Title

The effectiveness of treatments for symptoms of post-trauma related guilt, shame and anger in military and civilian populations: A systematic review

Abstract

Introduction: Individuals who have been exposed to a traumatic event can develop profound feelings of guilt, shame and anger. Yet, studies of treatments for post-traumatic stress disorder (PTSD) have largely investigated changes in PTSD symptoms relating to a sense of ongoing fear and threat and the effectiveness of such treatments for post-trauma related guilt, shame or anger symptom reduction is comparatively not well understood.

Methods: This review systematically examined the effectiveness of existing treatment approaches for three symptoms associated with exposure to traumatic events: guilt, shame and anger. Studies included had to be published after 2010 with a sample size of 50 or greater to ensure stable treatment outcome estimates.

Results: 15 studies were included, consisting of both civilian and (ex-) military population samples exposed to a wide range of traumatic events (e.g. combat-related, sexual abuse). Findings indicated a moderate strength of evidence that both cognitive- and exposure-based treatments are similarly effective in reducing symptoms: cognitive-based treatments were found to effectively reduce post-trauma related guilt and anger, while exposure-based treatments appeared effective for post-trauma related guilt, shame and anger.

Conclusions: Although promising, firm conclusions regarding the comparative effectiveness and long-term impact of these treatments could not be drawn due to insufficient evidence. Further

empirical research is needed to examine populations exposed to traumatic events and investigate which treatment approaches (or combination thereof) are more effective in the long-term.

Introduction

Post-traumatic stress disorder (PTSD) is a mental health condition that can be developed after experiencing or witnessing a traumatic, life-threatening event(s) [1]. PTSD has traditionally been conceptualised as a fear-based disorder, characterised by symptoms of hyperarousal, intrusive thoughts and flashbacks [2]. Models of PTSD have theorised that a sense of ongoing, current threat is central in the development and maintenance of PTSD [3]. This conceptualisation of PTSD gave rise to a number of fear-based treatment approaches [4]. However, individuals who experience traumatic events that may not be 'classically' life-threatening or frightening, can go on to experience considerable distress even though they may not experience fear-related emotions. For example, in a military context, following a traumatic event such as inadvertently killing civilians during an air strike, feelings of guilt or shame can be more prominent than feelings of fear and threat [5-7].

Several studies have demonstrated that those who meet criteria for PTSD can experience multiple distressing emotions outside of the fear spectrum, including post-trauma related guilt, shame and anger [8]. Recognition of this complexity can also be found by the inclusion of Complex-PTSD (C-PTSD) in the International Classification of Diseases (ICD-11) which features disturbances of self-organisation (DSO) symptoms, including interpersonal problems, affective dysregulation (e.g. anger) and negative self-concept (e.g. guilt, shame) [9, 10].

Many treatments for PTSD often combine cognitive interventions and extinction learning to address core symptoms [11], while post-trauma related guilt, shame and anger are often

assessed optionally in PTSD assessments and treated incidentally as part of a larger treatment approach [4]. Thus, the effectiveness of existing PTSD treatments for reducing symptoms of post-trauma related guilt, shame, and anger are currently not well-understood as they have received relatively little empirical evaluation [4, 12]. This view is also shared by clinical care teams as studies have found considerable uncertainty amongst clinicians about the efficacy of existing evidence-based PTSD interventions for symptoms of post-trauma related guilt, shame or anger [4, 13]. Clinicians have reported using an amalgamation of several validated treatments for patients with symptoms of intense post-trauma related guilt, shame and anger, yet report reservations whether this approach is effective long-term [7, 13, 14].

Although there are many recent systematic reviews/meta-analyses investigating the effectiveness of manualised treatments for PTSD [15, 16], PTSD symptom reduction and whether patients still meet diagnostic criteria post-treatment are their primary focus. There is a need to determine how effective existing PTSD treatments are in alleviating symptoms of post-trauma related guilt, shame and anger. A better understanding of whether and to what extent existing treatment approaches address these post-trauma related symptoms would be beneficial in optimising patient care post-trauma. In addition, while PTSD is not the only mental health disorder to develop after trauma (e.g. depression), this review is focusing particularly on the symptoms of post-trauma related guilt, shame and anger to try and gain a better understanding of effective treatments for these particular symptoms. Therefore, the aim of this review was to provide a narrative synthesis of the effectiveness of treatment approaches used to address post-trauma related (i) guilt, (ii) shame and (iii) anger.

Method

Search Strategy

Electronic literature databases were searched between January 2021 - June 2021. Reference lists of relevant review articles were also manually searched. Search terms included key words for trauma exposure, transgressive events, guilt, shame, anger, PTSD, depression anxiety and clinical treatment. A full list of search terms and search engines used is provided in Supplementary Material 1.

Eligibility

To be considered for inclusion, studies had to:

a) use validated measures of mental health outcomes,
b) be published after 2010,
c) be written in English,
d) the mean age of the sample had to be >18 years,
e) include a Randomised Control Trials (RCT) and cross-sectional study designs,
f) have a sample size of 50 or greater (to ensure stable treatment outcome estimates),
g) include civilian or (ex-) military participants exposed to traumatic event(s) which could have occurred during childhood or adulthood.
h) assessed at least one of the following symptoms: post-trauma related guilt, shame or anger.

Case studies, reviews, qualitative studies or studies which did not provide at least one pre-treatment and post-treatment assessment of these core symptoms, were excluded. Conference abstracts or Ph.D. dissertations where additional information or published versions could not be found or obtained from the corresponding author were also excluded. A Preferred Reporting

Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart (Figure 1) describes the systematic review process. 15 studies ultimately met the criteria for inclusion in this review. This review was pre-registered on PROSPERO (registration number: CRD42021232311). A description of the psychological treatments for post-trauma difficulties that have been delivered in the studies included in this review and the proposed mechanisms involved in each treatment are provided in Supplementary Material 2.

[INSERT FIGURE 1 HERE]

Data extraction

The following data were extracted from each study, where available: (a) study information (e.g. design, location), (b) participant demographic information (e.g. sample type [e.g. military, non-military], gender distribution, age), (c) event exposure and average time since event occurred, (d) event-related symptoms assessed, (e) treatment information (e.g. treatment delivered, number of sessions, measures used to assess symptoms and treatment effectiveness including pre, post and follow-up scores). Extracted data were independently assessed by two authors (DS, VW). Any discrepancies were checked and successfully resolved.

Study quality

The methodological quality of studies was independently assessed by two authors (DS, VW) using a 10-item checklist for assessing quantitative studies [17]. The highest possible quality score was 20, indicative of a better-quality study, with zero as the lowest possible score (Supplementary Material 3). Studies were scored on the extent to which specific criteria were met ('no' = 0, 'partial' = 1, 'yes' = 2). We calculated a summary score for each study by summing the total score across all items of the scale. Agreement between authors was strong,

with any disagreements resolved in a consensus meeting. Study quality ratings are provided in Table 1.

Data synthesis

Effect sizes were calculated according to Cohen's *d* statistic [18]. Cohen's *d* was selected as it was commonly used in the included studies but also as it provides an effect size for each study, rather than an effect size defined as the post-treatment difference between a treatment and control trial, which allowed for inclusion of uncontrolled studies [19]. An effect size of 0.20 was considered small, 0.50 medium and 0.80 or above large [20]. Effect sizes were not moderated by time since trauma, publication year, study quality or type of trauma. For each study the magnitude of change from pre- to post- and follow-up treatment was calculated following previous established methods [19, 21] using the means and standard deviations provided in the studies. Post-treatment and three-month follow-ups were reported in this review as these were most common across the studies. Where not available, a two-month follow-up was used.

For the outcome measures used in the present review, positive effect sizes represent improvements in event-related symptoms (i.e. reductions in problem severity), whereas negative effect sizes indicate a worsening of symptoms. When studies reported data for treatment completers then effect sizes were based on completer analyses rather than end-point or intent-to-treat analyses [19]. When means or standard deviations were not reported, where possible effect size was calculated from other available data, such as confidence intervals [21]. On two occasions necessary data were obtained from pervious parent studies [22-25]. In cases where (a) male and female data were reported separately the average mean and standard deviation were calculated [26], (b) subscale data only were reported, the scales were aggregated (e.g. Trauma-Related Guilt Inventory (TRGI) sub-scales) [24, 26-28].

[INSERT TABLE 1 HERE]

Results

Study sample

This review included 15 studies (Table 1), of which: (a) twelve studies assessed symptoms of post-trauma related guilt (Table 2), (b) six studies assessed symptoms of post-trauma related shame (Table 3), (c) six studies assessed symptoms of post-trauma related anger (Table 4). Across the 15 studies, the total number of participants was n=1657 and the mean age of all participants was 36.9 years old (SD = 9.9). Six studies included military samples and nine studies included general population samples. The majority of the studies were carried out in the US (n=9). There was a fair representation of genders with 51% of the sample being female. Overall, the inclusion criteria of the 15 studies were often broad, allowing patients who experienced a wide range of traumas to participate in the trials. Five studies reported the average time since trauma occurred between 2.5 to 20 years.

RCT design was used in most studies (n=11), while four studies used a cross-sectional design. Notably, studies which included a control group (n=6) (e.g. minimal contact, usual care psychotherapy) reported that those in the control group did not experience a change in symptoms and in some cases symptoms worsened [29, 30]. Results are presented below by symptom type (i.e. post-trauma related guilt, shame and anger), and civilian or (ex-) military populations findings are presented distinctly for clarity, with distinctions made between trauma exposure in childhood and adulthood.

Post-trauma related guilt

Twelve treatment studies targeted patient symptoms of post-trauma related guilt (Table 2). Cognitive Processing Therapy (CPT) (n = 3) and Prolonged Exposure (PE) (n = 5) were delivered in the majority of the studies

Civilian sample: Five studies investigated treatment outcomes for symptoms of post-trauma related guilt in civilian adults [25-27, 31, 32]. CPT was delivered in two studies and appeared to be highly effective: A large reduction in symptoms of post-trauma related guilt using CPT was found for rape survivors (*d*=1.57) [25] and interpersonal assault survivors (*d*=1.00) [26], for whom treatment gains were maintained after three months (*d*=0.97) [26]. Nonetheless, the samples of these two studies were small, consisting of mostly females, with no reported perpetrator-based experiences. Whether CPT is as effective for male survivors, or individuals who experience post-trauma related guilt following perpetration events is unclear. In addition, time since trauma occurred varied considerably in these studies. Further investigation is necessary to determine the relationship between time since trauma occurred and efficacy of treatments.

PE was delivered in three studies [25, 27, 31]. While in one study post-treatment results were large (*d*=1.33) [25], PE produced more moderate effect sizes in the other two studies (*d*=0.60) [27] and (*d*=0.61 & 0.71) [31]. The lack of follow-ups in these three PE studies did not allow for measurement of treatment effectiveness for post-trauma related guilt symptoms long-term.

Childhood trauma treatment of guilt in adulthood: Two studies examined the effectiveness of psychological treatments for adults who experienced adverse childhood experiences [29, 30]. Narrative Exposure Therapy (NET) and FORNET (a form of NET adapted

for traumatised/violent offenders), were delivered in these studies. Both treatments were culturally adapted and delivered in non-western societies to former child soldiers (average age of the sample being 18 at time of treatment) who had experienced high levels of trauma exposure as both victims and perpetrators of violence. Mixed results were found. NET appeared to produce a moderate effect size three months post-treatment (d=0.66) in a mixed-gender sample [29], while FORNET was not effective three months post-treatment (d=0.14) in a female only sample [30]. In these studies, therapists were lay counsellors or individuals without a mental health qualification who were trained to deliver the treatment which may have impacted the findings.

Military sample: Five studies examined treatment outcomes for symptoms of post-trauma related guilt in (ex) military samples [24, 28, 33-35]. The most effective treatment in this population was Trauma Management Therapy (TMT) [33], which was found to effectively reduce post-trauma related guilt symptoms (d=1.25) with continuous improvements after three months (d=1.60). Therapists were clinical psychologists and treatment fidelity processes were well monitored, yet the study was not an RCT and masking of independent evaluators was not possible. Other studies examined the effectiveness of ten-session PE (post-treatment: d=0.90) and spaced PE delivered over eight weeks (three months follow-up d=0.48) [24], five sessions of Accelerated Resolution Therapy (ART) (three months follow-up: d=0.85) [34], and 15 sessions of CPT (d=0.72) [28]. Notably large effects were found for the two studies which utilised shorter (therefore potentially more cost effective) treatments. However, as these samples included mostly males (84.9%) as well as both active and ex-military personnel who served in different eras, the findings may not be generalisable.

[INSERT TABLE 2 HERE]

Post-trauma related shame

Six treatment studies targeted the symptoms of post-trauma related shame (Table 3). Only one study provided a two-month follow-up [32].

Civilian sample: Three studies examined the impact of treatment on symptoms of post-trauma related shame in adult civilian populations [27, 31, 36]. PE (or the combination of PE and Imagery Rescripting (IR) were delivered in these three studies (*d*=0.79 [36]; *d*= 0.75 [27]; *d*=0.80, [31]) with the treatments appearing to be effective in reducing post-trauma related shame symptoms. Notably, standard PE (*d*=0.90) [31] reduced shame symptoms post-treatment for individuals presenting a wide range of trauma experiences (e.g. sexual/nonsexual assault). In addition, a combination of PE and IR delivered in the same population also produced a large effect size post-treatment (*d*=0.80) [31]. This combination treatment of PE and IR aimed to target negative self-evaluative emotions of post-trauma related shame as well as fear. A strenght of this study was that the sample was consisted of treatment-resistant patients exposed to a variety of traumas, which could indicate that such treatment can be beneficial even in a population with severe symptoms that maybe treatment refractory.

Childhood trauma treatment of shame in adulthood: Two studies examined the effectiveness of treatments for post-trauma related shame for adult survivors of childhood trauma [32, 37]. Eye movement desensitisation and reprocessing (EMDR) (*d*=0.85 [32]) and Interpersonal psychotherapy (IP) (*d*=0.87 [37]) were found to reduce post-trauma related shame symptoms post-treatment in civilians with histories of childhood trauma or sexual abuse. Data suggests that there were longer-term improvements for patients who were treated with EMDR (*d*=0.90) after two months [32] compared to IR (*d*=0.78) [37]. However, methodological limitations to these studies (e.g. a small-scale effectiveness trial with no follow-up assessments,

only including females) and lack of data about time since trauma limits our understanding of which treatments are more effective in particular contexts.

Military sample: Only one study examined treatment outcomes for symptoms of post-trauma related shame in ex-military populations [28]. There was considerable diversity in participant demographic characteristics, such as branch, years of service or trauma type. Fifteen sessions of CPT (both group and individual sessions) did not significantly improve post-trauma related shame symptoms post-treatment (*d*=0.40).

[INSERT TABLE 3 HERE]

Post-trauma related anger

Six studies targeted the symptoms of post-trauma related anger (Table 4). Three studies used CPT [26, 28, 38], two studies used IR [27, 32], while EMDR [32], PE [27] and TMT [33] were delivered in one study respectively . Three studies examined patient outcomes at three-month follow-ups [26, 33, 38] and one study at two-month follow-up [32].

Civilian sample: Two studies examined the effects of treatment on symptoms of post-trauma related anger in civilian adults [26, 27]. CPT had the largest change in post-trauma related anger symptoms post-treatment (*d*=0.86) for interpersonal assault survivors, and although results were not maintained after three months anger symptom scores remained low (*d*=0.61) [26]. It should be born in mind that despite regular supervision being provided, the therapists were master-level clinicians who had never delivered CPT previously [26]. PE (*d*=0.24) was found to be ineffective for post-trauma related anger symptoms [27]. Participants in this study experiences a wide range of traumas including sexual assaults, war-related traumas or accidents. Whether PE could be effective in reducing post-trauma related anger symptoms in civilian adults with a specific trauma type (e.g. perceived perpetration-based trauma) remains unclear.

Childhood trauma treatment of anger in adulthood: In adult civilians with childhood trauma, EMDR was found to reduce symptoms of post-trauma related anger post-treatment (*d*=0.79) with an indication of continuous improvements after two months (*d*=0.75) [32].

Military sample: Three studies investigated treatment effectiveness on symptoms of post-trauma related anger in (ex-) military personnel. The different treatment elements included in the TMT appeared to reduce post-trauma related anger symptoms (*d*=1.08) with continuous improvements after three months (*d*=1.10) [33]. CPT was also found to be effective for (ex-) service personnel with military-related trauma (*d*=3.08) [28], with an indication of a long-term impact (3-month follow-up: *d*=0.99) [38]. Nonetheless, it must be noted that the first study did not employ an RCT design, and thus accurate conclusion regarding the changes are limited [28] and in in the second study 17% of participants changed psychiatric medications during the course of treatment, which may have influenced findings [38].

[INSERT TABLE 4 HERE]

Discussion

The aim of this review was to examine and evaluate the effectiveness of treatment approaches in reducing post-trauma symptoms of post-trauma related guilt, shame and anger. Although, exposure-based and cognitive-based treatments may use different processes (e.g. imaginal and in vivo exposure vs. directly modifying maladaptive cognitions) to produce change [22, 39], our findings indicated a moderate strength of evidence that both approaches are effective in reducing symptoms. In particular, cognitive-based treatments were found to reduce symptoms of post-trauma related guilt and anger [25, 26, 28, 38], while exposure-based treatments were more effective in reducing post-trauma related guilt, shame and anger [25, 31, 33]. Taken together, these findings suggest the importance of confronting and discussing the traumatic event during therapy rather than using less directive treatments (e.g. supportive counselling).

Post-trauma related guilt

Avoidance is a main coping strategy associated with guilt symptoms, making guilt particularly difficult to treat [40]. This review suggests that cognitive-based treatment approaches, and in particular CPT, were most effective reducing symptoms of post-trauma related guilt in civilian populations [25, 26] with effects maintained at a three-month follow-up [26]. It is possible that cognitive-based treatments could be more appropriate for addressing symptoms of guilt post-trauma as treatments focus on altering patients' appraisals of their role in event; for example, challenging patients' interpretation of what happened to reduce post-trauma related guilt symptoms [41, 42]. Cognitive-based treatments could encourage patients to more accurately appraise their actions or inactions in the event by examining cognitions common to those experiencing post-trauma related guilt [43]. For example, consider the full context of what

happened and the options or responsibilities they truly had during the event, identify whether they purposefully did something that was wrong, or overcome possible hindsight bias [44].

Our results suggest mixed evidence for exposure-based treatments, such as PE, for (ex-) military [24, 35] and civilian populations [25, 27, 31]. TMT led to a significant post-trauma related guilt symptom reduction in (ex-) military populations with treatment gains being maintained after three months [33]. Interestingly, some have argued that exposure-based treatments may be harmful as guilt symptoms can be exacerbated, increasing the risk of patient dropout [41, 45, 46]. However, this theory is contrary to research which has shown a decrease in guilt symptoms when using exposure-based treatments, in particular PE [47] or a combination of imagery rescripting and imagery exposure [48].

CPT and PE use different processes to produce symptom change, with CPT directly modifying maladaptive cognitions and PE utilising repeated imaginal and in vivo exposure exercises. Nonetheless, some of the common mechanisms in the two treatments (e.g. rescripting of the traumatic event, habituation of distressing emotions, integration into the autobiographic memory) could be the effective treatment component(s) that lead to a reduction in post-trauma related guilt symptoms [39]. The mixed findings found in this review highlight the need for further research, such as a study that examines CPT versus PE to better understand effective treatment approaches for post-trauma related guilt.

Post-trauma related shame

Shame is associated with a range of psychological difficulties, including suicidality [49], social withdrawal and poor health outcomes [50]. Although shame is commonly experienced following trauma [51, 52], relatively little is known about effective treatments for reducing post-trauma related shame symptoms [53]. Evidence from similar studies also suggests that

encouraging patients to notice and experience shame can be a helpful in promoting symptom reduction [54, 55]. Consistent with this, the findings of this review suggest that exposure-based treatments, in particular PE, were effective in reducing post-trauma related shame post-treatment [27, 31, 36]. PE may lead to modifications in maladaptive beliefs about the patient's role in the traumatic event or allow for recognition of new trauma-related information regarding the circumstances of the event. Through this exposure and reflection upon the trauma memory in PE, patients may be able to cognitively approach the trauma in a different way and be more able to process post-trauma related shame symptoms. Additionally, this review found that EMDR significantly reduced post-trauma related shame, with symptoms being further reduced over time [32]. It is argued that EMDR desensitises patients to anxiety and allows them to be exposed to the trauma memories without detailed descriptions or strong psychological responses [32]. This distancing from, rather than re-living the event, while rapidly re-establishing a secure interpersonal context may be helpful mechanisms leading to shame symptom reduction [56]. Finally, we found cognitive-based treatments (CPT) had mixed effectiveness for reducing post-trauma related shame [28]. In light of these promising but mixed findings, there is a pressing need to better understand how symptoms of post-trauma related shame are developed and maintained following trauma exposure, including events that are and are not 'classically' threatening/frightening, to better support patients in treatment.

Post-trauma related anger

Anger is a particularly pernicious symptom that can decrease a patient's ability to engage in treatment [57]. The present review suggests that cognitive-based treatments (CPT, [26, 28, 38]) and exposure-based treatments (TMT, [33]) were most effective for reducing post-trauma related anger, with treatment gains being generally maintained in the long-term for both

approaches [33, 38]. CPT treatment includes patients writing about the personal meaning of the trauma which may help to facilitate the resolution of unprocessed emotions, such as anger. TMT is influenced by exposure-based approaches allowing patients to re-experience and process the event; but also features group-administered social and emotional skills training sessions. Whether this added improvement to interpersonal functioning is a key mechanism that leads to post-trauma related anger symptom reduction in military samples requires further investigation [33, 58]. It is also possible that to enhance patient treatment outcomes, it may be useful to address problematic post-trauma related anger early in treatment to encourage patient engagement and prevent drop-out, especially those who may be limited in their engagement with trauma accounts for fear of anger expression.

Translational applications of the findings

This is the first systematic review to specifically examine the effectiveness of evidence-based trauma treatments on post-trauma related guilt, shame and anger following exposure to a traumatic event(s). Overall, the 15 included studies examined a range of different treatments approaches, populations and traumatic events. Our findings expand current knowledge on the efficacy of post-trauma treatment approaches, allowing for a better understanding of methods (e.g. cognitive/exposure-based) that could be more or less effective for reducing symptoms of post-trauma related guilt, shame and anger. Overall, the findings indicate that cognitive-based (CPT), exposure-based (PE, TMT) and other treatments (EMDR) can lead to symptom reduction post-treatment, with benefits maintained at follow up. These findings demonstrate that there may be therapeutic benefits to confronting and discussing the traumatic event during therapy, rather than using less directive supportive treatments. Nonetheless, using these direct approaches is unlikely to be safely achievable without suitable preparation work to build up emotional

regulation strategies which should continue remain a treatment priority to reduce risks of additional distress or dropout from active confrontative treatment [59]. As research attention increasingly turns towards investigating the impact of other types of traumatic events, such as transgressive acts of perpetration or betrayal [60], existing manuals for cognitive or exposure-based could perhaps be revisited to determine how they could be used in case of non-fear based trauma. For example, the recently updated CPT manual [61] is more flexible and offers guidance on how to determine the patient's actual role in the event. This update also includes cases where individuals may have symptoms of post-trauma related guilt or shame due to perpetration events or moral compromises that violated their values. These updates to existing manualized treatments may help improve clinician confidence in treating cases presenting with intense post-trauma related shame, guilt and anger, such as individuals with moral injury [62].

At this stage, firm conclusions cannot be drawn about which treatment approach is likely to be the most effective for all three symptoms. There was also insufficient evidence to determine if specific treatments are effective for all individuals or if they are more effective in certain populations (e.g. military personnel or civilians). The studies included in this review did not typically report the treatment outcomes by gender, making it difficult to draw conclusions about treatment efficacy in male and females. Female gender remains a risk factor for the development of PTSD and other mental disorders [63]. Nonetheless, the fair proportion of females (51%) included in this review could suggest that treatment approaches may be similarly effective for both genders, something that should be considered in future studies. In addition, information regarding time since the event exposure was not consistently reported and, as time since trauma could be associated with distinct profiles of distress [64], future studies should also

aim to provide more comprehensive data to allow for a better understanding of treatment efficacy.

Limitations

The results of this review should be interpreted in light of the following limitations. First, both RCT and cross-sectional studies were included in this review and, while these studies reported good levels of treatment fidelity, a range of different treatment approaches and outcome measures were used. This heterogeneity across studies did not allow for a meta-analytic approach to be used. Second, our findings regarding the effectiveness of exposure-based or cognitive-based treatment approaches are largely driven by the larger number of PE (n=5) and CPT (n=4) treatment studies, while other treatments (e.g. EMDR, NET) were used in fewer studies and in specific populations (e.g. military samples). Finally, this review did not account for publication bias and it was beyond the scope of this review to include grey literature [65], which may have excluded some potentially relevant data.

Conclusions

This review systematically examined the effectiveness of a range of treatments for reducing symptoms post-trauma related guilt, shame and anger following a traumatic event(s). Several psychological treatments, including both exposure and cognitive-based treatments, were found to have moderate to large effects in reducing symptoms. The included studies were heterogeneous, with a variety of index trauma types and patient demographic characteristics. At present, while it is not possible to draw firm conclusions about comparative effectiveness, this review does suggest that these both exposure and cognitive-based treatments can be efficacious in reducing symptoms of post-trauma related guilt, shame and anger following a range of traumas in various populations.

References

1. American Psychiatric Association, *Diagnostic and statistical manual of mental disorders*. 5 ed. 2013, Arlington, VA: American Psychiatric Association.
2. Pai, A., A.M. Suris, and C.S. North, *Posttraumatic Stress Disorder in the DSM-5: Controversy, Change, and Conceptual Considerations.* Behavioral sciences (Basel, Switzerland), 2017. **7**(1): p. 7.
3. Ehlers, A. and D.M. Clark, *A cognitive model of posttraumatic stress disorder.* Behaviour Research and Therapy, 2000. **38**(4): p. 319-345.
4. Steenkamp, M.M., et al., *How best to treat deployment-related guilt and shame: Commentary on Smith, Duax, and Rauch (2013).* Cognitive and Behavioral Practice, 2013. **20**(4): p. 471-475.
5. Williamson, V., et al., *The impact of moral injury on the wellbeing of UK military veterans.* BMC Psychology, 2021. **9**(1): p. 73.
6. Williamson, V., et al., *The impact of trauma exposure and moral injury on UK military veterans: a qualitative study.* European journal of psychotraumatology, 2020.
7. Williamson, V., N. Greenberg, and D. Murphy, *Moral injury in UK armed forces veterans: a qualitative study.* European journal of psychotraumatology, 2019. **10**(1): p. 1562842.
8. Friedman, M.J., et al., *Classification of trauma and stressor-related disorders in DSM-5.* Depression and anxiety, 2011. **28**(9): p. 737-749.
9. NICE. *Post-traumatic stress disorder - NICE guidelines*. 2018; Available from: https://www.nice.org.uk/guidance/ng116/chapter/recommendations.
10. WHO, *Internationalclassification of diseases for mortality and morbid-ity statistics (11th Revision)*. 2018.
11. Nickerson, A., et al., *Moral Injury in Traumatized Refugees.* Psychotherapy and Psychosomatics, 2015. **84**(2): p. 122-123.
12. Taft, C.T., S.K. Creech, and C.M. Murphy, *Anger and aggression in PTSD.* Current Opinion in Psychology, 2017. **14**.
13. Williamson, V., et al., *Delivering treatment to morally injured UK military personnel and Veterans: The clinician experience.* Military Psychology, 2021: p. 1-9.
14. Koenig, H.G., N.A. Youssef, and M. Pearce, *Assessment of Moral Injury in Veterans and Active Duty Military Personnel With PTSD: A Review.* Frontiers in Psychiatry, 2019. **10**: p. 443.
15. Lewis, C., et al., *Psychological therapies for post-traumatic stress disorder in adults: systematic review and meta-analysis.* European Journal of Psychotraumatology, 2020. **11**(1): p. 1729633-1729633.
16. Watkins, L.E., K.R. Sprang, and B.O. Rothbaum, *Treating PTSD: A Review of Evidence-Based Psychotherapy Interventions.* Frontiers in behavioral neuroscience, 2018. **12**: p. 258.
17. Kmet, L.M., L.S. Cook, and R.C. Lee, *Standard quality assessment criteria for evaluating primary research papers from a variety of fields.* 2004.
18. Cohen, J., *Statistical Power Analysis for the Behavioural Sciences*. 2 ed. 1988, Hillsdale, NJ: Erlbaum.
19. Van Etten, M.L. and S. Taylor, *Comparative efficacy of treatments for post-traumatic stress disorder: a meta-analysis.* Clinical Psychology and Psychotherapy, 1998. **5**(3): p. 126-144.
20. Lakens, D., *Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs.* Frontiers in psychology, 2013. **4**: p. 863-863.
21. Bradley, R., et al., *A multidimensional meta-analysis of psychotherapy for PTSD.* American journal of Psychiatry, 2005. **162**(2): p. 214-227.
22. Resick, P.A., et al., *A comparison of cognitive-processing therapy with prolonged exposure and a waiting condition for the treatment of chronic posttraumatic stress disorder in female rape victims.* Journal of consulting and clinical psychology, 2002. **70**(4): p. 867-879.

23. Foa, E.B., et al., *Effect of Prolonged Exposure Therapy Delivered Over 2 Weeks vs 8 Weeks vs Present-Centered Therapy on PTSD Symptom Severity in Military Personnel: A Randomized Clinical Trial.* Jama, 2018. **319**(4): p. 354-364.
24. McLean, C.P., et al., *Guilt in the Treatment of Posttraumatic Stress Disorder Among Active Duty Military Personnel.* Journal of traumatic stress, 2019. **32**(4): p. 616-624.
25. Larsen, S.E., C.J.E. Fleming, and P.A. Resick, *Residual symptoms following empirically supported treatment for PTSD.* Psychological Trauma: Theory, Research, Practice, and Policy, 2019. **11**(2): p. 207-215.
26. Galovski, T.E., et al., *Sex differences in recovery from PTSD in male and female interpersonal assault survivors.* Behaviour research and therapy, 2013. **51**(6): p. 247-55.
27. Langkaas, T.F., et al., *Exposure and non-fear emotions: A randomized controlled study of exposure-based and rescripting-based imagery in PTSD treatment.* Behaviour Research and Therapy, 2017. **97**: p. 33-42.
28. McGuire, A.P., et al., *Pre- to posttreatment changes in trauma-cued negative emotion mediate improvement in posttraumatic stress disorder, depression, and impulsivity.* Traumatology, 2020: p. No-Specified.
29. Ertl, V., et al., *Community-implemented trauma therapy for former child soldiers in Northern Uganda: A randomized controlled trial.* JAMA - Journal of the American Medical Association, 2011. **306**(5): p. 503-512.
30. Robjant, K., et al., *The treatment of posttraumatic stress symptoms and aggression in female former child soldiers using adapted Narrative Exposure therapy-A RCT in Eastern Democratic Republic of Congo.* Behaviour Research and Therapy, 2019. **123**.
31. Oktedalen, T., A. Hoffart, and T.F. Langkaas, *Trauma-related shame and guilt as time-varying predictors of posttraumatic stress disorder symptoms during imagery exposure and imagery rescripting-A randomized controlled trial.* Psychotherapy Research, 2015. **25**(5): p. 518-532.
32. Boterhoven de Haan, K.L., et al., *Imagery rescripting and eye movement desensitisation and reprocessing as treatment for adults with post-traumatic stress disorder from childhood trauma: randomised clinical trial.* The British Journal of Psychiatry, 2020. **217**(5): p. 609-615.
33. Beidel, D.C., et al., *The efficacy of Trauma Management Therapy: A controlled pilot investigation of a three-week intensive outpatient program for combat-related PTSD.* Journal of Anxiety Disorders, 2017. **50**: p. 23-32.
34. Kip, K.E., et al., *Randomized controlled trial of accelerated resolution therapy (ART) for symptoms of combat-related post-traumatic stress disorder (PTSD).* Military medicine, 2013. **178**(12): p. 1298-1309.
35. Simon, N.M., et al., *Understanding the impact of complicated grief on combat related posttraumatic stress disorder, guilt, suicide, and functional impairment in a clinical trial of post-9/11 service members and veterans.* Depression and Anxiety, 2020. **37**(1): p. 63-72.
36. Bridges, A.J., et al., *How Does Timing Affect Trauma Treatment for Women Who Are Incarcerated? An Empirical Analysis.* Criminal Justice and Behavior, 2020. **47**(6): p. 631-648.
37. Talbot, N.L., et al., *A randomized effectiveness trial of interpersonal psychotherapy for depressed women with sexual abuse histories.* Psychiatric Services, 2011. **62**(4): p. 374-380.
38. Forbes, D., et al., *A multisite randomized controlled effectiveness trial of cognitive processing therapy for military-related posttraumatic stress disorder.* Journal of Anxiety Disorders, 2012. **26**(3): p. 442-452.
39. Gallagher, M.W. and P.A. Resick, *Mechanisms of Change in Cognitive Processing Therapy and Prolonged Exposure Therapy for PTSD: Preliminary Evidence for the Differential Effects of Hopelessness and Habituation.* Cognitive therapy and research, 2012. **36**(6): p. 10.1007/s10608-011-9423-6.
40. Street, A.E., L.E. Gibson, and D.R. Holohan, *Impact of childhood traumatic events, trauma-related guilt, and avoidant coping strategies on PTSD symptoms in female survivors of domestic violence.* Journal of Traumatic Stress, 2005. **18**(3): p. 245-252.
41. Kubany, E.S. and F.P. Manke, *Cognitive therapy for trauma-related guilt: Conceptual bases and treatment outlines.* Cognitive and Behavioral Practice, 1995. **2**(1): p. 27-61.
42. Resick, P.A. and M.K. Schnicke, *Cognitive processing therapy for sexual assault victims.* Journal of consulting and clinical psychology, 1992. **60**(5): p. 748.
43. Haller, M., et al., *A model for treating COVID-19–related guilt, shame, and moral injury.* Psychological Trauma: Theory, Research, Practice, and Policy, 2020.
44. Kubany, E.S., et al., *Cognitive trauma therapy for battered women with PTSD (CTT-BW).* Journal of consulting and clinical psychology, 2004. **72**(1): p. 3.
45. Najavits, L.M., *The problem of dropout from "gold standard" PTSD therapies.* F1000prime reports, 2015. **7**: p. 43-43.

46. Maguen, S. and K. Burkman, *Combat-related killing: Expanding evidence-based treatments for PTSD.* Cognitive and Behavioral Practice, 2013. **20**(4): p. 476-479.
47. Stapleton, J.A., S. Taylor, and G.J.G. Asmundson, *Effects of three PTSD treatments on anger and guilt: Exposure therapy, eye movement desensitization and reprocessing, and relaxation training*.* Journal of Traumatic Stress, 2006. **19**(1): p. 19-28.
48. Arntz, A., M. Tiesema, and M. Kindt, *Treatment of PTSD: A comparison of imaginal exposure with and without imagery rescripting.* Journal of Behavior Therapy and Experimental Psychiatry, 2007. **38**(4): p. 345-370.
49. Sheehy, K., et al., *An examination of the relationship between shame, guilt and self-harm: A systematic review and meta-analysis.* Clinical psychology review, 2019. **73**: p. 101779-101779.
50. Dickerson, S.S., T.L. Gruenewald, and M.E. Kemeny, *When the social self is threatened: Shame, physiology, and health.* Journal of personality, 2004. **72**(6): p. 1191-1216.
51. Farnsworth, J.K., et al., *A functional approach to understanding and treating military-related moral injury.* Journal of Contextual Behavioral Science, 2017. **6**(4): p. 391-397.
52. Griffin, B.J., et al., *Moral injury: An integrative review.* Journal of Traumatic Stress, 2019. **32**(3): p. 350-362.
53. La Bash, H. and A. Papa, *Shame and PTSD symptoms.* Psychological Trauma: Theory, Research, Practice, and Policy, 2014. **6**(2): p. 159.
54. Au, T.M., et al., *Compassion-Based Therapy for Trauma-Related Shame and Posttraumatic Stress: Initial Evaluation Using a Multiple Baseline Design.* Behavior Therapy, 2017. **48**(2): p. 207-221.
55. Luoma, J.B., et al., *Slow and steady wins the race: a randomized clinical trial of acceptance and commitment therapy targeting shame in substance use disorders.* Journal of consulting and clinical psychology, 2012. **80**(1): p. 43-53.
56. Shapiro, F., *The role of eye movement desensitization and reprocessing (EMDR) therapy in medicine: addressing the psychological and physical symptoms stemming from adverse life experiences.* The Permanente journal, 2014. **18**(1): p. 71-77.
57. Foa, E.B., et al., *The impact of fear activation and anger on the efficacy of exposure treatment for posttraumatic stress disorder.* Behavior therapy, 1995. **26**(3): p. 487-499.
58. Frueh, B.C., et al., *Trauma management therapy: a preliminary evaluation of a multicomponent behavioral treatment for chronic combat-related PTSD.* Behav Res Ther, 1996. **34**(7): p. 533-43.
59. Varker, T., et al., *Dropout from guideline-recommended psychological treatments for posttraumatic stress disorder: A systematic review and meta-analysis.* Journal of Affective Disorders Reports, 2021. **4**: p. 100093.
60. Bryan, C.J., et al., *Measuring Moral Injury: Psychometric Properties of the Moral Injury Events Scale in Two Military Samples.* Assessment, 2016. **23**(5): p. 557-70.
61. Resick, P.A., C.M. Monson, and K.M. Chard, *Cognitive processing therapy for PTSD: A comprehensive manual*. 2017: Guilford Publications.
62. Held, P., et al., *Do morally injurious experiences and index events negatively impact intensive PTSD treatment outcomes among combat veterans?* European journal of psychotraumatology, 2021. **12**(1): p. 1877026.
63. Rosenfield, S. and D. Mouzon, *Gender and mental health*, in *Handbook of the sociology of mental health* A. C. S., J. C.. Phelan, and B. A., Editors. 2013, Springer: Dordrecht. p. 277-296.
64. Litz, B.T., et al., *Distinct Trauma Types in Military Service Members Seeking Treatment for Posttraumatic Stress Disorder.* Journal of traumatic stress, 2018. **31**(2): p. 286-295.
65. Paez, A., *Grey literature: An important resource in systematic reviews.* J Evid Based Med, 2017.