Addressing Co-occurring Suicidal Thoughts and Behaviors and Posttraumatic Stress Disorder in Evidence-Based Psychotherapies for Adults: A Systematic Review

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Abstract

Posttraumatic stress disorder (PTSD) is a well-established risk factor for suicidal thoughts and behaviors. Historically, guidelines for treating PTSD have recommended against the use of trauma-focused therapies with patients who are high-risk for suicide likely due to concerns about potential suicide-related iatrogenesis, specifically the “triggering” of suicidal behaviors. This systematic review examines evidence for the impact of treatments specifically designed to treat PTSD or suicide on both PTSD- and suicide-related outcomes. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed and a total of 33 articles met full inclusion criteria, of which 23 examined PTSD treatments, 4 examined suicide-focused treatments, and 6 examined combined treatments. PTSD and combined treatments reduced both PTSD- and suicide-related outcomes, with most studies examining Cognitive Processing Therapy or Prolonged Exposure. Suicide-focused treatments (e.g., cognitive therapies for suicide prevention) also reduced suicide-related outcomes, but findings were mixed for their impact on PTSD-related outcomes. Overall, PTSD treatments had the most support, primarily due to a larger number of studies examining their outcomes. This supports current clinical guidelines, which suggest utilizing PTSD treatments for individuals at risk for suicide and who have PTSD. Suicide-focused and combined treatments also appeared to be promising formats although additional research is needed. Future research should seek to compare the effectiveness of the approaches to the treatment of PTSD and suicidal thoughts and behaviors concurrently, as well as to inform guidelines aimed at supporting decisions about the selection of an appropriate treatment approach.

Posttraumatic stress disorder (PTSD) is a well-established risk factor for suicidal thoughts and behavior, inclusive of suicidal ideation, attempts, deaths, as well as suicide-related inpatient hospitalization admissions (e.g., Holliday et al., 2020; May & Klonsky, 2016; Nock et al., 2009; Roberge et al., 2020; Panagioti et al., 2012; Stanley et al., 2021). Patients with more severe PTSD report more severe suicidal ideation and engage in more suicidal behaviors (Afzali et al., 2015; Roberge et al., 2019; Stanley et al., 2021). Moreover, PTSD is frequently associated with a number of co-occurring psychiatric conditions (e.g., depression, substance use) that are also risk factors for suicidal ideation and behaviors (Holliday et al., 2020).

Significant amounts of research funding, policy work, and clinical consideration have been dedicated to both the treatment of PTSD and management of suicide. Current clinical practice guidelines for the management of PTSD (e.g., American Psychological Association, 2017; VA/DOD, 2017) recommend trauma-focused psychotherapies including Cognitive Processing Therapy (CPT; Resick et al., 2017), Prolonged Exposure (PE; Foa et al., 2019), and Eye Movement Desensitization and Reprocessing (EMDR; Shapiro, 2018) as first-line psychotherapeutic interventions (Hamlen et al., 2019). These psychotherapies are effective at reducing PTSD symptoms in a variety of populations and in relation to different traumatic events (e.g., combat, sexual assault, physical assault, etc.; Forman-Hoffman et al., 2018).

Recent clinical guidelines for PTSD have suggested that trauma-focused treatments with individuals who are at elevated risk for suicide can be utilized (i.e., NICE, 2018; VA/DOD, 2017). However, they do not define when an individual with PTSD and risk for suicide is sufficiently “prepared” to engage in trauma-focused treatment or how to do so. One potential consequence of this lack of clear guidance is patients receiving an increased number of non-trauma-focused psychotherapeutic sessions in efforts to “prepare” or stabilize them (Holder et

al., 2021). These interventions may be neither trauma- nor suicide-focused, thereby delaying access to evidence-based treatments (EBTs). As such, a portion of patients with PTSD who endorse suicidal thoughts and behaviors may receive delayed trauma-focused treatment, if PTSD treatment is ever initiated at all. In contrast, previous guidelines specifically recommended against the use of trauma-focused therapies with patients who are high-risk for suicide (e.g., VA/DOD, 2010; Forbes et al., 2008). These more conservative guidelines were likely influenced by the exclusion of participants at high and/or intermediate acute risk for suicide in randomized controlled trials that have typically been used to inform practice guidelines (Holliday et al., 2019; Ronconi et al., 2014). Additionally, there have been concerns for potential suicide-related iatrogenesis, specifically the “triggering” of suicidal behaviors by engaging in trauma-specific treatment (Jakupcak & Varra, 2011).

This cautious approach likely inadvertently contributed to a considerable gap in knowledge about how to effectively manage and treat suicide risk among individuals with PTSD. This is further complicated by the fact that a valid and reliable system for categorizing suicide risk where “high” acute risk is associated with imminence of suicidal behaviors, or a tool to reliably predict suicidal behavior, does not exist (Franklin et al., 2017). Without clear empirically-informed guidance, providers and healthcare systems are left to rely on “clinical instincts” and patient reports, which can vary in validity based on several factors (e.g., patient openness to disclose). Unfortunately, the fear that many systems and providers experience in the context of managing suicide risk either significantly delays or prohibits patients from receiving PTSD treatment, and as a result, prolongs much of the suffering that likely contributes to suicidal ideation and behaviors.

If alternative treatments for individuals with PTSD or trauma-related symptoms who are at increased risk for suicide are used, it is plausible that suicide specific clinical guidelines would be followed. The VA/DOD clinical practice guidelines for the assessment and management of patients at risk for suicide (2019) cite strong evidence for the recommendation of managing and treating suicidality with cognitive behavioral interventions focused on suicide prevention, such as Cognitive Therapy for Suicide Prevention (CT-SP; Brown et al., 2005) and Brief Cognitive Behavior Therapy for Suicide (BCBT; Rudd et al., 2015). Although other treatments such as Dialectical Behavior Therapy (DBT; Linehan, 2014), Crisis Response Planning or Safety Planning Intervention (CRP/SPI; Bryan et al., 2017, Stanley & Brown, 2012), and problem-solving based psychotherapies (Salkovskis et al., 1990) are recommended in these guidelines, the evidence is not as strong for these therapies as it is for CT-SP and BCBT. However, these guidelines do not provide information on how to manage comorbid PTSD in high-risk individuals, nor do they discuss whether PTSD is managed by these interventions. With siloed guidelines and reviews focusing on either PTSD or suicide, clinicians are left without guidance and support on how to help patients suffering from both PTSD and suicidal thoughts and/or behaviors.

Importantly, a growing body of literature has found that suicidal ideation, as well as the beliefs that are associated with suicide risk, improves over the course of PTSD treatment (e.g., Bryan et al., 2016; Gradus et al., 2013; Holliday et al., 2018; Stayton et al., 2019). The improvement of suicidal thoughts in the context of trauma-focused therapy is unsurprising when considering their shared theoretical mechanisms of cognitive rigidity and emotion dysregulation (Bryan & Rozek, 2017; Joseph et al., 2015). Further, recent evidence points to additional shared mechanisms and risk factors of suicide and PTSD (e.g., shame, guilt, control) (e.g., Rugo et al.,

under review). This overlap suggests that either type of treatment (i.e., trauma-focused/PTSD or suicide-focused) may improve both PTSD and suicide-related outcomes by increasing cognitive flexibility and teaching emotional regulation and coping strategies. Several reviews have focused on understanding the combined prevalence, risk, and/or mechanisms of PTSD and suicide (e.g., Holliday et al., 2020; Krysinska & Lester, 2010; Rugo et al., under review). Although these reviews capture important information, to date, no reviews have focused specifically on treatment of co-occurring PTSD and suicidal thoughts and behaviors. Addressing this critical gap in knowledge about whether PTSD treatments and suicide-specific treatments impact both PTSD and suicide-related outcomes can inform, research, clinical care, and policies.

Therefore, the goals of the current systematic review are twofold. First, we will provide a review of the current literature of the impact of evidenced-based PTSD treatments on both PTSD- and suicide-related outcomes. Second, we will review the literature on suicide-specific treatments and their impact on PTSD- and suicide-related outcomes.

Method

This study was developed in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009) and submitted for pre-registration with the International Register of Systematic Reviews (PROSPERO: *Registration Number Redacted for Review*). We systematically searched the literature published between January 1, 1985 and January 26, 2021 within two electronic databases: PubMed and APA PsycInfo. An additional search was performed within the PTSDpubs database on June 23, 2021 to identify any studies that were missed by the original searches based on reviewer feedback (this is a deviation from the pre-registration and resulted in two additional articles being included for review). Search terms were developed in conjunction with a library science associate based on

the search engines algorithms to capture studies that reported both PTSD and suicide outcome measures within EBTs for PTSD and suicide (see Table 1 for search terms). Duplicate studies were then merged using the reference managing software Zotero (Roy Rosenzweig Center for History and New Media, 2020). From the database search results, additional studies were identified from relevant publications found in reference lists of studies identified for inclusion. Additionally, the primary author (REMOVED FOR BLIND REVIEW) had personal correspondence with researchers who had studies related to this topic recently accepted for publication.

During the PRISMA guideline screening stage, all titles and abstracts were reviewed independently by at least two reviewers (REMOVED FOR BLIND REVIEW) who were either graduate students in a doctoral clinical psychology program or individuals who had earned a PhD in psychology. Where there were disagreements concerning eligibility, the two reviewers addressed discrepancies and either came to a consensus or brought in a third reviewer to resolve discrepancies and make a final determination. Following the abstract screening stage, the full-text articles were independently examined for final inclusion by at least two reviewers (REMOVED FOR BLIND REVIEW). Data reviewed at this stage were: objective(s) of the study, population description, sample size for each condition, treatment description and any additional therapeutic components, PTSD outcome measure(s) and results, suicide outcome measure(s) and results, limitations, and any other important information.

Eligible studies were included based on the following criteria: 1) Published after January 1, 1985, 2) written/translated into English, 3) included an evidenced-based treatment for either PTSD as cited in clinical guidelines (e.g., CPT, PE) or suicidal thoughts and behaviors (e.g., BCBT, DBT), and 4) included outcome measures for both PTSD and suicidal thoughts and

behaviors. Of note, studies examining only nonsuicidal self-injury (NSSI) were excluded due to NSSI being non-suicidal behavior by definition. At times, different elements of inclusion criteria were found in different studies. For example, the primary outcome paper of a clinical trial may have had the PTSD outcomes and a secondary analysis paper had the suicide-related outcomes. These papers were combined to extract all data related to the study (see Figure 1 for overview). Exclusion criteria included: 1) case studies, 2) pediatric and adolescent samples, and 3) inadequate data (i.e., no specific outcomes suicide or PTSD outcomes, only pre-treatment data on suicide or PTSD). Due to variability in the study designs, outcome measures, and populations, a meta-analytic approach was not used. Instead, a descriptive synthesis approach was conducted (Mckenzie & Brennan, 2019), and the following descriptive data were extracted and synthesized for the current review (see Table 2) by four authors (REMOVED FOR BLIND REVIEW): sample characteristics, treatment type, supplemental components, comparison group(s), PTSD outcome measure(s), suicide outcome measure(s), and major findings.

A quality assessment was performed for each included study (REMOVED FOR BLIND REVIEW). Risk of bias was assessed using the following components of the Effective Public Health Practice Project (EPHPP) quality assessment tool (Thomas et al., 2004): selection bias, study design, confounders, data collection, and withdrawals/dropouts. To be considered of quality, analyses in the included studies were deemed as acceptable and standard quantitative analytic practices. The quality of each study was defined globally as “strong” if there were no weak component ratings, “moderate” if there was one weak component rating, and “weak” if there were two or more weak component ratings (See Table 2).

The authors categorized studies by intended focus of treatment (e.g., PTSD or trauma-focused, suicide-specific, and combined treatments). For PTSD-specific treatments, the clinical

guidelines recommendation both trauma-focused treatments (i.e., CPT, PE, EMDR, Narrative Exposure Therapy) and non-trauma focused psychotherapies (Present-Centered Therapy). Suicide-specific treatments included protocols that targeted suicide specifically (e.g., cognitive-based therapies for suicide) as well as DBT based on evidence that it targets and reduces risk for suicidal behavior and suicidal ideation (e.g., Linehan et al., 2006). Studies examining combined therapies grouped together for this review as they often combined two or more different therapies.

Results

Search terms in the PubMed and APA PsycInfo databases identified a total of 855 titles and abstracts once duplicates were removed. Following the initial screening review, 785 articles were removed due to not meeting eligibility criteria. This left 70 articles included for a full-text review, including additional articles that were found as part of follow up searches (i.e., reference mining) and author correspondence. Based on full-text review, 38 articles were excluded due to not meeting inclusion criteria and 2 articles (Bryan et al., 2016; Resick et al., 2015) were combined into 1 due to reporting on a shared dataset, and from this point forward will be presented together as one study. This resulted in 31 articles that met eligibility criteria. The subsequent search in PTSDpubs identified a total of 235 titles and abstracts after duplicates from the previous searches were removed. Following the initial screening review, 226 articles were removed due to not meeting eligibility criteria, leaving 9 articles included for a full-text review. Based on the full-text review, 7 articles were excluded, leaving 2 additional eligible articles from this review. Thus, a total of 33 articles are presented in the current systematic review. For additional details, see the PRISMA Literature Flow Diagram in Figure 1. In order to provide a descriptive examination, treatments were divided into PTSD-recommended treatments,

combination treatments, and suicide-focused treatments. Results for specific treatments (e.g., specific EBT modalities) within each category are presented as well.

Quality Assessment and Risk of Bias

The global risk of bias ratings are presented in Table 2. Overall, the ratings of articles included for review indicated 10 studies rated as strong, 17 studies rated as moderate, and 6 studies rated as weak. The majority of studies being rated as moderate or strong is important as it gives credibility to the results. However, there are still weaknesses in the studies not captured by this rating that can have an impact on the overall results. For example, one weakness was that sample size and power estimations in clinical trials were not always presented and some studies in the current review were pilot studies with smaller samples that future research should address. Additional areas of weakness included dropout/withdrawal rates (e.g., less than 60% of participants completed the study, Simon et al., 2020; dropout/withdrawal not reported, Stayton et al., 2019) and study designs without comparison or control groups.

PTSD Treatment

Overall

Overall, PTSD treatment was associated with reductions in both PTSD- and suicide-related outcomes. The outcomes did not appear to differ based on treatment modality, study population, trauma type, session format, or symptom measure. There were no deaths by suicide reported in any of these studies.

Cognitive Processing Therapy (CPT)

There were 11 studies that included CPT. Eight studies examined CPT only and 3 studies compared CPT to another EBT. Ten CPT studies showed reductions in both PTSD- and suicide-related outcomes, with the majority reporting significant reductions and generally few to no

reports of suicidal ideation or behaviors at post-treatment or at follow-up assessments. While one study reported suicide attempts by 2 participants approximately 7 months following treatment, as well as one suicide attempt from a participant who completed just one session (combined 1% of sample), the results showed that CPT significantly reduced PTSD symptoms regardless of patients' baseline suicide risk level (Roberge et al., 2021). For all studies that compared CPT to other EBTs, both EBTs resulted in improvement in PTSD and suicide outcomes. Gradus and colleagues (2013) found improvements in suicide-related outcomes for those in CPT and PE, and Resick et al. (2015) found greater improvements in PTSD symptoms for those in the CPT group compared to Present Centered Therapy (PCT).

Overall patterns of outcomes remained the same regardless of the format in which CPT was delivered (i.e., massed or daily treatment, weekly, individual, group), trauma type, or whom it was delivered to, although populations within studies were predominantly military personnel and/or veterans. One study included civilians and one study looked at women rape survivors only.

Prolonged Exposure (PE)

There were 9 studies that included PE. One study examined PE only, 5 studies compared PE to another EBT, 1 study compared PE to PE + Sertraline, 1 study integrated PE and virtual reality exposure (VRE), and 1 study integrated PE with CBT content into a manualized protocol for primary care. Six PE studies showed reductions in both PTSD- and suicide-related outcomes, with little to no exacerbation of suicidal ideation or behaviors following treatment. One study reported that adverse events (i.e., self-harm, suicide attempts, crisis contact, and psychiatric hospitalization) during treatment and follow-up in both PE and EMDR trauma-focused groups as well as the waitlist condition were comparable but less common in the trauma-treatment groups.

Another study reported no adverse events following treatment, and 1 reported no suicide-related outcomes at baseline or at follow-up. One study had longer-term follow-up (i.e., 6-months) that showed an increase in suicidal ideation from post-treatment to follow-up. Like CPT, the formats for PE treatment varied (e.g., standard weekly sessions, massed, virtual reality). All but one study, which combined group and individual treatment (Post et al., in press), delivered treatment in individual settings. The populations in these studies included military personnel or veterans, women rape survivors, and individuals with PTSD and psychosis or current psychotic symptoms.

Eye Movement Desensitization and Reprocessing (EMDR)

There were 4 studies that included EMDR. Two studies examined EMDR only, and 2 studies compared EMDR to another EBT. Of these studies, 1 showed significant reductions in both PTSD and suicidal ideation. The study by van der Berg and colleagues (2016) found adverse events (e.g., suicide attempts, crisis contact, psychiatric hospitalization) occurring during-treatment and at follow-up for both PE and EMDR trauma-focused groups and the waitlist condition were comparable but less common in the trauma-focused groups. The 2 other studies reported significant improvement in PTSD scores and no reports of adverse events. EMDR was delivered in a variety of formats (e.g., individual, weekly, biweekly). Populations treated included women with child abuse histories and individuals with PTSD and schizophrenia spectrum disorder, psychosis, or current psychotic symptoms.

Present Centered Therapy (PCT)

PCT is a second-line treatment for PTSD (e.g., VA/DOD, 2017) and there were 2 studies in this review that included PCT, both of which compared PCT to another EBT. Overall, these studies resulted in reductions in both PTSD- and suicide-related symptoms from pre- to post-treatment. One study reported an increase in suicidal ideation from post-treatment to 6-month

follow-up. Treatment was delivered in a weekly or biweekly individual format and these studies included military populations.

Narrative Exposure Therapy (NET)

One study examined NET (Steuwe et al., 2016), which resulted in a significant reduction in PTSD symptoms from pre- to post-treatment. Suicide-related symptoms were measured through observation, and there were no suicide attempts reported among participants.

Concurrent Treatment of PTSD and Substance Use Disorders (COPE)

Two studies included COPE, which integrates PE with relapse prevention. One study examined COPE only and the other compared COPE to Seeking Safety. For both studies, PTSD symptoms were significantly reduced and SI was not exacerbated. Tripp et al. (2020) reported that COPE, an exposure-based intervention, did not exacerbate symptoms of PTSD and suicidal ideation at higher rates than Seeking Safety, a non-exposure-based intervention. Treatment was delivered in individual format and populations in these studies included individuals with PTSD and alcohol-related disorders.

Combined PTSD & Suicide Treatment

Overall

Treatments that combined PTSD and suicide treatment appeared to result in reductions in PTSD symptoms and suicidal thoughts and behaviors. There were low rates of exacerbations of symptoms, adverse outcomes, and reports of suicidal thoughts and behaviors. The combining of treatments appears to be burgeoning and does not have consistent terms used for treatments.

Dialectical Behavior Therapy and Prolonged Exposure (DBT-PE) & Dialectical Behavior Therapy for PTSD (DBT-PTSD)

There were 6 articles that included combined DBT and exposure therapy. Three articles compared DBT+DBT PE to DBT, 1 study examined DBT-PE only, and 2 studies examined DBT-PTSD. With regard to the former 3 articles, it should be noted that one (Harned et al., 2018) is comprised of the samples from the other two articles (Harned et al., 2012 and Harned et al., 2014). Of note, the DBT protocols varied in that some delivered sequential treatment while others were more integrative in nature. Specifically, the DBT PE protocol used in the Harned et al. (2012, 2014, 2018) papers was sequential in nature, such that DBT was delivered first for approximately one year, followed by PE. The DBT PE protocol used by Meyers et al (2017) consisted of the full DBT protocol while simultaneously delivering PE during a 12-week intensive outpatient program (IOP). Across studies there were reductions in both PTSD- and suicide-related symptoms from pre- to post-treatment. Compared to DBT only, DBT+DBT PE, sequentially, resulted in greater improvements in PTSD as well as lower rates in suicide attempts and two studies reported no exacerbations in suicide or self-injurious behaviors. In the DBT-PE concurrent treatment (Meyers et al., 2017), there were no reports of adverse events including suicide attempts or hospitalizations. The DBT-PTSD models used by Bohus et al. (2013) and Steil et al. (2018) utilized core DBT components (e.g., basic assumptions, rules, methodology, etc.) integrated with exposure-based and cognitive interventions into the modular treatment. Both studies resulted in reductions in PTSD symptoms and no exacerbations in suicide attempts or ideation.

Suicide-Specific Treatment

Overall

Suicide-specific treatments appeared to reduce suicide-related outcomes, but results were mixed for PTSD symptoms.

Brief Cognitive Behavioral Therapy for Suicide Prevention (BCBT)

One study examined BCBT only (Rudd et al., 2015), which showed reductions in both PTSD- and suicide-related symptoms for active duty military personnel. Specifically, participants in the BCBT group compared to treatment as usual were 60% less likely to have a suicide attempt during the two year follow-up period, and there was a significant difference between groups in suicide attempts at 6 months follow-up. BCBT appears to have reduced PTSD symptoms at rates similar to treatment as usual (TAU), although these symptoms returned close to pre-treatment levels at the two-year follow-up in both BCBT and TAU.

Post-Admission Cognitive Therapy for the Prevention of Suicide (PACT)

There were two studies that examined PACT with Enhanced Usual Care (EUC) to only EUC. Both showed reductions in PTSD symptoms. In addition to PTSD symptom reductions, Ghahramanlou-Holloway and colleagues (2018) found that the PACT+EUC had a greater likelihood for significant reductions when examining high-risk patients only compared to the EUC group. Other findings included a greater likelihood for those in PACT+EUC to have significant reductions in suicidal ideation, no deaths by suicide during the study, and 17% of PACT+EUC participants (compared to 25% of EUC only participants) made one or more suicide attempts during follow-up. Both studies examining PACT reported similar study characteristics and procedures.

Dialectical Behavior Therapy (DBT)

There were four studies that included DBT. One study examined DBT only and 3 articles reported on DBT compared to DBT-PE (however, as noted in the DBT-PE section, there was overlap in the samples). The majority of the studies reported reductions in PTSD- and suicide-related symptoms. One study reported reductions in suicidal ideation only (Harned et al., 2010)

and found that among those who reduced exclusionary behaviors, including suicide and suicidal ideation, the majority still met criteria for PTSD at the end of treatment, though the presence of co-occurring PTSD did not lessen the impact of DBT on suicide risk. The other 3 articles reported no exacerbations in suicide behaviors. Study samples were comprised predominately of women with PTSD symptoms or diagnoses, borderline personality disorder (BPD), and suicide-related behaviors.

Discussion

In this systematic review, we examined the existing literature for 1) the impact of evidence-based PTSD treatments on suicide-related outcomes, 2) the impact of suicide-specific treatments on PTSD outcomes with the goal of informing researchers, clinicians, and policy makers about the available data related to these treatment options for individuals with PTSD and heightened suicide risk.

Through the review process, a third category of PTSD- and suicide-specific combined treatments (e.g., DBT-PE or DBT-PTSD) emerged and was examined for simultaneous reductions in PTSD- and suicide-related symptoms. Overall, whether treatment was for PTSD, suicide-specific, or combined, EBTs examined in this systematic review showed promising results in reducing both PTSD- and suicide-related symptoms. Such a finding may be indicative that these treatments act upon similar mechanisms underlying both suicide- and PTSD-related risk (e.g., cognitive reframing, coping skills to facilitate emotion regulation, emotions such as guilt, anger, shame, etc.). Importantly, trauma-focused treatments had the most research supporting these findings and additionally showed that suicide risk level does not negatively impact PTSD outcomes in trauma-focused treatment (Roberge et al., 2021). However, these overall conclusions should be couched within the context of a limited number of studies

(specifically those examining the impact of suicide-specific treatments on PTSD symptoms), the quality assessment (e.g., majority moderate or above but with noted weaknesses), and significant heterogeneity in suicide-related outcomes and measurement.

PTSD treatment

This systematic review revealed that PTSD treatments have the most evidence showing simultaneous reductions in PTSD symptoms and suicide outcomes. Specifically, there were more CPT studies that reported on and reduced both PTSD and suicide symptoms ($n = 12$) than any other treatment modality, followed by PE ($n = 9$). It is unsurprising that PTSD treatments simultaneously reduced PTSD and suicide symptoms given that they share key treatment components. For example, both CPT and BCBT may target negative cognitions related to traumatic experiences that are often intertwined with suicidal thoughts and behaviors. Similarly, PE reduces avoidance (and other trauma-related symptoms) and increases self-efficacy and engagement in meaningful activities. These reductions in symptoms are shown to have a link (direct and indirect) to reducing suicide risk (e.g., Holliday et al., 2020). All other PTSD treatments included in this review (i.e., EMDR, $n = 4$; PCT, $n = 2$; COPE, $n = 2$; NET, $n = 1$) showed positive impacts on PTSD symptoms and suicide-related outcomes; however, the number of included studies was fewer, suggesting the inherent need for additional research.

Suicide-specific treatment

Concerning the second aim, this systematic review revealed that there is initial evidence to suggest suicide-specific treatments are also effective in reducing both PTSD- and suicide-related symptoms. However, a critical limitation of this finding is that significantly fewer studies exist to support the efficacy of reducing PTSD symptoms in suicide-specific treatments. This gap in the research is expected given that a number of these studies were designed to focus on suicide

prevention among at-risk populations, which included those exposed to trauma, rather than PTSD symptom attenuation explicitly. Although these treatments are still important treatments to have available for individuals who may not have a history of trauma or PTSD but are still at heightened risk for suicide, given the risk for suicidal behaviors of individuals with PTSD, it is likely that many individuals in other suicide-specific treatment studies had PTSD or symptoms of PTSD but that was not reported or the focus of the trials.

In particular, both BCBT ($n = 1$) and PACT ($n = 2$) are treatments that show a reduction of both PTSD symptoms and suicide outcomes. The evidence reported in this review is promising for these treatments in managing suicide while reducing PTSD symptomology. Of note, the longer-term follow-up, 18-months in BCBT, showed PTSD symptoms returning to similar levels as pre-treatment. The sample in the BCBT trial had $\sim 1/3$ of participants diagnosed with PTSD, meaning the majority of participants did not have a trauma-specific diagnosis. These suicide-specific treatments may be useful in treating PTSD symptoms and may require additional treatment or revisions to be most effective for individuals with both PTSD and high risk for suicide. They may be best used as they were designed – for individuals who have suicide as the primary concern and they can still help reduce PTSD symptoms for those with related diagnoses.

We also examined DBT as a suicide-specific treatment, as DBT was designed to treat severe emotion dysregulation that often results in suicidal behaviors. DBT ($n = 4$) was consistently reported to effectively reduce personality disorder-, PTSD-, and suicide-related symptoms. A caveat to DBT treatment is that, as evidenced by the studies included in this review, standard DBT is an intensive therapy (i.e., multiple hours of weekly individual therapy and skills coaching per week) that typically consists of a full year long treatment (Linehan, 1993). Though DBT was found to reduce PTSD-, suicide-, and personality disorder-related

symptoms, the inherent intensity of this treatment suggests that DBT may be a best fit for individuals who present with severe symptoms and multiple diagnoses (e.g., PTSD, suicide related symptoms, and personality disorder).

Combination treatment

The review process revealed a third category of combined PTSD and suicide-specific treatments ($n = 6$), though there is currently less existing research in this area. Earlier studies in this area utilized a sequential approach to combining treatment in which exposure-based treatments (e.g., PE) were added only after DBT was first delivered and successful in managing suicide risk (e.g., Harned et al., 2012; Harned et al., 2014). More recent research has adopted an integrative approach in which both suicide-focused (DBT) and trauma-focused (PE) treatment are delivered simultaneously starting in the first few weeks of treatment (Meyers et al., 2017), as well as DBT-PTSD protocols that integrated exposure and cognitive skills into DBT treatment (Bohus et al., 2013; Steil et al., 2018). Integrative approaches like these may be more efficient while maintaining desired symptom reductions and, despite requiring more research, they are a promising medium for treating commonly comorbid mental health concerns.

Integration of Findings and Future Directions

As indicated by the current literature, EBTs for PTSD (e.g., CPT and PE) are effective in reducing suicidal ideation and behaviors and may be the best fitting treatment for someone with PTSD or other trauma-related disorders. A promising avenue for further reducing co-occurring PTSD and suicide risk is the integration of brief suicide-specific interventions *into* existing trauma-focused treatments (e.g., Rozek & Bryan, 2020). This approach, if supported by evidence from well-controlled trials, could have great benefits to patients, clinicians, and organizations. Given that there is less research on suicide-specific treatments managing PTSD

symptoms and that the evidence available, while supportive, may not have as lasting effects, a more fully integrated model of these treatments may provide the best outcomes possible for individuals with PTSD and heightened suicide risk.

This integrative model may reduce some burden and barriers to individuals who have PTSD and are at increased risk for suicide. If a patient is provided with suicide-specific treatment prior to PTSD treatment, the individual may have to go through two full courses of treatment. Although this may be useful and necessary for some individuals, if there is a way to best integrate these practices, we may lessen the burden on these individuals by reducing the financial, time (i.e., time spent in treatment), cognitive, and emotional burden that patients may experience in sequential approaches.

As seen in the DBT-PE and the integrated DBT-PTSD studies, true integration can occur in treatment. Given the overlap in conceptual interventions across trauma-focused treatments and suicide-specific treatments, a potential new therapy that integrates these components and provides guidance on how to focus on both PTSD and suicide within the same treatment is critical. This may mean that, similar to DBT-PTSD, the integration of different content of BCBT or PACT into CPT and/or PE to create a modified or new treatment for high-risk individuals at risk for suicide may be a promising treatment avenue. Alternatively, foundational components of suicide-specific treatments that are referenced in clinical practice guidelines (VA/DOD, 2019) including Crisis Response Planning (CRP; Bryan et al., 2017) and the Safety Plan Intervention (SPI; Stanley & Brown, 2012) are interventions that can be easily integrated into many treatments and are main components of suicide-specific treatments (i.e., BCBT and PACT). These interventions have been shown to reduce suicidal behaviors by 45-76% as a stand-alone intervention and improve other protective factors (Bryan et al., 2017; Rozek et al., 2019; Stanley

et al., 2018). Preliminary work has suggested using a CRP during trauma-focused treatment is feasible (Rozek & Bryan, 2020). Both the CRP and SPI are easily integrated into other trauma-focused treatments without undermining the fidelity of the original treatment. Future research should focus on understanding what components of suicide-specific treatments are most effective at reducing suicidal behavior and risk and then integrate these components in trauma-focused treatments.

Alternatively, a more specific focus on the integration of addressing suicidal thoughts and behaviors into other types of treatment could be done. The integration of DBT and PE has been combined in several different models as noted in the review. However, another type of integration could be to modify different protocols to have a specific suicide prevention component that fits within the treatment modality. For example, there could be the development of CPT for Suicide Prevention (CPT-SP). In this protocol, patients could go through the standard treatment with minor modifications such as assigning homework specific to the suicide related cognitions in addition to the trauma-focused cognitions. A module on suicide could be added to the current standard modules (i.e., safety, trust, power/control, esteem, and intimacy). Training and implementation of this type of treatment would focus on how to discuss suicidal cognitions and ensuring that they are an integrated part of treatment. Future research could examine integration of a focus on suicide and trauma for trauma-focused treatments.

Assessment of risk for suicide throughout treatment is critical for determining if additional intervention or modification of intervention should be considered. There are various pros and cons to developing a new treatment protocol versus the integration of brief suicide specific interventions into other established treatments. For example, if a patient discloses suicide risk in the middle of a treatment protocol, the integration of a brief suicide specific

intervention may be more appropriate than abruptly transitioning to a new protocol with a different focus. Ideally, the provider would integrate suicide prevention interventions such as safety plans into the session as seamlessly as possible. Future research can test whether novel integrated treatments for PTSD and suicide for individuals with heightened risk for suicide have a larger impact on suicidality than stand-alone treatments for PTSD or suicide.

The recent update in clinical practice guidelines was the first step in moving this area of treatment and research forward (VA/DOD, 2017, 2019). The current review supports these guidelines and provides a more in-depth review of how both PTSD- and suicide-related outcomes are reduced in trauma-focused and PTSD treatments. More guidance is needed to understand the best practices of using trauma-focused treatments with high-risk individuals and how to use suicide-specific treatments to help manage PTSD symptoms. Additionally, research and funding should target these areas including but not limited to testing slight modifications of already developed treatments, the integration of suicide specific treatment into trauma-focused treatments (e.g., components or full treatment), and/or understanding sequencing treatments effectively. These results will have a significant impact on policies in mental healthcare.

Limitations

The findings of this systematic review should be interpreted within the context of several limitations. Certain treatments were underrepresented in the included studies, and the conclusions relating to these treatments should therefore be considered preliminary. Specifically, few suicide-specific treatment studies that met inclusion criteria reported PTSD outcomes. This was to be expected as these treatments were developed to specifically target suicide risk, which does not always co-occur with PTSD. With respect to PTSD treatments, EMDR, PCT, COPE/SS, and NET were underrepresented relative to CPT and PE. Although these treatments did

demonstrate reductions in both PTSD- and suicide-related symptoms, further research is needed to determine the effectiveness of these treatments for individuals with co-occurring PTSD and suicidal thoughts and behaviors in studies that are developed to target these areas. Further, a confounding variable within this research is potential pharmacologic or other therapeutic intervention. The likelihood of study participants taking medication in conjunction with psychotherapy or engaging in other therapeutic practice should be considered when interpreting these findings as clinical guidelines also provide information on best pharmacological practices (e.g., VA/DOD, 2017).

Additionally, included studies used varied measures of suicide-related outcomes, with some focusing on single-item measurement (e.g., PHQ-9 item 9) and others focusing on documented or reported behaviors (e.g., adverse events). Measurement of suicide risk and the difference between suicidal ideation and behaviors is an area that needs further research (e.g., Brown et al., 2020; Tabares et al., 2020). It is possible that there are floor effects on some of these measures of suicide risk with the addition of earlier clinical guidelines suggesting exclusion of these individuals from treatment for PTSD. Differing use of self-report, clinician-administered, and observational measures of suicidal thoughts and behaviors and adverse events limited our ability to compare suicide-related outcomes across treatments. Due to these differences, it is sometimes hard to quantify the risk level of patients, making it problematic in determining how these treatments impact different aspects of suicide risk. Future research needs to take a more fine-grained approach to examining suicide risk including the development of new measures, as even common screeners of suicide have been shown to not perform well (e.g., Brown et al., 2020). Suicidal ideation is a risk factor for suicide and yet is distinct from suicidal behavior. Related to suicide outcome assessment, many trials included the limitation that high-

risk suicidal individuals were excluded with an emphasis on acute suicide risk (i.e., imminent danger), although other studies noted a range of risk levels. Additionally, although the majority of the studies were moderate in the quality rating, larger scale trials that are well designed are necessary to provide updates to clinical guidelines on these important topics. Studies were commonly limited by small sizes and observational designs, highlighting a need for more robust, randomized studies of PTSD- and suicide-specific treatments.

As with many clinical trials, there is a need for additional research on underrepresented groups to ensure that these treatments truly have the same effect across groups. In terms of treatments and study data, it is possible that other treatments that are suicide-specific (e.g., Collaborative Assessment and Management of Suicidality; Jobes et al., 2017) also impact PTSD but has not currently been reported in the literature. Similarly, suicide related outcomes may have been captured in PTSD treatment trials but not reported in publications. Future research should work towards having common data elements for treatments related to suicide and PTSD. This study is further limited to the search results from the three databases, and results do not include gray literature (i.e., articles not accepted for publication). Of note, the included studies were all conducted in the Western hemisphere and mostly based in the United States of America with many studies also being focused on military personnel. Additional research should focus on how cultural factors could impact these results and how these data might look in a global sample. Finally, due to heterogeneity in sample, design, and outcome measures, we were unable to compare the outcomes of the included studies using a meta-analytic approach. Although there are several limitations, the current review provides an overview of the current state of the research and provides future directions that can improve this area to help impact treatment, guidelines, and policies related to high-risk individuals with PTSD.

Conclusion and Clinical Implications

Our findings indicate that PTSD-specific, suicide-specific, and combined treatments appear to have a positive impact on PTSD- and suicide-related symptoms. The most research showing these effects has been done in trauma-focused treatments including both CPT and PE. Recent clinical guidelines have suggested that individuals with heightened risk for suicide can be provided trauma-focused treatments. Future research should focus on providing additional guidance on best practices for treating co-occurring PTSD and suicide risk. This may include modifying treatments, integrating treatments, and/or developing new treatments to increase effectiveness. Future clinical guidelines may be even more useful to providers if they are “un-siloed” and instead integrated (i.e., clinical guidelines for PTSD that include extensive integration and discussion of suicide related treatments). Overall, clinicians and researchers should continue to treat these individuals with the evidence-based treatments available in order to target PTSD and suicide risk to help alleviate their suffering.

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Database	Search Terms	Applied Filters	Results
PubMed	(Eye Movement Desensitization Reprocessing OR "trauma management therapy" OR "dialectical behavior therapy" OR "crisis response plan*" OR "suicide prevention" OR "cognitive processing therapy" OR "prolonged exposure" OR "written exposure therapy" OR crisis intervention OR psychotherapy OR "trauma treatment") AND ((ptsd) OR ("posttraumatic stress") AND self-injurious behavior)	Published between 1985 – January 26, 2021; Article types selected: Case Reports, Clinical Study, Clinical Trial, Clinical Trial, Phase I, Clinical Trial, Phase II, Clinical Trial, Phase III, Clinical Trial, Phase IV, Controlled Clinical Trial, Corrected and Republished Article, Evaluation Study, Guideline, Journal Article, Meta-Analysis, Multicenter Study, Observational Study, Practice Guideline, Pragmatic Clinical Trial, Randomized Controlled Trial, Review, Systematic Review, Validation Study	424
APA PsycInfo	("posttraumatic stress disorder" OR ptsd OR "post-traumatic stress disorder" OR "posttraumatic stress") AND (suicid* OR "self-destructive behavior" OR "self-injurious behavior" OR "self-injur*" OR "self harm" OR parasuicid*) AND (“cognitive therapy” OR “behavior* therapy” OR “cognitive behavior therapy” OR “cognitive processing therapy” OR “prolonged exposure” OR “eye movement desensitization therapy” OR “trauma management therapy” OR “written exposure therapy” OR “dialectical behavior therapy” OR “crisis response planning” OR “means restriction” OR “Suicide Prevention” OR “Crisis Intervention” OR “Psychotherapy” OR “Exposure Therapy” OR “Trauma Treatment”)	Published between 1985 – January 26, 2021; Academic journals	596

PTSDpubs	<p>("posttraumatic stress disorder" OR ptsd OR "post-traumatic stress disorder" OR "posttraumatic stress") AND (suicid* OR "self-destructive behavior" OR "self-injurious behavior" OR "self-injur*" OR "self harm" OR parasuicid*) AND ("cognitive therapy" OR "behavior* therapy" OR "cognitive behavior therapy" OR "cognitive processing therapy" OR "prolonged exposure" OR "eye movement desensitization therapy" OR "trauma management therapy" OR "written exposure therapy" OR "dialectical behavior therapy" OR "crisis response planning" OR "means restriction" OR "Suicide Prevention" OR "Crisis Intervention" OR "Psychotherapy" OR "Exposure Therapy" OR "Trauma Treatment")</p>	<p>Published between 1985 – June 23, 2021; Exclude books, book chapters, and book reviews</p>	235
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Table 2. Overview of included studies and reported PTSD and suicide-related outcomes

Study Author, Year	Population/ Sample	% Female	Treatment Format	Treatment Type	Medication	Treatment Description	PTSD Measure	Suicide Measure	PTSD and Suicide Outcomes	Quality
<i>Trauma-focused treatments</i>										
Blain et al., 2020	107 military veterans with PTSD (98%) or subthreshold PTSD in a VA residential treatment program. Majority of veterans were post-Vietnam and had a range in trauma type (e.g., combat, sexual assault).	36%	Residential, combined group and individual	CPT	Not reported, no related exclusion criteria	12 sessions over 7 weeks using a group (2x weekly for 75 minutes) and individual protocol (2x weekly for 60 minutes; i.e., Chard et al., 2009). Veterans were also able to participate in other groups (e.g., psychoeducation, recreational)	CAPS-5; PCL-5	BSSI	Both PTSD and SI symptoms significantly reduced from pre-to post treatment. Reductions in PTSD symptoms severity predicted changes and suicidal ideation. PTSD symptom reductions were indirectly associated with reductions in SI through reductions in perceived burdensomeness.	Moderate
Bryan et al., 2018	20 active-duty military and veterans with PTSD diagnoses or subthreshold symptomology in an ITP. The majority (70%) were post-9/11 veterans and the index traumas reported included combat/deployment-related trauma (45%), sexual trauma (45%),	40%	Outpatient, individual	CPT	Not reported, no related exclusion criteria	12 sessions delivered daily over the course of 2 weeks. Treatment was augmented by recreational activities (e.g., hiking, biking, skiing).	CAPS-5; PCL-5	BSSI	Both PTSD and SI decreased significantly over the course of treatment. Specifically, 75% experienced a clinically reliable clinician-rated and 69% a self-reported PTSD symptom reduction from pre-to post-treatment. Approximately 55% of the sample experience reliable change in SI from pre-treatment to the	Strong

	witnessing accidental death (5%), and childhood sexual abuse (5%).								6-month follow-up timepoint. Importantly, no suicide attempts were reported during treatment or at follow-up.	
Johnson et al. (in press) *Monson et al., 2018	188 community-based active-duty (19.2%), veteran (23.3%), and civilian (57.6%) individuals with a diagnosis of PTSD. Trauma type was not specified.	52%	Outpatient, individual	CPT	Not reported, no related exclusion criteria	12 sessions. No comparison group was included.	PCL-IV	OQ-45 suicide item	PTSD and SI reduced significantly over the course of treatment. Specifically, among treatment completers, approximately 52% experienced reliable clinically significant improvement of PTSD symptoms. Individuals showing larger decreases in PTSD symptoms tended to show larger decreases in SI relative to those showing smaller PTSD symptom decreases. PTSD symptoms predicted SI at the subsequent session when controlling for the prior session SI and the SI symptom trajectory.	Moderate
Resick et al., 2017	268 active-duty service members seeking treatment for PTSD after deployments to or near Iraq or Afghanistan.	9%	Outpatient, individual or group	CPT	Stable psychotropic medication regimen required. 57.1% on current	Individual CPT ($n = 135$) was delivered in 60-minute sessions 2x/week for 6 weeks, and group CPT ($n = 133$) was	PCL-S; PSS-I	BSSI	PTSD and suicidality reduced significantly over the course of treatment. Individuals who received individual treatment improved	Strong

	The sample endorsed a range of different traumatic events including combat-related trauma, non-combat-related death, and sexual assault.				psychotropic medications.	delivered in 90-minute sessions 2x/week for 6 weeks.			to a greater extent and more rapidly than those who received group treatment but overall effects between conditions were small and non-significant. There were no differences in either treatment condition for rates of patients no longer meeting the diagnostic criteria for PTSD.	
Roberge et al., 2021	290 veterans who were at-risk for suicide and had diagnoses of PTSD. Trauma type not reported in this study.	11.7%	Outpatient	CPT	Not reported, no related exclusion criteria	Delivered in a standard outpatient treatment program at a VA clinic.	PCL-5	Suicidal behaviors (suicide attempts) measured by chart review. Two contrast coding approaches used to categorize suicide risk level.	PTSD significantly reduced over the course of treatment. Suicide risk did not impact or predict participants' abilities to complete CPT, nor did it predict variability in participants' treatment response or rate of symptom reduction. Two participants attempted suicide about seven months post treatment, and one attempted suicide about one month after the first and only treatment session.	Weak
Stayton et al., 2019 *Walter et al., 2014	303 veterans who participated in residential treatment within a VA PTSD specialty clinic	20.8%	Residential, combined group and individual	CPT	Not reported, no related exclusion criteria	Seven-week format with 2x 75-min group sessions in addition to 2x 50-min	PCL-5	PHQ-9 item 9	PTSD and SI significantly reduced over the course of treatment. This change did not differ based on age,	Weak

	between July 2014 and September 2017. Veterans were admitted to a men's ($n=81$), women's ($n=63$), or men's PTSD/TBI ($n=159$) program at a Midwestern United States VA Medical Center. Trauma type was not specified.					individual sessions per week. Veterans also participated in psychoeducational group programming and groups and events such as gardening and knitting to promote social interaction. No comparison group was included (parent study examined outpatient vs. residential).			marital status, sex, or race/ethnicity.	
Holliday et al., 2018 *Surís et al., 2013	32 veterans with military sexual assault-related PTSD who were randomized to the CPT condition of the original RCT.	71.9%	Outpatient, individual	CPT	Stable psychiatric medication regimen required	12x 60-minute sessions delivered weekly. The parent RCT (Surís et al., 2013) compares the CPT group to the PCT-group, in which participants received 12 sessions (modified from the typical 10) of PCT. No comparison was made in the current study.	CAPS-IV; PCL-IV	SCS	PTSD and suicide cognitions significantly reduced over the course of treatment. Symptom reductions were moderate to large.	Moderate

Horwitz et al., 2018	177 military members and veterans in an ITP for PTSD. Trauma type not reported.	34%	Outpatient, combined group and individual	CPT	Not reported, no related exclusion criteria	Group (12 sessions) and individual (15 sessions) delivered over 3 weeks. Treatment was augmented with mindfulness-based classes (13 sessions), yoga (12 classes), and other various educational and skills-based classes.	PCL-5	PHQ-9 item 9	PTSD and SI reduced significantly over the course of treatment. Study results also showed that PTSD symptoms were not uniquely associated with SI, while pre-treatment SI was significantly associated with post treatment SI.	Weak
Cigrang et al., 2011	15 active-duty or activated reserve OEF/OIF veterans with PTSD who agreed to participate in a primary care-based treatment protocol. Trauma history included combat-related events such as being in a vehicle under fire, seeing dead bodies, and going on combat patrols or missions.	20%	Outpatient, individual	Manualized primary care-based intervention based on emotional processing theory and the PE model and drawing content from CBT for PTSD	40% of participants were taking at least one medication, including bupropion, citalopram, lorazepam, quetiapine, Risperdal, and zolpidem.	4-6x 30-minute appointments. Treatment was delivered by a psychologist in primary care. Sessions 5 and 6 were optional, and homework was assigned for completion between assignments. No comparison group was included.	PSS-I; PCL-M	BSSI	PTSD symptoms significantly reduced over the course of treatment. Specifically, 50% of treatment completers no longer met criteria for PTSD at 1-month follow up. Importantly, there were no reports of suicidal thoughts, behaviors, or plans from any study participants at either pre-treatment or follow-up.	Strong

Gradus et al., 2013 *Resick et al., 2002	163 adult women who had experienced rape. The participants experienced 6.4 lifetime crime incidents (e.g., child sexual or physical abuse, robbery, interpersonal violence, rape, and assault) in addition to the index rape, on average.	100%	Outpatient, individual	PE ($n=84$) or CPT+A ($n=79$)	Stable psychotropic medication regimen required. 30.7% of parent trial sample on current psychotropic medications.	Participants were randomized in a parent trial and received PE, CPT+A for PTSD, or WL (not used in this study). CPT and PE were delivered according to standard protocols and sessions were 2x weekly over 6 weeks.	PSS	BDI item 9	PTSD and SI decreased throughout treatment. There were sharp declines in PTSD symptoms that leveled over time with no significant differences between groups. Additionally, there were sharp decreases in SI during treatment that continued to decrease during follow-up, albeit at a slower rate. Declines in SI appeared greater for those receiving CPT.	Moderate
Post et al. (in press)	684 veterans and military members at two ITPs for PTSD. The majority of participants served post 9/11 and were discharged or retired at the time of the study. Trauma type was not reported.	32.31%	Outpatient, combined group and individual	PE ($n=376$) or CPT ($n=308$)	Not reported, no related exclusion criteria	PE was delivered in a 2-week ITP format with individual 90-minute sessions daily (9 total) and group 120-minute sessions (9 total) in vivo exposure. Augmentation in the PE treatment included a variety of other services and classes (e.g., medication management, career/financial support, yoga,	PCL-5	PHQ-9 item 9	PTSD and SI reduce significantly over the course of treatment. Specifically, PTSD symptom reductions were large, whereas SI reductions were small. The average amount of change in PTSD and SI symptoms throughout treatment was similar across both groups. In both groups, reductions and PTSD severity predicted subsequent reductions in SI.	Moderate

Simon et al., 2020 *Rauch et al., 2018a, Rauch et al., 2018b	223 veterans or service members of the United States military with a primary diagnosis of combat-related PTSD who served in the Iraq/Afghanistan wars. The sample consisted of those with and those without complicated grief. Participants had combat-related traumas.	With complicated grief: 11% Without complicated grief: 13%	Outpatient, individual	PE	Sertraline or placebo. Participants taking concurrent antidepressants or antipsychotics were excluded. Benzodiazepines, prazosin, and sleep agents (e.g., Zolpidem) allowed if dose was stable for at least 2 weeks.	Participants received either PE for PTSD and a placebo pill, PE and sertraline, or sertraline and enhanced medication management. Analyses included 194 participants. Participants completed 13 weeks of their randomly assigned treatment followed by 12 additional weeks of pill continuation and etc.). CPT was delivered in a 3-week ITP with individual 50-minute sessions daily (14 total) and group 120-minute sessions daily (13 total). Augmentation in the CPT treatment included daily mindfulness and yoga, as well as a variety of other services (e.g., psychoeducation groups, skills coaching).	CAPS-IV; PCL-IV	C-SSRS	PTSD symptoms significantly reduced through all conditions, with no significant differences between the groups. In a secondary analysis examining complicated grief (CG), participants were analyzed in 2 groups (those with vs. those without CG). Among both groups, suicidal behavior during treatment was rare (3%) and PTSD symptoms significantly reduced. There were no between-group	Weak
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						completion of missed sessions for PE. PE was delivered in up to 13 90-minute sessions.			differences. Further, participants with CG were more likely to experience some level of SI during the study, but there were no differences in the odds of experiencing worse SI during the treatment period relative to the month before treatment.	
Brown et al., 2019 *Foa et al., 2018	335 military personnel who met criteria for PTSD and were exposed to combat-related trauma.	10.7%	Outpatient, individual	PE	No related exclusion criteria. In parent trial, 54.5% of participants in M-PE, 58.7% in S-PE, 51.4% in PCT, and 70% in MCC were not taking psychotropic medications	Participants were randomized to either minimal contact control (MCC; $n=40$; weekly therapist phone calls lasting 15 minutes for 4 weeks), massed PE (M-PE; $n=75$; 10 sessions over 2 weeks), spaced PE (S-PE; $n=109$; 10 sessions over 8 weeks), or PCT ($n=107$; 10 sessions over 8 weeks).	PSS-I; PCL-S	BSS; BDI-II item 9; C-SSRS suicide behavior item	PTSD and SI symptoms significantly reduced over the course of treatment. Of individuals who received spaced PE and PCT, approximately 76% experienced reliable improvement in suicidal ideation. Specifically, reductions in PTSD symptom severity were associated with reductions in suicidal ideation. Increased suicidal ideation was reported at follow-up timepoints.	Moderate
Cox et al., 2016	289 veterans seeking treatment for PTSD at three specialty care VA treatment facilities.	11%	Outpatient, individual	PE	Not reported, no related exclusion criteria	Between 8-13 weekly 90-minute sessions.	PCL-M	BDI-II item 9	PTSD and SI significantly reduced over the course of treatment. PTSD and SI or correlated at each measurement time	Weak

	Trauma type not specified.								point. Previous session PTSD scores were predictive of SI over and above previous session SI.	
Norr et al., 2018 *Reger et al., 2016	162 active-duty U.S. Army soldiers with combat-related PTSD were recruited from a military base. Trauma type was not reported.	4%	Outpatient, individual	PE or VRE	Participants were excluded if psychotropic medications had changed in the past 30 days and were instructed not to initiate new medications during treatment. 44% of participants were on antidepressants, 24% on benzodiazepines, and 46% on other medications.	10 sessions delivered in 90–120-minute sessions. Participants were randomized to PE, VRE, or waitlist control. Current study examined only PE and VRE, and both conditions were identical with the exception that imaginal exposures were conducted using virtual reality in VRE.	CAPS-IV	BDI-II item 9	PTSD and SI significantly decreased over the course of treatment. The presence of SI at baseline did not affect PTSD symptoms change. Whereas reduced SI for the treatment groups persisted at post-treatment, individuals in the waitlist condition exhibited a slight increase in SI.	Moderate
De Bont et al., 2013	10 adults with PTSD, a severe psychotic episode in the past 3 years, and current psychotic symptoms. Trauma history included adult physical abuse, adult sexual abuse,	80%	Outpatient, individual	PE (n=5) or EMDR (n=5)	No related exclusion criteria. TAU included medication for all participants.	Up to 12x 90-minute sessions. Both protocols used Dutch-translation.	PSS-SR; CAPS-IV	Clinically adverse events (e.g., suicidal behaviors)	PTSD symptoms reduced over the course of treatment. PTSD symptom reductions were large and maintained at follow-up. Importantly, there were no clinically adverse events including hospital admissions, suicidal	Moderate

	childhood bullying, child emotional abuse, child physical abuse, child sexual abuse, violence, and war.								behavior, or NSSI that occurred during treatment.	
van den Berg & van der Gaag, 2012	27 patients from outpatient mental health services in the Netherlands with schizophrenia spectrum disorder and PTSD related to sexual abuse, physical abuse or physical threatening, emotional abuse, experiences during psychosis/treatment, or other causes (e.g., accidents or war).	44%	Outpatient, individual	EMDR	No related exclusion criteria. 25 participants were taking antipsychotics, 8 were taking antidepressants, 3 were taking lithium, and 10 were taking benzodiazepines	Dutch version used (De Jongh & Ten Broeke, 2003).	CAPS-IV; PSS-SR	Adverse events (e.g., symptom exacerbation, suicidal ideation); patient was asked if they thought any given event was related to the treatment	PTSD symptoms significantly reduced over the course of treatment. PTSD symptom reductions were large. Importantly, there were 0 suicide attempts and 0 reports of NSSI.	Strong
Jamshidi et al., 2020	30 female victims of child abuse living in the Welfare Organization Center of Shiraz, Iran participated in the study. All participants experienced childhood abuse including sexual	100%	Outpatient, individual	EMDR	Participants excluded if taking medication for a condition other than PTSD.	Participants were randomized to either EMDR ($n=15$) or waitlist control ($n=15$). EMDR consisted of 3 months, 2x/week, during eight 90-minute sessions. Modifications	CMS	BSSI	PTSD and SI significantly decreased for individuals who received treatment.	Moderate

	abuse, physical abuse, emotional abuse, and/or neglect.					were made as needed for individual participants, including minimal focus on early traumas for those who had significant current problems and using affect regulation techniques.				
van den Berg et al., 2016 *van den Berg et al., 2015	155 patients from outpatient hospitals in the Netherlands with psychosis and comorbid PTSD. Severe, repeated childhood trauma was the most commonly experienced trauma.	54.2%	Outpatient, individual	PE or EMDR	Participants were excluded if they had a change in antipsychoti c or antidepressa nt medications within the past two months.	8x weekly 90- minute sessions of trauma- focused treatment for PTSD over 10 weeks and treatment-as- usual for psychosis. Comparison group was a waitlist condition.	CAPS- IV; PSS- SR	Ratings of SI on a 0- 10 scale at the beginning and end of the first 2 trauma- focused sessions; adverse events (e.g., suicide attempts)	PTSD and SI significantly reduced over the course of treatment. SI decreased as early as the first session. Compared to the waitlist condition, participants receiving trauma focused treatments experienced less PTSD symptom exacerbation throughout treatment. The following adverse events were reported during treatment (TF vs WL): self-harm 15.4% vs. 10.3%; suicide attempt 2.2% vs. 2.6%; crisis contact with mental health care 24.2% vs. 28.2%; psychiatric hospitalization 2.2%	Moderate

vs. 10.3%. The following adverse events were reported at follow-up: self-harm 11.4% vs. 10.3%; suicide attempt 3.4% vs. 5.1%; crisis contact with mental health care 15.9% vs. 30.8%; psychiatric hospitalization 5.7% vs. 10.3%.										
Bryan et al., 2016 Resick et al., 2015	108 PTSD treatment-seeking active-duty soldiers in the U.S. Army. The majority of participants had deployment-related trauma. Reported index traumas included aftermath of battle, traumatic loss, moral injury, and childhood sexual abuse.	8%	Outpatient, group	CPT (n=56) or PCT (n=52)	Stable psychotropic medication regimen required.	12 sessions. All treatment groups were 90 minutes and twice per week with between 8-10 group members.	PCL-S; PSS-I	Adverse events (both study-related and -unrelated) ; BSSI; suicide attempts (triangulated from C-SSRS, BSS, and adverse events forms)	PTSD and SI significantly reduced over the course of treatment. Specifically, PTSD symptom reductions were large. Exacerbation of pre-existing SI was uncommon. Importantly, there were no deaths by suicide in either of the groups. However, there were 4 reports of non-study related SI during treatment (1 CPT, 3 PCT), 3 non-study-related reports of SI during follow-up (1CPT, 2 PCT), and 1 report of a non-study-related suicide attempt a follow up (CPT).	Strong

Steuwe et al., 2016	11 individuals in Germany with BPD and PTSD without previous stabilization periods or the absence of intentional self-injury. The sample reported an average of 4.9 different types of lifetime traumas.	90.9%	Inpatient, individual	NET	Stable psychiatric medication regimen required. Standard inpatient care involved psychopharmacological care not including benzodiazepines as needed.	NET (17 sessions) and standard inpatient care and were combined during a ten-week stay ($n = 11$). As part of standard inpatient care, individuals also received weekly individual custodial supportive sessions, twice weekly art or music therapy, weekly body therapy, movement therapy, and psychopharmacological treatment as needed.	PDS	Diary card to rate urges to commit suicide and NSSI (range 0–5) every evening; observations of suicide attempts and NSSI during the NET protocol	PTSD symptoms significantly reduced over the course of treatment and remained stable until 12-month follow-up. Approximately 37% of study participants experienced a remission and PTSD symptoms. Two of the study participants engaged in NSSI but no participant attempted suicide. At the 12-month follow-up, one patient reported a suicide attempt, and two had engaged in NSSI. The average intensity and pattern of change in urges to self-harm did not significantly differ between the exposure and non-exposure phases of treatment.	Moderate
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Persson et al., 2017	22 females with both PTSD and alcohol dependence (AD) diagnoses. Index traumas were mixed and included physical or sexual assault, witnessed injury or death, accident or disaster, or other.	100%	Outpatient, individual	COPE	Not reported, no related exclusion criteria	Twelve 90-minute weekly sessions. Accommodations were made for missed sessions, and all study participants took longer than the scheduled 12 weeks to complete treatment. Additionally, participants were free to access other psychiatric and SUD treatment during the study period.	CAPS-DX; PCL-C	Adverse events, defined as increased suicidality as measured by the suicidality section of the MINI	PTSD symptoms significantly reduced over the course of treatment, and more than half (66.7%) of the sample no longer met criteria for PTSD when followed up with one week after the end of the study. There were no reports of adverse events (e.g., increased suicidality) during or after treatment.	Strong
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Tripp et al., 2020 *Norman et al., 2019, Norman et al., 2015	81 veterans with PTSD and AUD, recruited from a VA hospital. Participants experienced an average of 8.18 prior traumas. Trauma type not specified.	14.8%	Outpatient, individual	COPE or SS	No related exclusion criteria. Psychiatrists prescribed medication at study site in open-label format.	Participants were randomized to 12-16 sessions of 90-minute COPE or Seeking Safety (SS) once or twice weekly (see primary outcome study Norman et al., 2019). SS was modified to include 90-minute rather than the standard 45-60-minute sessions.	PCL-5; CAPS-5	PHQ-9 item 9	PTSD symptoms reduced in both treatment groups, with greater reductions seen in the COPE. There were few clinically meaningful PTSD or SI exacerbations. Approximately 15% of the sample experienced exacerbations in PTSD symptoms, and 13% of the sample experienced exacerbations in SI. There were no significant differences in symptom exacerbation between groups. For the study, reliable exacerbation was defined respectively as 6.11 points on the PCL-5 and .52 points on the PHQ-9 Item 9.	Moderate
<i>Combined treatments</i>										
Meyers et al., 2017	33 veterans with PTSD and BPD symptoms. PTSD-related trauma was not reported.	48.5%	Outpatient, combined group and individual	DBT-PE	Not reported, no related exclusion criteria	12-week ITP. DBT and PE were provided simultaneously, consisting of individual DBT sessions and 3 skills groups each week in addition to 2x weekly 90-minute sessions of standard PE	PCL-C	BSSI	PTSD and SI significantly reduced over the course of treatment. Specifically, 91% showed a reliable reduction in symptoms and over half of the sample no longer screened positive for PTSD by the end of treatment.	Weak

						(beginning in the second week of the program, with sessions 1 and 2 being group-based educational sessions). Treatment was augmented with various activities including mindfulness, community outings and/or meetings, and group-based skills practice.			Importantly, no reports of self-harm, suicide attempts, or hospitalizations.	
Harned et al., 2012	13 women with PTSD, BPD, and recent and/or imminent suicidal behavior or serious NSSI participated in the study. The women in the sample reported a range of index traumas including childhood sexual abuse, adult rape, and childhood physical abuse.	100%	Outpatient, combined group and individual	DBT-PE	Not reported, no related exclusion criteria	Participants received DBT with the addition of PE, which included one year of standard DBT (1 hour individual + 2.5 hours of group skills training weekly + phone consultation). The DBT-PE protocol was given during the year once patients achieved control over higher-priority targets such as not being at imminent risk of suicide. Participants	PSS-I	SBQ; SASII	SI significantly decreased over the course of treatment. Specifically, approximately 85% of treatment completers and 70% in the ITT group experienced reliable symptom improvements. Additionally, approximately 71% in the DBT + PE group and 60% in the ITT group no longer met criteria for PTSD at the end of treatment. Importantly, there was no evidence of exacerbation of intentional self-injury urges or behaviors, PTSD	Moderate

						received either one combined individual therapy session per week (90 min of DBT-PE and 30 min of DBT) or 2 individual therapy sessions per week (one 90 min DBT-PE session and one 60 min DBT session), as well as group skills training and as needed phone consultations. DBT+DBT-PE was compared to DBT only.			symptom severity, treatment drop out, or crisis service use.	
Harned et al., 2014	26 treatment-seeking females with BPD, PTSD, and at least two suicide attempts or NSSI episodes within the past 5 years with at least one episode in the past 8 weeks. Participants endorsed a range of traumas including childhood sexual abuse, adult rape, and intimate partner violence.	100%	Outpatient, combined group and individual	DBT (<i>n</i> =9) or DBT + DBT-PE (<i>n</i> =17)	Participants were asked to taper off SSRIs before DBT-PE or remain on a stable dose during DBT-PE. Participants matched for randomization on current SSRI use. Standard DBT pharmacotherapy procedure used for all medications except	Participants were randomized to receive DBT or DBT + DBT-PE. Standard DBT was used (1 hour individual + 2.5 hours of group skills training weekly + phone consultation). DBT + DBT-PE included either one combined individual therapy session per week (90 min of DBT-PE and 30 min of DBT) or 2	PSS-I	SASII	PTSD symptoms severity significantly decreased over the course of treatment. Individuals who received DBT + PE reported significantly greater improvements than those who received DBT. Those in the DBT+ PE group were 1.3x more likely to report reliable and clinically significant improvement and 2x more likely to achieve diagnostic remission than those in the DBT group.	Moderate

					SSRIs. 88% of all participants had used psychotropic medication in the past year.	individual therapy sessions per week (one 90 min DBT-PE session and one 60 min DBT session), as well as group skills training and as needed phone consultations. Individuals could receive the DBT-PE protocol if or when they achieved control over higher-priority targets such as not being at imminent risk of suicide or intentional self-injury.			Additionally, the suicide attempt rate was 1.4-2.4x lower in the DBT + PE group and the rate of NSSI was 1.3-1.5x lower in the DBT + PE group compared to the DBT group. Importantly, suicide and self-injurious behavior were not exacerbated by PTSD treatment.	
Harned et al., 2018 **Comprise d of Harned et al., 2012 and Harned et al., 2014 samples	38 women with BPD and PTSD and recent suicidal behavior or NSSI. Reported index traumas were varied and included events such as childhood sexual abuse, adult rape, and childhood physical abuse.	100%	Outpatient, combined group and individual	DBT or DBT + DBT-PE	See Harned et al., 2012 and Harned et al., 2014	This study combined participants from Harned et al., 2012 and Harned et al., 2014 (with the loss of one participant in 2014 due to consent error for daily data). Participants enrolled in either an open trial of DBT + DBT-PE (Harned et al., 2012) or a	PCL-C	Single item to assess urges to engage in problem behaviors (e.g., attempt suicide)	PTSD symptom severity changed significantly in the second and third stages of treatment. Receipt of DBT + PE resulted in slightly larger but non-significant reductions in PTSD symptoms in the second and third stage of treatment. Both groups experienced non-significant reductions in SI or self-harm across the	Strong

						randomized controlled trial (RCT) comparing DBT with and without the DBT-PE protocol (Harned et al., 2014).			three phases of treatment.	
Bohus et al., 2013 **Kruger et al., 2014 reports secondary analysis from this sample	74 participants with and without BPD who had CSA-related, treatment-resistant PTSD. Participants also had a comorbid eating disorder or major depressive disorder.	100%	Outpatient, combined group and individual	DBT-PTSD	No related exclusion criteria. Psychiatrists in both treatment arms used clinical expertise to prescribe psychotropic medications.	Individual DBT ($n=38$) with two weekly 45-minute treatment sessions and additional weekly group sessions for skills training, self-esteem, mindfulness, and psychoeducation over a 12-week period. Augmentation included 3 additional non-specific group sessions (e.g., music or art therapy). Treatment as usual was a waitlist condition (TAU-WL; $n=38$).	CAPS-IV; PDS	Adverse events (e.g., suicide attempts, suicidal ideation, NSSIB)	PTSD and NSSI behaviors decreased over the course of treatment. Specifically, participants who received DBT experienced large symptom reductions and did not experience increased PTSD symptoms. Six participants in the waitlist condition reported increased PTSD symptoms. Importantly, there were no increases in suicidal ideation or suicide attempts during the study period.	Strong

Steil et al., 2018	21 adult females who met criteria for PTSD related to childhood sexual abuse (CSA) and who met at least 4 criteria for BPD.	100%	Outpatient, individual	DBT-PTSD	81% of participants received psychopharmacological medication at the start of treatment and were asked not to change medication until after follow-up.	Participants received up to 24 weekly sessions. Session length varied between 50 and 120 minutes, with no more than 40 treatment hours per individual. Participants attended one booster session 6 weeks after treatment completion.	CAPS-IV	Severe Behaviour Dyscontrol Interview (SBD-I)	PTSD symptoms significantly decreased over the course of treatment, and suicidality or self-harm as measured by the SBD-I was not exacerbated for any of the study participants.	Strong
<i>Suicide-focused treatments</i>										
Rudd et al., 2015	152 active-duty soldiers with current (past week) SI with intent to die and/or a recent (past month) suicide attempt. PTSD-related trauma type not reported.	12.5%	Outpatient, individual	BCBT	No related exclusion criteria. TAU included medication.	12xweekly or biweekly 60-minute sessions ($n=76$; except for the first session, which was 90-minutes). Comparison group was TAU (included individual and/or group psychotherapy, psychiatric medication, substance abuse treatment, support groups; $n=76$).	PCL-M	SASII; BSSI	PTSD and SI reduced over the course of treatment. Individuals receiving BCBT were 60% less likely to attempt suicide within 2 years after treatment completion.	Moderate

Ghahramanlou-Holloway et al., 2018	24 U.S. military members and adult beneficiaries who were admitted to a psychiatric hospital due to a recent suicidal crisis. PTSD-related trauma type not reported.	42%	Inpatient, individual	PACT	Not reported, no related exclusion criteria	6x 60- to 90-minute sessions over three days. All participants also received enhanced usual care (EUC), which included a variety of individual and group-based sessions, recreation therapy, art therapy, and medication management. This comprised the PACT+EUC group ($n=12$), compared to the EUC group ($n=12$).	PCL-M/-C	C-SSRS; SSI-WP	PTSD symptoms reduced over the course of treatment. Treatment groups did not significantly differ at any time point on any given measure. While both groups overall were equally likely to show significant decreases in PTSD symptoms, PACT+EUC showed increased likelihood for significant symptom reductions when looking at high-risk participants only. Those in PACT+EUC were more likely to have significant reductions in suicidal ideation. 5 participants (17% PACT+EUC; 25% EUC) made at least 1 suicide attempt during follow-up, but between-groups re-attempt status did not significantly differ. There were no deaths by suicide during the study.	Moderate
LaCroix et al., 2018	36 military service members or adult beneficiaries who were psychiatrically hospitalized due	30.6%	Inpatient, individual	PACT	Not reported, no related exclusion criteria	Participants were randomized to PACT ($n=18$) with combined with enhanced usual care	PCL-M or PCL-C	C-SSRS; SSI	PTSD symptoms reduced over the course of treatment. A greater proportion of individuals in the PACT + enhanced usual care group	Moderate

to a recent suicide attempt and had a documented inpatient admission record of ASD or PTSD. Trauma type was not specified.

(EUC) or EUC only ($n=18$). Both were delivered over the course of a psychiatric stay. PACT consisted of approximately 6 60- to 90-min sessions delivered over 3 days. EUC varied based on the individual but commonly included group psychotherapy, recreation therapy, art therapy, and medication management. Psychiatric inpatients in military treatment facilities also have access to military chaplains and may be visited by family, friends, and members of their chain of command.

experienced clinically significant PTSD symptom change (100%) compared to the enhanced usual care group (38%). Over the course of the 3-month follow-up period, three participants (17%) in the PACT + enhanced usual care group and two participants (11%) in the enhanced usual care group made at least one subsequent suicide attempt following psychiatric discharge. Results indicated no significant differences in reattempt status for participants in the PACT + enhanced usual care group compared with the enhanced usual care group. No participants in the PACT enhanced usual care group and one participant in the enhanced usual care group died by suicide during the follow-up period.

Harned et al., 2010 *Linehan et al., 2006	51 adult women with BPD and at least two suicide attempts and/or nonsuicidal self-injuries within the past 5 years with at least one episode in the past 8 weeks. 51% of the sample also met criteria for PTSD. Those with PTSD endorsed a range of index traumas including childhood physical abuse, childhood sexual abuse, and adult sexual assault.	100%	Outpatient, combined group and individual	DBT	Not reported, no related exclusion criteria	12 months of DBT, which included 1 hour/week of individual psychotherapy, 2.5 hours/week of group skills training, and phone consultations as needed.	SCID-IV PTSD module	SBQ; SASII	Imminent SI and recent NSSI decreased significantly over the course of treatment. The presence of co-occurring PTSD did not attenuate DBT's impact on suicidal and self-injuring behaviors. Between 80-100% of participants who experienced reduced SI continued to meet criteria for PTSD.	Strong
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Note. *Parent study; **Related to another study. Weak = Two or more weak component ratings. Moderate = One weak component rating. Strong = No weak component ratings. ASD: Acute Stress Disorder. AUD: Alcohol Use Disorder. BCBT: Brief Cognitive Behavioral Therapy. BDI-II: Beck Depression Inventory-II. BPD: Borderline Personality Disorder. BSS: Beck Scale for Suicide Ideation. C-SSRS: Columbia-Suicide Severity Rating Scale. CAPS-IV: Clinician Administered PTSD Scale for DSM-IV. CAPS-5: Clinician Administered PTSD Scale for DSM-V. CBT: Cognitive Behavioral Therapy. CG: Complicated Grief. CMS: Civilian Mississippi Scale for PTSD. COPE: Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure. CPT: Cognitive Processing Therapy. CSA: Childhood Sexual Abuse. DBT: Dialectical Behavior Therapy. EMDR: Eye Movement Desensitization and Reprocessing therapy. ITP: Intensive Treatment Program. ITT: Intent to Treat. NET: Narrative Exposure Therapy. NSSI: Non-Suicidal Self-Injury. OEF: Operation Enduring Freedom. OIF: Operation Iraqi Freedom. OQ-45: Outcome Questionnaire 45. PACT: Post Admission Cognitive Therapy. PCL-IV: PTSD Symptom Checklist for DSM-IV. PCL-5: PTSD Symptom Checklist for DSM-V. PCL-C: PTSD Symptom Checklist - Civilian Version. PCL-M: PTSD Symptom Checklist - Military Version. PCL-S: PTSD Symptom Checklist - Specific. PCT: Present-Centered Therapy. PDS: Posttraumatic Diagnostic Scale. PE: Prolonged Exposure. PHQ-9: Patient Health Questionnaire-9. PSS-I: PTSD Symptom Scale - Interview. PSS-SR: PTSD Symptom Scale - Self-Report. PTSD: Posttraumatic Stress Disorder. RCT: Randomized Controlled Trial. SASII: Suicide Attempt Self-Injury Interview. SBQ: Suicide Behaviors Questionnaire. SCID-IV: Structured Clinical Interview for DSM-IV. SCS: Suicide Crisis Syndrome. SI: Suicidal Ideation. SS: Seeking Safety. SSI: Scale for Suicide Ideation. SSI-WP: Scale for Suicide Ideation-Worst. SSRI: Selective Serotonin Reuptake Inhibitor. TAU: Treatment as Usual. TBI: Traumatic Brain Injury. TF: Trauma-Focused. VA: Veterans Affairs. VRE: Virtual Reality Exposure. WL: Waitlist.