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**Psychological therapies for post-traumatic stress
disorder in adults: systematic review and meta-analysis**

Abstract

Background: Psychological therapies are the recommended first-line treatment for post-traumatic stress disorder (PTSD). Previous systematic reviews have grouped theoretically similar interventions to determine differences between broadly distinct approaches. Consequently, we know little regarding the relative efficacy of the specific manualised therapies commonly applied to the treatment of PTSD.

Objective: To determine the effect sizes of manualised therapies for PTSD.

Methods: We undertook a systematic review following Cochrane Collaboration guidelines. A pre determined definition of clinical importance was applied to the results and the quality of evidence was appraised using the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach.

Results: 114 randomised controlled trials (RCTs) of 8171 participants were included. There was robust evidence that the therapies broadly defined as CBT with a trauma focus (CBT-T), as well as Eye Movement Desensitisation and Reprocessing (EMDR), had a clinically important effect. The manualised CBT-Ts with the strongest evidence of effect were Cognitive Processing Therapy (CPT); Cognitive Therapy (CT); and Prolonged Exposure (PE). There was also some evidence supporting CBT without a trauma focus; group CBT with a trauma focus; guided internet-based CBT; and Present Centred Therapy (PCT). There was emerging evidence for a number of other therapies.

Conclusions: A recent increase in RCTs of psychological therapies for PTSD, results in a more confident recommendation of CBT-T and EMDR as the first-line treatments. Among the CBT-Ts considered by the review CPT, CT and PE should be the treatments of choice. The findings should guide evidence informed shared decision making between patient and clinician.

Introduction

Post-traumatic stress disorder (PTSD) is a common mental disorder that can develop as a consequence of exposure to a serious traumatic event [1, 2]. 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 [1]. PTSD is a debilitating disorder, which is commonly comorbid with other conditions such as depression, substance use and anxiety disorders [3, 4].

Previous systematic reviews have converged on the general finding that psychological therapies are effective for the treatment of PTSD [5-9]. Reviews to date have grouped psychological therapies together based on similar theoretical underpinnings and overlapping techniques. A broad distinction has been made between 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 [5-8]. A further distinction has been made based on the theoretical model from which a therapy stems, for example grouping those based on cognitive behavioural principles. Despite the benefits to the methodology in terms of detecting differences between broadly different therapeutic approaches, categorising interventions for meta-analysis has hindered the reporting of effect sizes for specific manualised therapies.

A recent proliferation of randomised controlled trials (RCTs) has resulted in adequate data to move beyond grouping therapies for meta-analysis, allowing the estimation of effect sizes for specific manualised therapies. In addition to the benefits of being able to inform more detailed and precise treatment recommendations, this approach may indicate the procedures shared by the most effective interventions to inform an understanding of the crucial components when developing and modifying therapies. An in-depth understanding is also required to aid patients and clinicians in the co-production of treatment plans. These should take patient characteristics and preferences into account, alongside the evidence-base for the many psychological therapies currently available for the treatment of PTSD in adults.

We conducted a comprehensive systematic review and meta-analyses of RCTs of all psychological therapies for PTSD. The aim was to determine effect sizes for specific

manualised therapies for PTSD and to apply a pre-determined definition of clinically important effect in order to inform a detailed understanding of the relative efficacy of the specific psychological therapies commonly applied to the treatment of PTSD. The review informed the 2018 update of the International Society for Traumatic Stress Studies (ISTSS) treatment guidelines [10].

Method

Selection Criteria

The review included 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). 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, but there were no other exclusions based on co-morbidity. Studies that conducted secondary analyses of data already included in the meta-analyses were excluded. Studies were also excluded if a continuous measure of PTSD severity post-treatment was not available.

Search Strategy

This systematic review was undertaken alongside a number of reviews for an update of the ISTSS Treatment Guidelines [10]. 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 [5]. 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 U.S. 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 outcome data were extracted by two reviewers using a form that had been piloted on five of the included studies. In order to categorise therapies, information on the protocol used was sought from the methods sections of the included studies and authors were contacted if there was uncertainty regarding the type of therapy delivered. The outcome measure for the review was reduction in the severity of PTSD symptoms post-treatment using a standardised measure. When available, clinician rated measures were included in meta-analyses (e.g. the Clinician Administered PTSD Scale (CAPS) [11]). If no clinician rated measure was used or reported, self-report measures were included (e.g. the PTSD Checklist for DSM-5 (PCL-5) [12]). Study authors were contacted to obtain missing data. Therapy classifications were agreed with the ISTSS treatment guidelines committee.

Risk of Bias Assessment

All included studies were assessed for risk of bias using Cochrane criteria [13]. 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, baseline imbalances between groups, small sample size, or 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.

Quality of Evidence Assessment

The quality of evidence for each comparison was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system [14]. Evidence was categorised as high quality (indicating that further research is very unlikely to change confidence in the estimate of effect); moderate quality (indicating that further research is

likely to have an important impact on our confidence in the estimate of effect and may change the estimate); low quality (indicating that further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate) or very low quality (indicating that we are very uncertain about the estimate).

Data Synthesis

Meta-analyses were conducted using the Cochrane's Review Manager 5 (RevMan) software [15]. Continuous measures of post-treatment PTSD severity were analysed as standardised mean differences (SMDs). All outcomes were presented using 95% confidence intervals. Clinical heterogeneity was assessed in terms of variability in the experimental and control interventions; participants; settings; and outcomes. Heterogeneity was assessed further using both the I^2 statistic and the chi-squared test of heterogeneity, as well as visual inspection of the forest plots. Data were pooled using fixed-effect meta-analyses, except where heterogeneity was present, when random-effect models were used. Since combining waitlist and usual care in a single comparison was a potential limitation of the review, sensitivity analyses looked at the influence of removing studies that adopted a usual care control group from meta-analyses making this comparison. To determine the impact of risk of bias within the included studies on outcome, sensitivity analyses were conducted by removing studies with high risk of bias in three or more domains. Sensitivity analyses were only conducted for meta-analyses including 10 or more studies, since it was unlikely that meaningful differences would be determined among a smaller number of studies. A funnel plot was constructed for the meta-analysis containing the largest number of studies and visually inspected, with signs of asymmetry taken to indicate publication bias.

Clinical Importance

A definition of clinical importance, which was developed by the ISTSS treatment guidelines committee, after consultation with the ISTSS membership, and approved by the ISTSS Board, was applied to the meta-analytic results [10]. To be rated as clinically important, an intervention had to demonstrate an effect size of > 0.80 for wait list control comparisons; > 0.5 for attention control comparisons; > 0.4 for placebo control comparisons; and > 0.2 for active treatment control comparisons. If there was only one RCT, an intervention was not rated as clinically important unless it included over 300 participants. Non-inferiority RCT evidence alone was not enough to rate an intervention as clinically important.

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. This resulted in a total of 114 RCTs of 8171 participants. Figure 1 presents a flow diagram for study selection.

[FIGURE 1 HERE]

Study Characteristics

Study characteristics are summarised in table 1. Twenty-nine defined psychological therapies were evaluated. Eight of these were broadly categorized as 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); Single Session CBT; Reconsolidation of Traumatic Memories (RTM); Virtual Reality Exposure Therapy (VRE). Twelve 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 (OEI); Interpersonal Psychotherapy; Psychodynamic Psychotherapy; Relaxation Training; REM Desensitisation; Emotional Freedom Technique (EFT); Dialogical Exposure Therapy (DET); Relaxation Training; Psychoeducation; Guided Internet-based CBT with a Trauma Focus. There were five different types of group therapy: Group CBT-T; Group and Individual CBT-T; Group Interpersonal Therapy; Group Stabilising Treatment; Group Supportive Counselling. Couples CBT with a Trauma Focus was also evaluated. It was decided a priori that therapies delivered in a group format would be grouped, due to the small number of studies.

The number of randomised participants ranged from 10 to 366. Studies were conducted in Australia (9), Canada (2), China (2), Denmark (1), Germany (5), Iran (2), Israel (1), Italy (2), Japan (1), the Netherlands (4), Norway (1), Portugal (1), Romania (1), Rwanda (1), Spain (1), Sweden (3), Switzerland (1), Syria (1), Thailand (1), Turkey (3), Uganda (2), UK (11), USA (61). Participants were traumatised by military combat (27 studies), sexual assault or rape (11 studies), war/persecution (8 studies), road traffic accidents (6 studies), earthquakes (4

studies), childhood sexual abuse (7 studies), political detainment (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 (41 studies) included individuals traumatised by a variety of different traumatic events. There were 27 studies of females only and 9 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%. Exclusion criteria varied across studies, with the most common being: current or lifetime psychosis (69 studies); bipolar disorder (18 studies) or severe depression (12 studies); substance use (63 studies); suicidal ideation (55 studies). Participants were recruited from health or social care settings (71 studies); from the general public via advertisements (21); or through a combination of the two approaches (7 studies).

[TABLE 1 HERE]

Risk of Bias

Risk of bias assessments for the included studies are summarised in table 2. Fifty-three studies reported a method of sequence allocation judged to pose a "low" risk of bias; four 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; one 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 12 of the included studies; it was unclear whether the outcome assessor was aware of group allocation in 18 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; 80 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 78 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]

Efficacy

Results of the meta-analyses are summarised in tables 3 and 4. The strongest evidence of effect was for the studies broadly categorised as CBT-T, and EMDR. Meta-analyses of specific manualised CBT-Ts found that CPT; CT; and PE had the strongest evidence of effect. There was also some evidence supporting the effect of NET (a variant of CBT-T); CBT without a trauma focus; PCT; Group CBT-T and guided internet-based CBT. There was emerging evidence to support the effect of single session CBT; RTM; VRE (all variants of CBT-T); as well as Written Exposure Therapy; combined group and individual CBT-T; and couples CBT-T. There was insufficient evidence to support the efficacy of BEP (a variant of CBT-T); Supportive Counselling; Group Interpersonal Therapy; Group Stabilising Treatment; Group Supportive Counselling; Group Interpersonal Therapy; OEI; Psychodynamic Therapy; Relaxation Training; or Psychoeducation.

[TABLE 3 HERE]

[TABLE 4 HERE]

Sensitivity Analyses

Four of the meta-analyses included 10 or more studies (CBT-T versus waitlist/usual care/minimal attention; PE versus waitlist/usual care/minimal attention; EMDR versus waitlist/usual care/minimal attention; and EMDR versus CBT-T). Sensitivity analyses that removed studies with high risk of bias in three or more domains gave similar SMDs and confidence intervals. Sensitivity analyses that removed studies with a usual care control group found that SMDs and confidence intervals in the analyses of CBT-T and PE, but evidence of improved effect in the case of EMDR.

Heterogeneity

There was evidence of substantial clinical 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 qualifications and experience of therapists;

the predominant trauma type; the mean age of participants; and the proportion of female versus male participants. Considerable statistical heterogeneity was also evident in many of the pooled comparisons. This resulted in regular use of a random-effects model.

Publication Bias

All of the included studies were published. There was evidence of some publication bias, demonstrated by a funnel plot using data from the comparison of CBT-T versus waitlist/usual care/minimal attention.

Discussion

Main Findings

In agreement with previous reviews and in continued support of existing treatment guidelines [16-19], there was robust evidence for the clinically important effect of the therapies broadly defined as CBT-T, as well as EMDR. A substantial increase in the number of RCTs published in recent years, resulted in a greater level of confidence in these findings. This review went further, and we conducted meta-analyses of specific manualised therapies. By applying pre-determined definitions of clinically important effect, we found that the CBT-Ts with the strongest evidence were PE, CPT and CT. There was also some evidence in support of NET; and emerging evidence in support of other CBT-Ts, namely, single session CBT-T; RTM; VRE; and WRT. There was insufficient evidence to support the efficacy of BEP. Although CBT-Ts and EMDR demonstrated the strongest evidence of effect, there was also evidence supporting the effect of CBT without a trauma focus; PCT; Group CBT-T; and guided internet-based CBT, as well as emerging evidence in support of combined group and individual CBT with a trauma focus; couples CBT with a trauma focus. There was insufficient evidence to support Group therapies without a trauma focus; OEI; Psychodynamic Therapy; Relaxation Training; or psychoeducation.

The comparison of effect sizes across meta-analyses was not straightforward. Although we can draw conclusions in relation to the treatments most strongly supported by the evidence-base, this does not equate to evidence that other interventions were ineffective. Some comparisons may have lacked sufficient statistical power to demonstrate clinically important effect. On occasion, therapies were delivered to act as an active control and may not have

been optimally effective. As an example, supportive counselling often barred discussion of the trauma, which diverges from standard practice. There were many more RCTs of CBT-T and EMDR than those without a trauma-focus, and greater number of studies of therapies delivered on an individual basis than those delivered to couples or groups. Although it is unlikely new studies will substantially alter the estimated pooled-effect of CBT-T or EMDR, it is probable that further research will modify the evidence base for therapies currently represented by fewer studies. Although not as strong as the evidence for CBT-T and EMDR, emerging evidence for interventions such as guided internet-based CBT and PCT advances the field by providing a greater choice of evidence-based therapies.

Strengths and Limitations

The review followed Cochrane guidelines for the identification of relevant studies; data extraction and synthesis; risk of bias assessment; and interpretation of findings [27]. The review moves the field forward, by estimating the effect of specific manualised therapies when available data allowed, rather than grouping similar approaches. Despite the many strengths of the review, there were inevitable limitations. The small number of studies evaluating interventions delivered to a group or to couples, precluded analyses of these therapies, as was previously the case for therapies delivered on an individual basis. All included studies were published, resulting in the possibility of publication bias. A funnel plot constructed from the meta-analysis of CBT-T versus waitlist or usual care, found some evidence of publication bias, indicating that the currently-available evidence may overestimate the effect of CBT-T. Several studies reported incomplete data and although authors were contacted, it was not always possible to obtain missing information, resulting in the exclusion of otherwise eligible studies. The majority of studies included in the review excluded individuals with comorbidities of substance dependence, psychosis, and severe depression; we are not, therefore, able to draw any conclusions beyond the efficacy of psychological therapies for relatively simple presentations of PTSD. Waitlist and treatment as usual were included as a single comparison group in meta-analyses, giving a more conservative estimate of effect than reviews that have separated the two. It is acknowledged that usual care, especially in more recent studies, may have included evidence-based therapies. This said, sensitivity analyses, which excluded studies with a usual care control group from comparisons with more than ten studies, revealed little difference in the outcome in two of three eligible analyses. The methodological quality of included studies varied considerably, and risk of bias was high/unclear in several domains of many studies. However,

sensitivity analyses removing studies with high risk of bias in at least three or more domains, revealed little influence. Most of the trials to date have been conducted on DSM-IV PTSD. We are not therefore able to draw conclusions regarding the performance of therapies on the additional cluster of symptoms (alterations in mood and cognitions) that was introduced by DSM-5. Data on the competence of the therapists and the number of therapy sessions was not extracted from the included studies and we cannot therefore comment on these as factor that may have impacted efficacy. Sample sizes were often small, however the pooled comparisons included data from 8171 participants.

Clinical Implications

The psychological therapies with the strongest evidence of effect should be those prioritised for clinical use when available and acceptable to the patient. It is, however, unlikely that any given therapy is universally appropriate for all individuals with PTSD. There is a need to consider predictors of outcome that may indicate the suitability of particular therapies for specific subgroups of patients. We should also consider the skills and therapeutic style of the therapist, given the likelihood that some are better at delivering certain types of therapy than others. Since there is evidence for the effect of numerous psychological therapies, the evidence-base should be used to guide shared decision making between patient and clinician. There is a need for detailed assessment; followed by discussion surrounding the evidence; resulting in the co-production of treatment plans that consider patient-preference[28]. Although the strongest evidence of effect was for CBT-T and EMDR, there was also evidence in support of CBT without a trauma focus and PCT. This indicates a role for these therapies as alternatives to trauma focused intervention, if the latter are not available; if patient preference dictates; or if exposure work is contraindicated, for example if an individual is unable to tolerate the treatment.

Despite the current review giving a good indication of the therapies most strongly supported by the current evidence-base, these are not always widely available or accessible. There is growing evidence in support of group and internet-based therapies, which are potential avenues for widening access to low-cost treatment and disseminating evidence-based therapies more efficiently. At least a proportion of individuals are likely to respond to these minimally intensive treatments and require no further intervention, which fits well with the principles of prudent healthcare. It is hoped that future work will identify the characteristics of those unlikely to respond to less intensive interventions, allowing a more stratified or

personalised approach to treatment. Work is needed to develop optimal clinical pathways that deliver appropriate evidence-based therapies in the most efficient way possible, whilst ensuring the acceptability of the approach to patients. There are additional factors to take into account when considering clinical implications, including rates of attrition from treatment; adverse events; the acceptability of treatment approaches; and cost-effectiveness. Considering these factors was beyond the scope of this review, but they should inform clinical practice.

Research Implications

Although we report effect sizes across a range of therapies, further high-quality head-to-head RCTs of the most effective interventions are necessary to determine comparative efficacy among participants drawn from the same population. We know little about the predictors of outcome and acceptability of psychological therapies, and a greater understanding would enable targeted recommendation of particular treatments to specific sub-groups of patients. PTSD is a highly heterogeneous condition [30, 31] and work is needed to develop more personalised approaches. We do not have a sufficient understanding of the efficacy of current therapies for those with a diagnosis of ICD-11 complex PTSD [32-34]. Further research is needed to evaluate existing therapies among those with complex PTSD, and to modify or develop new therapies, as appropriate. Work is also needed to determine the efficacy of therapies in addressing the DSM-5 symptom-cluster related to mood and cognition. Therapies delivered in a group format and to couples, have shown promise, but there are currently an insufficient number of studies to conduct meta-analyses beyond those grouping interventions into broad categories. There is a need for established standards for the reporting of psychological therapy trials to ensure that methods are transparent and any risk of bias clear. This would also ensure a clearer definition of control groups. In many studies it was unclear what constituted usual care and what intervention, if any, was permitted in wait-list control groups. We know very little about the acceptability of psychological therapies for PTSD and more work should focus on patient preference.

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Table 1: Study Characteristics

Study	N	Country	Intervention 1	Intervention 2	Intervention 3	Intervention 4	Population	Trauma type	% Female	% Unemployed	% University Educated
Acarturk 2016 [35]	98	Turkey/Syria	EMDR	WL			Refugees	War/Persecution	74	Unknown	4
Adenauer 2011 [20]	34	Germany	NET (CBT-T)	WL			Refugees	War/Persecution	44	Unknown	Unknown
Ahmadi 2015 [36]	48	Iran	EMDR	REM Desensitization	WL		Military Personnel/Veterans	Military Trauma	0	Unknown	33.3
Akbarian 2015 [37]	40	Iran	Group CBT-T	MC/RA			General Population	Various	79	Unknown	Unknown
Asukai 2010 [38]	24	Japan	PE (CBT-T)	TAU			General Population	Various	88	Unknown	Unknown
Basoglu 2005 [39]	59	Turkey	Single-session CBT-T	WL			General Population	Earthquake	85	Unknown	5.1
Basoglu 2007 [40]	31	Turkey	Single-session CBT-T	MC/RA			General Population	Earthquake	93	Unknown	10
Beck 2009 [41]	44	USA	Group CBT-T	MC/RA			General Population	Road Traffic Accident	82	54	Unknown
Bichescu 2007 [42]	18	Romania	NET (CBT-T)	Psychoeducation			General Population	Political detainment	94	0%	72
Blanchard 2003 [43]	98	USA	CBT-T	SC	WL		General Population	Road Traffic Accident	73	Unknown	Unknown
Bradshaw 2014 [44]	10	Canada	OEI	WL			General Population	Various	70	0	Unknown
Brom 1989 [45]	83	Netherlands	CBT-T	Psychodynamic Therapy	WL		General Population	Various	79	49	Unknown
Bryant 2003 [46]	58	Australia	CBT-T	SC			General Population	Various	52	Unknown	Unknown

Bryant 2011 [47]	28	Thailand	CBT-T	SC			General Population	Terrorist Attack	96	84%	Unknown
Buhmann 2016 [48]	138	Denmark	CBT-T	WL			Refugees	Organised Violence	41	Unknown	Unknown
Buttolo 2016 [49]	148	Germany	CPT (CBT-T)	DET			General Population	Various	66	Unknown	Unknown
Capezzani 2013 [50]	21	Italy	EMDR	CBT-T			General Population	Cancer	90	Unknown	Unknown
Carletto 2016 [51]	50	Italy	EMDR	Relaxation Training			General Population	Multiple Sclerosis	81	Unknown	Unknown
Carlson 1998 [52]	35	USA	EMDR	Relaxation Training	TAU		Military Personnel/Veterans	Military Trauma	0	62	Unknown
Castillo 2016 [53]	86	USA	Group CBT-T	WL			Military Personnel/Veterans	Military Trauma	100	44%	Unknown
Chard 2005 [54]	71	USA	CPT (CBT-T)	WL			General Population	Child Sexual Abuse	100	Unknown	Unknown
Cloitre 2002 [55]	58	USA	CBT-T	WL			General Population	Child Abuse	100	24%	52
Cloitre 2010 [56]	71	USA	CBT-T	CBT without a trauma focus			General Population	Child Abuse	100	31%	Unknown
Deville 1998 [57]	35	Australia	EMDR	TAU			Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown
Deville 1999 [58]	32	Australia	EMDR	CBT-T			General Population	Various	100	Unknown	Unknown
Dorrepaal 2012 [59]	71	Netherlands	Group Stabilising Treatment	TAU			General Population	Child Abuse	Unknown	83%	Unknown
Duffy 2007 [60]	58	UK	CT (CBT-T)	WL			General Population	Various	40	Unknown	Unknown
Dunne 2012 [61]	26	Australia	CBT-T	WL			General Population	Road Traffic Accident	50	31%	73
Echeburua 1997 [62]	20	Spain	CBT-T	Relaxation Training			General Population	Child Abuse or Adult RaPE (CBT-T)	100	Unknown	20

Ehlers 2005 [63]	28	UK	CT (CBT-T)	WL			General Population	Various	50	25%	35
Ehlers 2003 [64]	57	UK	CT (CBT-T)	MC/RA			General Population	Road Traffic Accident	Unknown	Unknown	Unknown
Ehlers 2014 [65]	91	UK	CT (CBT-T)	SC	WL		General Population	Various	58.7	23	26
Falsetti 2008 [66]	60	USA	Group CBT-T	WL			General Population	Various	100	Unknown	Unknown
Fecteau 1999 [67]	20	Canada	CBT-T	WL			General Population	Road Traffic Accident	70	Unknown	Unknown
Feske 2008 [68]	21	USA	PE (CBT-T)	TAU			General Population	Various	100	29%	90%
Foa 1991 [69]	45	USA	PE (CBT-T)	CBT without a trauma focus	Supportive counselling	WL	General Population	Sexual Assault	100	Unknown	Unknown
Foa 1999 [70]	66	USA	PE (CBT-T)	CBT without a trauma focus	WL		General Population	Assault/Sexual assault	100	38%	41%
Foa 2005 [71]	179	USA	PE (CBT-T)	WL			General Population	Assault	100	17%	34%
Foa 2018 [72]	256	USA	Spaced PE (CBT-T)	PCT	MC/RA		Military Personnel/Veterans	Military Trauma	12	100%	66%
Fonzo 2017 [73]	66	USA	PE (CBT-T)	WL			General Population	Various	65	Unknown	Unknown
Forbes 2012 [74]	59	Australia	CPT (CBT-T)	TAU			Military Personnel/Veterans	Military Trauma	4	36%	Unknown
Ford 2011 [75]	146	USA	CBT without a trauma focus	PCT	WL		General Population	Various	100	Unknown	22%
Ford 2013 [76]	80	USA	Group CBT-T	Group Supportive Counselling			Incarcerated Women	Various	100	Unknown	Unknown
Galovski 2012 [77]	100	USA	CPT (CBT-T)	MC/RA			General Population	Various	69	Unknown	Unknown
Gamito 2010 [78]	10	Portugal	VRE (CBT-T)	Control Exposure	WL		Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown

Gersons 2000 [79]	42	Netherlands	BEP (CBT-T)	WL			General Population	Various	Unknown	Unknown	Unknown
Gray 2017 [80]	74	USA	RTM (CBT-T)	WL			Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown
Hensel-Dittmann 2011 [21]	28	Germany	NET (CBT-T)	CBT without a trauma focus			Asylum Seekers	Organised Violence	Unknown	Unknown	Unknown
Hinton 2005 [81]	40	USA	CBT-T	WL			Refugees	Genocide	60	Unknown	Unknown
Hinton 2011 [82]	24	USA	Group CBT-T	WL			General Population	Various	100	Unknown	Unknown
Hogberg 2007 [83]	24	Sweden	EMDR	WL			General Population	Various	38	Unknown	Unknown
Hollifield 2007 [84]	55	USA	Group trauma-focused CBT	WL			General Population	Various	68	Unknown	40%
Ironson 2002 [85]	22	USA	EMDR	PE (CBT-T)			General Population	Various	77	Unknown	Unknown
Ivarsson 2014 [86]	62	Sweden	I-CBT	WL			General Population	Various	82	8%	65%
Jacob 2014 [87]	76	Rwanda	NET (CBT-T)	WL			Genocide Survivors	Genocide	92	Unknown	Unknown
Jensen 1994 [88]	25	USA	EMDR	WL			Military Personnel/Veterans	Military Trauma	0	68	Unknown
Johnson 2011 [89]	70	USA	CBT without a trauma focus	TAU			General Population	Intimate Partner Violence	100	73	7%
Johnson 2016 [90]	60	USA	CBT without a trauma focus	TAU			General Population	Intimate Partner Violence	100	77	5%
Karatzias 2011 [91]	46	UK	EMDR	EFT			General Population	Various	57	37	47%
Keane 1989 [92]	24	USA	CBT-T	WL			Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown

Krupnick 2008 [93]	48	USA	Group IPT	WL			General Population	Interpersonal Trauma	100	80	13%
Kubany 2003 [94]	37	USA	CBT-T	WL			General Population	Domestic Abuse	100	Unknown	Unknown
Kubany 2004 [95]	107	USA	CBT-T	WL			General Population	Domestic Abuse	100	Unknown	Unknown
Laugharne 2016 [96]	20	Australia	EMDR	PE (CBT-T)			General Population	Various	70	Unknown	Unknown
Lee 2002 [97]	24	Australia	CBT-T	EMDR			General Population	Various	46	Unknown	Unknown
Lewis 2017 [98]	42	UK	I-CBT	WL			General Population	Various	57	19	62%
Littleton 2016 [99]	87	USA	I-CBT	I- Psychoeducation			General Population	Rape	100	Unknown	Unknown
Litz 2007 [100]	45	USA	I-CBT	I-SC			Military Personnel/Veterans	Terrorism / Military Trauma	Unknown	Unknown	Unknown
Marcus 1997 [101]	67	USA	EMDR	TAU			General Population	Various	79	Unknown	Unknown
Markowitz 2015 [102]	110	USA	IPT	PE (CBT-T)	Relaxation Therapy		General Population	Various	70	21	Unknown
Marks 1998 [103]	87	UK	PE (CBT-T)	Cognitive Restructuring	PE (CBT-T) (CBT-T)(CBT-T)and Cognitive Restructuring	Relaxation without PE (CBT-T) (CBT-T)(CBT-T)or CR	General Population	Various	36	54	Unknown
McDonagh 2005 [104]	74	USA	PE (CBT-T)	PCT	WL		General Population	Child Sexual Abuse	100	17	Unknown
McLay 2011 [105]	20	USA	VRE (CBT-T)	TAU			Military Personnel/Veterans	Military Trauma	5	Unknown	Unknown
McLay 2017 [106]	81	USA	VRE (CBT-T)	Control Exposure Therapy			Military Personnel/Veterans	Military Trauma	4	Unclear	Unclear

Monson 2012 [107]	20	USA	Couples CBT-T	WL			General Population	Various	25	40	Unknown
Monson 2006 [108]	60	USA	CPT (CBT-T)	WL			Military Personnel/Veterans	Military Trauma	10	Unknown	Unknown
Morath 2014 [22]	38	Germany	NET (CBT-T)	WL			Refugees	Organised Violence	32	Unknown	Unknown
Meuser 2008 [109]	108	USA	CBT-T	TAU			General Population	Various	79	Unknown	Unknown
Nacasch 2011 [110]	30	Israel	PE (CBT-T)	TAU			Military Personnel/Veterans	Military Trauma	Unknown	63	Unknown
Neuner 2010 [23]	32	Germany	NET (CBT-T)	TAU			Refugees	Torture	31	Unknown	Unknown
Neuner 2008 [24]	277	Uganda	NET (CBT-T)	SC	Monitoring		Refugees	War	51	49	Unknown
Neuner 2004 [25]	43	Uganda	NET (CBT-T)	SC	Psychoeducation		Refugees	War	60	28	Unknown
Nijdam 2012 [111]	140	Netherlands	BEP (CBT-T)	EMDR			General Population	Various	56	Unknown	30
Pacella 2012 [112]	66	USA	PE (CBT-T) (CBT-T)	MC/RA			General Population	HIV Diagnosis	37	Unknown	Unknown
Paunovic 2011 [113]	29	Sweden	CBT-T	WL			General Population	Crime	63	74	11
Peniston 1991 [114]	29	USA	CBT-T	TAU			Military Personnel/Veterans	Military Trauma	Unknown	Unknown	Unknown
Power 2002 [115]	105	UK	EMDR	CBT-T	WL		General Population	Various	42	Unknown	Unknown
Rauch 2015 [116]	36	USA	PE (CBT-T) (CBT-T)	PCT			Military Personnel/Veterans	Military Trauma	9	Unknown	Unknown
Ready 2010 [117]	11	USA	VRE (CBT-T)	PCT			Military Personnel/Veterans	Military Trauma	Unknown	Unknown	Unknown
Reger 2016 [118]	162	USA	VRE (CBT-T)	PE (CBT-T)	WL		Military Personnel/Veterans	Military Trauma	4	Active duty	7

Resick 2015 [119]	108	USA	Group CBT-T	Group PCT			Military Personnel/Veterans	Military Trauma	8	0	8
Resick 2002 [120]	171	USA	CPT (CBT-T) (CBT-T)	PE (CBT-T)	Minimal Attention		General Population	Rape	100	Unknown	Unknown
Resick 2017 [121]	268	USA	CPT (CBT-T) (CBT-T)	Group CBT-T			Military Personnel/Veterans	Military Trauma	9	100	19
Rothbaum 1997 [122]	18	USA	EMDR	WL			General Population	Sexual Assault	100	19	43
Rothbaum 2005 [123]	60	USA	PE (CBT-T)	EMDR	WL		General Population	Rape	100	Unknown	Unknown
Sautter 2015 [124]	57	USA	Couples CBT without a trauma focus	Couples Psychoeducation			Military Personnel/Veterans	Military Trauma	1.75	12	75
Scheck 1998 [125]	60	USA	EMDR	SC			General Population	Various	100	Unknown	Unknown
Schnurr 2003 [126]	360	USA	Group CBT-T	Group PCT			Military Personnel/Veterans	Military Trauma	0	51	Unknown
Schnurr 2007 [127]	284	USA	PE (CBT-T) (CBT-T)	Group PCT			Military Personnel/Veterans	Military Trauma	100	38	Unknown
Schnyder 2011 [128]	30	Switzerland	BEP (CBT-T)	MC/RA			General Population	Various	46.7	Unknown	Unknown
Sloan 2012 [129]	46	USA	WET	WL			General Population	Road Traffic Accident	Unclear	78	41
Sloan 2018 [130]	126	USA	WET	CPT (CBT-T)			General Population	Various	49	Unknown	13
Spence 2011 [131]	42	Australia	I-CBT	WL			General Population	Various	81	41	Not Cle
Stenmark 2013 [26]	81	Norway	NET (CBT-T)	TAU			Refugees	Various	31	Unknown	25
Suris 2013 [132]	86	USA	CPT (CBT-T)	PCT			Military Personnel/Veterans	Military Sexual Trauma	85	43	16
Taylor 2003 [133]	60	USA	PE (CBT-T)	Relaxation Therapy	EMDR		General Population	Various	75	13	Unknown

Tylee 2017 [134]	30	USA	RTM (CBT-T)	WL			General Population	Military Trauma	0	Unknown	Unknown
Vaughan 1994 [135]	36	Australia	CBT-T	Relaxation Training	EMDR		General Population	Various	64	Unknown	Unknown
Wells 2015 [136]	32	UK	PE (CBT-T)	CBT without a trauma focus	WL		General Population	Various	38	6	Unknown
Wells 2012 [137]	20	UK	CBT without a trauma focus	WL			General Population	Various	55	Unknown	Unknown
Yehuda 2014 [138]	52	USA	PE (CBT-T)	MC/RA			Military Personnel/Veterans	Military Trauma	Unclear	Unknown	Unknown
Zang 2014 [139]	20	China	NET (CBT-T)	WL			General Population	Earthquake	90	Unknown	Unknown
Zang 2013 [140]	22	China	NET (CBT-T)	WL			General Population	Earthquake	77	Unknown	Unknown
Zlotnick 1997 [141]	48	USA	Group CBT-T	WL			General Population	Child Sexual Abuse	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

OEI = 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 2: Risk Assessment

	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
Basoglu 2005	Low	Low	Low	Low	Unclear	High	1
Basoglu 2007	Low	Low	High	High	Unclear	High	3
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
Cloitre 2002	Unclear	Unclear	Low	Low	High	Low	1
Cloitre 2010	Unclear	Low	Low	Low	Low	Low	0
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
Hinton 2005	Low	Unclear	Low	Low	Unclear	High	1
Hinton 2011	Unclear	Unclear	Low	Unclear	Unclear	High	1
Hogberg 2007	Low	Unclear	High	Low	Unclear	High	2
Hollifield 2007	Low	Low	Low	Low	Unclear	High	1
Ironson 2002	Unclear	Unclear	Low	High	Unclear	High	2
Ivarsson 2014	Low	Unclear	Low	Low	Low	High	1

Jacob 2014	Low	Low	Low	Low	Unclear	High	1
Jensen 1994	Unclear	Unclear	High	Unclear	Unclear	High	2
Johnson 2011	Low	Unclear	Low	High	Unclear	Low	1
Johnson 2016	Low	Low	Low	Low	Unclear	Low	0
Karatzias 2011	Low	Low	Low	Low	Unclear	High	1
Keane 1989	Unclear	Unclear	Unclear	High	Unclear	High	2
Krupnick 2008	Unclear	Unclear	Low	Unclear	Unclear	High	1
Kubany 2003	Unclear	Unclear	Low	Low	Unclear	High	1
Kubany 2004	Unclear	Unclear	Low	Low	Low	High	1
Laugharne 2016	Low	Low	Low	Low	Unclear	High	1
Lee 2002	Unclear	Unclear	Low	Low	Unclear	High	1
Lewis 2017	Low	Low	Low	Low	Low	High	1
ylittleton 2016	Low	Unclear	Low	High	Low	Low	1
Litz 2007	Unclear	Unclear	High	Low	Low	High	2
Marcus 1997	Unclear	Unclear	Unclear	High	Unclear	High	2
Markowitz 2015	Low	Low	Low	Low	Low	High	1
Marks 1998	Unclear	Unclear	Low	Low	Unclear	Low	0
McDonagh 2005	Unclear	Unclear	Low	Low	Unclear	Low	0
McLay 2011	Low	Low	Unclear	High	Unclear	High	2
McLay 2017	Low	Unclear	Low	Low	Low	Low	0

Monson 2012	Low	Low	Low	Low	Low	Low	0
Monson 2006	Low	Low	Low	Low	Unclear	Low	0
Morath 2014	Low	Low	Unclear	Low	Low	Low	0
Meuser 2008	Low	Low	Low	Low	Unclear	High	1
Nacasch 2011	Low	Unclear	Low	Low	Low	High	1
Neuner 2004	Low	Unclear	Low	Low	Low	High	1
Neuner 2008	Unclear	Unclear	Low	Low	Unclear	Low	0
Neuner 2010	Unclear	Unclear	Low	Low	Unclear	High	1
Nijdam 2012	Unclear	Low	Low	Low	Low	Low	0
Pacella 2015	Low	Unclear	Low	Low	Unclear	Low	0
Paunovic 2011	Unclear	Unclear	Low	High	Unclear	High	2
Peniston 1991	Unclear	Unclear	Unclear	Low	Unclear	Unclear	0
Power 2002	Low	Low	High	Low	Unclear	Low	1
Rauch 2015	Unclear	Unclear	Low	Low	Unclear	High	1
Ready 2010	Unclear	Unclear	Unclear	Low	Unclear	High	1
Reger 2016	Low	Low	Low	Low	Unclear	Low	0
Resick 2002	Unclear	Unclear	Low	Low	Unclear	High	1
Resick 2015	Unclear	Unclear	Low	Low	Unclear	Low	0
Resick 2017	Low	Unclear	Low	Low	Low	Low	0
Rothbaum 1997	Unclear	Unclear	High	Low	Unclear	High	2

Rothbaum 2005	Unclear	Unclear	High	Low	Unclear	Low	1
Sautter 2015	Unclear	Unclear	Low	Low	Unclear	Low	0
Scheck 1998	Low	Low	High	Unclear	Unclear	High	2
Schnurr 2003	High	Unclear	Low	Low	Low	Low	1
Schnurr 2007	Low	Low	Low	Low	Low	Low	0
Schnyder 2011	Low	Unclear	Low	Low	Unclear	Unclear	0
Sloan 2012	Low	Low	Unclear	Low	Unclear	Low	0
Sloan 2018	Low	Low	Low	Low	Low	Low	0
Spence 2011a	Low	Unclear	High	High	Low	Unclear	2
Stenmark 2013	Unclear	Unclear	Low	High	Low	High	2
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 3:

	Severity of PTSD symptoms post-treatment	<i>GRADE judgement for quality of evidence</i>
1) CBT with a trauma focus versus wait list or treatment as usual.	CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 51; N=1380; SMD -1.32 CI -1.57 to -1.08].	<i>MODERATE QUALITY</i>
2) Brief Eclectic Psychotherapy versus wait list or treatment as usual.	Brief Eclectic Psychotherapy showed no benefit when compared with wait list or treatment as usual [k = 2; N=72; SMD -0.38 CI -0.85 to 0.09].	<i>VERY LOW QUALITY</i>
3) Cognitive Processing Therapy versus wait list or treatment as usual.	Cognitive Processing Therapy showed a positive effect when compared with wait list or treatment as usual [k = 4; N=298; SMD -1.03 CI -1.45 to -0.61].	<i>LOW QUALITY</i>

4) Cognitive Therapy versus wait list or treatment as usual.	Cognitive Therapy showed a positive effect when compared with wait list or treatment as usual [k = 4; N=189; SMD -1.33 CI -1.80 to -0.86].	<i>LOW QUALITY</i>
5) Narrative Exposure Therapy (NET) versus wait list or treatment as usual.	Narrative Exposure Therapy (NET) showed a positive effect when compared with wait list or treatment as usual [k = 8; N=241; SMD -1.06 CI -1.61 to -0.52].	<i>LOW QUALITY</i>
6) Prolonged Exposure versus wait list or treatment as usual.	Prolonged exposure (PE) showed a positive effect when compared with wait list or treatment as usual [k = 12; N=772; SMD -1.59 CI -2.05 to -1.13].	<i>LOW QUALITY</i>
7) Single Session CBT with a trauma focus versus wait list or treatment as usual.	Single Session CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 2; N=90; SMD -0.57 CI -1.00 to -0.15].	<i>VERY LOW QUALITY</i>

8) Reconsolidation of traumatic memories (RTM) versus wait list or treatment as usual	RTM showed a positive effect when compared with wait list or treatment as usual [k = 2; N=96; SMD -2.35 CI -2.89 to -1.82].	<i>VERY LOW QUALITY</i>
9) EMDR versus wait list or treatment as usual	EMDR showed a positive effect when compared with wait list or treatment as usual [k = 11; N=415; SMD -1.23 CI -1.69 to -0.76].	<i>LOW QUALITY</i>
10) Non-trauma focused CBT versus wait list or treatment as usual	CBT without a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 7; N=318; SMD -1.06 CI -1.39 to -0.73].	<i>LOW QUALITY</i>
11) Supportive counselling versus waitlist or treatment as usual	There was no evidence of a difference between supportive counselling and wait list or treatment as usual [k = 2; N=72; SMD -0.43 CI -0.90 to 0.04].	<i>VERY LOW QUALITY</i>
12) Present centred therapy versus waitlist or treatment as usual	Present centred therapy showed a positive effect when compared with waitlist of treatment as usual [k = 2; N=138; SMD -0.97 CI -1.33 to -0.62].	<i>VERY LOW QUALITY</i>

13) Psychodynamic therapy versus treatment as usual	Psychodynamic therapy showed no benefit when compared with wait list or treatment as usual [k = 1; N=52; SMD -0.41; CI -0.96 to 0.14].	<i>VERY LOW QUALITY</i>
14) Written exposure therapy versus treatment as usual	Written exposure therapy showed a positive effect when compared with waitlist of treatment as usual [k = 1; N=44; SMD -3.39; CI -4.43 to -2.44].	<i>VERY LOW QUALITY</i>
15) Virtual Reality Therapy versus wait list or treatment as usual	Virtual Reality Therapy showed a positive effect when compared with wait list or treatment as usual [k = 3; N=104; SMD -0.43 CI -0.83 to -0.03].	<i>VERY LOW QUALITY</i>
16) Observed and experimental integration (OEI) versus wait list or treatment as usual	OEI showed a positive effect when compared with wait list or treatment as usual [k = 1; N=10; SMD -2.86 CI -4.90 to -0.83].	<i>VERY LOW QUALITY</i>
17) Relaxation Training versus wait list or treatment as usual	Relaxation training showed no benefit when compared with wait list or treatment as usual [k = 1; N=53; SMD -0.10; CI -0.65 to 0.46].	<i>VERY LOW QUALITY</i>

18) Group CBT with a trauma focus versus wait list or treatment as usual	Group CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 7; N=313; SMD -1.02 CI -1.26 to -0.78].	<i>MODERATE QUALITY</i>
19) Group and individual CBT with a trauma focus versus wait list or treatment as usual	Group and individual CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 1; N=55; SMD -2.32 CI -3.01 to -1.62].	<i>VERY LOW QUALITY</i>
20) Group stabilising treatment versus wait list or treatment as usual	Group stabilising treatment showed no benefit when compared with wait list or treatment as usual [k = 1; N=71; SMD -0.11; CI -0.36 to 0.57].	<i>VERY LOW QUALITY</i>
21) Group interpersonal therapy (IPT) versus wait list or treatment as usual	Group IPT showed a positive effect when compared with waitlist or treatment as usual [k = 1; N=48; SMD -1.19; CI -1.84 to -0.54].	<i>VERY LOW QUALITY</i>

22) Couples CBT with a trauma focus vs waitlist or treatment as usual	Couples CBT with a trauma focus showed a positive effect when compared with waitlist or treatment as usual [k = 1; N=40; SMD -1.12; CI -1.79 to -0.45].	<i>VERY LOW QUALITY</i>
23) Guided internet-based trauma focused CBT versus waitlist/usual care	Guided internet-based CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 3; N=145; SMD -1.08 CI -1.80 to -0.37].	<i>VERY LOW QUALITY</i>

Table 4

	Severity of PTSD symptoms post-treatment	<i>GRADE judgement for quality of evidence</i>
1) CBT with a trauma focus versus CBT without a trauma focus	There was no evidence of a difference between CBT with a trauma focus versus CBT without a trauma focus [k = 5; N=185; SMD -0.10 CI -0.19 to 0.39].	<i>LOW QUALITY</i>

2) CBT with a trauma focus versus Present Centred Therapy	CBT with a trauma focus showed a positive effect when compared with present centred therapy [k = 4; N=433; SMD -0.45 CI -0.81 to -0.09].	<i>LOW QUALITY</i>
3) CBT with a trauma focus versus supportive counselling	CBT with a trauma focus showed a positive effect when compared with supportive counselling [k = 8; N=434; SMD -0.63 CI -1.04 to -0.21].	<i>LOW QUALITY</i>
4) CBT with a trauma focus versus psychodynamic therapy	There was no evidence of a difference between CBT with a trauma focus and psychodynamic therapy [k = 1; N = 56; SMD -0.03 CI -0.56 to 0.49].	<i>VERY LOW QUALITY</i>
5) CBT with a trauma focus versus Interpersonal Therapy (IPT)	CBT-T showed a positive effect when compared with IPT [k = 1; N=66; SMD -0.48; CI -0.98 to 0.01].	<i>VERY LOW QUALITY</i>
6) CBT without a trauma focus versus PCT	There was no evidence of a difference between CBT without a trauma focus and PCT [k = 1; N = 101; SMD -0.04 CI -0.43 to 0.35].	<i>VERY LOW QUALITY</i>

7) CBT with a trauma focus versus dialogical exposure therapy (DET)	CBT with a trauma focus showed a positive effect when compared with dialogical exposure therapy [k = 1; N=138; SMD -0.39; CI -0.73 to -0.05].	<i>VERY LOW QUALITY</i>
8) Cognitive processing therapy (CPT) versus prolonged exposure (PE)	There was no evidence of a difference between cognitive processing therapy and prolonged exposure [k = 1; N=124; SMD -0.18; CI -0.53 to 0.17].	<i>VERY LOW QUALITY</i>
9) EMDR versus CBT with a trauma focus	There was no evidence of a difference between CBT with a trauma focus and EMDR [k = 10; N=387; SMD -0.17 CI -0.55 to 0.21].	<i>LOW QUALITY</i>
10) EMDR versus supportive counselling	EMDR showed a positive effect when compared with supportive counselling [k = 1; N=57; SMD -0.75 CI -1.29 to -0.21].	<i>VERY LOW QUALITY</i>
11) EMDR versus EFT	There was no evidence of a difference between EMDR and EFT [k = 1; N=46; SMD = 0.08; CI -0.50 to 0.65].	<i>VERY LOW QUALITY</i>

12) EMDR versus Relaxation Training	There was no evidence of a difference between EMDR and Relaxation Training [k = 4; N=117; SMD = -0.23; CI -0.59 to 0.14].	<i>VERY LOW QUALITY</i>
13) EMDR versus REM Desensitisation	There was no evidence of a difference between EMDR and REM Desensitisation [k = 1; N=21; SMD = 0.06; CI -0.80 to 0.91].	<i>VERY LOW QUALITY</i>
14) CBT without a trauma focus versus supportive counselling	CBT without a trauma focus showed a positive effect when compared with supportive counselling [k = 1; N=25; SMD -1.22 CI -2.09 to -0.35].	<i>VERY LOW QUALITY</i>
15) CBT with a trauma focus versus psychoeducation	There was no evidence of a difference between CBT-T and psychoeducation [k = 1; N=27; SMD = -0.19; CI -0.95 to 0.57].	<i>VERY LOW QUALITY</i>
16) Written exposure therapy versus CBT with a trauma focus	There was no evidence of a difference between WED and CBT with a trauma focus [k = 1; N=126; SMD 0.13; CI -0.21 to 0.48].	<i>VERY LOW QUALITY</i>

17) CBT with a trauma focus versus relaxation training	Individual CBT with a trauma focus showed a positive effect when compared with relaxation training [k = 5; N=203; SMD -0.49; CI -0.79 to -0.20].	<i>LOW QUALITY</i>
18) Supportive counselling versus psychoeducation	There was no evidence of a difference between supportive counselling and psychoeducation [k = 1; N=25; SMD 0.13; CI -0.92 to 0.65].	<i>LOW QUALITY</i>
19) Interpersonal therapy versus relaxation training	There was no evidence of a difference between IPT and relaxation training [k = 1; N=60; SMD -0.15; CI -0.67 to 0.38].	<i>VERY LOW QUALITY</i>
20) Virtual reality therapy versus control exposure	There was no evidence of a difference between virtual reality therapy and control exposure [k = 2; N=177; SMD 0.01; CI -0.68 to 0.71].	<i>LOW QUALITY</i>
21) Virtual reality therapy and present centred therapy	There was no evidence of a difference between virtual reality therapy and present centred therapy [k = 1; N=9; SMD -0.51; CI -1.86 to 0.84].	<i>VERY LOW QUALITY</i>

22) Group CBT with a trauma focus versus group present centred therapy	Group CBT with a trauma focus showed a positive effect when compared with group present centred therapy [k = 2; N=333; SMD -0.44; CI -0.63 to -0.24].	<i>LOW QUALITY</i>
23) Group CBT with a trauma focus versus individual CBT with a trauma focus	Individual CBT with a trauma focus showed a positive effect when compared with group CBT with a trauma focus [k = 1; N=268; SMD 0.35; CI 0.11 to 0.59].	<i>VERY LOW QUALITY</i>
24) Group CBT without a trauma focus versus group supportive counselling	There was no evidence of a difference between group CBT without a trauma focus and group supportive counselling [k = 1; N=72; SMD -0.02; CI -0.48 to 0.44].	<i>VERY LOW QUALITY</i>
25) Couples CBT without a trauma focus vs couples psychoeducation	Couples CBT without a trauma focus showed a positive effect when compared with couples psychoeducation [k = 1; N=43; SMD -1.37; CI -2.04 to -0.70].	<i>VERY LOW QUALITY</i>

26) Internet-based trauma focused CBT versus internet-based psychoeducation	Internet-based CBT with a trauma focus showed no benefit when compared with internet-based psychoeducation [k = 1; N=87; SMD 0.11 CI -0.31 to 0.53].	<i>VERY LOW QUALITY</i>
27) Internet-based trauma focused CBT versus internet-based CBT without a trauma focus	Internet-based CBT with a trauma focus showed no benefit when compared with internet-based CBT without a trauma focus [k = 1; N=31; SMD 0.40 CI -1.12 to 0.31].	<i>VERY LOW QUALITY</i>

Figure 1: Study flow diagram

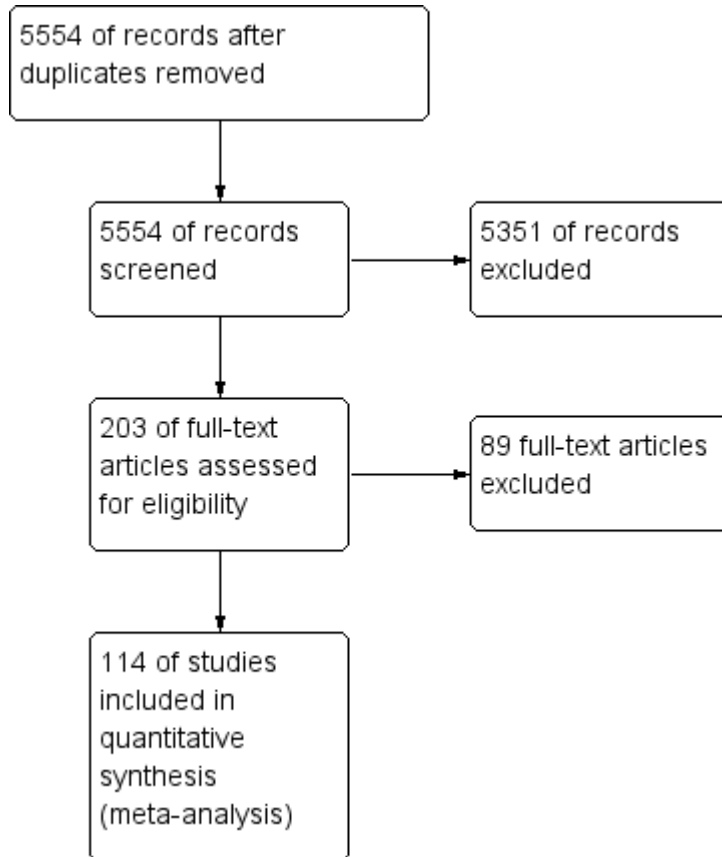


Figure 1: Study flow diagram

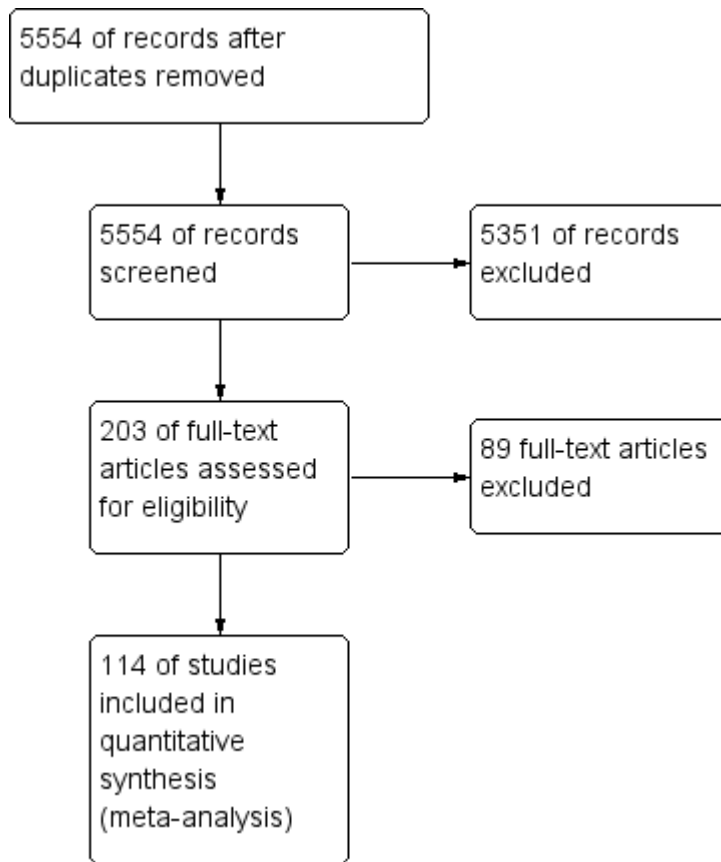


Table 1: Study Characteristics

Study	N	Country	Intervention 1	Intervention 2	Intervention 3	Intervention 4	Population	Trauma type	% Female	% Unemployed	% University Educated
Acarturk 2016 [35]	98	Turkey/Syria	EMDR	WL			Refugees	War/Persecution	74	Unknown	4
Adenauer 2011 [20]	34	Germany	NET (CBT-T)	WL			Refugees	War/Persecution	44	Unknown	Unknown
Ahmadi 2015 [36]	48	Iran	EMDR	REM Desensitization	WL		Military Personnel/Veterans	Military Trauma	0	Unknown	33.3
Akbarian 2015 [37]	40	Iran	Group CBT-T	MC/RA			General Population	Various	79	Unknown	Unknown
Asukai 2010 [38]	24	Japan	PE (CBT-T)	TAU			General Population	Various	88	Unknown	Unknown
Basoglu 2005 [39]	59	Turkey	Single-session CBT-T	WL			General Population	Earthquake	85	Unknown	5.1
Basoglu 2007 [40]	31	Turkey	Single-session CBT-T	MC/RA			General Population	Earthquake	93	Unknown	10
Beck 2009 [41]	44	USA	Group CBT-T	MC/RA			General Population	Road Traffic Accident	82	54	Unknown
Bichescu 2007 [42]	18	Romania	NET (CBT-T)	Psychoeducation			General Population	Political detainment	94	0%	72
Blanchard 2003 [43]	98	USA	CBT-T	SC	WL		General Population	Road Traffic Accident	73	Unknown	Unknown
Bradshaw 2014 [44]	10	Canada	OEI	WL			General Population	Various	70	0	Unknown
Brom 1989 [45]	83	Netherlands	CBT-T	Psychodynamic Therapy	WL		General Population	Various	79	49	Unknown
Bryant 2003 [46]	58	Australia	CBT-T	SC			General Population	Various	52	Unknown	Unknown

Bryant 2011 [47]	28	Thailand	CBT-T	SC			General Population	Terrorist Attack	96	84%	Unknown
Buhmann 2016 [48]	138	Denmark	CBT-T	WL			Refugees	Organised Violence	41	Unknown	Unknown
Buttolo 2016 [49]	148	Germany	CPT (CBT-T)	DET			General Population	Various	66	Unknown	Unknown
Capezzani 2013 [50]	21	Italy	EMDR	CBT-T			General Population	Cancer	90	Unknown	Unknown
Carletto 2016 [51]	50	Italy	EMDR	Relaxation Training			General Population	Multiple Sclerosis	81	Unknown	Unknown
Carlson 1998 [52]	35	USA	EMDR	Relaxation Training	TAU		Military Personnel/Veterans	Military Trauma	0	62	Unknown
Castillo 2016 [53]	86	USA	Group CBT-T	WL			Military Personnel/Veterans	Military Trauma	100	44%	Unknown
Chard 2005 [54]	71	USA	CPT (CBT-T)	WL			General Population	Child Sexual Abuse	100	Unknown	Unknown
Cloitre 2002 [55]	58	USA	CBT-T	WL			General Population	Child Abuse	100	24%	52
Cloitre 2010 [56]	71	USA	CBT-T	CBT without a trauma focus			General Population	Child Abuse	100	31%	Unknown
Deville 1998 [57]	35	Australia	EMDR	TAU			Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown
Deville 1999 [58]	32	Australia	EMDR	CBT-T			General Population	Various	100	Unknown	Unknown
Dorrepaal 2012 [59]	71	Netherlands	Group Stabilising Treatment	TAU			General Population	Child Abuse	Unknown	83%	Unknown
Duffy 2007 [60]	58	UK	CT (CBT-T)	WL			General Population	Various	40	Unknown	Unknown
Dunne 2012 [61]	26	Australia	CBT-T	WL			General Population	Road Traffic Accident	50	31%	73
Echeburua 1997 [62]	20	Spain	CBT-T	Relaxation Training			General Population	Child Abuse or Adult RaPE (CBT-T)	100	Unknown	20

Ehlers 2005 [63]	28	UK	CT (CBT-T)	WL			General Population	Various	50	25%	35
Ehlers 2003 [64]	57	UK	CT (CBT-T)	MC/RA			General Population	Road Traffic Accident	Unknown	Unknown	Unknown
Ehlers 2014 [65]	91	UK	CT (CBT-T)	SC	WL		General Population	Various	58.7	23	26
Falsetti 2008 [66]	60	USA	Group CBT-T	WL			General Population	Various	100	Unknown	Unknown
Fecteau 1999 [67]	20	Canada	CBT-T	WL			General Population	Road Traffic Accident	70	Unknown	Unknown
Feske 2008 [68]	21	USA	PE (CBT-T)	TAU			General Population	Various	100	29%	90%
Foa 1991 [69]	45	USA	PE (CBT-T)	CBT without a trauma focus	Supportive counselling	WL	General Population	Sexual Assault	100	Unknown	Unknown
Foa 1999 [70]	66	USA	PE (CBT-T)	CBT without a trauma focus	WL		General Population	Assault/Sexual assault	100	38%	41%
Foa 2005 [71]	179	USA	PE (CBT-T)	WL			General Population	Assault	100	17%	34%
Foa 2018 [72]	256	USA	Spaced PE (CBT-T)	PCT	MC/RA		Military Personnel/Veterans	Military Trauma	12	100%	66%
Fonzo 2017 [73]	66	USA	PE (CBT-T)	WL			General Population	Various	65	Unknown	Unknown
Forbes 2012 [74]	59	Australia	CPT (CBT-T)	TAU			Military Personnel/Veterans	Military Trauma	4	36%	Unknown
Ford 2011 [75]	146	USA	CBT without a trauma focus	PCT	WL		General Population	Various	100	Unknown	22%
Ford 2013 [76]	80	USA	Group CBT-T	Group Supportive Counselling			Incarcerated Women	Various	100	Unknown	Unknown
Galovski 2012 [77]	100	USA	CPT (CBT-T)	MC/RA			General Population	Various	69	Unknown	Unknown
Gamito 2010 [78]	10	Portugal	VRE (CBT-T)	Control Exposure	WL		Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown

Gersons 2000 [79]	42	Netherlands	BEP (CBT-T)	WL			General Population	Various	Unknown	Unknown	Unknown
Gray 2017 [80]	74	USA	RTM (CBT-T)	WL			Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown
Hensel-Dittmann 2011 [21]	28	Germany	NET (CBT-T)	CBT without a trauma focus			Asylum Seekers	Organised Violence	Unknown	Unknown	Unknown
Hinton 2005 [81]	40	USA	CBT-T	WL			Refugees	Genocide	60	Unknown	Unknown
Hinton 2011 [82]	24	USA	Group CBT-T	WL			General Population	Various	100	Unknown	Unknown
Hogberg 2007 [83]	24	Sweden	EMDR	WL			General Population	Various	38	Unknown	Unknown
Hollifield 2007 [84]	55	USA	Group trauma-focused CBT	WL			General Population	Various	68	Unknown	40%
Ironson 2002 [85]	22	USA	EMDR	PE (CBT-T)			General Population	Various	77	Unknown	Unknown
Ivarsson 2014 [86]	62	Sweden	I-CBT	WL			General Population	Various	82	8%	65%
Jacob 2014 [87]	76	Rwanda	NET (CBT-T)	WL			Genocide Survivors	Genocide	92	Unknown	Unknown
Jensen 1994 [88]	25	USA	EMDR	WL			Military Personnel/Veterans	Military Trauma	0	68	Unknown
Johnson 2011 [89]	70	USA	CBT without a trauma focus	TAU			General Population	Intimate Partner Violence	100	73	7%
Johnson 2016 [90]	60	USA	CBT without a trauma focus	TAU			General Population	Intimate Partner Violence	100	77	5%
Karatzias 2011 [91]	46	UK	EMDR	EFT			General Population	Various	57	37	47%
Keane 1989 [92]	24	USA	CBT-T	WL			Military Personnel/Veterans	Military Trauma	0	Unknown	Unknown

Krupnick 2008 [93]	48	USA	Group IPT	WL			General Population	Interpersonal Trauma	100	80	13%
Kubany 2003 [94]	37	USA	CBT-T	WL			General Population	Domestic Abuse	100	Unknown	Unknown
Kubany 2004 [95]	107	USA	CBT-T	WL			General Population	Domestic Abuse	100	Unknown	Unknown
Laugharne 2016 [96]	20	Australia	EMDR	PE (CBT-T)			General Population	Various	70	Unknown	Unknown
Lee 2002 [97]	24	Australia	CBT-T	EMDR			General Population	Various	46	Unknown	Unknown
Lewis 2017 [98]	42	UK	I-CBT	WL			General Population	Various	57	19	62%
Littleton 2016 [99]	87	USA	I-CBT	I- Psychoeducation			General Population	Rape	100	Unknown	Unknown
Litz 2007 [100]	45	USA	I-CBT	I-SC			Military Personnel/Veterans	Terrorism / Military Trauma	Unknown	Unknown	Unknown
Marcus 1997 [101]	67	USA	EMDR	TAU			General Population	Various	79	Unknown	Unknown
Markowitz 2015 [102]	110	USA	IPT	PE (CBT-T)	Relaxation Therapy		General Population	Various	70	21	Unknown
Marks 1998 [103]	87	UK	PE (CBT-T)	Cognitive Restructuring	PE (CBT-T) (CBT- T)(CBT-T)and Cognitive Restructuring	Relaxation without PE (CBT-T) (CBT- T)(CBT-T)or CR	General Population	Various	36	54	Unknown
McDonagh 2005 [104]	74	USA	PE (CBT-T)	PCT	WL		General Population	Child Sexual Abuse	100	17	Unknown
McLay 2011 [105]	20	USA	VRE (CBT-T)	TAU			Military Personnel/Veterans	Military Trauma	5	Unknown	Unknown
McLay 2017 [106]	81	USA	VRE (CBT-T)	Control Exposure Therapy			Military Personnel/Veterans	Military Trauma	4	Unclear	Unclear

Monson 2012 [107]	20	USA	Couples CBT-T	WL			General Population	Various	25	40	Unknown
Monson 2006 [108]	60	USA	CPT (CBT-T)	WL			Military Personnel/Veterans	Military Trauma	10	Unknown	Unknown
Morath 2014 [22]	38	Germany	NET (CBT-T)	WL			Refugees	Organised Violence	32	Unknown	Unknown
Meuser 2008 [109]	108	USA	CBT-T	TAU			General Population	Various	79	Unknown	Unknown
Nacasch 2011 [110]	30	Israel	PE (CBT-T)	TAU			Military Personnel/Veterans	Military Trauma	Unknown	63	Unknown
Neuner 2010 [23]	32	Germany	NET (CBT-T)	TAU			Refugees	Torture	31	Unknown	Unknown
Neuner 2008 [24]	277	Uganda	NET (CBT-T)	SC	Monitoring		Refugees	War	51	49	Unknown
Neuner 2004 [25]	43	Uganda	NET (CBT-T)	SC	Psychoeducation		Refugees	War	60	28	Unknown
Nijdam 2012 [111]	140	Netherlands	BEP (CBT-T)	EMDR			General Population	Various	56	Unknown	30
Pacella 2012 [112]	66	USA	PE (CBT-T) (CBT-T)	MC/RA			General Population	HIV Diagnosis	37	Unknown	Unknown
Paunovic 2011 [113]	29	Sweden	CBT-T	WL			General Population	Crime	63	74	11
Peniston 1991 [114]	29	USA	CBT-T	TAU			Military Personnel/Veterans	Military Trauma	Unknown	Unknown	Unknown
Power 2002 [115]	105	UK	EMDR	CBT-T	WL		General Population	Various	42	Unknown	Unknown
Rauch 2015 [116]	36	USA	PE (CBT-T) (CBT-T)	PCT			Military Personnel/Veterans	Military Trauma	9	Unknown	Unknown
Ready 2010 [117]	11	USA	VRE (CBT-T)	PCT			Military Personnel/Veterans	Military Trauma	Unknown	Unknown	Unknown
Reger 2016 [118]	162	USA	VRE (CBT-T)	PE (CBT-T)	WL		Military Personnel/Veterans	Military Trauma	4	Active duty	7

Resick 2015 [119]	108	USA	Group CBT-T	Group PCT			Military Personnel/Veterans	Military Trauma	8	0	8
Resick 2002 [120]	171	USA	CPT (CBT-T) (CBT-T)	PE (CBT-T)	Minimal Attention		General Population	Rape	100	Unknown	Unknown
Resick 2017 [121]	268	USA	CPT (CBT-T) (CBT-T)	Group CBT-T			Military Personnel/Veterans	Military Trauma	9	100	19
Rothbaum 1997 [122]	18	USA	EMDR	WL			General Population	Sexual Assault	100	19	43
Rothbaum 2005 [123]	60	USA	PE (CBT-T)	EMDR	WL		General Population	Rape	100	Unknown	Unknown
Sautter 2015 [124]	57	USA	Couples CBT without a trauma focus	Couples Psychoeducation			Military Personnel/Veterans	Military Trauma	1.75	12	75
Scheck 1998 [125]	60	USA	EMDR	SC			General Population	Various	100	Unknown	Unknown
Schnurr 2003 [126]	360	USA	Group CBT-T	Group PCT			Military Personnel/Veterans	Military Trauma	0	51	Unknown
Schnurr 2007 [127]	284	USA	PE (CBT-T) (CBT-T)	Group PCT			Military Personnel/Veterans	Military Trauma	100	38	Unknown
Schnyder 2011 [128]	30	Switzerland	BEP (CBT-T)	MC/RA			General Population	Various	46.7	Unknown	Unknown
Sloan 2012 [129]	46	USA	WET	WL			General Population	Road Traffic Accident	Unclear	78	41
Sloan 2018 [130]	126	USA	WET	CPT (CBT-T)			General Population	Various	49	Unknown	13
Spence 2011 [131]	42	Australia	I-CBT	WL			General Population	Various	81	41	Not Cle
Stenmark 2013 [26]	81	Norway	NET (CBT-T)	TAU			Refugees	Various	31	Unknown	25
Suris 2013 [132]	86	USA	CPT (CBT-T)	PCT			Military Personnel/Veterans	Military Sexual Trauma	85	43	16
Taylor 2003 [133]	60	USA	PE (CBT-T)	Relaxation Therapy	EMDR		General Population	Various	75	13	Unknown

Tylee 2017 [134]	30	USA	RTM (CBT-T)	WL			General Population	Military Trauma	0	Unknown	Unknown
Vaughan 1994 [135]	36	Australia	CBT-T	Relaxation Training	EMDR		General Population	Various	64	Unknown	Unknown
Wells 2015 [136]	32	UK	PE (CBT-T)	CBT without a trauma focus	WL		General Population	Various	38	6	Unknown
Wells 2012 [137]	20	UK	CBT without a trauma focus	WL			General Population	Various	55	Unknown	Unknown
Yehuda 2014 [138]	52	USA	PE (CBT-T)	MC/RA			Military Personnel/Veterans	Military Trauma	Unclear	Unknown	Unknown
Zang 2014 [139]	20	China	NET (CBT-T)	WL			General Population	Earthquake	90	Unknown	Unknown
Zang 2013 [140]	22	China	NET (CBT-T)	WL			General Population	Earthquake	77	Unknown	Unknown
Zlotnick 1997 [141]	48	USA	Group CBT-T	WL			General Population	Child Sexual Abuse	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

OEI = 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 2: Risk Assessment

	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
Basoglu 2005	Low	Low	Low	Low	Unclear	High	1
Basoglu 2007	Low	Low	High	High	Unclear	High	3
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
Cloitre 2002	Unclear	Unclear	Low	Low	High	Low	1
Cloitre 2010	Unclear	Low	Low	Low	Low	Low	0
Deville 1998	Unclear	Unclear	High	Low	Unclear	Low	1
Deville 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
Hinton 2005	Low	Unclear	Low	Low	Unclear	High	1
Hinton 2011	Unclear	Unclear	Low	Unclear	Unclear	High	1
Hogberg 2007	Low	Unclear	High	Low	Unclear	High	2
Hollifield 2007	Low	Low	Low	Low	Unclear	High	1
Ironson 2002	Unclear	Unclear	Low	High	Unclear	High	2
Ivarsson 2014	Low	Unclear	Low	Low	Low	High	1

Jacob 2014	Low	Low	Low	Low	Unclear	High	1
Jensen 1994	Unclear	Unclear	High	Unclear	Unclear	High	2
Johnson 2011	Low	Unclear	Low	High	Unclear	Low	1
Johnson 2016	Low	Low	Low	Low	Unclear	Low	0
Karatzias 2011	Low	Low	Low	Low	Unclear	High	1
Keane 1989	Unclear	Unclear	Unclear	High	Unclear	High	2
Krupnick 2008	Unclear	Unclear	Low	Unclear	Unclear	High	1
Kubany 2003	Unclear	Unclear	Low	Low	Unclear	High	1
Kubany 2004	Unclear	Unclear	Low	Low	Low	High	1
Laugharne 2016	Low	Low	Low	Low	Unclear	High	1
Lee 2002	Unclear	Unclear	Low	Low	Unclear	High	1
Lewis 2017	Low	Low	Low	Low	Low	High	1
ylittleton 2016	Low	Unclear	Low	High	Low	Low	1
Litz 2007	Unclear	Unclear	High	Low	Low	High	2
Marcus 1997	Unclear	Unclear	Unclear	High	Unclear	High	2
Markowitz 2015	Low	Low	Low	Low	Low	High	1
Marks 1998	Unclear	Unclear	Low	Low	Unclear	Low	0
McDonagh 2005	Unclear	Unclear	Low	Low	Unclear	Low	0
McLay 2011	Low	Low	Unclear	High	Unclear	High	2
McLay 2017	Low	Unclear	Low	Low	Low	Low	0

Monson 2012	Low	Low	Low	Low	Low	Low	0
Monson 2006	Low	Low	Low	Low	Unclear	Low	0
Morath 2014	Low	Low	Unclear	Low	Low	Low	0
Meuser 2008	Low	Low	Low	Low	Unclear	High	1
Nacasch 2011	Low	Unclear	Low	Low	Low	High	1
Neuner 2004	Low	Unclear	Low	Low	Low	High	1
Neuner 2008	Unclear	Unclear	Low	Low	Unclear	Low	0
Neuner 2010	Unclear	Unclear	Low	Low	Unclear	High	1
Nijdam 2012	Unclear	Low	Low	Low	Low	Low	0
Pacella 2015	Low	Unclear	Low	Low	Unclear	Low	0
Paunovic 2011	Unclear	Unclear	Low	High	Unclear	High	2
Peniston 1991	Unclear	Unclear	Unclear	Low	Unclear	Unclear	0
Power 2002	Low	Low	High	Low	Unclear	Low	1
Rauch 2015	Unclear	Unclear	Low	Low	Unclear	High	1
Ready 2010	Unclear	Unclear	Unclear	Low	Unclear	High	1
Reger 2016	Low	Low	Low	Low	Unclear	Low	0
Resick 2002	Unclear	Unclear	Low	Low	Unclear	High	1
Resick 2015	Unclear	Unclear	Low	Low	Unclear	Low	0
Resick 2017	Low	Unclear	Low	Low	Low	Low	0
Rothbaum 1997	Unclear	Unclear	High	Low	Unclear	High	2

Rothbaum 2005	Unclear	Unclear	High	Low	Unclear	Low	1
Sautter 2015	Unclear	Unclear	Low	Low	Unclear	Low	0
Scheck 1998	Low	Low	High	Unclear	Unclear	High	2
Schnurr 2003	High	Unclear	Low	Low	Low	Low	1
Schnurr 2007	Low	Low	Low	Low	Low	Low	0
Schnyder 2011	Low	Unclear	Low	Low	Unclear	Unclear	0
Sloan 2012	Low	Low	Unclear	Low	Unclear	Low	0
Sloan 2018	Low	Low	Low	Low	Low	Low	0
Spence 2011a	Low	Unclear	High	High	Low	Unclear	2
Stenmark 2013	Unclear	Unclear	Low	High	Low	High	2
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 3:

	Severity of PTSD symptoms post-treatment	<i>GRADE judgement for quality of evidence</i>
1) CBT with a trauma focus versus wait list or treatment as usual.	CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 51; N=1380; SMD -1.32 CI -1.57 to -1.08].	<i>MODERATE QUALITY</i>
2) Brief Eclectic Psychotherapy versus wait list or treatment as usual.	Brief Eclectic Psychotherapy showed no benefit when compared with wait list or treatment as usual [k = 2; N=72; SMD -0.38 CI -0.85 to 0.09].	<i>VERY LOW QUALITY</i>
3) Cognitive Processing Therapy versus wait list or treatment as usual.	Cognitive Processing Therapy showed a positive effect when compared with wait list or treatment as usual [k = 4; N=298; SMD -1.03 CI -1.45 to -0.61].	<i>LOW QUALITY</i>

4) Cognitive Therapy versus wait list or treatment as usual.	Cognitive Therapy showed a positive effect when compared with wait list or treatment as usual [k = 4; N=189; SMD -1.33 CI -1.80 to -0.86].	<i>LOW QUALITY</i>
5) Narrative Exposure Therapy (NET) versus wait list or treatment as usual.	Narrative Exposure Therapy (NET) showed a positive effect when compared with wait list or treatment as usual [k = 8; N=241; SMD -1.06 CI -1.61 to -0.52].	<i>LOW QUALITY</i>
6) Prolonged Exposure versus wait list or treatment as usual.	Prolonged exposure (PE) showed a positive effect when compared with wait list or treatment as usual [k = 12; N=772; SMD -1.59 CI -2.05 to -1.13].	<i>LOW QUALITY</i>
7) Single Session CBT with a trauma focus versus wait list or treatment as usual.	Single Session CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 2; N=90; SMD -0.57 CI -1.00 to -0.15].	<i>VERY LOW QUALITY</i>

8) Reconsolidation of traumatic memories (RTM) versus wait list or treatment as usual	RTM showed a positive effect when compared with wait list or treatment as usual [k = 2; N=96; SMD -2.35 CI -2.89 to -1.82].	<i>VERY LOW QUALITY</i>
9) EMDR versus wait list or treatment as usual	EMDR showed a positive effect when compared with wait list or treatment as usual [k = 11; N=415; SMD -1.23 CI -1.69 to -0.76].	<i>LOW QUALITY</i>
10) Non-trauma focused CBT versus wait list or treatment as usual	CBT without a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 7; N=318; SMD -1.06 CI -1.39 to -0.73].	<i>LOW QUALITY</i>
11) Supportive counselling versus waitlist or treatment as usual	There was no evidence of a difference between supportive counselling and wait list or treatment as usual [k = 2; N=72; SMD -0.43 CI -0.90 to 0.04].	<i>VERY LOW QUALITY</i>
12) Present centred therapy versus waitlist or treatment as usual	Present centred therapy showed a positive effect when compared with waitlist of treatment as usual [k = 2; N=138; SMD -0.97 CI -1.33 to -0.62].	<i>VERY LOW QUALITY</i>

13) Psychodynamic therapy versus treatment as usual	Psychodynamic therapy showed no benefit when compared with wait list or treatment as usual [k = 1; N=52; SMD -0.41; CI -0.96 to 0.14].	<i>VERY LOW QUALITY</i>
14) Written exposure therapy versus treatment as usual	Written exposure therapy showed a positive effect when compared with waitlist of treatment as usual [k = 1; N=44; SMD -3.39; CI -4.43 to -2.44].	<i>VERY LOW QUALITY</i>
15) Virtual Reality Therapy versus wait list or treatment as usual	Virtual Reality Therapy showed a positive effect when compared with wait list or treatment as usual [k = 3; N=104; SMD -0.43 CI -0.83 to -0.03].	<i>VERY LOW QUALITY</i>
16) Observed and experimental integration (OEI) versus wait list or treatment as usual	OEI showed a positive effect when compared with wait list or treatment as usual [k = 1; N=10; SMD -2.86 CI -4.90 to -0.83].	<i>VERY LOW QUALITY</i>
17) Relaxation Training versus wait list or treatment as usual	Relaxation training showed no benefit when compared with wait list or treatment as usual [k = 1; N=53; SMD -0.10; CI -0.65 to 0.46].	<i>VERY LOW QUALITY</i>

18) Group CBT with a trauma focus versus wait list or treatment as usual	Group CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 7; N=313; SMD -1.02 CI -1.26 to -0.78].	<i>MODERATE QUALITY</i>
19) Group and individual CBT with a trauma focus versus wait list or treatment as usual	Group and individual CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 1; N=55; SMD -2.32 CI -3.01 to -1.62].	<i>VERY LOW QUALITY</i>
20) Group stabilising treatment versus wait list or treatment as usual	Group stabilising treatment showed no benefit when compared with wait list or treatment as usual [k = 1; N=71; SMD -0.11; CI -0.36 to 0.57].	<i>VERY LOW QUALITY</i>
21) Group interpersonal therapy (IPT) versus wait list or treatment as usual	Group IPT showed a positive effect when compared with waitlist or treatment as usual [k = 1; N=48; SMD -1.19; CI -1.84 to -0.54].	<i>VERY LOW QUALITY</i>

22) Couples CBT with a trauma focus vs waitlist or treatment as usual	Couples CBT with a trauma focus showed a positive effect when compared with waitlist or treatment as usual [k = 1; N=40; SMD -1.12; CI -1.79 to -0.45].	<i>VERY LOW QUALITY</i>
23) Guided internet-based trauma focused CBT versus waitlist/usual care	Guided internet-based CBT with a trauma focus showed a positive effect when compared with wait list or treatment as usual [k = 3; N=145; SMD -1.08 CI -1.80 to -0.37].	<i>VERY LOW QUALITY</i>

Table 4

	Severity of PTSD symptoms post-treatment	<i>GRADE judgement for quality of evidence</i>
1) CBT with a trauma focus versus CBT without a trauma focus	There was no evidence of a difference between CBT with a trauma focus versus CBT without a trauma focus [k = 5; N=185; SMD -0.10 CI -0.19 to 0.39].	<i>LOW QUALITY</i>

2) CBT with a trauma focus versus Present Centred Therapy	CBT with a trauma focus showed a positive effect when compared with present centred therapy [k = 4; N=433; SMD -0.45 CI -0.81 to -0.09].	<i>LOW QUALITY</i>
3) CBT with a trauma focus versus supportive counselling	CBT with a trauma focus showed a positive effect when compared with supportive counselling [k = 8; N=434; SMD -0.63 CI -1.04 to -0.21].	<i>LOW QUALITY</i>
4) CBT with a trauma focus versus psychodynamic therapy	There was no evidence of a difference between CBT with a trauma focus and psychodynamic therapy [k = 1; N = 56; SMD -0.03 CI -0.56 to 0.49].	<i>VERY LOW QUALITY</i>
5) CBT with a trauma focus versus Interpersonal Therapy (IPT)	CBT-T showed a positive effect when compared with IPT [k = 1; N=66; SMD -0.48; CI -0.98 to 0.01].	<i>VERY LOW QUALITY</i>
6) CBT without a trauma focus versus PCT	There was no evidence of a difference between CBT without a trauma focus and PCT [k = 1; N = 101; SMD -0.04 CI -0.43 to 0.35].	<i>VERY LOW QUALITY</i>

7) CBT with a trauma focus versus dialogical exposure therapy (DET)	CBT with a trauma focus showed a positive effect when compared with dialogical exposure therapy [k = 1; N=138; SMD -0.39; CI -0.73 to -0.05].	<i>VERY LOW QUALITY</i>
8) Cognitive processing therapy (CPT) versus prolonged exposure (PE)	There was no evidence of a difference between cognitive processing therapy and prolonged exposure [k = 1; N=124; SMD -0.18; CI -0.53 to 0.17].	<i>VERY LOW QUALITY</i>
9) EMDR versus CBT with a trauma focus	There was no evidence of a difference between CBT with a trauma focus and EMDR [k = 10; N=387; SMD -0.17 CI -0.55 to 0.21].	<i>LOW QUALITY</i>
10) EMDR versus supportive counselling	EMDR showed a positive effect when compared with supportive counselling [k = 1; N=57; SMD -0.75 CI -1.29 to -0.21].	<i>VERY LOW QUALITY</i>
11) EMDR versus EFT	There was no evidence of a difference between EMDR and EFT [k = 1; N=46; SMD = 0.08; CI -0.50 to 0.65].	<i>VERY LOW QUALITY</i>

12) EMDR versus Relaxation Training	There was no evidence of a difference between EMDR and Relaxation Training [k = 4; N=117; SMD = -0.23; CI -0.59 to 0.14].	<i>VERY LOW QUALITY</i>
13) EMDR versus REM Desensitisation	There was no evidence of a difference between EMDR and REM Desensitisation [k = 1; N=21; SMD = 0.06; CI -0.80 to 0.91].	<i>VERY LOW QUALITY</i>
14) CBT without a trauma focus versus supportive counselling	CBT without a trauma focus showed a positive effect when compared with supportive counselling [k = 1; N=25; SMD -1.22 CI -2.09 to -0.35].	<i>VERY LOW QUALITY</i>
15) CBT with a trauma focus versus psychoeducation	There was no evidence of a difference between CBT-T and psychoeducation [k = 1; N=27; SMD = -0.19; CI -0.95 to 0.57].	<i>VERY LOW QUALITY</i>
16) Written exposure therapy versus CBT with a trauma focus	There was no evidence of a difference between WED and CBT with a trauma focus [k = 1; N=126; SMD 0.13; CI -0.21 to 0.48].	<i>VERY LOW QUALITY</i>

17) CBT with a trauma focus versus relaxation training	Individual CBT with a trauma focus showed a positive effect when compared with relaxation training [k = 5; N=203; SMD -0.49; CI -0.79 to -0.20].	<i>LOW QUALITY</i>
18) Supportive counselling versus psychoeducation	There was no evidence of a difference between supportive counselling and psychoeducation [k = 1; N=25; SMD 0.13; CI -0.92 to 0.65].	<i>LOW QUALITY</i>
19) Interpersonal therapy versus relaxation training	There was no evidence of a difference between IPT and relaxation training [k = 1; N=60; SMD -0.15; CI -0.67 to 0.38].	<i>VERY LOW QUALITY</i>
20) Virtual reality therapy versus control exposure	There was no evidence of a difference between virtual reality therapy and control exposure [k = 2; N=177; SMD 0.01; CI -0.68 to 0.71].	<i>LOW QUALITY</i>
21) Virtual reality therapy and present centred therapy	There was no evidence of a difference between virtual reality therapy and present centred therapy [k = 1; N=9; SMD -0.51; CI -1.86 to 0.84].	<i>VERY LOW QUALITY</i>

22) Group CBT with a trauma focus versus group present centred therapy	Group CBT with a trauma focus showed a positive effect when compared with group present centred therapy [k = 2; N=333; SMD -0.44; CI -0.63 to -0.24].	<i>LOW QUALITY</i>
23) Group CBT with a trauma focus versus individual CBT with a trauma focus	Individual CBT with a trauma focus showed a positive effect when compared with group CBT with a trauma focus [k = 1; N=268; SMD 0.35; CI 0.11 to 0.59].	<i>VERY LOW QUALITY</i>
24) Group CBT without a trauma focus versus group supportive counselling	There was no evidence of a difference between group CBT without a trauma focus and group supportive counselling [k = 1; N=72; SMD -0.02; CI -0.48 to 0.44].	<i>VERY LOW QUALITY</i>
25) Couples CBT without a trauma focus vs couples psychoeducation	Couples CBT without a trauma focus showed a positive effect when compared with couples psychoeducation [k = 1; N=43; SMD -1.37; CI -2.04 to -0.70].	<i>VERY LOW QUALITY</i>

26) Internet-based trauma focused CBT versus internet-based psychoeducation	Internet-based CBT with a trauma focus showed no benefit when compared with internet-based psychoeducation [k = 1; N=87; SMD 0.11 CI -0.31 to 0.53].	<i>VERY LOW QUALITY</i>
27) Internet-based trauma focused CBT versus internet-based CBT without a trauma focus	Internet-based CBT with a trauma focus showed no benefit when compared with internet-based CBT without a trauma focus [k = 1; N=31; SMD 0.40 CI -1.12 to 0.31].	<i>VERY LOW QUALITY</i>

