The probability of change versus dropout in veterans receiving Cognitive Processing Therapy for posttraumatic stress disorder

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ABSTRACT

Objective: We sought to elucidate the timing of symptom change and treatment dropout in a leading evidence-based psychotherapy for posttraumatic stress disorder, Cognitive Processing Therapy (CPT). Despite its efficacy across numerous populations, treatment nonresponse and premature dropout are common in CPT and other trauma-focused interventions, particularly among military veterans. Advancements are therefore needed to reduce dropout and increase retention.
Method: Survival analysis was used to identify the temporal probability of symptom amelioration at each session of CPT (with written trauma account; CPT-A) and compare this with the cumulative, session-by-session probability of dropout. Data were obtained from 194 veterans seeking outpatient treatment at a Veterans Affairs specialty clinic.
Results: Overall, 49–61% of veterans reported meaningful symptom reduction in the course of CPT-A and 40% dropped out prematurely. The cumulative probability of dropout exceeded the probability of symptom change beginning after session six of therapy. Secondary analyses indicated that this six session rule generalized well across subgroups.
Conclusions: When symptom amelioration is not observed by the midway point in CPT-A, a change in therapeutic approach appears warranted for preempting dropout among veterans and boosting treatment retention.

Several psychological treatments are available for treating posttraumatic stress disorder (PTSD) in adults, and Cognitive Processing Therapy (CPT; Resick, Monson, & Chard, 2017) is among those specifically identified by the Departments of Veterans Affairs (VA) and Defense as a first-line, best practice intervention for Veterans (Management of Posttraumatic Stress Disorder Work Group, 2017). CPT has been disseminated throughout the VA healthcare system and demonstrated effectiveness in Veteran samples (Chard, Schumm, Owens, & Cottingham, 2010).

One limitation to the present understanding of CPT is knowing when symptom amelioration is most likely to occur. Treatment outcome studies generally provide information on pre- and post-treatment symptom severity in an aggregated sample; however, many CPT patients achieve good end-state functioning with fewer than 12 sessions, while others require additional sessions beyond the 12-session protocol (Galovski, Blain, Mott, Elwood, & Houle, 2012). Still some patients do not experience a meaningful reduction in symptoms during CPT (Hoge, Lee, & Castro, 2017). Existing evidence regarding the trajectory or rate of symptom change in CPT is inconsistent (Macdonald, Monson, Doron-Lamarca, Resick, & Palfai, 2011; Resick et al., 2008). Although diagnostic status is an important marker, this metric does not provide clinicians with expectations about the rate and probability of change occurring throughout treatment. Clinicians may therefore, unknowingly, continue a course of CPT that is unlikely to result in a desired outcome. This is particularly problematic when considered vis-à-vis the high incidence of dropout.

Indeed, despite its efficacy and effectiveness, like most evidence-based treatments, notable rates of dropout are often seen in studies of CPT (Goetter et al., 2015). A meta-analysis of dropout rates for PTSD treatment found that, across 54 active treatment studies, the average rate of dropout was 18%, with 36% of individuals receiving trauma-specific treatment dropping out of treatment (Imel, Laska, Jakupcak, & Simpson, 2013). Among service members and Veterans, however, dropout rates are typically much higher and, in some cases, exceed 50%. In CPT specifically, dropout rates have ranged between 32 and 50% in VA PTSD outpatient clinics (Goetter et al., 2015; Kehle-Forbes, Meis, Spoont, & Polusny, 2016; Mott et al., 2014). Given the high incidence of dropout, trauma therapists working with Veterans and

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service personnel often have a narrow opportunity for engaging patients and relieving distress.

One potential reason for dropout may be treatment non-response. In randomized clinical trials (RCTs) for PTSD in Veterans and active duty personnel, many patients receiving CPT continue to meet diagnostic status or do not achieve reliable change after treatment completion (e.g., Monson et al., 2006). Accordingly, it seems likely that some of those engaging in PTSD treatment do not perceive benefit. If clinicians knew when it is no longer probable for an individual to experience meaningful symptom reduction, or when dropout it most probable, they would be better positioned to preemptively switch treatment approach prior to dropout occurring.

Recently, Gutner, Gallagher, Baker, Sloan, and Resick (2016) examined dropout across various PTSD treatments using survival analysis. In two RCTs of PTSD treatment, including CPT, the majority of participants who dropped out did so by session five; however, there was no clear session in which individuals were most likely to drop out after presenting to the first treatment session. Additional research examining the probability of dropout across the treatment protocol could provide clinicians with valuable information for treatment planning (Chard et al., 2010; Monson et al., 2006).

Accordingly, the current study sought to examine the probability, at each CPT with written trauma account (CPT-A) session, of clinically significant change occurring by treatment's end and comparing this to the cumulative, session-by-session probability of dropout. Survival analysis was conducted to investigate this using data collected from veterans seeking therapy at a VA outpatient clinic. A secondary aim was to explore whether findings concerning the temporal occurrence of change and dropout generalized across subgroups of veterans.

1. Method

1.1. Participants and procedure

Participants were Veterans seeking trauma-focused treatment at a Midwestern VA PTSD outpatient specialty clinic between July 2014 and February 2017. Data were collected as part of routine clinical care and use of these data, via waiver of written consent, was approved by a local Institutional Review Board. All Veterans completed a formal PTSD diagnostic assessment prior to engaging in therapy. The initial sample consisted of 231 participants, 211 (91.3%) of whom met full PTSD diagnostic criteria and 20 (8.7%) subthreshold PTSD. All participants completed at least one session of CPT-A. The PCL-5 was provided at each individual therapy session and 36 participants were excluded from analyses due to missing data.

The final sample ($n = 194$) was primarily male ($n = 172$, 88.7%), and mean age was 41.9 years old ($SD = 14.1$). The majority were Caucasian ($n = 149$, 76.8%) or African American ($n = 42$, 21.6%), married ($n = 87$, 44.8%), employed full-time ($n = 74$, 38.1%), and of the OEF/OIF service era ($n = 117$, 60.3%). The most commonly reported index traumas were combat ($n = 105$, 54.1%), witnessing death ($n = 20$, 10.3%), and sexual assault ($n = 19$, 9.8%).

1.2. Measures

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013). The PCL-5 is a 20-item self-report measure of PTSD symptom severity with items mapping directly onto the *DSM-5* diagnostic criteria for PTSD. Each item is rated on a five-point Likert-type scale (0 = "Not at all" and 4 = "Extremely") based on the past month. In the present study, PCLs were anchored to the most distressing traumatic event. The PCL-5 has demonstrated good-to-excellent internal consistency, adequate test-retest reliability, and good convergent validity (e.g., Wortmann et al., 2016).

1.3. Data analysis

All analyses were conducted using PASW Statistics version 23 (IBM SPSS, 2015). Participants were excluded if missing at least one PCL-5 total score. Of the 36 participants excluded, 28 were missing one PCL-5 score and eight were missing two or more PCL-5 scores.

Life tables were created for PCL-5 scores over time. Two outcomes of change were examined. First, the survival curve for probable diagnostic remission was examined. Individuals were considered to have achieved probable remission if they rated their PTSD symptom severity as less than 33 on the PCL-5 reliably, such that, at all subsequent sessions, the PCL-5 was within this range. The score of 33 was used, with scores ≥ 33 suggesting probable PTSD diagnosis in a previous psychometric study (Bovin et al., 2016). A second survival analysis was conducted with change conceptualized as a 10-point reduction in PTSD symptom severity. Based on Monson et al. (2008), a 10-point reduction on the PCL was found to be reliable change using the PCL for *DSM-IV*; however a reliable change index has not yet been determined using the PCL-5. Based on the number of items on the PCL for *DSM-IV* and the range of potential scores, a 10-point reduction in PTSD symptom severity represented 11.8% change. Using the PCL-5, a change of 11.8% would be 9.4 points, so a 10-point change in score was used as a conservative estimate.

Next, a survival analysis was used to examine the likelihood of dropout across the course of treatment. For this sample, dropout was operationalized as attending fewer than 12 sessions of CPT-A and having a PCL-5 score greater than 24 at one's last session. A PCL-5 score of 24 was chosen based on Wortmann et al. (2016), which found that a score of 24 following treatment indicated that an individual achieved clinically-significant change and was likely to be within the distribution of the functional population. The probability of symptom reduction at each session was calculated and compared to the cumulative probability of treatment dropout. Finally, Cox logistic regressions were conducted to test for differential change between groups, specifically service era (Operations Enduring/Iraqi Freedom [OEF/OIF] vs. other service era) and index trauma (combat vs. non-combat trauma). These secondary analyses were used to evaluate the generalizability of our primary results.

2. Results

Mean PCL-5 score at pre-treatment was 50.2 ($SD = 13.5$, Range = 9–80). The mean number of completed CPT-A sessions was 8.4 ($SD = 4.0$), and the median number of completed sessions was 10. Among patients who attended 12 sessions ($n = 78$) the final PCL-5 score was 29.4 on average ($SD = 18.1$). Among early completers ($n = 38$), the mean PCL-5 score was 13.3 ($SD = 7.2$) at the final session. Veterans classified as dropout ($n = 78$) had an average final PCL-5 score of 49.3 ($SD = 13.6$) and, using the whole sample ($n = 194$), the average PCL-5 score at the last session was 34.2 ($SD = 20.0$).

Table 1 displays the life tables for PTSD symptom change, both for reaching PCL-5 < 33 and achieving a 10-point reduction on symptoms, as well as the probability of dropout across treatment. Fig. 1 displays the probability, at each session, of experiencing meaningful symptom amelioration during CPT-A. The cumulative probability of dropout at each session is superimposed on this survival curve. Beginning after session six of CPT-A, the probability of dropout exceeded the probability of meaningful symptom reduction. This finding was consistent across both operational definitions of symptom improvement.

2.1. Cox regressions

Cox regression survival analyses were next performed to examine symptom amelioration in different groups. There were no significant differences between OEF/OIF Veterans and non-OEF/OIF Veterans in the survival time of probable diagnostic remission, χ^2 (1) = 1.88,

Table 1
Life table describing survival analyses of achieving PCL-5 change across treatment and predicting dropout.

Life table for the probability of achieving PCL-5 score < 33

Session Number	No. in treatment	No. achieving PCL < 33	Cumulative proportion remaining in treatment without symptom change	Probability of achieving change after session
Pre-treatment	194	0	1.00	.49
1	194	16	.92	.44
2	178	8	.88	.42
3	170	9	.83	.39
4	161	5	.80	.37
5	156	6	.77	.34
6	150	9	.73	.30
7	141	8	.69	.26
8	133	6	.65	.22
9	127	10	.60	.15
10	117	4	.58	.12
11	113	5	.56	.08

Life table for the probability of achieving a 10-point reduction on the PCL-5

Session Number	No. in treatment	No. achieving 10 point change on PCL-5	Cumulative proportion remaining in treatment without symptom change	Probability of achieving change after session
Pre-treatment	194	0	1.00	.61
1	194	17	.91	.57
2	177	14	.84	.53
3	163	15	.76	.49
4	148	9	.72	.45
5	139	11	.66	.41
6	127	13	.59	.34
7	114	10	.54	.28
8	104	6	.51	.23
9	97	10	.46	.15
10	87	4	.44	.11
11	83	4	.41	.06

Life table for the probability of treatment dropout

Session Number	No. in treatment	No. dropping out	Cumulative proportion remaining in treatment	Cumulative probability of dropout after session
Pre-treatment	194	0	1.00	.00
1	194	5	.97	.03
2	189	12	.91	.09
3	177	14	.84	.16
4	163	7	.80	.20
5	156	11	.75	.25
6	145	9	.70	.30
7	136	5	.68	.32
8	131	7	.64	.36
9	124	1	.63	.37
10	123	3	.62	.38
11	120	4	.60	.40

Note. PCL-5 = PTSD Checklist for DSM-5.

$p = .17$; however OEF/OIF Veterans had a significantly different rate for achieving a 10-point reduction in PTSD symptom severity compared to non-OEF/OIF Veterans, χ^2 (1) = 3.99, $p < .05$. No significant differences between OEF/OIF Veterans and other service eras were found in the survival time of dropout, χ^2 (1) = 0.21, $p = .65$. Life tables comparing probabilities of symptom amelioration and dropout were

calculated and are presented in Supplemental Table 1. After six sessions of CPT-A, the cumulative probability of dropout approximated or exceeded the probability of symptom amelioration in both service era groups.

Next, Cox regressions using index trauma (combat trauma vs. non-combat trauma) as a covariate were conducted. There were no significant differences in rate to achieve probable diagnostic remission based on index trauma, χ^2 (1) = 1.35, $p = .25$, nor were there significant differences between groups in rate of achieving a 10-point decrease in PCL-5 scores, χ^2 (1) = 0.02, $p = .88$. Having an index trauma of combat experience was not related to dropout compared to other types of index traumas, χ^2 (1) = 0.57, $p = .45$. Life tables comparing probabilities of symptom amelioration and dropout were calculated and are presented in Supplemental Table 1. After six sessions of CPT-A, the cumulative probability of dropout again approximated or exceeded the probability of symptom amelioration in both trauma type groups.

3. Discussion

Results of the present study indicate that, among outpatient Veterans receiving CPT-A at a Veterans Affairs PTSD specialty clinic, 40% dropped out of treatment. The proportion of individuals prematurely ending therapy was similar to that found in other VA outpatient PTSD samples (Kehle-Forbes et al., 2016; Mott et al., 2014). Approximately half of the Veterans in this sample were able to achieve probable diagnostic remission, based on the PCL-5 score of less than 33, and 61% achieved at least a 10-point reduction in PTSD symptom severity. In addition, about 20% of Veterans were considered early completers, indicating that they achieved clinically-significant change and terminated treatment prior to completing 12 sessions. This finding is consistent with previous research that many individuals receiving CPT achieve treatment gains without completing the 12-session protocol (Galovski et al., 2012).

This study aimed to compare the session-by-session probabilities of symptom change to the session-by-session probabilities of dropout to better understand when change is likely to occur and when it may be advantageous to switch treatment approach. Based on our findings, the sixth session of CPT-A may mark a point beyond which the probability of an individual dropping out exceeds their likelihood of treatment response. Accordingly, to preempt dropout, it could be valuable for clinicians to consider changes in treatment plan should meaningful symptom reduction not be reported by the midpoint of CPT-A. Although the incidence of dropout decreases somewhat in the second half of treatment, dropout continues to occur steadily at each remaining session.

Service era and index trauma were also examined as potential moderators of symptom change and dropout. The relationship between service era and rate of symptom change was inconsistent. OEF/OIF Veterans differed in the time it took to achieve a 10-point reduction on PCL-5 scores; however, there were no differences between OEF/OIF Veterans and other Veterans in time to reach a PCL-5 score of less than 33. Regarding index trauma, there were no significant differences in symptom change or dropout between individuals who identified combat experience as their index trauma relative to other traumas. Consistent with findings in the overall sample, the cumulative probability of dropout approximated or exceeded the probability of symptom change after six sessions among all subgroups. This suggests that session six of CPT-A has good generalizability as a point in treatment at which changes in treatment plan should be considered in the absence of meaningful symptom reduction.

The present study has several limitations. The sample consisted of treatment-seeking Veterans from a single VA clinic and was primarily male. Results may therefore not generalize to female or civilian samples or in other VA settings. Further, the reasons for dropout were not assessed in the current study, and no inferences regarding the impact of
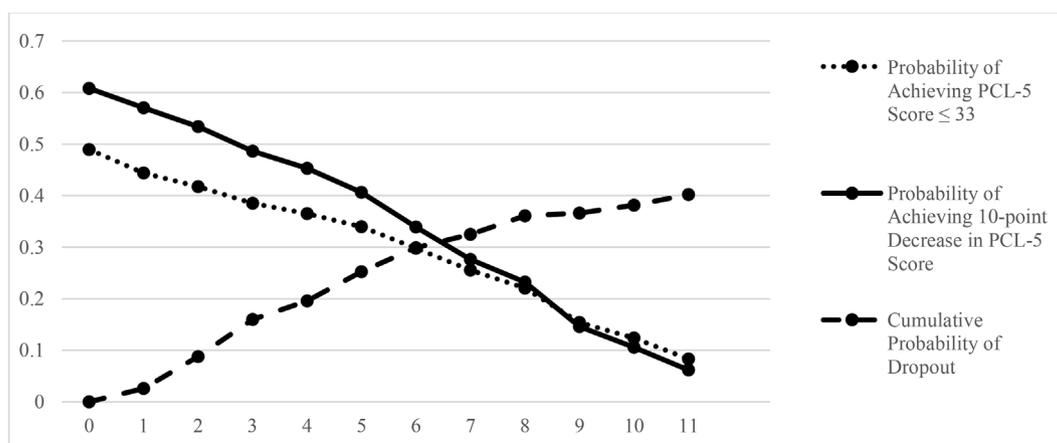
Fig. 1. Survival function indicating probability of symptom reduction by treatment session and cumulative probability of Dropout.
Note. PCL-5 = PTSD checklist for DSM-5.

treatment adherence could be drawn. All individuals were receiving outpatient CPT-A treatment in a VA PTSD specialty clinic. These findings may not apply to individuals receiving CPT without the narrative account (previously CPT-C). Despite these limitations, this study has several strengths including its utility and application to clinical care. Although replication is needed, our findings generalized across operational definitions of change and subgroups of Veterans. This implies that it may be appropriate to apply a "six session rule" (i.e., encouraging consideration of change in treatment approach when meaningful change is not observed) more broadly with Veterans completing CPT-A. Implementation of this rule could serve to reduce rates of dropout among Veterans and boost retention. Beyond replication, future research will need to investigate if study findings generalize to other trauma-focused treatments and populations.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.brat.2019.103483.

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