mixture modeling was used to study how posttraumatic stress disorder symptom patterns during the first 5 treatment encounters predicted dropout. Results: In total, 782 patients (30.0%) completed fewer than 8 sessions of PE. Younger veterans were more likely to drop out of PE; odds ratio (OR) per year of age \(0.97, p < .01\). Controlling for other factors, veterans who focused on childhood trauma were less likely to drop out than those focusing on combat trauma (OR = 0.51, \(p < .05\)). Dropout was unrelated to symptom course or symptom worsening between sessions. Nevertheless, clinicians attributed dropout to distress or avoidance in 45% of the patients who dropped out, citing other factors in 37% of dropout cases. Conclusions: Treatment dropout was predicted by age but not by initial symptom severity or symptom course early in treatment. Symptom exacerbation was rare and did not increase risk of dropout. Nonetheless, clinicians often attributed dropout to patients not tolerating PE.

Clinical Impact Statement
Findings from the current study add to the growing literature suggesting that dropout from prolonged exposure is not readily predictable from basic patient characteristics or from symptom measures.

Keywords: PTSD, dropout, treatment, veterans, PE

Trauma-focused psychotherapies, including prolonged exposure (PE) therapy (Foa, Hembree, & Rothbaum, 2007), cognitive processing therapy (CPT; Resick, Monson, & Chard, 2007), and eye movement desensitization and reprocessing (Shapiro, 2001), are among the most effective psychotherapies for posttraumatic stress disorder (PTSD; e.g., Bisson, Roberts, Andrew, Cooper, & Lewis, 2013; Cusack et al., 2016; Institute of Medicine, 2014). PE is a well-studied exposure-based trauma-focused treatment for PTSD, with demonstrated effectiveness with men and women exposed to a variety of traumas (e.g., Foa, Hembree, et al., 2005; Schnurr et al., 2007). PE, along with other trauma-focused psychotherapies, is recommended as first-line treatment in numerous practice guidelines (Courtois et al., 2017; Department of Veterans Affairs & Department of Defense, 2017; Foa, Keane, et al., 2005).

Despite the strong empirical support for PE, some clinicians remain apprehensive about using exposure therapy (Becker, Zayfert, & Anderson, 2004; Cook, Simiola, Hamblen, Bernardy, & Schnurr, 2017; van Minnen, Hendriks, & Olff, 2010). Concerns about potential symptom exacerbation and treatment dropout (Becker et al., 2004; Hembree et al., 2003; Najavits, 2015; Ruzek et al., 2014; van Minnen et al., 2010) have resulted in some clinicians using patient characteristics to help determine whether patients are “ready” for PE. Some clinicians presume that PE is less effective for patients with more severe symptoms (Garcia,
Kelley, Rentz, & Lee, 2011), more psychiatric comorbidity (van Minnen et al., 2010), multiple traumas, and/or complex PTSD from childhood trauma (Cloitre, Petkova, Su, & Weiss, 2016; Cook et al., 2017; van Minnen et al., 2010).

Most studies show little evidence for symptom exacerbation in PE. Two studies among civilians found that symptom exacerbation in PE was uncommon and that, when exacerbation occurred, it was unrelated to dropout and had no lasting negative effects (Foa, Zoellner, Feeny, Hembree, & Alvarez-Conrad, 2002; Larsen, Wiltsey Stirman, Smith, & Resick, 2016). However, both studies were conducted under tightly controlled study conditions and did not consider the effects of other patient characteristics.

The empirical literature on patient characteristics associated with dropout from exposure therapy for PTSD is inconsistent. The one well-replicated finding is that younger age predicts higher dropout in studies of U.S. veterans receiving PE or CPT (Garcia et al., 2011; Goodson, Helstrom, Marino, & Smith, 2017; Khele-Forbes, Meis, Spoont, & Polusny, 2016; Mott et al., 2014). Initial PTSD symptom severity predicted higher dropout from exposure therapy in one study of veterans (Garcia et al., 2011) but not in two studies of civilians (Belleau et al., 2017; van Minnen, Amtz, & Keijsers, 2002). Concurrent substance use predicted dropout from exposure in one study of civilians (van Minnen et al., 2002) but not in another (Belleau et al., 2017). One study (Miles & Thompson, 2016) reported higher rates of dropout from PE or CPT among veterans who experienced childhood trauma rather than combat trauma.

Despite the lack of clear evidence for increased symptom exacerbation and dropout from PE, some clinicians continue to express concern about potential harm and strive to determine which patients are “ready” for PE. With the significant effort put forth to disseminate the best evidence-based treatments within the Veterans Heath Administration (VHA), it is important to assess what information regarding the patient is available to clinicians to help them identify subgroups of veterans who are at elevated risk of dropout from PE. Prior studies on predictors of dropout from PE have been limited by small samples with limited power or were conducted in the context of clinical trials that provided substantial scaffolding to limit dropout. The present evaluation uses a large program evaluation data set of veterans in clinics across the VHA to assess how baseline characteristics and initial symptom course predict dropout from PE. First, we consider whether demographic variables, initial PTSD severity, initial depression severity, and type of trauma are associated with risk of dropout. We then consider whether the outcomes data typically obtained by Veterans’ Administration [VA] clinicians (biweekly monitoring of symptoms with the PCL) early in treatment can be used to identify symptom trajectories associated with higher odds of dropout from PE. This can inform efforts to develop empirical tools for helping clinicians identify subgroups of patients who are most at risk for dropping out from PE.

Method

Data for this analysis were provided by mental health providers throughout the United States who were participating in the national VHA PE Training Program from June 2010 through September 2014. This evaluation was deemed exempt from review by the Stanford University Institutional Review Board.

Participating Clinicians

Participants in the national PE Training Program were licensed VHA mental health clinicians nominated for training by mental health leadership of their medical center or region. Clinicians initially went through a 4-day in-person experiential training in PE, followed by an average of 6 months of case consultation. Clinicians had to treat a minimum of two or more PE cases to competency while receiving consultation. Consultation involved weekly individual and group meetings as well as audio review of critical portions of sessions (Ruzek et al., 2016). On average, most clinicians completed consultation within 6–9 months, with some requiring an extension due to extenuating circumstances. Clinicians provided deidentified data on these training cases, including patient characteristics and clinical outcomes, to program evaluation staff. Additional information on clinician participants and veterans they treated has been published previously (Eftekhari et al., 2015). Of the 988 clinician trainees who worked with the cases reported in this study, clinician background information was available for 966 (97.8%). Two thirds were female (68.8%, n = 665). Over half were doctoral-level psychologists (57.7%, n = 557) while roughly a third were master’s level social workers (36.9%, n = 356), with a small number of other types of providers represented (5.4%, n = 53). Roughly two thirds worked in either outpatient PTSD clinical teams (33.8%, n = 326) or general mental health clinics (32.1%, n = 310), with the remaining providers coming from primary care, specialty clinics, residential treatment programs, or other types of clinics (34.1%, n = 329).

Patient Characteristics

All patients consented to care and had a primary diagnosis of PTSD, as determined by whatever process clinicians normally used. Consistent with the PE manual, clinicians were educated that PE might not be appropriate for patients at imminent risk of harm to themselves or others, with active severe psychosis, at high risk for being assaulted, or with insufficient memory of the trauma. Clinicians otherwise used their clinical judgment in determining whom to treat with PE. Characteristics of veteran patients are summarized in Table 1. Trauma history was obtained during clinical interview and chart review, and target trauma for treatment was selected collaboratively with the patient per standard protocol in PE (Foa et al., 2007).

Measures

Symptoms. Patients completed the following self-report symptom measures in their first session and at a minimum of every other session thereafter during the course of the therapy. PTSD symptoms were assessed with the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993), a 17-item measure corresponding to the PTSD symptom criteria in DSM–IV–TR (American Psychiatric Association, 2000). Clinicians used the PCL-S (cued to a specific trauma) to ensure anchoring of symptoms to the target trauma being addressed in PE. Patients rated the degree to which they were bothered by each symptom on a 5-point Likert scale (1 = not at all to 5 = extremely). Items were summed to create a total PCL score ranging from 17 to 85. The PCL has...
been found to demonstrate good validity, internal consistency, and reliability (Wilkins, Lang, & Norman, 2011). Depression symptoms were assessed with the Beck Depression Inventory–II (BDI-II; Clapp, Kemp, Cox, & Tuerk, 2016), which is a 21-item self-report measure of depression. Items were rated on a 4-point Likert scale (ranging from 0 to 3). Scores range from 0 to 63, with higher scores reflecting greater depression severity. The BDI-II has demonstrated good validity, internal consistency, and reliability (Beck, Steer, & Brown, 1996).

### Dropout

A full course of PE typically consists of 8–15 sessions. Using guidance by Foa, Hembree, et al. (2005), premature dropout was defined as completing fewer than 8 sessions of PE. Clinicians reported reasons for dropout based on patient self-report or their best clinical judgment based on their last contact with the patient. Clinicians were provided with the following response options to explain why their patient had dropped out of treatment: “S/he improved and did not return,” “s/he experienced increased distress and did not continue,” “other” reasons that were written in open-ended, or “unknown” reason.

### Comorbidity

Because patients were not identified, we did not have access to comorbidity data and other information from their medical records. Halfway into the project, we began asking clinicians to report patients’ psychiatric comorbidities based on information accessible through clinical interview, chart review, and/or clinician’s clinical impression of the patient. The most common comorbidities reported were depression and substance use disorders. Of the 1,259 patients with clinician-reported co-occurring disorders, 708 (56.2%) had a depressive disorder and 293 (23.3%) had a substance use disorder.

### Analysis Plan

Demographic and background information was available on all patients. However, missing data rates for PCLs at each session ranged from 24.9% at Session 1 to 84.8% at Session 12, with an average of 64.9% in any one session. One or more PCL scores were missing for 87.6% of the cases, which is consistent with the PCL being given every other session. Missing data were handled using maximum likelihood estimation and multiple imputation.

First, we examined the impact of (a) patient demographics, (b) PTSD and depression symptoms at intake, (c) self-reported lifetime trauma types, and (d) type of traumatic event serving as the PE trauma target on the risk of dropout from PE using binary logistic regression. Predictor variables were entered sequentially in blocks based on the four types of patient characteristics. Analyses were completed in MPlus 8.0.

To understand how changes in PCL symptom patterns affected dropout, growth mixture modeling was used to study symptom trajectories in PCL scores for the first five treatment sessions (Ram & Grimm, 2009). In VA, the second protocol session of PE was divided into two sessions (2a and 2b), so the first five treatment encounters with the patient included protocol Sessions 1, 2a, 2b, 3, and 4. We focused on the trajectory in these sessions because most dropout occurred prior to the fifth session (Eftekhar et al., 2015). Also, the imaginal exposure portion of PE begins in protocol Session 3 (fourth treatment encounter), so any increases in symptoms due to anticipatory anxiety or reactions after starting exposure should be apparent by the fifth treatment encounter (Foa et al., 2002). This mod-
eling procedure groups common patterns of PCL scores and assigns each person a probability of being in each of the identified symptom trajectory groups. Common trajectories observed in similar studies include treatment responders, sudden gains, no change, or symptom exacerbations. Based on model selection procedures described in Ram and Grimm (2009), we modeled two to five latent classes. Two types of models were estimated: (a) means models and (b) means and covariances models. A third type of model (means, covariances, and patterns) was not reported due to poor convergence and improper solutions, which are influenced by model complexity and missing data (Berlin, Parra, & Williams, 2014; Jung & Wickrama, 2008). Several model characteristics and fit indices were used to select the final model: Bayesian information criterion (BIC) values, entropy values, Vuong-Lo-Mendell-Rubin likelihood ratio test results, and model interpretability. Finally, dropout rates were compared among participants in each trajectory group.

**Results**

Of the 2,606 veterans included in the current evaluation, 1,824 (70.0%) completed eight or more sessions of the PE treatment protocol (M = 11.1, SD = 1.69). The remaining 782 patients (30.0%) were considered dropouts. These patients completed an average of 3.5 PE sessions (SD = 1.69). Table 1 displays patient demographic information by treatment completion status.

**Baseline Characteristic Predictors of PE Dropout**

Results from the final logistic regression model containing all predictor variables are provided in Table 2. Of the demographic characteristics investigated, only younger age predicted risk for dropout (odds ratio [OR] per year = 0.97, p < .001). Block 2 investigated the baseline mental health symptoms. Neither PCL nor BDI-II scores from Session 1 predicted treatment dropout. The remaining two blocks of variables investigated two distinct types of trauma variables: (a) lifetime trauma history and (b) trauma serving as the focus on PE. Lifetime history of trauma exposure did not differentially predict risk for early PE treatment termination (all ps > .05). However, controlling for other risk factors, patients were less likely to drop out of treatment (OR = 0.55, p < .05) if the focus of PE was on childhood trauma rather than combat trauma.

In the subsample that had clinician-reported comorbidity data, preliminary analyses suggested neither alcohol diagnoses nor depression diagnoses predicted dropout when controlling for other study variables, \( \chi^2(1) < 2.01, ps > .156 \). Comorbidity data were therefore not included in the models.

**Symptom Trajectory and Treatment Dropout**

Based on model fit statistics for all growth mixture models, we selected the three-class, means-only model as the most parsimonious solution; entropy = .804, BIC = 51,903, Vuong-Lo-Mendell-Rubin likelihood ratio test results = 128.89 (7), \( p = .008 \). The great majority of cases (\( n = 2,391, 92.3\% \)) showed modest change (M = 3.2 points) on the PCL from PE Session 1 (M = 61.8) to PE Session 4 (M = 58.7); \( b = -1.03, p < .001 \). In total, 186 veterans (7.2%) demonstrated rapid improvement (mean PCL reduction = 22.9, \( b = -7.44, p < .001 \)) between Session 1 (M = 60.1) and Session 4 (M = 37.3). Dropout rates did not differ between veterans showing moderate improvement (30.0% dropout) and rapid improvement (30.5%) early in treatment. Only 12 cases (0.5%) showed worsening from Session 1 (M = 24.0) to Session 4 (M = 65.8), and their dropout rate was only 16.1% (not significantly different from the other two groups).

**Clinician Attritions for Patient Dropout**

When patients did not complete treatment (\( n = 782 \)), clinicians were asked to report reasons why. Clinicians reported that in 352 cases (45%), dropout was due to not tolerating PE: either increases in distress (\( n = 280, 35.9\% \)) or treatment avoidance (\( n = 72, 9.2\% \)). In 289 cases (37%), clinicians cited other reasons for patient dropout, including outside stressors such as death of a loved one, medical issue, and/or hospitalization (\( n = 112, 14.3\% \)); scheduling conflicts (\( n = 100, 12.8\% \)); and other miscellaneous reasons (\( n = 77, 9.8\% \)). A total of 140 patients (17.9%) dropped out for unknown reasons.

**Post Hoc Analysis of Consecutive Week Changes in Symptoms**

To further explore clinicians’ report that increased distress contributed to dropout in some cases, we conducted a post hoc
analysis to see if short-term changes in symptoms predicted dropout. We included all cases with PCL assessments conducted in two consecutive sessions (Session 1 to Session 2a, Sessions 2a to 2b, Sessions 2b to 3, and Sessions 3 to 4). We used a PCL-S threshold of over 6.23 points as indicating reliable change between consecutive sessions. Between each pair of sessions ($n = 509–732$), $16.1–25.0\%$ of patients improved, $8.1–14.9\%$ worsened, and $63.6–75.8\%$ were unchanged. However, symptom change between sessions was not significantly associated with subsequent dropout ($\chi^2 = 1.04–4.98$, $p > .08–.60$).

### Discussion

We used the evaluation data from the national VHA PE Training Program to see whether patient characteristics and outcomes data that are typically available to clinicians can predict patient dropout from PE. We found that dropout was not readily predictable and that some clinical assumptions about who is likely to drop out were not supported. Consistent with prior studies (Garcia et al., 2011; Goodson et al., 2017; Kehle-Forbes et al., 2016; Mott et al., 2014), younger veterans were more likely to drop out of PE than were older veterans. This reflects lower retention of younger veterans in all kinds of PTSD treatment, not just trauma-focused psychotherapies (Lu, Duckart, O’Malley, & Dobscha, 2011). Younger veterans generally report significant logistical barriers, including but not limited to work obligations, childcare, school, and relationship concerns.

Contrary to many clinicians’ beliefs (Cook, Dinnen, Simiola, Thompson, & Schnurr, 2014; Osei-Bonsu et al., 2017) and one small prior study (Garcia et al., 2011), neither severity of PTSD nor depression symptoms at the start of treatment increased risk for dropout. This accords with prior studies in other civilian and veteran populations of patients receiving PE (Belleau et al., 2017; Goodson et al., 2017; Kehle-Forbes et al., 2016; van Minnen et al., 2002). Miles and Thompson (2016) previously reported higher dropout from PE and CPT among veterans who had experienced childhood trauma. However, they examined only history of trauma exposure (all the types of trauma experienced), not which type of trauma was the target of treatment. The present study assessed both trauma history and the target trauma addressed in treatment. We found no effect for trauma history, but we did find an effect for target trauma. The veterans whose treatment focused on childhood trauma actually had a lower likelihood of dropping out than did veterans who addressed combat trauma. We speculate that because childhood trauma may be especially painful, people willing to focus on such a difficult trauma in treatment may have been especially highly motivated, resulting in low dropout.

Standard VA procedures for measuring symptoms biweekly did not provide a good indication of dropout risk. Dropout rates did not differ among veterans with moderate and rapid improvement early in treatment or the tiny proportion (0.5\%) with a worsening symptom course. This last group may be an artifact of regression to the mean among patients with unusually low intake scores or may include misdiagnosed veterans who did not have PTSD and therefore did not benefit. In a post hoc analysis, the 8–15\% of patients whose symptoms worsened between pairs of biweekly assessments did not have higher subsequent dropout. This accords with studies in civilians showing that symptom exacerbation is uncommon in PE and does not predict dropout (Foa et al., 2002; Larsen et al., 2016).

So how do we reconcile this with clinicians reporting that symptom exacerbation was a factor in one third of their patients who dropped out? It is possible that clinicians may have noted brief increases in distress, such as an episode of particularly bad nightmares, that were not captured in the PCL trajectories. Measuring PTSD symptoms every 2 weeks may be too infrequent to provide timely information. More frequent monitoring (Short, Boffa, Clancy, & Schmidt, 2018) might provide a more sensitive measure of brief spikes in symptoms and coping responses, enabling us to determine whether these increase dropout risk. It may also be that there were some increases in distress among patients who stayed in treatment as well as those who dropped out, but these increases were more apparent to clinicians if patients dropped out.

We also do not know to what extent clinicians’ reports of reasons for dropout were based on what patients told them or on clinicians’ best guesses. A recent study of clinician–patient dyads after dropout from PE or CPT found that clinicians were often unaware when their patient had concerns about the treatment. Patients reported they frequently did not communicate with providers when they were having reservations or felt the clinician was not responsive to their concerns (Ackland et al., 2018). Ensuring adherent yet flexible implementation of PE that continually fosters rapport and humanizes the therapy may be a critical component in patient engagement.

Our inability to accurately predict PE dropout from basic patient characteristics and overall symptom course raises the question of what other unmeasured factors might impact retention in treatment. Clinicians often consider patients’ level of motivation when deciding whether PE is appropriate (Cook et al., 2017; Osei-Bonsu et al., 2017). However, we did not systematically assess patients’ motivation level at the start of treatment. Also, while clinicians are rated by their consultants on their ability to establish and maintain rapport (Capaldi, Asmaani, Zandberg, Carpenter, & Foa, 2016), therapeutic alliance was not assessed by patient report. We also did not measure patients’ beliefs about whether PE would help them or their willingness to tolerate distress during treatment (Chen, Keller, Zoellner, & Feeny, 2013). Systematic implementation of shared decision-making approaches may improve patients’ treatment expectancies, sense of buy-in, and retention in psychotherapy (Mott et al., 2014; Watts et al., 2015). Finally, formally engaging family support can also potentially reduce dropout from PE (Meis et al., 2019).

Key strengths of this study include the large sample and resultant statistical power, inclusion of patients from sites throughout the VA health care system, and data from clinical settings rather than a research trial. There are also important limitations. PTSD diagnoses were not assessed independently, so some veterans may not have been properly diagnosed as having PTSD. Symptoms were monitored only every second week, and there were high rates of missing data. Because of this, we could assess overall symptom trajectory but not momentary spikes in symptoms that may have resolved between assessments. We also relied on clinician report of patient reasons for leaving treatment.
It is important to keep in mind that these data were from clinicians’ training cases. The dropout rate in our sample was 30.0%. This is significantly lower, \( \chi^2(1) = 20.79, p < .001 \), than the average 39.1% dropout rate (range = 24.0–54.5%) in other observational studies of veterans receiving PE or PE and CPT in VA care settings (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011; Kehle-Forbes et al., 2016; Miles & Thompson, 2016; Mott et al., 2014; Niles et al., 2018; Tuerk et al., 2011; Tuerk, Yoder, Ruggiero, Gros, & Acierno, 2010). Several factors may potentially explain why dropout rate was relatively low in our sample. First, clinicians needed to complete two or more training cases to a minimum level of competency (ideally within a 6-month period) to be placed on the VA provider roster. Clinicians may therefore have made extra efforts to keep patients in treatment, so they could complete the program requirements.

The second issue is potential patient selection factors. Clinicians might have been motivated to seek “easier,” less complicated cases with whom to first learn PE. However, clinicians may have also had to treat any cases available within their clinics to get through training within 6 months. Intake PCL scores for these training cases were on a par with other veteran samples (Kehle-Forbes et al., 2016; Niles et al., 2018). Reported prevalence of depression and alcohol use disorders was lower than in other samples (Sripada, Bohnert, Ganoczy, & Pfeiffer, 2017), but we cannot tell whether the difference in prevalence reflects differences in methods (clinician report vs. review of administrative data) or differences in the patient population. The third factor is that clinicians in the PE program were in the process of being trained. Risk for dropout may have been higher given that clinicians were in the process of learning proper implementation of protocol. However, trainees also had the benefit of weekly individual and group consultation, with consultants reviewing audio-recordings of trainees’ sessions. One study suggests that clinicians who completed the PE training program or had comparable training had lower dropout from PE than did clinical trainees or licensed clinicians with less intensive training (Goodson et al., 2017). However, even if our overall base rate of dropout differs from other studies, it is reasonable to expect that the patient risk factors for dropout in this sample would generalize to other veteran samples.

In sum, while 30% of patients terminated PE prior to receiving the specified minimum dose, we were unable to predict dropout from either baseline characteristics or from biweekly monitoring of symptoms. Our inability to predict dropout from patient symptoms or trauma history suggests these factors should not be used in determining who should or should not receive PE (van Minnen et al., 2002). Rather than trying to make predictions a priori, it may be more important to foster open dialogue with patients to collaboratively assess their subjective experience over the course of treatment (Ackland et al., 2018). This may help identify modifiable factors that can be targeted to improve dropout and effectiveness. Future studies in veteran and civilian samples should consider how factors such as patient beliefs, shared decision-making, social support, minority status, substance use, therapeutic alliance, and structured between-session support (via phone, text messaging, or PE Coach app) impact patient retention and outcomes in PE.

References


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