Prevention and Treatment

TREATMENT OF POSTTRAUMATIC STRESS DISORDER REDUCES SUICIDAL IDEATION

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Background: *Suicide is a significant public health problem. Although various studies have found evidence of posttraumatic stress disorder (PTSD) as a risk factor for suicidal behaviors, no study has examined whether or not PTSD treatment decreases suicidal thoughts. This study aims to fill this gap in the literature by examining changes in suicidal ideation over the course of a randomized clinical trial, which compared two widely used treatments for PTSD—cognitive processing therapy (CPT) and prolonged exposure (PE).* **Methods:** *Data from 163 trial participants over five time points (pre- and posttreatment, 3 and 9 months posttreatment, and 5–10 years posttreatment) were examined using multilevel growth curve analyses to determine if reductions in PTSD symptoms during treatment were associated with reductions in suicidal ideation. Major depression diagnosis and hopelessness were controlled.* **Results:** *Suicidal ideation decreased sharply during treatment with continued, but more subtle decreases, during the follow-up period. These decreases were associated with decreases in PTSD symptoms over the course of treatment. These associations were not accounted for by depression diagnoses at the start of the study or changes in hopelessness over the course of treatment.* **Conclusions:** *Two widely used, effective treatments for PTSD reduce suicidal ideation. CPT exhibited a larger influence on suicidal ideation than PE, although the magnitude of the difference was small in size. Inclusion of PTSD screening and treatment could enhance suicide prevention efforts. Depression and Anxiety 30:1046–1053, 2013.*

Key words: *stress disorders; posttraumatic; suicidal ideation; psychotherapy; life change events; clinical trial*

INTRODUCTION

Suicide is a significant public health problem and a leading cause of death in the United States.[1] According to the US Centers of Disease Control and Prevention, 8.3 million adults aged 18 or older experienced suicidal thoughts in 2008 (prevalence = 3.7%).[2] The National Comorbidity Survey follow-up study found that 6.2% of their original sample had new onset suicidal ideation

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since the first wave of data collection. Suicidal ideation was also persistent, with 35% of those that reported suicidal ideation at baseline also reporting ideation during the 10-year follow-up period.[3] Further, 21.2% of people who experienced suicidal ideation made a suicide plan during the follow-up period, 10.8% made a suicide gesture (i.e., a suicide attempt that was described by the participant as a cry for help without wanting to die) and 15.4% made a suicide attempt.[3] A study of risk factors for suicidal behaviors in 17 countries provides context for the scope of the international public health suicide problem that exists as well—Nock and colleagues found that the lifetime prevalence of suicidal ideation across these countries was 9.2%; the conditional probability of making a suicide plan among people who experienced suicidal ideation was 33.6%; and the conditional probability of making a suicide attempt among people who experienced suicidal ideation was 29%.[4] Clearly, suicidal ideation is a public health problem with potentially dire consequences.

Various studies have found evidence of posttraumatic stress disorder (PTSD) acting as a strong risk factor for suicidal behaviors. In the National Comorbidity Survey, Kessler and colleagues found that participants with PTSD had an adjusted odds ratio of 5.1 for suicidal ideation and an adjusted odds ratio of 6 for suicide attempts compared with participants without PTSD.[5] Tarrier and Gregg found that, in a sample of PTSD patients, over half (56.4%) reported suicidal ideation, suicide plans, or a suicide attempt since their trauma exposure.[6] In a national Canadian study, Sareen and colleagues found that suicide attempts were 2.4 times more likely among people with PTSD than people without PTSD, while adjusting for various demographic and psychiatric variables.[7] More recently, Gradus and colleagues found in a national study of the population of Denmark that citizens diagnosed with PTSD had 5.3 times greater odds of suicide than citizens without this diagnosis, adjusted for depression diagnoses and demographic variables.[8] Importantly, given the increasing concerns about suicidal behavior in the military, there is evidence of this association among veteran samples as well. A variety of studies have found associations between PTSD symptoms and suicidal behavior in veterans of all eras of service.[9–13] One potential mechanism that has been proposed for this association is depression symptoms, which frequently co-occur with PTSD and are a well-established predictor of suicidal behavior. Further, studies have shown that PTSD and depression symptoms have a synergistic effect on suicide, such that when PTSD and depression co-occur, their effect on suicide is greater than what can be explained by the independent effects of PTSD or depression diagnoses alone.[8] A second mechanism that may explain observed associations between PTSD and suicidal behaviors is hopelessness, a known correlate of PTSD and depression, and a consistent predictor of suicidal behavior.[14,15]

One empirical question that remains is whether or not treatment for PTSD symptoms leads to decreases in suicidal thoughts. Information about the impact of PTSD treatment on suicidal thoughts and behaviors would contribute to the current knowledge about the mechanisms of this association, and could potentially have great implications for the treatment of suicidal individuals in traumatized populations. Further, literature on the impact of trauma-focused treatment for PTSD on suicidal ideation specifically is severely lacking. In their review of studies examining PTSD and suicidal behavior, Panagioti and colleagues concluded that cognitive behavioral therapy could be a recommended course of treatment for reducing suicide risk in PTSD patients as it has been shown to be effective in decreasing suicide risk regardless of diagnostic group. However, the authors also state that studies examining treatments to reduce suicide risk in PTSD patients specifically are few and thus treatment recommendations are speculative.[16]

The current study aims to fill this gap in the literature by examining changes in suicidal ideation over the course of a randomized clinical trial, which compared the effects of the most widely used psychotherapy treatments for PTSD: cognitive processing therapy (CPT) and prolonged exposure (PE). Specifically, we aimed to (1) examine if changes in PTSD symptoms over the course of treatment are associated with changes in suicidal ideation up to 10 years after treatment and (2) examine if differences exist between CPT and PE with regard to the impact of PTSD symptoms on suicidal ideation. We hypothesized that change in PTSD symptoms over the course of treatment would be associated with changes in suicidal ideation up to 10 years after treatment. We also hypothesized that there would be no differences between CPT and PE with regard to the association between PTSD and suicidal ideation symptoms over time, based on the previous literature that has compared the impact of these two treatments on PTSD and depression over a long-term follow-up period.[17] Finally, we aimed to examine whether any observed associations could be explained by major depression diagnoses or changes in hopelessness over the course of treatment.

MATERIALS AND METHODS

The parent trial methods including a full description of the sample, recruitment procedures, therapies administered, and a CONSORT chart have been published elsewhere.[17,18] In brief, the overall trial included 171 adult women who had experienced a rape at least 3 months prior to entry into the study. The participants experienced 6.4 ($SD = 4.9$) lifetime crime incidents (e.g., child sexual or physical abuse, robbery, interpersonal violence, rape, and assault) in addition to the index rape, on average. The current analyses include 163 participants for whom major depression diagnostic data at the pretreatment time point were available. Table 1 displays the descriptive characteristics of the sample.

Potential participants were recruited throughout the greater St. Louis, Missouri region, and treated at a psychological trauma center on a University campus. Following the initial pretreatment assessment, participants were blindly randomized to receive CPT, PE, or to be on a waiting list (WL). Participants who were initially randomized to the WL condition were randomized to either PE or CPT at

TABLE 1. Pretreatment sample characteristics by study condition

	Total ($n = 163$)	CPT ($n = 79$)	PE ($n = 84$)
Demographic characteristics			
Age, mean (*SD*)	32.04 (10.00)	31.41 (9.63)	32.64 (10.35)
Education, mean (*SD*)	14.37 (2.38)	14.57 (2.33)	14.19 (2.43)
Race/ethnicity, % (*n*)			
White	71.8 (117)	70.2 (58)	73.4 (59)
African American	23.9 (39)	22.8 (18)	25.0 (21)
Other	4.3 (7)	3.8 (3)	4.7 (4)

Note: CPT, cognitive processing therapy; PE, prolonged exposure. One-way ANOVAs and chi-square indicated no significant differences between treatment groups.

the same time (treatment assignment remained blinded), so if they were still eligible and interested in treatment after the 6-week waiting period they received one of the two treatments. Because improvements in PTSD symptoms were identical for WL participants who were received CPT or PE, their data were combined with the original CPT or PE groups for follow-up analyses.[18] Participants who completed treatment were invited back at 3 and 9 months posttreatment for reassessment. All original randomized participants were invited to participate in the long-term follow-up assessment 5–10 years after the end of treatment, regardless of how much therapy they had received as part of the trial, for five major assessment time points over the course of the trial.

MEASURES

The PTSD Symptom Scale (PSS),[19] is a 17-item scale representing all Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for PTSD. The PSS was administered at all five major assessment points and once a week during treatment, resulting in 11 data points. A score of less than 10 on the PSS is considered mild PTSD; scores between 10 and 27 are indicative of moderate PTSD; scores of greater than 28 indicate severe PTSD.[19] For the current analyses, we used the total score to represent PTSD symptom severity.

To assess suicidal ideation we created a dichotomous item from data collected from item 9 of the Beck Depression Inventory (BDI).[20] Participants who endorsed the following: "I had thoughts of killing myself, but I would not carry them out," "I would like to kill myself," and "I would kill myself if I had the chance" were categorized as having suicidal ideation. All participants who chose "I don't have any thoughts of killing myself" were categorized as not having suicidal ideation. The BDI was administered at all five major assessment time points. Although single-item measurement of suicidal ideation has limitations, research has shown that this BDI item is highly correlated with Beck's Scale for Suicidal Ideation, and can be considered a valid approach to suicidal ideation assessment.[21]

The Structured Clinical Interview for DSM (SCID),[22] is a diagnostic interview based on criteria from the fourth edition of the DSM.[23] Three modules were used to assess mood disorders, panic disorder, and substance abuse dependence in the parent study. For the current analyses, we used SCID major depression diagnoses at the start of treatment to adjust for depression.

The Beck Hopelessness Scale (BHS)[24] is a 20-item self-report measure of hopelessness. The measure consists of true/false items that assess expectations for the future. The BHS was administered at all five major assessment points and we used the total score to adjust for hopelessness.

The Institutional Review Board (IRB) of University of Missouri-St. Louis approved the protocol, and participants gave written informed consent prior to enrollment. The IRB of VA Boston Healthcare System provided oversight of the data analyses.

STATISTICAL ANALYSIS

We conducted a series of multilevel growth curve analyses using the software program Hierarchical Linear and Nonlinear Modeling (HLM)[25] to examine whether or not reductions in PTSD symptoms during treatment were associated with reductions in suicidal ideation from pretreatment through the long-term follow-up assessment. The analyses were carried out in multiple steps. First, using the procedure described by Griffin,[26–28] we conducted standard growth curve analyses to derive Level-1 (within-participants) empirical Bayes estimates of initial status and change over time in PTSD symptoms (PSS) during treatment for each participant.[25] Second, the derived change parameters were included as Level-2 (between participant) predictors in multilevel logistic growth curve analyses to examine whether changes in PTSD were associated with changes in the likelihood of endorsing suicidal ideation (a dichotomous outcome variable) when controlling for initial SCID major depression diagnostic status. Finally, we examined the association between changes in PTSD symptoms and suicidal ideation while accounting for changes in hopelessness.

RESULTS

The main paper from parent study from which the data were derived documented substantial changes in PTSD symptoms during treatment, with no significant differences between the CPT and PE treatment groups.[18] However, that study did not utilize growth curve analysis procedures so we will briefly summarize the findings of the preliminary growth models used to derive PTSD change estimates for the current study. We evaluated two preliminary change models that estimated (1) linear change using the number of days since baseline as a Level-1 predictor, and (2) nonlinear change using a natural-log transformation of the number of days since baseline assessment. The deviance statistic (a log-likelihood based goodness-of-fit indicator produced by HLM), an estimate of the amount of within-subjects variance accounted for, indicated that the nonlinear model fit the data better. The regression coefficients from the natural-log model indicated an average initial PTSD symptom score of 31.86 ($SD = 9.52$). The average PTSD symptom trajectory ($b = -3.54$, $t = -16.16$, $P < .001$) was characterized by a sharp early decline during treatment that flattened out over time (see Fig. 1). The variance component of the model also indicated significant variability in change across the sample (as depicted by the dashed lines in Fig. 1). As already described, individual empirical Bayes estimates of initial status and change over time were saved for the analyses for the current manuscript, which aimed to examine whether this change in PTSD symptoms was associated with change in suicidal ideation over time.

We conducted a series of multilevel logistic growth analyses to assess changes in suicidal ideation from pretreatment to the long-term follow-up. Table 2 presents the regression coefficients from these analyses. First, we conducted a multilevel logistic growth curve analysis with time modeled as the natural-log number of days

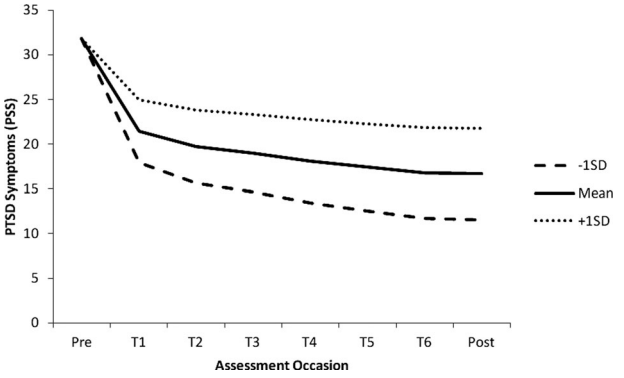

Figure 1. Change in PTSD symptoms during treatment for the full sample. Solid line depicts mean level change and dashed lines indicate change at +1 and –1 *SD* below mean levels of change. T1–T6 correspond to the weekly time points at which the PSS was administered throughout the treatment portion of the trial.

since baseline assessment and no predictors of change parameters. The results indicated a significant mean level decrease in suicidal ideation that decreased sharply during treatment with continued, but more subtle decreases, during the follow-up period (see Section 1 of Table 2 and the solid line in Fig. 2). Next, we added SCID major depression diagnosis (MDD) as a covariate predicting intercept (initial suicidal ideation status) and change in suicidal ideation. As Section 2 of Table 2 indicates, participants with a MDD diagnosis were more likely to endorse suicidal ideation at pretreatment. However, MDD diagnosis was not associated with change over time in suicidal ideation as indicated by the estimates for the slope.

We added the change parameters derived from the PTSD growth curve analyses as described above as predictors of initial status and change over time in the likelihood of endorsing suicidal ideation. The slope coefficients in Section 3 of Table 2 indicate that more change in PTSD symptoms was associated with more change in suicidal ideation. The dashed lines in Fig. 2 depict change in suicidal ideation at –1 and +1 *SD* above the mean level of change in PTSD, and indicate that participants exhibiting larger decreases in PTSD symptoms during treatment (represented the –1 *SD* line; the negative indicates larger decreases) exhibited larger decreases in the likelihood of endorsing suicidal ideation. Next, we added hopelessness as a time-varying (Level-1) covariate to test whether the PTSD symptom change and suicidal ideation relationship was maintained when controlling for changes in hopelessness. Section 4 of Table 2 indicates that, although this association was reduced with hopelessness in the model (change in b from 0.28 to 0.18), the association between change in PTSD symptoms during treatment and change in suicide ideation remained significant. Thus, it appears that changes in hopelessness accounts for some, but not all, of the association between change in PTSD symptoms during treatment and reductions in suicidal ideation.

Finally, we examined the impact of treatment condition on change in suicidal ideation. First, we evaluated a model with only treatment condition (dummy coded variable with PE coded as 1) and MDD status predicting initial status and change over time in suicidal ideation. The effect of treatment condition on initial status of suicidal ideation was not significant (see Section 5 of Table 2). A significant treatment effect emerged on change in suicidal ideation over time, such that participants in the CPT condition exhibited larger decreases in suicidal ideation over time than participants in the PE condition (see Section 5 of Table 2 and Fig. 3). Next, we examined treatment condition × change in PTSD interactions by including treatment condition, PTSD change parameters, and treatment condition × PTSD change parameters interactions predicting initial status and change over time in the likelihood of endorsing suicidal ideation. The treatment condition × change in PTSD interaction term approached statistical significance ($b = –0.35$, $P = .067$) with the PTSD—change and suicidal ideation association stronger for participants in the CPT condition ($b = 0.48$, $t = 4.20$, $P < .001$, OR = 1.62) than for participants in the PE condition ($b = 0.13$, $t = 0.85$, $P = .40$, OR = 1.14). We added hopelessness as a time-varying covariate into the model, and the treatment condition × change in PTSD interaction became statistically significant ($P = .01$, see Section 7 of Table 2) with the association continuing to be stronger for participants in the CPT ($b = 0.41$, $t = 3.86$, $P < .001$, OR = 1.51) than the PE ($b = –0.04$, $t = –0.30$, $P < .76$, OR = 0.96) condition.

DISCUSSION

Consistent with our hypotheses, the current study found that decreases in PTSD symptoms over the course of treatment are associated with decreases in suicidal ideation, and declines in suicidal ideation were maintained over a follow-up period of 5–10 years. Further, the relationship between decreases in PTSD symptoms during treatment and decreases in suicidal ideation could not be explained by comorbid major depression. One possible explanation for the relationship between decreases in PTSD symptoms and decreases in suicidal ideation is that PTSD treatment reduces hopelessness, which in turn reduces suicidal ideation. Cognitive behavioral treatment for disorders other than PTSD has been shown to reduce hopelessness, a robust predictor of suicidal ideation.[29,30] Further, a recent study found that, relative to PE, CPT leads to greater decreases in hopelessness.[31] However, our results indicate that changes in hopelessness over the course of PTSD treatment did not account for the association between decreases in PTSD symptoms and decreases in suicidal ideation. Reduction in PTSD symptoms may reduce risk for suicide through a number of alternative mechanisms, including reductions in distress associated with re-experiencing and hyperarousal PTSD symptoms; such possibilities should be explored in future research.[16]

TABLE 2. Results of the multilevel logistic growth analyses examining changes in PTSD symptomatology over the course of treatment as a predictor of suicidal ideation trajectory

Analysis	Change coefficient	Predictor	*b*	*t*	OR	(95% CI)
1. Unconditional change						
	Initial status		− 0.67	− 4.21	0.40	(0.30, 0.54)
	Slope (LnDays)		− 0.30	− 5.72	0.98	(0.97, 0.99)
2. Controlling for MDD						
	Initial status					
		Int	− 0.97	− 4.57	0.38	(0.25, 0.58)
		MDD	0.73	2.28	2.07	(1.10, 3.89)
	Slope (LnDays)					
		Int	− 0.37	− 5.22	0.69	(0.60, 0.80)
		MDD	0.10	0.92	1.10	(0.89, 1.36)
3. PTSD change predicting suicidal ideation trajectory						
	Initial status					
		Int	− 0.86	− 3.96	0.42	(0.28, 0.65)
		MDD	0.44	1.32	1.56	(0.80, 3.02)
		PTSD initial	0.11	2.03	1.12	(1.00, 1.25)
		PTSD change	− 0.14	− 0.44	0.87	(0.47, 1.61)
	Slope (LnDays)					
		Int	− 0.38	− 5.26	0.68	(0.59, 0.79)
		MDD	0.07	0.60	1.07	(0.86, 1.33)
		PTSD initial	− 0.02	− 1.07	0.98	(0.94, 1.02)
		PTSD change	0.28	3.14	1.33	(1.11, 1.59)
4. PTSD change predicting suicidal ideation trajectory controlling for hopelessness						
	Initial status					
		Int	− 1.23	− 5.84	0.29	(0.19, 0.44)
		MDD	0.16	0.46	1.18	(0.59, 2.37)
		PTSD initial	0.08	1.46	1.08	(0.97, 1.20)
		PTSD change	− 0.24	− 0.77	0.79	(0.43, 1.44)
	Slope (LnDays)					
		Int	− 0.19	− 2.71	0.82	(0.71, 0.95)
		MDD	0.11	1.01	1.11	(0.90, 1.37)
		PTSD initial	− 0.01	− 0.79	0.99	(0.95, 1.02)
		PTSD change	0.18	2.15	1.20	(1.02, 1.42)
5. Treatment condition predicting suicidal ideation trajectory						
	Initial status					
		Int	− 0.69	− 2.56	0.50	(0.30, 0.85)
		MDD	0.69	2.17	2.00	(1.07, 3.76)
		Treatment (PE = 1)	− 0.54	− 1.69	0.58	(0.31, 1.09)
	Slope (LnDays)					
		Int	− 0.51	− 5.84	0.60	(0.50, 0.71)
		MDD	0.12	1.16	1.13	(0.92, 1.40)
		Treatment (PE = 1)	0.27	2.57	1.31	(1.06, 1.61)
6. Treatment condition × PTSD change predicting suicidal ideation trajectory						
	Initial status					
		Int	− 0.54	− 1.97	0.58	(0.34, 1.00)
		MDD	0.41	1.22	1.50	(0.78, 2.90)
		Treatment (PE = 1)	− 0.66	− 2.05	0.52	(0.27, 0.97)
		PTSD initial	0.07	0.91	1.08	(0.92, 1.27)
		PTSD change	− 0.12	− 0.28	0.89	(0.39, 2.03)
		Treatment × PTSD initial	0.07	0.63	1.07	(0.87, 1.33)
		Treatment × PTSD change	0.14	0.22	1.15	(0.32, 4.15)
	Slope (LnDays)					
		Int	− 0.53	− 6.76	0.59	(0.50, 0.69)
		MDD	0.07	0.70	1.08	(0.88, 1.32)
		Treatment (PE = 1)	0.32	3.40	1.38	(1.15, 1.66)
		PTSD initial	0.01	0.59	1.01	(0.97, 1.06)
		PTSD change	0.48	4.20	1.62	(1.29, 2.03)
		Treatment × PTSD initial	− 0.05	− 1.44	0.95	(0.89, 1.02)
		Treatment × PTSD change	− 0.35	− 1.84	0.70	(0.48, 1.03)

TABLE 2. Continued

Analysis	Change coefficient	Predictor	*b*	*t*	OR	(95% CI)
7. Treatment condition × PTSD change predicting suicidal ideation trajectory controlling for hopelessness						
	Initial status					
		Int	− 0.54	− 0.90	0.41	(0.24, 0.70)
		MDD	0.11	0.32	1.12	(0.56, 2.23)
		Treatment (PE = 1)	− 0.66	− 2.08	0.52	(0.28, 0.97)
		PTSD initial	0.01	0.18	1.01	(0.87, 1.19)
		PTSD change	− 0.16	− 0.41	0.85	(0.38, 1.89)
		Treatment × PTSD initial	0.11	1.04	1.11	(0.91, 1.37)
		Treatment × PTSD change	0.03	0.05	1.03	(0.29, 3.67)
	Slope (LnDays)					
		Int	− 0.30	− 3.65	0.74	(0.63, 0.87)
		MDD	0.10	0.98	1.10	(0.91, 1.34)
		Treatment (PE = 1)	0.27	3.05	1.31	(1.10, 1.56)
		PTSD initial	0.02	0.88	1.02	(0.98, 1.07)
		PTSD change	0.41	3.86	1.51	(1.22, 1.86)
		Treatment × PTSD initial	− 0.04	− 1.27	0.96	(0.90, 1.02)
		Treatment × PTSD change	− 0.45	− 2.68	0.64	(0.45, 0.89)

Note: CI, confidence interval; MDD, SCID major depression diagnosis; PE, prolonged exposure; PTSD, posttraumatic stress disorder; OR, odds ratio.
Continuous predictors were mean centered.

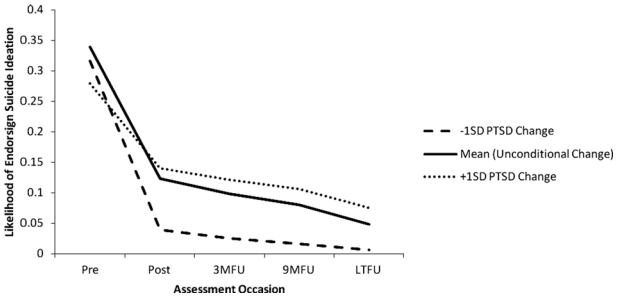

Figure 2. Change in the likelihood of endorsing suicidal ideation during the study for the full sample. Solid line depicts mean level change in endorsement of suicide ideation with no other predictors in the model. Dashed lines indicate change for participants who showed steep (–1 *SD*) and shallow (+1 *SD*) decreases in PTSD during treatment. The metric of the *y*-axis is proportion, which was computed by transforming the likelihood estimates using the following formula: ($e^{likelihood}/(e^{likelihood} + 1)$).

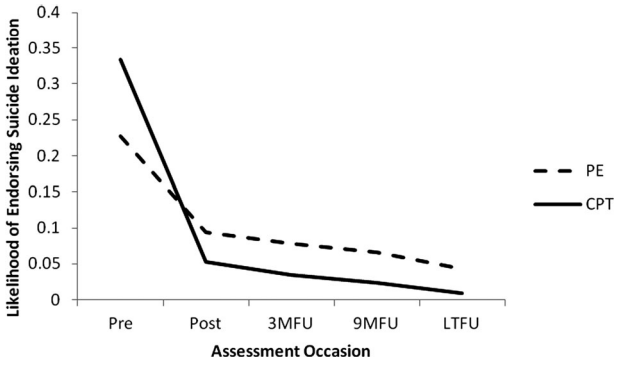

Figure 3. Change in the likelihood of endorsing suicidal ideation during the course of the study as a function of treatment condition. Solid line depicts change in endorsement of suicide ideation with for the CPT condition. Dashed lines indicate change for PE condition. The metric of the *y*-axis is proportion, which was computed by transforming the likelihood estimates using the following formula: ($e^{likelihood}/(e^{likelihood} + 1)$).

Follow-up tests indicated that declines in suicidal ideation were evidenced in both the CPT and PE groups, but this effect was larger for people receiving CPT. The CPT group started with a slightly higher proportion of individuals endorsing suicidal ideation, raising the possibility that individuals in the PE group showed smaller decreases due to differences in initial status. However, the difference between the CPT and PE groups in initial status of suicidal ideation was not significant, indicating that the observed treatment effect could not be entirely accounted for by baseline differences. Moreover, the relationship between decreases in PTSD and decreases in suicidal ideation was significant in the CPT but not the PE group, contrary to our hypotheses. Therefore, even though individuals receiving PE showed declines in suicidal ideation, the changes in suicidal ideation were not related to PTSD symptom change during treatment. Future research should examine the mechanisms through which treatment of PTSD with PE leads to reductions in suicidal ideation symptoms.

The significant difference between CPT and PE on decreases in suicidal ideation is surprising given evidence that these treatments show equivalent effects on PTSD and a number of comorbid psychiatric conditions.[18] CPT may lead to greater declines in suicidal ideation than PE as a function of the different components of each treatment. Although there is some overlap, CPT is primarily a cognitive therapy, which involves teaching individuals with PTSD to identify and challenge

maladaptive thinking patterns about their role in the trauma, as well as current thinking about themselves and the world. Although suicidal thoughts are not specifically targeted in the CPT protocol, cognitive therapy skills can be applied to any maladaptive thought and individuals in CPT practice challenging both trauma-related and nontrauma-related thoughts during therapy. Therefore, patients who receive CPT develop skills that they may apply to suicidal thoughts.

PE has also been shown to change certain types of trauma-related cognition because cognitive processing is one component of the PE treatment protocol.[18,32] It is possible that CPT had a greater impact on reducing suicidal ideation than PE since one of the significant focuses within this treatment is in modifying changes in guilt and shame-based cognitions (e.g., "It was my fault the trauma happened"). In the parent study,[18] CPT was found to reduce guilt cognitions related to the trauma more than PE, although global nonspecific guilt improved equally. It is possible that the resolution of trauma-related guilt and self-blame also reduced suicidal ideation, and this might explain why decreases in suicidal ideation were associated with reductions in PTSD symptoms specifically in the CPT condition, but associated only with general improvement in functioning in the PE condition.

Current treatment guidelines indicate that trauma-focused treatments, such as CPT and PE, are not recommended for individuals who are actively suicidal.[32,33] These recommendations are due to concerns that temporary increases in distress related to discussing traumatic events may have dire consequences among suicidal individuals. However, the level of suicide risk at which trauma-focused therapy is contraindicated is not clearly defined. Our findings indicate that successful trauma-focused PTSD treatment results in long-lasting declines in suicidal ideation, thus potentially reducing risk for suicide. Therefore, determining the level of suicide risk at which trauma-focused therapy can be implemented safely is critically important, so that PTSD treatment is not delayed any longer than necessary for individuals experiencing suicidal ideation. Future research could examine trauma-focused therapy among individuals with PTSD who report a wider range of suicide risk than has been examined in prior work, while including appropriate precautions for participant safety. Such studies could include a more comprehensive assessment of suicide risk than the BDI item 9, including a more detailed assessment of suicidal ideation and assessment of other suicide risk factors, such as history of suicide attempts. It will be important in future research to assess (1) whether trauma-focused treatment can be implemented safely among individuals with higher levels of suicide risk at baseline and (2) whether successful PTSD treatment leads to long-lasting declines in suicidal ideation and suicidal behaviors among this higher risk sample.

It is important to note this study's limitations. First, our measure of suicidal ideation consists of a single item from the BDI. Although this item asked about varying levels of ideation, it is possible that the results of the study would differ if a more detailed measure of suicidal ideation had been included. Second, this study compared two psychological treatments for PTSD among women who had been raped. It will be important to examine whether similar effects of PTSD treatment on suicidal ideation are seen for men, for individuals with PTSD related to other index trauma types, such as combat, and for other effective PTSD treatments, such as medication. Third, although CPT led to significantly greater declines in suicidal ideation than PE, the difference between these treatments was small in magnitude. It will be important to replicate this finding in future work, particularly in samples that are more closely matched on suicidal ideation at baseline. Strengths of this study include the randomized controlled trial study design, the large sample size, the use of longitudinal data analytic methods that account for missing data and the availability of long term follow-up data 5–10 years following treatment completion.

CONCLUSIONS

Treatment with two widely used, effective therapies for PTSD is associated with long-term reductions in suicidal ideation. Further, treatment of PTSD with CPT appears to lead to greater reductions in long-term suicidal ideation than treatment with PE, and this association is not accounted for by major depression diagnoses or changes in hopelessness. Given that treatment for PTSD can have the added benefit of reducing suicidal ideation, suicide prevention efforts may be enhanced by screening for PTSD and making referrals to trauma-focused PTSD treatment as appropriate. Future research should replicate our findings in samples of people who have experienced other traumatic events, and explore the impact of trauma-focused PTSD treatment on a wider range of suicidal behaviors, including suicide attempts.

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