Dropout from psychological therapies for post-traumatic stress disorder (PTSD) in adults: systematic review and meta-analysis

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Abstract

Background: Despite the established efficacy of psychological therapies for post-traumatic stress disorder (PTSD) there has been little systematic exploration of dropout rates.

Objective: To ascertain rates of dropout across different modalities of psychological therapy for PTSD and to explore potential sources of heterogeneity.

Method: A systematic review of dropout rates from randomised controlled trials (RCTs) of psychological therapies was conducted. The pooled rate of dropout from psychological therapies was estimated and reasons for heterogeneity explored using meta-regression.

Results: The pooled rate of dropout from RCTs of psychological therapies for PTSD was 16% (95% CI 14% - 18%). There was evidence of substantial heterogeneity across studies. We found evidence that psychological therapies with a trauma-focus were significantly associated with greater dropout. There was no evidence of greater dropout from therapies delivered in a group format; from studies that recruited participants from clinical services rather than via advertisements; that included only military personnel/veterans; that were limited to participants traumatised by sexual traumas; that included a higher proportion of female participants; or from studies with a lower proportion of participants who were University educated.

Conclusions: Dropout rates from recommended psychological therapies for PTSD are high and this appears to be particularly true of interventions with a trauma focus. There is a need to further explore reasons for dropout and to look at ways of increasing treatment retention.

Keywords: Post-traumatic stress disorder; trauma; psychological; therapy; dropout; review
**Introduction**

Post-Traumatic Stress Disorder (PTSD) is a debilitating psychiatric disorder with a lifetime prevalence of approximately 8% [1]. In addition to the requirement of exposure to a major traumatic event, the diagnostic criteria for PTSD specify the presence of symptoms including re-experiencing the traumatic event; avoiding reminders of the trauma; alterations in arousal and reactivity; and changes in cognition and mood [2].

Despite decades of research converging on support for the efficacy of psychological therapy for PTSD [3-5], we know remarkably little regarding dropout from these interventions [6-9]. Many psychological therapies have been applied to the treatment of PTSD and these have fundamentally different components and proposed active ingredients [10]. It follows that these variations may have some influence on differential rates of dropout. Despite this likelihood, there have been few attempts to systematically determine dropout rates from the psychological therapies commonly applied to the treatment of PTSD.

Among the evidence-based therapies for PTSD, a major distinction can be drawn between the therapies that focus on the traumatic event and those that aim to reduce traumatic stress symptoms without directly targeting the trauma memory or related thoughts, with the strongest evidence for the effect of those with a trauma-focus [3-5]. Trauma-focused Cognitive Behaviour Therapy (CBT) and Eye Movement Desensitisation and Reprocessing (EMDR) are currently recommended as first line interventions for PTSD [11-13]. These trauma-focused psychological therapies rely on confrontation of traumatic images, which can be difficult to tolerate and may result in the potential for greater dropout [14, 15]. Psychological therapies omitting a role for trauma-focused work may be more tolerable, potentially leading to better retention. However, there is evidence that the absence of a trauma-focus results in poorer outcomes [3-5].
The issue of treatment tolerability and symptom exacerbation resulting from trauma-focused psychological therapies has been one of contention in the literature [14, 16, 17]. It is uncertain whether dropout rates vary as a function of treatment modality or whether those with a trauma-focus are associated with poorer retention. To date, a small number of meta-analyses have compared drop-out rates across different modalities of psychological therapy for PTSD [4, 17-19]. One of these studies reported no differences between therapies with and without exposure-work, however the review is now dated and includes a far smaller number of studies than currently available [17]. Another review reported a trend towards greater dropout from exposure based treatment, but did not analyse this statistically [4]. A more recent review reported that dropout was not associated with trauma-focus, however studies comparing trauma-focused CBT to waitlist or usual care control groups were excluded, restricting the review to 42 studies [18]. A more recent review found no difference in dropout rates from therapies that included exposure work in comparison to those that did not, but the review only included twenty studies of US military veterans [19].

The aim of the current review was to ascertain rates of dropout across different modalities of psychological therapy and to determine whether some psychological therapies (especially those with a trauma-focus) were associated with higher rates of dropout than others. Since there is no agreed definition of dropout, we took the number of participants that had left the study at the point of post-treatment assessment as a proxy-indicator of dropout in order to allow the inclusion of data from a maximal number of studies. We also aimed to explore potential sources of heterogeneity among the included studies. Our overarching goal was to contribute to a refined understanding of dropout from psychological therapies for PTSD that will inform the development of treatment protocols that maximise retention.
Method

Selection Criteria

Data on drop-out was extracted from studies that had been identified for a review of the efficacy of psychological therapies for adults with PTSD, which was undertaken as part of an update of the International Society for Traumatic Stress Studies (ISTSS) Treatment Guidelines [12]. Both reviews had the same inclusion criteria. RCTs of any defined psychological therapy aimed at the reduction of PTSD-symptoms in comparison with a control group (e.g. usual care / waiting list); other psychological therapy; or psychosocial intervention (e.g. psychoeducation / relaxation training), were included. At least 70% of study participants were required to be diagnosed with PTSD with a duration of three-months or more, according to DSM or ICD criteria determined by clinician diagnosis or an established diagnostic interview. This review considered studies of adults aged 18 or over, only. There were no restrictions based on symptom-severity or trauma-type. The diagnosis of PTSD was required to be primary and studies of comorbid PTSD and substance use disorder were excluded, but there were no other restrictions based on co-morbidity. Studies were only included if they reported data on the number of participants that had dropped out of the study by the point of post-treatment assessment. If multiple studies reported data on the same participants, dropout data was only included once. We also excluded RCTs of single-session interventions.

Search Strategy

A search was conducted by the Cochrane Collaboration, which updated a previously published Cochrane review with the same inclusion criteria, which was published in 2013 [3]. The updated search aimed to identify all RCTs related to the prevention and treatment of PTSD, published from January 2008 to the 31st May 2018, using the search terms PTSD or posttrauma* or post-trauma* or "post trauma*" or "combat disorder*" or "stress disorder*". The searches included results from PubMed, PsycINFO, Embase and the Cochrane database of randomised trials. This produced a group of papers related to the psychological treatment of PTSD in adults. We checked reference lists of the
included studies. We searched the World Health Organization’s, and the US National Institutes of Health’s trials portals to identify additional unpublished or ongoing studies. We contacted experts in the field with the aim of identifying unpublished studies and studies that were in submission. A complementary search of the Published International Literature on Traumatic Stress (PILOTS) was also conducted.

Data Extraction

Study characteristics and dropout data were extracted by two reviewers independently and in duplicate, using a form that had been pre-piloted. Since there is no agreed definition of dropout, taking the number of participants that had left the study at the point of post-treatment assessment allowed the inclusion of data from a maximal number of studies. Study authors were contacted to obtain missing data. Therapy classifications were agreed with the ISTSS treatment guidelines committee and posted on the ISTSS website to allow comment from the membership. Reasons for dropout and adverse events were not universally available or consistently reported by studies and it was not therefore possible to extract or meta-analyse this data.

Risk of Bias Assessment

All included studies were assessed for risk of bias at study level, using Cochrane criteria [20]. This included: (1) sequence allocation for randomisation (the methods used for randomly assigning participants to the treatment arms and the extent to which this was truly random); (2) allocation concealment (whether or not participants or personnel were able to foresee allocation to a specific group); (3) assessor blinding (whether the assessor was aware of group allocation); (4) incomplete outcome data (whether missing outcome data was handled appropriately); (5) selective outcome reporting (whether reported outcomes matched with those that were pre-specified); and (6) any other notable threats to validity (for example, premature termination of the study). Two researchers
independently assessed each study and any conflicts were discussed with a third researcher with the aim of reaching a unanimous decision.

Data Synthesis

Meta-analyses of proportion were conducted using the `metaprop` command in STATA version 13.1 [21]. The `metaprop` command pools proportions and uses the score statistic and the exact binomial method to compute 95% confidence intervals [22]. Data were pooled across all active psychological therapies. Sub-group analyses were also conducted to determine the dropout rate for each psychological therapy. A random effects model was chosen due to the heterogeneity across studies in terms of the inclusion and exclusion criteria of the studies; the populations from which the samples were drawn; the nature and duration of therapy; the predominant trauma type; and the mean age of participants.

Heterogeneity was assessed using both the $I^2$ statistic (which indicates the proportion of the variance that is due to heterogeneity [23]) and visual inspection of the forest plots. To explore potential sources of heterogeneity, meta-regression was performed using the `metareg` function of STATA version 13.1 [21]. Meta-regression assesses the association between study-level variables and the effect size [22]. It was hypothesised that a number of study-level variables would result in higher rates of drop-out, these being: therapies having a trauma-focus (due to the possibility of these therapies being difficult for some participants to tolerate); therapies being delivered in a group-format (since drop out from group therapies has been found to be greater than from therapies delivered on an individual basis [18]); recruitment from clinical services rather than through advertisements (due to the likelihood of more severe symptoms and a possible tendency for these participants to be less motivated to engage in treatment); whether or not the participants were selected from military/veteran populations (due a greater likelihood of complex or severe PTSD); whether the trauma experienced by participants was sexual (due to the possibility of therapy being more difficult to tolerate); and the percentage of participants who were University educated (due to the possibility
that more educated participants are better able to grasp the concepts involved in therapy). To explore the possibility of publication bias, we constructed a funnel plot using data on dropout from all active therapy groups.

**Results**

The original Cochrane review included 70 RCTs. The update search identified 5500 potentially eligible studies published since 2008. Abstracts were reviewed and full text copies obtained for 203 potentially relevant studies. Forty-four new RCTs met inclusion criteria for the review of efficacy that informed the ISTSS treatment guidelines [12], which resulted in a total of 114 RCTs that reported sufficient data on efficacy for inclusion in that review. Forty-six of the identified studies met the eligibility criteria and reported data on dropout, resulting in 115 studies for inclusion in this review. Figure 1 presents a flow diagram for study selection.

![Figure 1 Here]

**Study Characteristics**

Study characteristics are summarised in table 1. Twenty-eight defined psychological therapies were evaluated. Eight of these were broadly categorized as CBT with a Trauma Focus (CBT-T) delivered on an individual basis: Brief Eclectic Psychotherapy (BEP); Cognitive Processing Therapy (CPT); Cognitive Therapy (CT); Narrative Exposure Therapy (NET); Prolonged Exposure (PE); Reconsolidation of Traumatic Memories (RTM); Virtual Reality Exposure Therapy (VRE) and CBT-T (not based on a specific model). Thirteen other therapies delivered to individuals were evaluated: EMDR; CBT without a Trauma Focus; Present Centred Therapy (PCT); Supportive Counselling; Written Exposure Therapy; Observed and Experiential Integration (OEL); Interpersonal Psychotherapy; Psychodynamic Psychotherapy; REM Desensitisation; Emotional Freedom Technique (EFT); Dialogical Exposure Therapy (DET); Internet-based CBT; and Relaxation Training. There were six different types of group
therapy: Group CBT-T; Group Present Centred Therapy (PCT); Group and Individual CBT-T; Group Stabilising Treatment; Group Interpersonal Therapy; Group Supportive Counselling. There were also RCTs of couples CBT-T. There were six types of control group: psychoeducation; couples psychoeducation; internet-based psychoeducation; waitlist; treatment as usual; and minimal attention/symptom monitoring.

The number of randomised participants ranged from 10 to 360. Studies were conducted in Australia (9), Canada (2), China (2), Denmark (1), Germany (5), Iran (2), Israel (1), Italy (2), Japan (1), the Netherlands (5), Norway (1), Portugal (1), Romania (1), Rwanda (1), Spain (1), Sweden (3), Switzerland (1), Thailand (1), Turkey/Syria (1), Uganda (2), UK (10) and USA (62). Participants were traumatised by military trauma (27 studies), sexual assault or rape (11 studies), war/persecution (4 studies), road traffic accidents (6 studies), earthquakes (2 studies), childhood abuse (3 studies), political detention (1 study), terrorism (2 studies), physical assault (2 studies), domestic abuse (4 studies), medical diagnoses/emergencies (4 studies), genocide (1 study) and organised violence (3 studies). The remainder included individuals traumatised by various different traumatic events. There were 27 studies of females only and 10 of only males; the percentage of females in the remaining studies ranged from 1.75% to 96%. The percentage with a University education ranged from 4% to 90%.

Risk of Bias

Risk of bias assessments for the included studies are summarised in table 2. Fifty-two studies reported a method of sequence allocation judged to pose a "low" risk of bias; five reported a method with a "high" risk of bias; the remainder reported insufficient details and were, therefore, rated as “unclear”. Forty-one studies reported methods of allocation concealment representing a "low" risk of bias; two a method with a “high” risk of bias; with the remainder rated as “unclear”. The outcome assessor was aware of the participant's allocation in 11 of the included studies; it was unclear whether the outcome assessor was aware of group allocation in 20 studies; with the remainder using blind-raters or self-report questionnaires delivered in a way that could not be influenced by members of the
research team. Twenty-three studies were judged as posing a "high" risk of bias in terms of incomplete outcome data; 79 studies were felt to have dealt with dropouts appropriately ("low" risk of bias); it was unclear in the remaining studies. The majority of studies failed to reference a published protocol, resulting in an ‘unclear’ risk of selective reporting for 75 studies; risk of bias was judged as “high” in five studies and low in the remainder. Seventy of the included studies presented a “high” risk of bias in other areas, for example, in relation to sample size, baseline imbalances between groups, or other methodological shortfalls. We could not rule out potential researcher allegiance, since treatment originators were involved in the evaluation of their own intervention in many of the included studies.

[TABLE 2 HERE]

**Dropout**

Across the different modalities of psychological therapy, dropout rates from individual studies ranged from 0%-65%. The pooled dropout rate from psychological therapies for PTSD was 16% (95% CI 14 – 18; k = 116) with substantial heterogeneity across studies ($I^2 = 77.3\%$). The dropout rate for each modality of psychological therapy is presented in table 3. The heterogeneity in dropout rates indicates differences that may be predicted by the variables entered into meta-regression.

[TABLE 3 HERE]

**Meta-regression**

We found evidence that psychological therapies with a trauma-focus were significantly associated with greater dropout ($\beta = 0.069; CI 0.011- 0.127; P = 0.021$; dropout rate of 18% (95% CI 15-21%) from those with a trauma focus versus 14% (95% CI 10-18%) from those without a trauma focus).

There was no evidence of greater dropout from therapies delivered in a group format; from studies that recruited participants from clinical services rather than via advertisements; that included only
military personnel/veterans; that included only participants traumatised by sexual traumas; from studies with a higher proportion of female participants; or from studies with a lower proportion of participants who were University educated.

[TABLE 4 HERE]

Publication Bias

A funnel plot, which was constructed using data on dropout from all active therapy groups, did not show evidence of publication bias.

[FIGURE 2 HERE]

Discussion

Main findings

The pooled dropout rate from psychological therapies for PTSD was 16% (95% CI 14-18%). This is of a similar magnitude to a previous meta-analysis of 42 studies, which found an average dropout rate of 18% [18] using the definition of dropout given by the included studies. This is also similar to the dropout rate of 17.5% obtained from a meta-analysis of dropout from RCTs of psychotherapy for depression [24] that defined dropout as unexpected attrition among individuals who were randomized to a treatment but failed to complete it. It was considerably lower than the pooled dropout rate of 36% found by a more recent review of twenty studies of US military veterans [19]. This was in comparison to a pooled dropout rate from studies of veterans/military personnel in this review of 18% (95% CI 15-22%). This is likely to reflect the fact that the previous review included a variety of different study designs including naturalistic studies and used the definition of dropout given by the authors of individual studies.

There was no evidence of greater dropout from therapies delivered in a group format. This contradicts the findings of earlier reviews that found group delivery to be associated with a significant increase in dropout [18, 19]. This may be the result of more recent studies evaluating interventions
that have been optimised to increase retention. There was also no evidence of significantly greater
dropout from studies that recruited participants from clinical services rather than via advertisements;
that included only military personnel/veterans; that included only participants traumatised by sexual
traumas; that included only female participants; and from studies with a lower proportion of
participants who were University educated. Research looking at factors associated with dropout have
yielded inconsistent findings [9, 25, 26]. Although the findings of the current review contradict some
previous studies; they are in agreement with others. Inconsistencies may be the result of difference
in study type and design; the types of interventions of interest and the degree to which they are
protocolised; or may vary according to the populations of interest.

We found evidence that psychological therapies with a trauma-focus were significantly associated
with greater dropout. This challenges the findings of previous, far smaller, meta-analyses, which
found no significant differences in dropout rates from therapies with and without a trauma-focus [17,
19]. However, one of these studies found a significant difference between PCT (a non-trauma focused
intervention) and a group of therapies that had a trauma-focus [18]. Our findings may be a result of
the accumulated data available from a larger number of studies. Although there are many reasons for
dropout from psychological therapies, this finding suggests that difficulties tolerating trauma-focused
treatment may be one of these. Adverse events such as the prolonged exacerbation of existing
symptoms (for example, an increased frequency of unwanted thoughts or nightmares) or the
occurrence of new symptoms (for example anger or self-blame) may lead to dropout, yet there is a
surprising scarcity of research exploring the issue [27]. Psychological therapy is traditionally perceived
as safe, presenting a low risk of unwanted effects [28]. In reality, the estimated rate of reported side
effects is between 3% and 15%, which is of a similar magnitude to that reported for pharmacotherapy
[29]. However, it is often difficult to draw a distinction between adverse events and time-limited
negative experiences inherent to the process of some psychological therapies. This includes the
experience of distress provocation, which is inevitable in the process of trauma-focused work.
A survey of psychologists’ attitudes to trauma focused intervention found that concerns about tolerability and dropout were among the main reasons that psychologists did not use trauma focused intervention, despite the compelling evidence supporting its use [30]. However, only a small number of studies have acknowledged or explored adverse events such as symptom worsening or its influence on dropout in relation to trauma focused therapy. This is surprising, given that symptom exacerbation has long since been documented in the treatment of PTSD [31, 32]. It also limits our ability to judge how well various therapies were tolerated by PTSD sufferers. An RCT of imagery rehearsal therapy for trauma-related nightmares found that all four participants who actively withdrew from the treatment group had experienced increased negative imagery effects, suggesting a direct relationship between an inability to tolerate the treatment and subsequent dropout [33, 34]. Conversely, a study of 76 individuals found that only 9-21% of participants showed reliable symptom exacerbation, and these individuals were no more likely to drop out of treatment prematurely [35]. Similarly, an RCT comparing cognitive therapy (without a trauma focus) to imaginal exposure found that symptom worsening affected 10% of participants, with a significantly greater number of these being in the imaginal exposure group, however, this between-group difference was no longer present at follow-up and rates of dropout were similar from both groups [34].

The studies included in this review usually failed to provide information on adverse events and contained few explanations for dropout, so it is difficult to ascertain why participants dropped out. It must be acknowledged that symptom improvement is a possible reason for dropout [36]. It follows that termination of treatment for this reason would be highest from the most effective treatments (i.e. those with a trauma-focus [3-5]). More transparent reporting of dropout is required to explore this further. Whatever the cause, dropout is a major health and societal concern, which may results in individuals failing to receive optimal treatment [37, 38].
Strengths and limitations

The review followed Cochrane guidelines for the identification of relevant studies; data extraction; and risk assessment [23]. A wide range of psychological therapies for PTSD were considered, which included participants from different countries and backgrounds, who had been exposed to a variety of different traumatic events. Inevitably, there were some limitations. The majority of studies included in the review excluded individuals with comorbidities of substance dependence, psychosis, and severe depression, who may be more likely to drop out of treatment prematurely, as evidenced by particularly high rates of drop out from studies of participants with co-morbid alcohol dependency [39-41]. All included studies were published, resulting in the possibility of publication bias. However, a funnel plot constructed from the data did not show evidence of this being an issue.

Since there is no agreed conceptualisation of dropout, this review extracted and meta-analysed data on the number of participants that had left the study at the point of post-treatment assessment to allow the inclusion of data from a maximal number of studies. There may have been participants who completed a full course of therapy but failed to attend the post-treatment assessment. Equally, there may have been participants who failed to complete the course of treatment but attended the post-treatment assessment nonetheless. Although this may bias our findings, there are limitations to all methods that we could have adopted to conceptualise dropout.

The review relied on RCT evidence, which is both a strength and a limitation. The methodology may have excluded some potentially high quality sources of evidence, such as large observational studies and non-randomized controlled effectiveness studies [40], which could contribute to a more accurate overall assessment of dropout. It may be the case that dropout from clinical trials underestimates the true extent of dropout in routine clinical care on the basis that study teams are motivated to retain participants and often provide incentives for the completion of treatment. Equally, participants may have been more inclined to drop out on the basis of the additional demands of participation in a trial,
such as regular completion of research assessments. However, taking a broader approach would risk diluting higher quality sources of evidence with weaker ones. A major weakness was that reasons for dropout were not reported or were poorly reported by most studies and it was not possible to systematically extract and analyse this information.

**Research Implications**

Bringing together the available evidence on dropout has always been problematic given that there is no agreed definition and studies have conceptualised the phenomenon differently. Agreeing a definition of dropout would advance the field by encouraging the reporting of data that is comparable across trials. A previous study that compared the application of four operational definitions of dropout (therapist judgment, failure to attend the last scheduled appointment, a median-split procedure, and failure to return to therapy after the intake appointment), found that the rate ranged from 17.6% to 53.1%, depending on the definition that was used [42]. It follows that a framework to guide the standardised collection and documentation of data related to dropout including information on adverse events, is needed. There is currently no theoretical concept to guide the evaluation and reporting of dropout and adverse events that occur during psychological therapy, which is needed and would include a standardised list of reasons for dropout. A first step would be for research ethics committees to mandate that future RCTs of psychological treatments routinely collect and report standardised data on dropout, including the reasons for it. When possible, studies should also report on the severity of symptoms at the point that participants drop out from therapy and whether any adverse events occurred [17]. Systematic reviews that analyse individual patient data in relation to dropout enable the application of a standardised definition across studies and would advance the field by moving beyond looking at associations between study-level variables and dropout. Only when we have sufficient knowledge on the reasons for dropout can we be sure that patients are receiving the best possible intervention.
Clinical implications

Although we cannot be sure that the reasons for dropout are negative, the findings point to the need for careful assessment of the suitability of patients for trauma-focused work. Since there is evidence for the effect of many different modalities of psychological therapy [11-13], the evidence-base should be used to guide shared-decision making between patient and clinician [13]. Enhancing patient choice may improve retention on the basis that individuals are self-selecting treatment approaches that hold personal appeal. Whether or not this ultimately impacts retention and treatment outcomes, requires investigation. Since PTSD is a highly heterogeneous condition [43], a greater understanding of dropout has the potential to facilitate the targeted recommendation of existing evidence-based treatments to specific sub-groups of patients. Dropout is clearly a complex phenomenon, which may be best conceptualised as having a multi-faceted aetiology that is likely to vary across different therapies and diagnostic groups. A multi-factorial approach is likely to be required to reduce dropout, such as a stepped care approach that is personalised and addresses the various barriers to remaining in treatment [44]. Phased therapies have been developed with preparatory work to improve stability before trauma-focused work [45]. This approach has been found to result in improved outcomes and greater retention in trauma-focused CBT for PTSD [46]. Another option is the introduction of peer support, which has been shown to encourage participants to re-enter treatment and subsequently achieve significant clinical improvement [47].

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Participants were traumatised by military combat (27 studies), sexual assault or rape (11 studies), war/persecution (8 studies), road traffic accidents (6 studies), earthquakes (2 studies), childhood sexual abuse (7 studies), political detention (1 study), terrorism (2 studies), physical assault (2 studies), domestic violence (4 studies), trauma from a medical diagnosis/emergency (4 studies) and crime/organised violence (4 studies). The remainder (43 studies) included individuals traumatised by a variety of different traumatic events.

| Study                | N  | Country       | Intervention 1 | Intervention 2 | Intervention 3 | Intervention 4 | Population          | Trauma type          | % Female | % Unemployed | % University Educated |
|----------------------|----|---------------|----------------|----------------|----------------|----------------|---------------------|----------------------|----------|--------------|----------------------|
| Acarturk 2016 [48]   | 98 | Turkey/Syria  | EMDR           | WL             |                |                | Refugees            | War/Persecution      | 74       | Unknown      | 4                    |
| Adenauer 2011 [49]   | 34 | Germany       | NET (CBT-T)    | WL             |                |                | Refugees            | War/Persecution      | 44       | Unknown      | Unknown              |
| Ahmadi 2015 [50]     | 48 | Iran          | EMDR           | REM Desensitization | WL |                | Military Personnel/Veterans | Military Trauma      | 0        | Unknown      | 33.3                 |
| Akbarian 2015 [51]   | 40 | Iran          | Group CBT-T    | MC/RA          |                |                | General Population  | Various              | 79       | Unknown      | Unknown              |
| Asukai 2010 [52]     | 24 | Japan         | PE (CBT-T)     | TAU            |                |                | General Population  | Various              | 88       | Unknown      | Unknown              |
| Beck 2009 [53]       | 44 | USA           | Group CBT-T    | MC/RA          |                |                | General Population  | Road Traffic Accident | 82       | 54           | Unknown              |
| Bichescu 2007 [54]   | 18 | Romania       | NET (CBT-T)    | Psychoeducation |                |                | General Population  | Political detainment | 94       | 0            | 72                   |
| Blanchard 2003 [55]  | 98 | USA           | CBT-T          | SC             | WL             |                | General Population  | Road Traffic Accident | 73       | Unknown      | Unknown              |
| Bradshaw 2014 [56]   | 10 | Canada        | OEI            | WL             |                |                | General Population  | Various              | 70       | 0            | Unknown              |
| Brom 1989 [57]       | 83 | Netherlands   | CBT-T          | Psychodynamic Therapy | WL |                | General Population  | Various              | 79       | 49           | Unknown              |
| Bryant 2003 [58]     | 58 | Australia     | CBT-T          | SC             |                |                | General Population  | Various              | 52       | Unknown      | Unknown              |
| Bryant 2011 [59]     | 28 | Thailand      | CBT-T          | SC             |                |                | General Population  | Terrorism            | 96       | 84%          | Unknown              |
| Buhmann 2016 [60]    | 138| Denmark       | CBT-T          | WL             |                |                | Refugees            | Organised Violence   | 41       | Unknown      | Unknown              |
| Buttolo 2016 [61]    | 148| Germany       | CPT (CBT-T)    | DET            |                |                | General Population  | Various              | 66       | Unknown      | Unknown              |
| Capezzani 2013 [62]  | 21 | Italy         | EMDR           | CBT-T          |                |                | General Population  | Medical Diagnoses/Emergencies | 90 | Unknown | Unknown |
| Carletto 2016 [63]   | 50 | Italy         | EMDR           | Relaxation Training |                |                | General Population  | Medical Diagnoses/Emergencies | 81 | Unknown | Unknown |
| Study (Year) | Country | Intervention Type | Comparison | Population | Condition | Effect Size | Time to Follow-up |
|-------------|---------|-------------------|------------|------------|-----------|-------------|-----------------|
| Carlson 1998 [64] | USA | EMDR | Relaxation Training | TAU | Military Personnel/Veterans | Military Trauma | 0 | 62 | Unknown |
| Castillo 2016 [65] | USA | Group CBT-T | WL | Military Personnel/Veterans | Military Trauma | 100 | 44 | Unknown |
| Chard 2005 [66] | USA | CPT (CBT-T) | WL | General Population | Sexual Assault or Rape | 100 | Unknown | Unknown |
| Cloitre 2002 [67] | USA | CBT-T | WL | General Population | Child Abuse | 100 | 24 | 52 |
| Cloitre 2010 [68] | USA | CBT-T | CBT without a trauma focus | General Population | Child Abuse | 100 | 31 | Unknown |
| Cooper 1989 | USA | EMDR | Relaxation Therapy | TAU | Military Personnel/Veterans | Military Trauma | 0 | Unknown | Unknown |
| Devilly 1998 [69] | Australia | EMDR | TAU | Military Personnel/Veterans | Military Trauma | 0 | Unknown | Unknown |
| Devilly 1999 [70] | Australia | EMDR | CBT-T | General Population | Various | 100 | Unknown | Unknown |
| Dorrepaal 2012 [71] | Netherlands | Group Stabilising Treatment | TAU | General Population | Child Abuse | Unknown | 83 | Unknown |
| Duffy 2007 [72] | UK | CT (CBT-T) | WL | General Population | Various | 40 | Unknown | Unknown |
| Dunne 2012 [73] | Australia | CBT-T | WL | General Population | Road Traffic Accident | 50 | 31 | 73 |
| Echeburua 1997 [74] | Spain | CBT-T | Relaxation Training | General Population | Sexual Assault or Rape | 100 | Unknown | 20 |
| Ehlers 2005 [75] | UK | CT (CBT-T) | WL | General Population | Various | 50 | 25 | 35 |
| Ehlers 2003 [76] | UK | CT (CBT-T) | MC/RA | General Population | Road Traffic Accident | Unknown | Unknown | Unknown |
| Ehlers 2014 [77] | UK | CT (CBT-T) | SC | WL | General Population | Various | 58 | 23 | 26 |
| Falsetti 2008 [78] | USA | Group CBT-T | WL | General Population | Various | 100 | Unknown | Unknown |
| Fecteau 1999 [79] | Canada | CBT-T | WL | General Population | Road Traffic Accident | 70 | Unknown | Unknown |
| Feske 2008 [80] | USA | PE (CBT-T) | TAU | General Population | Various | 100 | 29% | 90% |
| Foa 1991 [81] | USA | PE (CBT-T) | CBT without a trauma focus | Supportive counselling | WL | General Population | Sexual Assault or Rape | 100 | Unknown | Unknown |
| Foa 1999 [82] | USA | PE (CBT-T) | CBT without a trauma focus | WL | General Population | Sexual Assault or Rape | 100 | 38 | 41 |
| Foa 2005 [6] | USA | PE (CBT-T) | WL | General Population | Assault | 100 | 17 | 34 |
| Study            | Year | Country | Treatment | Condition | Group | Population | Diagnosis | N | Outcome | Effect Size | Researcher, Year | Country | Treatment | Condition | Group | Population | Diagnosis | N | Outcome | Effect Size |
|------------------|------|---------|-----------|-----------|-------|------------|-----------|---|---------|-------------|-----------------|----------|------------|-----------|-------|------------|-----------|---|---------|-------------|
| Foa 2018 [83]    | 2018 | USA     | Spaced PE (CBT-T) | PCT          | MC/RA   | Military Personnel/Veterans | Military Trauma | 12 | 100     | 66          | Fonzo 2017 [84] | USA     | PE (CBT-T) | General Population | Various | 65 | Unknown | Unknown |
| Forbes 2012 [85] | 2012 | Australia | CPT (CBT-T) | TAU          |       | Military Personnel/Veterans | Military Trauma | 4  | 36      | Unknown    | Ford 2011 [86] | USA     | CBT without a trauma focus | General Population | Various | 100 | Unknown | 22    |
| Ford 2013 [87]   | 2013 | USA     | Group CBT-T | Group Supportive Counselling | MC/RA | Incarcerated Women | Various | 100 | Unknown | Unknown    | Galovski 2012 [88] | USA     | CPT (CBT-T) | General Population | Various | 69 | Unknown | Unknown |
| Gamito 2010 [89] | 2010 | Portugal | VRE (CBT-T) | Control Exposure | WL      | Military Personnel/Veterans | Military Trauma | 0  | Unknown | Unknown    | Gersons 2000 [90] | Netherlands | BEP (CBT-T) | WL | General Population | Various | Unknown | Unknown | Unknown |
| Gray 2017 [91]   | 2017 | USA     | RTM (CBT-T) | WL          |       | Military Personnel/Veterans | Military Trauma | 0  | Unknown | Unknown    | Hensel-Dittmann 2011 [92] | Germany | NET (CBT-T) | CBT without a trauma focus | Asylum Seekers | Organised Violence | Unknown | Unknown | Unknown |
| Hinton 2005 [93] | 2005 | USA     | CBT-T      | WL          |       | Refugees | Genocide | 60 | Unknown | Unknown    | Hinton 2011 [94] | USA     | Group CBT-T | WL | General Population | Various | 100 | Unknown | Unknown |
| Hogberg 2007 [95] | 2007 | Sweden   | EMDR       | WL          |       | General Population | Various | 38 | Unknown | Unknown    | Hollifield 2007 [96] | USA     | Group trauma-focused CBT | WL | General Population | Various | 68  | Unknown | 40     |
| Ironson 2002 [97] | 2002 | USA     | EMDR       | PE (CBT-T)   |       | General Population | Various | 77 | Unknown | Unknown    | Ivarsson 2014 [98] | Sweden   | I-CBT | WL | General Population | Various | 82  | 8       | 65     |
| Jacob 2014 [99]  | 2014 | Rwanda   | NET (CBT-T) | WL          |       | Genocide Survivors | Genocide | 92 | Unknown | Unknown    | Jensen 1994 [100] | USA     | EMDR | WL | Military Personnel/Veterans | Military Trauma | 0   | 68      | Unknown |
| Study                  | Year | Country | Treatment Group | Focus                  | Control Group     | Population Type                      | Condition Type            | Effect Size | Confidence Interval |
|------------------------|------|---------|-----------------|------------------------|-------------------|--------------------------------------|---------------------------|-------------|---------------------|
| Johnson 2011 [101]     | 2011 | USA     | CBT without a trauma focus | TAU                   | General Population | Domestic Abuse                      | 100                        | 73          | 7                   |
| Johnson 2016 [102]     | 2016 | USA     | CBT without a trauma focus | TAU                   | General Population | Domestic Abuse                      | 100                        | 77          | 5                   |
| Karatzias 2011 [103]   | 2011 | UK      | EMDR            | EFT                   | General Population | Various                            | 57                         | 37          | 47                  |
| Keane 1989 [104]       | 1989 | USA     | CBT-T           | WL                    | Military Personnel/Veterans | Military Trauma               | 0                          | Unknown     | Unknown             |
| Krupnick 2008 [105]    | 2008 | USA     | Group IPT       | WL                    | General Population | Various                            | 100                       | 80          | 13%                 |
| Kubany 2003 [106]      | 2003 | USA     | CBT-T           | WL                    | General Population | Domestic Abuse                      | 100                       | Unknown     | Unknown             |
| Kubany 2004 [107]      | 2004 | USA     | CBT-T           | WL                    | General Population | Domestic Abuse                      | 100                       | Unknown     | Unknown             |
| Laugharne 2016 [108]   | 2016 | Australia | EMDR          | PE (CBT-T)            | General Population | Various                            | 70                         | Unknown     | Unknown             |
| Lee 2002 [109]         | 2002 | Australia | CBT-T          | EMDR                  | General Population | Various                            | 46                         | Unknown     | Unknown             |
| Lewis 2017 [110]       | 2017 | UK      | I-CBT           | WL                    | General Population | Various                            | 57                         | 19          | 62                  |
| Lindauer               |      | Netherlands | BEP           | WL                    | General Population | Various                            | 54                         | Unknown     | Unknown             |
| Littleton 2016 [111]   | 2016 | USA     | I-CBT           | I-Psychoeducation     | General Population | Sexual Assault or Rape              | 100                       | Unknown     | Unknown             |
| Litz 2007 [112]        | 2007 | USA     | I-CBT           | I-SC                  | Military Personnel/Veterans | Terrorism / Military Trauma   | Unknown                   | Unknown     | Unknown             |
| Marcus 1997 [113]      | 1997 | USA     | EMDR            | TAU                   | General Population | Various                            | 79                         | Unknown     | Unknown             |
| Markowitz 2015 [114]   | 2015 | USA     | IPT             | PE (CBT-T)            | General Population | Various                            | 70                         | 21          | Unknown             |
| Marks 1998 [115]       | 1998 | UK      | PE (CBT-T)      | Cognitive Restructuring | General Population | Various                            | 36                         | 54          | Unknown             |
| McDonagh 2005 [116]    | 2005 | USA     | PE (CBT-T)      | PCT                   | General Population | Sexual Assault or Rape             | 100                       | 17          | Unknown             |
| Mclay 2011 [117]       | 2011 | USA     | VRE (CBT-T)     | TAU                   | Military Personnel/Veterans | Military Trauma              | 5                          | Unknown     | Unknown             |
| Study        | Year | Country | Treatment  | Comparator | Population                          | Condition                              | N  | Age Range | Country | Mean Effect Size | SD | Unclear | Unclear   |
|--------------|------|---------|------------|------------|--------------------------------------|----------------------------------------|-----|-----------|---------|-----------------|-----|----------|----------|
| McIvor 2017  | 2017 | USA     | VRE (CBT-T)|            | Military Personnel/Veterans          | Military Trauma                         | 81  | 118       | USA     | 4               |     | True     | True     |
| Monson 2012  | 2012 | USA     | Couples CBT-T | WL       | General Population                   | Various                                | 20  | 119       | USA     | 25              | 40  | True     | True     |
| Monson 2006  | 2006 | USA     | CPT (CBT-T) | WL       | Military Personnel/Veterans          | Military Trauma                         | 60  |           | USA     | 10             | Unknown | True     | True     |
| Morath 2014   | 2014 | Germany | NET (CBT-T) | WL       | Refugees                             | Organised Violence                      | 38  |           | Germany | 32             | Unknown | True     | True     |
| Meuser 2008   | 2008 | USA     | CBT-T       | TAU      | General Population                   | Various                                | 108 |           | USA     | 79             | Unknown | True     | True     |
| Nacasch 2011  | 2011 | Israel   | PE (CBT-T)  | TAU      | Military Personnel/Veterans          | Military Trauma                         | 30  |           | Israel   | 63             | Unknown | True     | True     |
| Neuner 2010   | 2010 | Germany | NET (CBT-T) | TAU      | Refugees                             | Torture                                | 32  |           | Germany | 31             | Unknown | True     | True     |
| Neuner 2008   | 2008 | Uganda   | NET (CBT-T) | SC       | Monitoring                           | Refugees                               | 277 |           | Uganda   | 51             | 49     | True     | True     |
| Neuner 2004   | 2004 | Uganda   | NET (CBT-T) | SC       | Psychoeducation                      | Refugees                               | 43  |           | Uganda   | 60             | 28     | True     | True     |
| Nijdam 2012   | 2012 | Netherlands | BEP (CBT-T) | EMDR    | General Population                   | Various                                | 140 |           | Netherlands | 56    | Unknown | True     |
| Pacella 2012  | 2012 | USA     | PE (CBT-T)  | MC/RA   | General Population                   | Medical Diagnoses/Emergencies          | 66  |           | USA     | 37             | Unknown | True     | True     |
| Paunovic 2011 | 2011 | Sweden   | CBT-T       | WL      | General Population                   | Various                                | 29  |           | Sweden   | 63             | 74     | True     | True     |
| Peniston 1991 | 1991 | USA     | CBT-T       | TAU      | Military Personnel/Veterans          | Military Trauma                         | 29  |           | USA     | Unknown        | Unknown | True     | True     |
| Power 2002    | 2002 | UK      | EMDR       | CBT-T    | General Population                   | Various                                | 105 |           | UK      | 42             | Unknown | True     | True     |
| Rauch 2015    | 2015 | USA     | PE (CBT-T)  | PCT     | Military Personnel/Veterans          | Military Trauma                         | 36  |           | USA     | 9              | Unknown | True     | True     |
| Ready 2010    | 2010 | USA     | VRE (CBT-T) | PCT     | Military Personnel/Veterans          | Military Trauma                         | 11  |           | USA     | Unknown        | Unknown | True     | True     |
| Reger 2016    | 2016 | USA     | VRE (CBT-T) | PE (CBT-T) | Military Personnel/Veterans          | Military Trauma                         | 162 |           | USA     | 4              | Active duty | True     | True     |
| Resick 2015   | 2015 | USA     | Group CBT-T | Group PCT | Military Personnel/Veterans          | Military Trauma                         | 108 |           | USA     | 8              | 0     | True     | True     |
| Resick 2002   | 2002 | USA     | CPT (CBT-T) | PE (CBT-T) | Minimal Attention                    | General Population                      | 171 |           | USA     | 100            | Unknown | True     | True     |
| Resick 2017   | 2017 | USA     | CPT (CBT-T) | Group CBT-T | Military Personnel/Veterans          | Military Trauma                         | 268 |           | USA     | 9              | 100    | True     | True     |
| Reference          | Year | Country | Treatment | Focus | Client Group                              | Diagnosis/Issue                          | EMDR | CBT | PCT | WC | Other | ZK | VZ | NV |
|--------------------|------|---------|-----------|-------|------------------------------------------|------------------------------------------|------|-----|-----|----|-------|----|----|-----|
| Rothbaum 1997 [137] | 1997 | USA     | EMDR      | WL    | General Population                       | Sexual Assault or Rape                   | 100  | 19  | 43  |    |       |    |    |     |
| Rothbaum 2005 [138] | 2005 | USA     | PE (CBT-T)| EMDR  | General Population                       | Sexual Assault or Rape                   | 100  | Unknown | Unknown |      |       |    |    |     |
| Sautter 2015 [139] | 2015 | USA     | Couples CBT without a trauma focus | Couples Psychoeducation | Military Personnel/Veterans | Military Trauma | 1.75 | 12 | 75 | | | | | |
| Scheck 1998 [140]  | 1998 | USA     | EMDR      | SC    | General Population                       | Various                                  | 100  | Unknown | Unknown |      |       |    |    |     |
| Schnurr 2003 [141] | 2003 | USA     | Group CBT-T| Group PCT | Military Personnel/Veterans | Military Trauma | 0 | 51 | Unknown | | | | | |
| Schnurr 2007 [142] | 2007 | USA     | PE (CBT-T) (CBT-T) | Group PCT | Military Personnel/Veterans | Military Trauma | 100 | 38 | Unknown | | | | | |
| Schnyder 2011 [143] | 2011 | Switzerland | BEP (CBT-T) | MC/RA | General Population | Various | 46.7 | Unknown | Unknown | | | | |
| Shemesh            | 60   | USA     | CBT-T     | Psychoeducation | General Population | Medical Diagnoses/Emergencies | 33 | Unknown | Unknown | | | | |
| Sloan 2012 [144]   | 2012 | USA     | WET       | WL    | General Population                       | Road Traffic Accident                   | Unclear | 78 | 41 | | | | | |
| Sloan 2018 [145]   | 2018 | USA     | WET       | CPT (CBT-T) | General Population | Various | 49 | Unknown | 13 | | | | | |
| Spence 2011 [146]  | 2011 | Australia | I-CBT | WL    | General Population                       | Various                                  | 81 | 41 | Not Clear | | | | |
| Stenmark 2013 [147] | 2013 | Norway   | NET (CBT-T) | TAU | Refugees | Various | 31 | Unknown | 25 | | | | |
| Suris 2013 [148]   | 2013 | USA     | CPT (CBT-T) | PCT | Military Personnel/Veterans | Sexual Assault or Rape | 85 | 43 | 16 | | | | | |
| Taylor 2003 [149]  | 2003 | USA     | PE (CBT-T) | Relaxation Therapy | EMDR | General Population | Various | 75 | 13 | Unknown | | | | |
| Tylee 2017 [150]   | 2017 | USA     | RTM (CBT-T) | WL | General Population                       | Military Trauma | 0 | Unknown | Unknown | | | | |
| Vaughan 1994 [151] | 1994 | Australia | CBT-T | Relaxation Training | EMDR | General Population | Various | 64 | Unknown | Unknown | | | | |
| Wells 2015 [152]   | 2015 | UK      | PE (CBT-T) | CBT without a trauma focus | WL | General Population | Various | 38 | 6 | Unknown | | | | |
| Wells 2012 [153]   | 2012 | UK      | CBT without a trauma focus | WL | General Population | Various | 55 | Unknown | Unknown | | | | | |
| Yehuda 2014 [154]  | 2014 | USA     | PE (CBT-T) | MC/RA | Military Personnel/Veterans | Military Trauma | Unclear | Unknown | Unknown | | | | | |
| Study   | Year | Country | Type | Design | Population | Diagnosis | CBT-T | Treatment | Follow-up | Notes |
|---------|------|---------|------|--------|------------|-----------|-------|-----------|-----------|-------|
| Zang 2014 | 2014 | China   | NET (CBT-T) | WL   | General Population | Earthquake | 90    | Unknown | Unknown |
| Zang 2013 | 2013 | China   | NET (CBT-T) | WL   | General Population | Earthquake | 77    | Unknown | Unknown |
| Zlotnick 1997 | 1997 | USA     | Group CBT-T | WL   | General Population | Sexual Assault or Rape | 100   | Unknown | 33 |

BEP = Brief Eclectic Psychotherapy  
CBT = Cognitive Behavioural Therapy  
CBT-T = Cognitive Behavioural Therapy with a Trauma focus  
CPT = Cognitive Processing Therapy  
CR = Cognitive Restructuring  
CT = Cognitive Therapy  
DET = Dialogical Exposure Therapy  
EFT = Emotional Freedom Technique  
EMDR = Eye Movement Desensitisation and Reprocessing  
I-CBT = Internet-based Cognitive Behavioural Therapy  
I-Psychoeducation = Internet based Psychoeducation  
IPT = Interpersonal Psychotherapy  
I-SC = Internet based Supportive Counselling  
MC/RA = Medical Checks/Repeated Assessments  
NET = Narrative Exposure Therapy  
OEU = Observed and Experimental Integration  
PCT = Present Centred Therapy  
PE = Prolonged Exposure  
REM Desensitization = Rapid Eye Movement Desensitization  
RTM = Reconsolidation of Traumatic Memories  
SC = Supportive Counselling  
TAU = Treatment as Usual  
VRE = Virtual Reality Exposure  
WET = Written Emotion Therapy  
WL = Waiting List

Table 1: Characteristics of Included Studies
| Study            | Random sequence generation | Allocation concealment | Incomplete outcome data assessment | Blinding of outcome | Selective reporting | Other sources of bias | Total no. high risk |
|------------------|----------------------------|------------------------|-----------------------------------|--------------------|---------------------|----------------------|-----------------------|
| Acarturk 2016    | Low                        | Low                    | Low                               | Low                | Low                 | Low                  | 0                     |
| Adenauer 2011    | Low                        | Low                    | Low                               | Low                | High                | High                 | 2                     |
| Ahmadi 2015      | Unclear                    | Unclear                | High                              | Unclear            | Unclear             | High                 | 2                     |
| Akbarian 2015    | Low                        | High                   | Low                               | Low                | Unclear             | High                 | 2                     |
| Asukai 2010      | Low                        | Low                    | Low                               | Low                | Unclear             | High                 | 1                     |
| Beck 2009        | Unclear                    | Unclear                | High                              | Low                | Unclear             | High                 | 2                     |
| Bichescu 2007    | High                       | Unclear                | Low                               | Low                | Unclear             | High                 | 2                     |
| Blanchard 2003   | High                       | Unclear                | Low                               | Low                | Unclear             | Low                  | 1                     |
| Bradshaw 2014    | Unclear                    | Unclear                | Low                               | High               | Unclear             | High                 | 2                     |
| Brom 1989        | Unclear                    | Unclear                | High                              | Unclear            | Unclear             | High                 | 2                     |
| Bryant 2003      | Low                        | Unclear                | Low                               | Low                | Low                 | High                 | 1                     |
| Bryant 2011      | Low                        | Low                    | Low                               | Low                | Unclear             | High                 | 1                     |
| Buhmann 2016     | Low                        | Low                    | Unclear                           | Low                | Low                 | Low                  | 0                     |
| Buttolo 2016     | Unclear                    | Unclear                | Low                               | Low                | Unclear             | High                 | 1                     |
| Capezzani 2013   | Unclear                    | Unclear                | Low                               | Low                | Unclear             | High                 | 1                     |
| Carletto 2016    | Low                        | Low                    | High                              | Low                | Low                 | Low                  | 1                     |
| Carlson 1998     | Unclear                    | Unclear                | High                              | Unclear            | Unclear             | Low                  | 1                     |
| Castillo 2016    | Unclear                    | Unclear                | Low                               | Low                | Unclear             | High                 | 1                     |
| Chard 2005       | Unclear                    | Unclear                | Low                               | Low                | Unclear             | High                 | 1                     |
| Cloître 2002      | Unclear                    | Unclear                | Low                               | Low                | High                | Low                  | 1                     |
| Project            | Risk | Trend | Stress | Growth | Uncertainty | Direction | Outcome |
|--------------------|------|-------|--------|--------|-------------|-----------|---------|
| Cloître 2010       | Unclear | Low   | Low    | Low    | Low         | Low       | 0       |
| Cooper 1989        | High  | High  | High   | Unclear| Low         | High      | 4       |
| Devilly 1998       | Unclear| Unclear| High   | Low    | Unclear     | Low       | 1       |
| Devilly 1999       | High  | Unclear| High   | Unclear| Unclear     | High      | 3       |
| Dorrepaal 2012     | Unclear| Low   | Low    | Low    | High        | High      | 2       |
| Duffy 2007         | Low   | Low   | Low    | Unclear| Low         | High      | 1       |
| Dunne 2012         | Unclear| Unclear| Low    | Unclear| Unclear     | High      | 1       |
| Echeburua1997      | Unclear| Unclear| Low    | Unclear| Unclear     | High      | 1       |
| Ehlers 2003        | Low   | Low   | High   | Low    | Unclear     | High      | 2       |
| Ehlers 2005        | Unclear| Unclear| Low    | Low    | Unclear     | High      | 2       |
| Ehlers 2014        | Unclear| Low   | Low    | Low    | Low         | Low       | 0       |
| Falsetti 2008      | Unclear| Unclear| Low    | Low    | High        | High      | 2       |
| Fecteau 1999       | Low   | Unclear| High   | Unclear| Unclear     | High      | 2       |
| Feske 2008         | Unclear| Unclear| Low    | Unclear| Unclear     | High      | 1       |
| Foa 1991           | Unclear| Unclear| High   | Low    | Unclear     | High      | 2       |
| Foa 1999           | Unclear| Unclear| Low    | Low    | Unclear     | High      | 1       |
| Foa 2005           | Low   | Low   | Low    | Low    | Unclear     | Low       | 0       |
| Foa 2018           | Low   | Low   | Low    | Low    | Low         | Low       | 0       |
| Fonzo 2017         | Low   | Unclear| Low    | Unclear| Low         | Low       | 0       |
| Forbes 2012        | Unclear| Low   | Low    | Unclear| Unclear     | High      | 1       |
| Ford 2011          | Low   | Low   | Low    | Low    | Unclear     | High      | 1       |
| Ford 2013          | Low   | Low   | High   | Low    | Unclear     | High      | 2       |
| Galovski 2012      | Unclear| Unclear| Low    | Low    | Unclear     | Low       | 0       |
| Gamito 2010        | Unclear| Unclear| Unclear| Unclear| High        | High      | 2       |
| Gersons 2000       | Unclear| Unclear| Low    | Low    | Unclear     | Low       | 0       |
| Gray 2017          | Low   | Low   | Unclear| Unclear| Unclear     | Unclear   | 0       |
| Hensel-Dittmann 2011| Low   | Low   | Low    | Low    | Unclear     | Low       | 0       |
| Name                | 2005  | 2011  | 2007  | 2008  | 2010  | 2012  | 2013  | 2014  | 2016  | 2018  | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Hinton              | Low   | Unclear | Low   | Low   | Uncl... | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Hogberg             | Low   | Unclear | High  | Low   | Unclear | High  | 2     |       |       |       |       |       |       |       |       |       |       |       |       |
| Hollfield           | Low   | Low    | Low   | Low   | Unclear | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Ironson             | Unclear | Unclear | Low   | High  | Unclear | High  | 2     |       |       |       |       |       |       |       |       |       |       |       |       |
| Ivarsson            | Low   | Unclear | Low   | Low   | Low    | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Jacob               | Low   | Low    | Low   | Low   | Unclear | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Jensen              | Unclear | Unclear | High  | Unclear | Unclear | High  | 2     |       |       |       |       |       |       |       |       |       |       |       |       |
| Johnson             | Low   | Unclear | Low   | High  | Unclear | Low   | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Johnson             | Low   | Low    | Low   | Low   | Unclear | Low   | 0     |       |       |       |       |       |       |       |       |       |       |       |       |
| Karatzias           | Low   | Low    | Low   | Low   | Unclear | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Keane               | Unclear | Unclear | Unclear | High  | Unclear | High  | 2     |       |       |       |       |       |       |       |       |       |       |       |       |
| Krupnick            | Unclear | Unclear | Low   | Unclear | Unclear | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Kubany              | Unclear | Unclear | Low   | Low   | Unclear | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Kubany              | Unclear | Unclear | Low   | Low   | Low    | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Laughrine           | Low   | Low    | Low   | Low   | Unclear | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Lee                 | Unclear | Unclear | Low   | Low   | Unclear | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Lewis               | Low   | Low    | Low   | Low   | Low    | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Lindauer            | Low   | Low    | Low   | Low   | Low    | High  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Littleton           | Low   | Unclear | Low   | High  | Low    | Low   | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Litz                | Unclear | Unclear | High  | Low   | Low    | High  | 2     |       |       |       |       |       |       |       |       |       |       |       |       |
| Marcus              | Unclear | Unclear | Unclear | High  | Unclear | High  | 2     |       |       |       |       |       |       |       |       |       |       |       |       |
| Markowitz           | Low   | Low    | Low   | Low   | Low    | High  | 1     |       |       |       |       |       |       |       |       |       |       |       |       |
| Marks               | Unclear | Unclear | Low   | Low   | Unclear | Low   | 0     |       |       |       |       |       |       |       |       |       |       |       |       |
| McDonagh            | Unclear | Unclear | Low   | Low   | Unclear | Low   | 0     |       |       |       |       |       |       |       |       |       |       |       |       |
| McLay               | Low   | Low    | Unclear | High  | Unclear | High  | 2     |       |       |       |       |       |       |       |       |       |       |       |       |
| McLay               | Low   | Unclear | Low   | Low   | Low    | Low   | 0     |       |       |       |       |       |       |       |       |       |       |       |       |
| Monson              | Low   | Low    | Low   | Low   | Low    | Low   | 0     |       |       |       |       |       |       |       |       |       |       |       |       |
| Study         | Low | Low | Low | Low | Unclear | Low | 0 |
|--------------|-----|-----|-----|-----|---------|-----|---|
| Monson 2006  |     |     |     |     |         |     |   |
| Morath 2014  |     |     |     |     |         |     |   |
| Meuser 2008  |     |     |     |     |         |     |   |
| Nascash 2011 |     |     |     |     |         |     |   |
| Neuner 2004  |     |     |     |     |         |     |   |
| Neuner 2008  |     |     |     |     |         |     |   |
| Neuner 2010  |     |     |     |     |         |     |   |
| Nijdam 2012  |     |     |     |     |         |     |   |
| Pacella 2015 |     |     |     |     |         |     |   |
| Paunovic 2011|     |     |     |     |         |     |   |
| Power 2002   |     |     |     |     |         |     |   |
| Rauch 2015   |     |     |     |     |         |     |   |
| Ready 2010   |     |     |     |     |         |     |   |
| Reger 2016   |     |     |     |     |         |     |   |
| Resick 2002  |     |     |     |     |         |     |   |
| Resick 2015  |     |     |     |     |         |     |   |
| Resick 2017  |     |     |     |     |         |     |   |
| Rothbaum 1997|     |     |     |     |         |     |   |
| Rothbaum 2005|     |     |     |     |         |     |   |
| Sautter 2015 |     |     |     |     |         |     |   |
| Scheck 1998  |     |     |     |     |         |     |   |
| Schnurr 2003 |     |     |     |     |         |     |   |
| Schnurr 2007 |     |     |     |     |         |     |   |
| Shemesh      |     |     |     |     |         |     |   |
| Sloan 2012   |     |     |     |     |         |     |   |
| Sloan 2018   |     |     |     |     |         |     |   |
| Spence 2011a |     |     |     |     |         |     |   |
| Stenmark 2013|     |     |     |     |         |     |   |
| Study          | Risk of Bias | Risk of Bias | Risk of Bias | Risk of Bias | Risk of Bias | Risk of Bias |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Suris 2013    | Unclear      | Unclear      | Low          | Low          | Low          | High         | 1            |
| Taylor 2003   | Unclear      | Unclear      | Low          | Low          | Unclear      | Low          | 0            |
| Tylee 2017    | Unclear      | Unclear      | Unclear      | Low          | Unclear      | High         | 1            |
| Vaughan 1994  | Unclear      | Unclear      | Low          | Low          | Unclear      | Low          | 0            |
| Wells 2012    | Low          | Low          | Low          | Low          | Unclear      | High         | 1            |
| Wells 2015    | Low          | Low          | High         | High         | Unclear      | High         | 3            |
| Yehuda 2014   | Unclear      | Unclear      | High         | Unclear      | Unclear      | Unclear      | 1            |
| Zang 2013     | Unclear      | Unclear      | Low          | Low          | Low          | High         | 1            |
| Zang 2014     | Low          | Unclear      | Low          | Low          | Low          | High         | 1            |
| Zlotnick 1997 | Unclear      | Unclear      | High         | Low          | Low          | High         | 2            |

Table 2: Risk of bias assessments of the included studies
|   | Procedure                                      | Number of studies | Mean % drop out (95% CI) | I² (%) |
|---|-----------------------------------------------|-------------------|--------------------------|-------|
| 1 | CBT-T (not based on a specific model)         | 25                | 13 (9-18)                | 64.41 |
| 2 | Brief Eclectic Psychotherapy                  | 3                 | 17 (0-51)                | 90.40 |
| 3 | Cognitive Processing Therapy (CPT)            | 8                 | 30 (22-39)               | 75.15 |
| 4 | Cognitive Therapy (CT)                        | 6                 | 9 (1-23)                 | 82.72 |
| 5 | Narrative Exposure Therapy                    | 11                | 12 (3-26)                | 85.59 |
| 6 | Prolonged Exposure (PE)                       | 22                | 22 (16-28)               | 72.56 |
| 7 | Reconsolidation of Traumatic Memories (RTM);  | 1                 | 1 (0-8)                  | 0.00  |
| 8 | Virtual Reality Exposure (VRE)                | 5                 | 18 (3-38)                | 76.32 |
| 9 | Eye Movement Desensitisation and Reprocessing (EMDR) | 21            | 18 (12-24)               | 62.13 |
|10 | CBT without a trauma focus                    | 9                 | 14 (7-23)                | 61.96 |
|11 | Present Centred Therapy (PCT)                 | 6                 | 20 (13-28)               | 40.85 |
|12 | Supportive Counselling                        | 9                 | 15 (3-32)                | 87.84 |
|13 | Observed and Experiential Integration (OEI)   | 1                 | 0                        | Not applicable |
|14 | Interpersonal Psychotherapy (IPT)             | 1                 | 15 (6-30)                | Not applicable |
|15 | Psychodynamic Psychotherapy                   | 1                 | 14                       | Not applicable |
|16 | REM Desensitization                           | 1                 | 38                       | Not applicable |
|17 | Emotional Freedom Technique (EFT)             | 1                 | 39                       | Not applicable |
|18 | Dialogical Exposure Therapy (DET)             | 1                 | 12                       | Not applicable |
|19 | Internet-based CBT                            | 3                 | 16 (8-26)                | 32.12 |
|20 | Relaxation Training                           | 8                 | 10 (3-19)                | 56.80 |
|21 | Group CBT with a Trauma Focus (group CBT-T)   | 9                 | 24 (16-33)               | 76.29 |
|22 | Group Present Centred Therapy (PCT)           | 3                 | 14 (11-18)               | 0.00  |
|23 | Group and Individual CBT-T                    | 1                 | 22                       | Not applicable |
|24 | Group Stabilizing Treatment                   | 1                 | 18                       | Not applicable |
|25 | Group Interpersonal Psychotherapy             | 1                 | 38                       | Not applicable |
|   | Treatment Description                        | N | M | Percentage |
|---|---------------------------------------------|---|---|------------|
| 26. | Group Supportive Counselling                 | 1 | 3 | Not applicable |
| 27. | Couples CBT-T                                | 2 | 22 (11-36) | 0.00 |
| 28. | Psychoeducation                              | 3 | 1 (0-7) | 0.00 |
| 29. | Couples Psychoeducation                      | 3 | 12 (3-25) | 64.00 |
| 30. | Internet-based psychoeducation               | 1 | 7 | Not applicable |
| 31. | Waitlist                                     | 53 | 11 (8-15) | 65.43 |
| 32. | Treatment usual                              | 14 | 13 (7-19) | 61.37 |
| 33. | Minimal attention/symptom monitoring         | 8 | 13 (2-32) | 92.30 |

Table 3: Results of the meta-analyses of dropout
| Variable                                      | $\beta$ (95% confidence intervals) | P     |
|----------------------------------------------|-----------------------------------|-------|
| Trauma focus                                 | 0.069 (0.011-0.127)               | 0.021 |
| Recruitment from clinical services           | -0.028 (-0.087-0.030)             | 0.341 |
| Delivered in a group format                 | -0.022 (-0.096-0.523)             | 0.564 |
| Sample drawn from military population        | 0.032 (-0.023-0.087)              | 0.251 |
| Sexual trauma                               | 0.040 (-0.049-0.130)              | 0.376 |
| % Female                                     | 0.040 (-0.049-0.130)              | 0.376 |
| % University Educated                        | 0.001 (-0.003-0.001)              | 0.208 |

Table 4: Meta-regression of study-level variables on dropout from all active psychological therapies

Trauma-focus coded as 0 = non-trauma focused, 1 = trauma focused; recruitment method coded as 0 = not recruited from clinical services, 1 = recruited from clinical services; delivered in a group format coded as 0 = not delivered in a group format, 1 = not delivered in a group format; sample drawn from military population coded 0 = not from a military population; 1 = from a military population; sexual trauma coded 0 = not a sexual trauma; 1 = a sexual trauma.
5554 records (including studies from the last version of the review) after duplicates removed

5554 records screened

5351 records excluded

87 full-text articles excluded
(n = 43, less than 70% of study participants had formal diagnosis of PTSD)
(n = 10, not an RCT)
(n = 12, PTSD symptoms were not primary target of the intervention)
(n = 5, efficacy data could not be extracted)
(n = 8, participants recruited on the basis of having a comorbid substance use disorder)
(n = 9, ineligible intervention or comparator)

203 full-text articles assessed for eligibility

115 studies included in quantitative synthesis (meta-analysis)

Figure 1: Study flow diagram
Figure 2: Funnel plot