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Long-Term Treatment Gains of a Brief Exposure-Based Treatment for PTSD

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Abstract

Background: Written exposure therapy (WET) is a 5-session PTSD treatment that may address barriers in treatment for posttraumatic stress disorder (PTSD) given its brevity and tolerability. A recent study found outcomes for WET were non-inferior to outcomes from Cognitive Processing Therapy (CPT) through 36 weeks from first treatment session (Sloan, Marx, Lee, & Resick, 2018); the current study examined whether treatment gains were maintained through 60 weeks from first session, and also evaluated both treatments' effect on depressive symptoms.

Methods: The study enrolled 126 individuals with PTSD randomized to WET or CPT. Assessments were conducted at baseline and 6-, 12-, 24-, 36-, and 60-weeks following the first treatment session. PTSD diagnosis and symptom severity were determined via the Clinician Administered PTSD Scale for *DSM-5* (CAPS-5), and depression symptoms were assessed using the Beck Depression Inventory-2.

Results: WET remained non-inferior to CPT through the 60 week assessment; the groups had a difference of less than 3 points in their total CAPS-5 scores, and within-condition effects on PTSD were large (WET $d = 1.23$; CPT $d = 1.38$). Both treatments significantly reduced depressive symptoms over the 60 week study, with the CPT group experiencing a more rapid decrease. The between-condition effect of treatment on depression was small ($d = .19$).

Conclusions: WET is a treatment that is non-inferior to CPT with regard to PTSD symptoms, with treatment effects that are long-lasting. Additionally, both WET and CPT demonstrated substantial effects on depressive symptoms. WET should be considered a good option for PTSD treatment.

Clinical trials registration: NCT01800773

Keywords

PTSD; therapy; trauma; clinical trials

Although there are several evidence-based approaches available to treat posttraumatic stress disorder (PTSD), many of those who receive these treatments do not achieve clinically meaningful outcome (Steenkamp, Litz, Hoge, & Marmar, 2015) or drop out of treatment prematurely (36%; Imel, Laska, Jakupcak, & Simpson, 2013). Additional barriers to adequate treatment for PTSD include a dearth of clinicians trained to provide evidence-based care as well as conditions that interfere with implementing such intensive treatments (e.g., high workloads and limited staff and other resources; Finley et al., 2015).

Written exposure therapy (WET) is a 5-session PTSD treatment that may address some of the barriers to giving and receiving trauma-focused care given its efficacy, brevity, tolerability, and reduced resource requirements (Sloan, Marx, Bovin, Feinstein, & Gallagher, 2012; Sloan, Marx, & Resick, 2016). WET requires less time from therapists and patients than other trauma-focused therapies. Additionally, WET does not include out-of-session homework assignments, further reducing patient burden. From the provider perspective, WET requires less time to learn how to implement than other trauma-focused treatments. A recently published randomized controlled trial found that WET was non-inferior compared with Cognitive Processing Therapy (CPT), a 12-session, first line psychotherapy for PTSD (Sloan et al., 2018). Specifically, results showed that WET was non-inferior to CPT in terms of PTSD symptom severity outcome at assessments conducted out to 36 weeks post-first treatment session, and there were no significant condition differences in the percentage of participants who no longer met diagnostic criteria for PTSD. The findings were notable given the considerable difference in the number of sessions in each treatment. In addition, treatment dropout was significantly less for the WET condition (6%) relative to CPT (39%).

Although these results are encouraging, the two treatments may differ in the extent to which symptom improvements are maintained over time. Prior research has found that PTSD treatment gains associated with CPT may be sustained for as long as 10 years following treatment (Resick et al., 2012). In contrast, long-term outcome data for WET have not yet been examined. Moreover, while CPT has been shown to significantly reduce depression symptoms (Resick et al., 2012), there are no published data to suggest that WET is efficacious in reducing depression symptoms.

We examined whether PTSD treatment gains from WET and CPT were maintained 60 weeks after treatment began. We also investigated the extent to which both treatments reduced depression symptoms. Given the findings that WET was non-inferior relative to CPT at 36 weeks post first treatment session, we expected that treatment gains would be maintained at the 60-week assessment period. Moreover, we anticipated that significant reductions in depression symptoms would be observed for both treatments.

Method

Participants

The demographics of the sample and the study methodology have been described elsewhere (Sloan et al., 2018; Sloan et al., 2016). Briefly, participants were 126 adults (52% male, 54.8% Caucasian) who sought treatment for PTSD. Inclusion criteria were broad, consisting of meeting Diagnostic and Statistical Manual, fifth edition (*DSM-5*) (American Psychiatric

Association [APA], 2013) criteria for PTSD and being stable on any psychiatric medications for a minimum of 1 month. Participants were excluded if they had high suicidal risk, severe cognitive impairment, current substance dependence, or were actively psychotic or manic. Furthermore, participants were not permitted to be enrolled in concurrent PTSD therapy. The sample included both civilian and veteran participants, and individuals reported a range of index traumas (e.g., motor vehicle accidents, combat, natural disasters, sexual abuse). The CONSORT diagram is shown in Figure 1. The study was registered in clinicaltrials.org (NCT01800773).

Measures

Given the difference in the number of sessions for the two treatments, assessments were conducted at the same time for each condition so that any between condition difference could be attributed to treatment rather than differences in timing of the assessments. Thus, assessments were conducted at baseline and 6-, 12-, 24-, 36-, and 60-weeks following the first treatment session for both treatment conditions (see Sloan et al., 2016 for additional information); outcomes through the 36-week assessment are reported in Sloan et al. (2018). Clinical interviews were administered by masters-level evaluators who were blinded to treatment assignment.

The primary outcomes were PTSD symptom severity and diagnostic status, as measured by the Clinician Administered PTSD Scale for *DSM-5* (CAPS-5; Weathers et al., 2013). Diagnostic status was determined based on the *DSM-5* algorithm. Regarding initial severity at baseline, participants in both conditions had CAPS-5 total scores well above (10 points) the minimum score for diagnosis (26; Weathers et al., 2018). Inter-rater reliability for the CAPS-5 in this sample was excellent ($\kappa = .85$). The Beck Depression Inventory, second edition (BDI-II; Beck, Steer, & Brown, 1996) was used assess depression symptom severity.

Procedures

Following recruitment and determination of eligibility, participants were randomized to either WET or CPT.¹ Both treatments were delivered as individual sessions, and both followed a manualized protocol. Adherence and competence of treatment delivery was rated as good to excellent for both WET and CPT, and therapists were supervised by the developers of both treatments throughout the trial (further information can be found in the supplemental material for Sloan et al., 2018). The WET protocol consists of five weekly sessions during which participants wrote for 30 minutes in detail about a single traumatic event associated with their PTSD diagnosis. The first session includes psychoeducation information about PTSD and a treatment rationale and is 60 minutes in duration; the remaining sessions last approximately 40 minutes. WET does not include any between-session assignments. The CPT protocol consists of 12, 60-minute weekly or twice weekly sessions during which participants learn strategies for recognizing and reevaluating unhelpful or inaccurate thoughts about their traumatic experience, themselves, others, and the world. CPT participants also complete written trauma accounts as homework between

¹Detailed description of procedures is reported in Sloan et al. (2016)

sessions 4 and 5, as well as homework sheets between each session focused on cognitive restructuring.

Data Analysis

All randomized individuals, whether or not they completed treatment, were included in this intent to treat (ITT) analysis. The primary aim of the overall study was to test non-inferiority with regard to PTSD symptom severity outcome between WET and CPT. A non-inferiority margin has not yet been established for the CAPS-5; the prior version of the CAPS had a 10-point non-inferiority margin (Schnurr et al., 2003). In the present sample, we calculated the reliable change index (RCI; Jacobson & Truax, 1991) using the pooled standard deviation ($SD = 9.47$) for CAPS-5 scores at baseline in this sample, as well as the established test-retest value for the CAPS-5 ($r = .78$; Weathers et al., 2017) and the standard error of the difference between the two groups ($S_{diff} = 6.28$). This resulted in an RCI value of 13 points; however, we elected to use a 10-point non-inferiority margin to be more conservative. Difference scores of greater than 10 between WET and CPT conditions would suggest a treatment discrepancy that is reliably different and not due to measurement error. Sample size estimates indicated that we were sufficiently powered to detect a true difference between the groups (Sloan et al., 2018).

Hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) was also conducted to determine the impact of treatment on PTSD symptoms over time, as well as on levels of depression symptoms over time. Analyses were conducted using an autoregressive covariance matrix at level 1 (within-person) and a scaled identity matrix at level 2 (between persons). A between-treatments variable was included in the depression analyses, as depression severity was a secondary outcome and therefore not subject to the same non-inferiority analyses. Guidelines from Cohen (1988) were used to interpret the within- and between-condition effect sizes (d).

Results

As previously reported (Sloan et al., 2018), participants assigned to the two conditions did not significantly differ in baseline demographics. The groups also did not differ in PTSD symptom severity ($t[124] = -0.57, p = .57$) or depression symptom severity ($t[123] = -0.84, p = .40$) at baseline. At baseline one-third of the sample (34.8%) reported having been previously hospitalized for psychological problems and nearly two-thirds (61.8%) reported having previously been treated as an outpatient; these earlier treatments were not necessarily focused on PTSD. Forty percent of the sample reported currently taking any psychiatric medication.

Long-term treatment gains for PTSD Severity and Diagnosis

CAPS-5 mean symptom severity scores for participants in each treatment condition, as well as the number of participants assessed at each time point, are included in Table 1. Within-condition HLM analyses indicated a significant fixed effect of linear change in CAPS-5 severity scores in both the WET ($B = -2.82, SE = 0.32, t = -8.88, p < .001$) and CPT ($B = -3.64, SE = 0.39, t = -9.37, p < .001$) conditions. A fixed quadratic growth term also explained

significant variance over and above a linear term in both the WET ($B=0.43$, $SE=0.17$, $t=2.50$, $p=.013$) and CPT ($B=0.64$, $SE=0.21$, $t=3.06$, $p=.002$) conditions and improved the model fit (linear only model $-2LL=2408.59$; linear and quadratic model $-2LL=2400.73$).

The mean difference in CAPS-5 severity score change from baseline to week 60 between the two conditions was 2.81 ($SE=2.53$; 95% CI $-2.20:7.81$); average symptom change in CPT was -17.74 ($SD=13.67$) and in WET the average change was -14.93 ($SD=12.83$). This difference is within the non-inferiority benchmark, indicating that the CAPS-5 severity scores for individuals in the WET condition were non-inferior to those of individuals in the CPT condition at 60 week assessment. Less than a third of participants met PTSD diagnostic criteria at 60 weeks in both conditions (see Table 1), and there was no significant difference between conditions in the likelihood of meeting diagnostic criteria ($\chi^2=.36$, $p=.55$). As shown in Table 2, within-condition effect sizes were large in both conditions, and the between-condition effect size was very small ($d=.15$).

Depression Symptom Outcome

At baseline, levels of depression symptoms across the sample were moderate (mean BDI-II total score = 22.00, $SD = 11.70$, see Table 2). Between-condition HLM analysis of the entire sample showed that there was a significant fixed effect of linear time on depression symptoms ($B=-1.33$, $SE=0.20$, $t=-6.62$, $p<.001$). Model fit was superior with the addition of a fixed effect of quadratic time (linear only model $-2LL=4743.85$; linear and quadratic model $-2LL=4738.39$; quadratic time $B=0.34$, $SE=0.12$, $t=2.82$, $p=.005$). A time by condition fixed effect was significant ($B=-0.70$, $SE=0.33$, $t=-2.13$, $p=.034$), indicating that CPT participants experienced more rapid declines in depression symptoms (see Figure 2). However, as shown in Table 3, the between-condition effect size at week 60 was small ($d=.19$), and within-condition effects were medium in both treatments (WET $d=.51$, CPT $d=.68$).²

Discussion

Our findings indicate that previously reported PTSD severity non-inferiority results for WET compared with CPT are maintained for approximately one year. Previous work has already suggested that patients continue to benefit from CPT even 5–10 years after treatment (Resick et al., 2012). This is the first study to follow a cohort that received WET for more than 6 months post-treatment. The robust treatment effect found for WET in this trial is encouraging, because it indicates that even a brief treatment for PTSD can have sustained effects, and effects that are similar to a more intensive treatment approach.

In both conditions, the number of participants who met diagnostic criteria for PTSD at 60 weeks was lower than the number that had met criteria at 36 weeks. For WET, 48% of the sample met criteria for PTSD at 36 weeks, whereas 32% met criteria at 60 weeks; for CPT, 39% met criteria at 36 weeks, whereas just over 26% met criteria at 60 weeks. This decrease of 13 percentage points in both conditions suggests that these interventions may continue to

²All analyses for both CAPS-5 and BDI-II outcomes were also re-run using full information maximum likelihood (FIML) and the results did not change.

exert their effects over time, long after treatment has ended. This finding speaks to the importance of assessing treatments over longer timeframes, because not all of the potential gains are observed within a few weeks of completing the intervention. Some mechanisms of the treatment effect may have a longer duration of action, either in general or for specific sub-populations of patients. Not all participants will be on the same timeline for improvement. Some individuals may begin (or continue) to confront previously avoided situations, resulting in further symptom reductions. In the CPT condition participants are encouraged to continue to practice their cognitive restructuring skills, including using treatment handouts, following the end of formal treatment. Thus, post-treatment activities that are explicitly encouraged by the therapists or independently initiated by the participants may account for some of the “long tail” of treatment effect.

We also examined depression as a secondary outcome and found that participants in both conditions experienced substantial decreases in their depressive symptoms through the 60-week assessment. A treatment difference in rate of depression symptom change did emerge, with CPT participants showing more rapid decreases in depression symptoms. This finding is not surprising given the considerable focus on challenging and restructuring negative cognitions included in CPT. Participants assigned to CPT received a great deal of focused instruction and assistance on reevaluating their thinking and are assigned further practice in these skills as homework to be completed between sessions. In contrast, participants assigned to the WET condition were not assigned any practice between treatment sessions and received no training in changing their thoughts, other than what was provided in the writing instructions; these instructions encouraged them to write about how the trauma had affected their life and their thinking, and how the trauma relates to their future. Nonetheless, at the final time point, the between-conditions effect size in levels of depression symptoms was small. Across the overall sample, WET achieved long-term depression outcomes that are nearly identical to those of CPT, with average BDI-II scores that were within three points of each another at weeks 36 and 60. This is striking given the lack of focus on depressive symptomatology in WET, the lack of dedicated skills training that would seem to be relevant to depression (such as CPT’s teaching of cognitive reappraisal), and the substantially smaller treatment dose in WET compared with CPT.

It is important to determine the mechanism by which both of these treatments achieved their effects on depression symptoms. The fact that there was a small difference in depression outcomes between the two treatments at the final assessment point is intriguing given the different format of the two protocols. Does WET change depression through cognitive shifts, despite the lack of Socratic questioning, specific instruction about cognitive errors, or assigned practice? Or is emotional arousal via exposure the mechanism? Prolonged Exposure (PE), another exposure-based intervention for PTSD, has been shown to have significant effects on depression symptoms (Powers, Halpern, Ferenschak, Gillihan & Foa, 2010) that are not significantly different from the effects of CPT (Resick, Nishith, Weaver, Astin, & Feuer, 2002) or from PE plus cognitive restructuring (Foa et al., 2005). Clearly, exposure-based treatments such as PE and WET can improve depression symptoms along with PTSD symptoms, but for each of these trauma-focused treatments the precise underlying mechanisms are not understood. Given the high rates of comorbidity between

depression and PTSD (Creamer, Burgess, & McFarlane, 2001; O'Donnell, Creamer, & Pattison, 2004), further work in this area is clearly needed.

The findings of this study add to the growing literature demonstrating that PTSD can be successfully treated with less treatment dose than once thought. For instance, Galovski and colleagues (2013) have shown that the majority of individuals receiving CPT require less than 12 sessions to achieve clinically meaningful improvement and Nacash et al. (2015) found that PE using 20 minutes of imaginal exposure sessions was non-inferior compared to PE using 60 minute sessions of imaginal exposure. Finally, Cigrang and colleagues (2017) found that a brief version of PE modified for the primary care setting was efficacious in the treatment of PTSD relative to a minimal contact comparison condition, with moderate between condition effect sizes obtained. These findings underscore the need to better understand underlying mechanisms of PTSD treatments in order to create more efficient treatments that focus on the active mechanisms underlying PTSD treatment outcome.

Limitations of the study included a high rate of treatment dropout in the CPT condition compared to WET; dropout was defined as ending treatment prior to session 5 for WET or session 12 for CPT (see (Sloan et al., 2018) for dropout rates and reasons). Notably, these dropout rates are not different from those seen in many CPT studies, particularly among veterans (e.g., Imel et al., 2013). That results were consistent even when using FIML estimation adds strength to our findings, despite the issue of differential dropout. Additionally, during the follow-up period we were unable to reliably track whether participants received additional therapies or medication treatment; we are therefore unable to say to what degree some of the maintained treatment gains might be due to non-study treatments. If participants sought and obtained additional treatment, particularly if the two groups differed in the extent to which they did so, then the findings presented will not be completely accurate. Unfortunately, we do not know WET and CPT participants differed in the extent to which they sought additional treatment once they completed treatment in our study. It is not possible to guess whether WET or CPT would have been more likely to result in participants seeking additional treatment. Finally, depression was measured using self-report rather than a blinded, clinician-administered interview. Study strengths included the clinician-rated assessment of the primary outcome and low attrition rates throughout the follow-up period.

The identification of PTSD treatments with long-lasting effects is critically important. One possible concern for very brief treatments such as WET is that patients may not sustain their improvements over time. The current results indicate that this is not the case; with only five sessions of treatment, participants who received WET had long-term outcomes that were non-inferior to those assigned to the more dose intensive CPT. Moreover, WET was associated with significant reduction in depression symptoms, although the rate of decline was not as great as what was observed for CPT. Nonetheless, the findings add to existing evidence that WET should be considered to be a viable PTSD treatment option, resulting in substantial symptom improvement with less attrition and less time burden (in training and treatment delivery) than other trauma-focused treatments. While these findings are encouraging, additional research is needed to understand for whom WET works best (i.e., moderators) and implementation factors that affect when and how WET is used in routine

care environments (e.g., mental health clinics, primary care settings). Finally, it will be important to demonstrate that the promising efficacy findings of WET can be replicated with other investigators.

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Figure 1.

Participant flow

Note. WET = Written Exposure Therapy; CPT = Cognitive Processing Therapy

Figure 2.

Graph of mean depression scores across all time points for both WET and CPT

Note. WET = Written Exposure Therapy; CPT = Cognitive Processing Therapy; BDI-II = Beck Depression Inventory (second edition)

Table 1.

PTSD Outcomes by Condition

	Baseline	60 week
CAPS-5 Total Score		
WET	36.10(8.91)	21.11(13.47)
CPT	37.10(10.07)	19.04(14.65)
Difference	1.00	2.07
CAPS-5 % PTSD diagnosis		
WET	63 of 63 (100%)	18 of 57 (31.58%)
CPT	63 of 63(100%)	14 of 53(26.42%)

Note. CAPS-5 = Clinician Administered PTSD Scale for *DSM-5*; CPT = cognitive processing therapy; PTSD = posttraumatic stress disorder; WET = written exposure therapy.

Table 2.

Means and SDs of depression scores at each time point

	BDI-II mean (SD)					
	All		WET		CPT	
	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>
Baseline	22.00 (11.70)	125	21.11 (10.49)	62	22.87 (12.80)	63
Week 6	19.82 (12.38)	114	19.59 (12.13)	61	20.08 (12.77)	53
Week 12	16.46 (12.69)	112	18.02 (12.98)	60	14.65 (12.22)	52
Week 24	14.73 (12.00)	102	16.24 (11.50)	55	12.96 (12.44)	47
Week 36	15.92 (13.28)	100	16.87 (12.90)	52	14.90 (13.75)	48
Week 60	14.74 (12.70)	105	15.96 (11.96)	53	13.50 (13.41)	52

Note. Means and SDs are based on the intent-to-treat sample. WET = written exposure therapy; CPT = cognitive processing therapy.

Table 3.

Within- and Between-Condition Effect Sizes (d) for PTSD and Depression, Baseline to 60 Weeks

Within-Condition Effect Sizes		
	PTSD	Depression
WET	1.23	.51
CPT	1.38	.68

Between-Condition Effect Sizes		
	PTSD	Depression
Difference between WET and CPT at 60 weeks	.15	.19

Note. CPT = cognitive processing therapy; WET = written exposure therapy.