

CADTH RAPID RESPONSE REPORT:  
SUMMARY WITH CRITICAL APPRAISAL

# Group Cognitive Processing Therapy for Adults with Post- Traumatic Stress Disorder, Anxiety, or Mood Disorders: A Review of Clinical Effectiveness and Guidelines

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## Context and Policy Issues

Post-traumatic stress disorder (PTSD) is a severe, often chronic and disabling disorder, which develops in some persons following exposure to a traumatic event, such as military combat, motor vehicle collisions, violent personal assault, being taken hostage, a terrorist attack, torture, natural or human-caused disasters and in some cases, being diagnosed with a life-threatening illness.<sup>1,2</sup> The lifetime prevalence of PTSD in Canada has been estimated to be 9.2% in the general population, while a higher rate was observed in the armed forces population (11.1%).<sup>3,4</sup> Generalized anxiety disorder and depression are also common mental disorders. The lifetime prevalence has been estimated to be 12.1% for anxiety and 15.7% for depression among those in the Canadian armed forces.<sup>3,4</sup>

Cognitive-behavioral therapy (CBT) is a commonly used practice in the treatment of PTSD and other corollary symptoms following traumatic events.<sup>5</sup> Clinical practice guidelines developed by different agencies recommend that CBTs are the most effective treatment for PTSD.<sup>6-10</sup> It is a trauma-focused psychological intervention that treats mental disorders by directly addressing thoughts, feelings or memories of the traumatic event, and includes components from both behavioral and cognitive therapy.<sup>1,3,11</sup> It can be administered either as group or individual therapy. Two commonly used CBTs are cognitive processing therapy (CPT) and prolonged exposure (PE).<sup>12</sup> CPT is a specific type of CBT which includes “psychoeducation, written accounts about the traumatic event, and cognitive restructuring addressing the beliefs about the event’s meaning and the implications of the trauma for one’s life.”<sup>11</sup> It can be divided into three phases: education, processing, and challenging. Similarly to CBT, CPT can be offered in individual, group, or a combination of the two settings in clinical practice, depending on the population being served and resources of the therapy site.<sup>13</sup>

Group therapy is a form of psychotherapy in which patients are treated together in a group format.<sup>14</sup> Common features of a group therapy include: a relatively homogenous group membership, provision of mutual support, acknowledgement and validation of the traumatic experience, and normalisation of traumatic responses.<sup>15</sup> The presence of other individuals with similar experiences may help to overcome a belief that the therapist cannot be helpful because he or she has not experienced the specific trauma.<sup>15</sup> Common group therapy approaches include the cognitive behavioral, educative, interpersonal and/or interactive, psychodynamic, group-as-a-whole, and creative approaches.<sup>16,17</sup> An integrative approach that combines educational, psychodynamic and interpersonal theories and techniques have also been introduced by researchers.<sup>16</sup> Previous research has indicated that not all patients with psychiatric disorders may benefit from group psychotherapy. Patients with paranoid symptoms, acute psychosis, severe depression, or those who were organically damaged may not be appropriate candidates for group therapy.<sup>14</sup>

The purposes of this review are to identify the clinical evidence on group CPT for adults (in particular veteran, active military, and first responder populations) with PTSD, anxiety and other mood disorders, and to examine the clinical effectiveness of group CPT for these patients.

## Research Questions

1. What is the clinical effectiveness of group cognitive processing therapy for adults with post-traumatic stress disorder, anxiety disorders, or mood disorders?
2. What are the evidence-based guidelines associated with the group cognitive processing therapy for adults with post-traumatic stress disorder, anxiety disorders, or mood disorders?

## Key Findings

Evidence from one systematic review, two randomized controlled trials and two non-randomized controlled trials suggested that compared with other group therapies, group cognitive processing therapy had a similar effect in improving clinical symptoms (post-traumatic stress disorder- or depression-related, and sleep disorders) in adult patients with post-traumatic stress disorder. Patients treated with individual cognitive processing therapy had greater improvements in post-traumatic stress disorder severity than group cognitive processing therapy. However, the clinical effectiveness of group cognitive processing therapy relative to other treatments for post-traumatic stress disorder should be interpreted with caution, due to the compromised quality and the small sample size in the majority of the included trials.

One evidence-based clinical practice guideline developed in Australia suggests that group cognitive behavioral therapy may be provided as adjunctive to, but not be considered an alternative to, individual trauma-focused therapy.

## Methods

### Literature Search Methods

A limited literature search was conducted on key resources including Medline, PsycINFO, PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2012 and May 12, 2017.

Rapid Response reports are organized so that the evidence for each research question is presented separately.

### Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

**Table 1: Selection Criteria**

<b>Population</b>	Adults with PTSD, anxiety disorders, or mood disorders
<b>Intervention</b>	CPT in group form

<b>Comparator</b>	Q1: CPT in individual form; any other type of group therapy Q2: No comparator
<b>Outcomes</b>	Q1: Clinical effectiveness Q2: Guidelines
<b>Study Designs</b>	HTAs, SRs, MAs, RCTs, comparative non-RCTs, and evidence-based clinical practice guidelines.

CPT = cognitive processing therapy; HTA = Health technology assessments; MA = meta-analysis; PTSD = post-traumatic stress disorder; RCT = randomized controlled trial; SR = systematic review.

## Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or were published prior to 2012. Studies with pre-post-test design but without a control group were excluded. Studies were also excluded when it was unclear whether the intervention was delivered in a group format. Guidelines with unclear methodology were also excluded.

## Critical Appraisal of Individual Studies

The included systematic reviews were critically appraised using the AMSTAR instrument,<sup>18</sup> randomized and non-randomized studies were critically appraised using the Downs and Black checklist,<sup>19</sup> and guidelines were assessed with the AGREE II instrument.<sup>20</sup> Summary scores were not calculated for the included studies; rather, a review of the strengths and limitations of each included study were described.

## Summary of Evidence

### Quantity of Research Available

A total of 230 citations were identified in the literature search. Following screening of titles and abstracts, 204 citations were excluded 26 potentially relevant reports from the electronic search were retrieved for full-text review. One potentially relevant publication was retrieved from the grey literature search. Of these potentially relevant articles, 21 publications were excluded for various reasons, while six publications met the inclusion criteria and were included in this report. Appendix 1 describes the PRISMA flowchart of the study selection.

### Summary of Study Characteristics

Six publications were identified for inclusion in this report: one systematic review (SR),<sup>21</sup> three randomized controlled trials (RCTs),<sup>22-24</sup> one non-RCT,<sup>25</sup> and one clinical practice guideline.<sup>15</sup>

A detailed summary of study characteristics is provided in Appendix 2.

### Study Design

The SR by Steenkamp et al. aimed to examine the effectiveness of psychotherapies for PTSD in military and veteran populations.<sup>21</sup> It included five RCTs of CPT (either in individual or group settings) compared to other active treatments (such as present-centered therapy [PCT] and treatment as usual) or a waitlist. The included primary studies were

published between 2006 and 2015. One of the five RCTs comparing group CPT with group PCT was relevant to this review (Resick et al. 2015).<sup>26</sup>

In two of the three RCTs included in this review,<sup>22,23</sup> randomization was carried out with computer-generated random numbers. The follow-up periods in the three RCTs ranged from three to 12 months.<sup>22-24</sup> One study conducted by Pruiksmas et al.<sup>24</sup> reported the effect of group therapies on sleep disturbance in the study population based on data from an earlier RCT,<sup>26</sup> which was included in the Steenkamp review.<sup>21</sup> Williams et al. evaluated the effect of group therapies on interpersonal trust in a non-RCT.<sup>25</sup>

One evidence-based guideline by Phoenix Australia - Centre for Posttraumatic Mental Health was published in 2013.<sup>15</sup> The purpose of this guideline is to provide guidance on the treatment for children, adolescents and adults with acute stress disorder and PTSD.<sup>15</sup> It is an update of a previous guideline developed in 2007.

### *Country of Origin*

The SR was conducted by authors in the United States.<sup>21</sup> All RCTs and non-RCT were conducted in the United States.<sup>22-25</sup>

### *Guideline Development and Methodology*

During the development of the Australian guideline, the working party and multidisciplinary panel worked in collaboration to establish the research questions, to identify relevant evidence using a systematic literature search strategy, and to develop the recommendations arising from the literature review.<sup>15</sup>

Guideline recommendations arising from the SR are graded according to the National Health and Medical Research Council (NHMRC) grading system developed between 2005 and 2009.<sup>27</sup>

- Grade A: Body of evidence can be trusted to guide practice
- Grade B: Body of evidence can be trusted to guide practice in most situations
- Grade C: Body of evidence provides some support for recommendation(s) but care should be taken in its application
- Grade D: Body of evidence is weak and recommendation(s) must be applied with caution (page 8)<sup>27</sup>

### *Patient Population*

In the RCTs included in the Steenkamp review, service members, veterans or both were enrolled, and one RCT recruiting active duty soldiers was relevant to this review.<sup>21</sup> In this study, 108 participants were randomized to receive group CPT (n = 56) or group PCT (n = 52).

In the RCTs included in this review, two enrolled active-duty US army soldiers seeking treatment for PTSD,<sup>22,24</sup> while another examined the effects of group CPT in civilians.<sup>23</sup> The non-RCT by Williams et al. recruited male Vietnam combat veterans only.<sup>25</sup>

### *Guideline Intended Users and Target Population*

The Australian guideline is intended to be used by healthcare professionals who plan and provide treatment across clinical settings, or patients who are affected by trauma.<sup>15</sup>

### *Interventions and Comparators*

In the Steenkamp review, CPT was given in individual settings in four RCTs and in group settings in one RCT.<sup>21</sup> In the one RCT comparing group CPT with group PCT,<sup>26</sup> a CPT-cognitive only version (CPT-C) was adopted in the intervention group. The patient groups met twice weekly for six weeks for 90-minute sessions with CPT- and PCT-certified therapist.

All primary RCTs and non-RCT evaluated the effectiveness of group CPT (various versions) in adult patients with a diagnosis of PTSD.<sup>22-25</sup> In general, group CPT was offered as 12 90-minute treatment sessions, twice a week for six weeks consecutively. It was compared with individual CPT<sup>22</sup> or other psychological therapies in group formats, such as memory specificity training (MeST),<sup>23</sup> present-cognitive therapy (PCT),<sup>24</sup> or long-term process (LTP).<sup>25</sup>

The Australian guideline considered group therapy for treatment of PTSD.<sup>15</sup>

### *Outcomes*

In the Steenkamp review, the most reported outcomes were degree of clinically significant PTSD symptom improvement (which was measured using different approaches, such as change in PTSD symptom scores from baseline), the proportion of patients attaining clinically meaningful change in PTSD symptoms at the end of the treatment, and between-group effect size measured with Cohen d (calculated as the difference between two mean PTSD severity scores divided by the pooled standard deviation [SD]; a d of 0.20 = small effect size, d of 0.50 = medium effect size, d of 0.80 = large effect size).<sup>21</sup> The PTSD symptom score was measured by the PTSD Symptom Scale-Interview (PSS-I), in that a score of 1 or more over the past two weeks is counted as a PTSD symptom toward diagnosis.<sup>28</sup> The PTSD Checklist (PCL) is an instrument used for assessing the severity of the disease. Higher scores indicates greater PTSD severity, and a 10-point change in PCL is considered clinically relevant.<sup>29</sup>

Severity of PTSD symptom (assessed using either clinician-administered scales or self-reported scales) and depressive symptoms (assessed using self-reported scales) were evaluated in the identified RCTs and non-RCTs. Global functioning, sleep disturbance and interpersonal trust were also explored in these primary studies. Adverse events associated with group CPT was reported in one RCT.<sup>22</sup>

The intended outcome of the Australian Guidelines is resolution of PTSD symptoms.<sup>15</sup>

### *Summary of Critical Appraisal*

Strengths of the Steenkamp reviews were related to the comprehensive literature search.<sup>21</sup> A diagnosis of PTSD in the included RCTs all followed the Diagnostic and Statistical Manual for Mental Disorders (Fourth Edition, Text Revision).<sup>30</sup> It was unclear whether duplicate study selection or data extraction was performed. Quality assessment of the identified RCTs was not reported. Data synthesis was not conducted. One of the included RCTs was relevant to this review when the clinical effectiveness of group CPT was examined. Patient characteristics of this trial such as demographic characteristics, disease severity or concurrent therapy were insufficiently described; therefore it is unclear whether the patients' baseline characteristics were similar between the two treatment groups, and whether the study results are generalizable to a Canadian population. Another strength of

the Steenkamp review was that the authors focused on intent-to-treat outcomes when available.

The study objective was clearly described, and the inclusion and exclusion criteria were stated in all RCTs and non-RCT. In two RCTs,<sup>22,23</sup> random numbers were generated to assign treatment groups to the study participants,<sup>22,23</sup> while in the third RCT, the methods of randomization was not provided.<sup>24</sup> The participants were not blinded to the intervention in any of the studies; however the outcome assessors were unaware of the treatment groups. Blinding study participants would be difficult due to the nature of these interventions, and it is unclear whether patients' awareness of their treatment allocation has an impact on the study results.

Interpretation of the findings from some RCTs may be challenging, due to the small sample size or a lack of power calculation.<sup>23,25</sup>

Three studies enrolling veterans or active-duty soldiers were conducted in the United States.<sup>22,24,25</sup> There were no Canadian studies. It is unclear whether the study findings can be generalized to Canadian military personnel who suffered with PTSD or other mood disorders. Participants in an RCT<sup>23</sup> were recruited via advertisement in local community; therefore they may not be entirely representative of a typical Canadian patients population.

For the non-RCT, the quality of these studies was compromised due to the nature of the study design, in that patients were not randomly allocated to the investigated treatment modalities. Selection bias is likely to be introduced in this manner. In the Williams' study,<sup>25</sup> group CPT was not described in sufficient detail; therefore it is uncertain whether this intervention was conducted in a similar approach as other studies. Potential confounders such as disease severity and duration, co-morbidities, previous and concomitant treatment and experience of the therapists were not elaborated either. In addition, patients' baseline characteristics were not reported in detail. Thus, it is challenging to compare the two treatments based on limited information.

In the Australian guidelines, the overall objective, the scope and rationale of the guidelines were specifically described.<sup>15</sup> It also had clear involvement of the relevant professional groups in the guideline development process. A systematic literature search strategy was employed to identify relevant evidence. A grade for the whole body of evidence supporting each recommendation was determined, and the working party then reviewed the strength of the evidence and generated recommendations accordingly. In addition to the recommendations, the working party also provided a grade to indicate the strength of the recommendation. Specific recommendations were easily identifiable, and presented considerations for special populations and different options for management of the applicable condition. Funding sources in support of the guideline development was reported.

Additional details regarding study strengths and limitations are provided in Appendix 3.

## Summary of Findings

Details of the main study findings and authors' conclusions are presented in Appendix 4.

Six publications regarding the clinical effectiveness of group CPT for adult patients (military personnel or civilians) with PTSD met the inclusion criteria for this review.



1. *What is the clinical effectiveness of group cognitive processing therapy for adults with post-traumatic stress disorder, anxiety disorders, or mood disorders?*

All studies but one<sup>24</sup> included in this review reported results pertaining to change in PTSD symptoms. Clinical effectiveness of group CPT on sleep quality was assessed in one secondary analysis of an RCT.<sup>24</sup> Improvement in interpersonal trust related to the group therapy was examined in a non-RCT.<sup>25</sup> Adverse effect associated with group CPT was examined in an RCT.<sup>22</sup>

Change in PTSD symptoms

The results from one systematic review showed that the PTSD symptoms (measured with PSS-I) decreased from baseline in both group CPT (-4.7) and group PCT (-3.2). A larger proportion of patients reported clinically meaningful change (at least 10-point reduction) in the PCL score in the group CPT arm. The between-group effect size from pre-treatment to post-treatment was small (Cohen d = 0.21).<sup>21</sup>

In the RCT by Resick et al, group CPT was compared with individual CPT.<sup>22</sup> The results showed that at the end of the treatment among active-duty soldiers, individual treatment was associated with statistically greater improvement in PTSD severity; greater improvement in depressive symptoms was also observed in the individual treatment group, but the between-group difference was not statistically significant. At the six-month follow-up, the between-group differences were not statistically significant for any of these outcomes. Another RCT involving civilians reported that both group MeST and group CPT were effective in reducing PTSD symptoms and depressive symptoms, and the treatment effect was maintained at 3-month follow-up.<sup>23</sup>

In one non-RCT, group CPT was superior to long-term process in reducing PTSD symptoms in veterans.<sup>25</sup>

Change in sleep disturbance

According to a secondary analysis of RCT data in a population of active-duty soldiers, treatment with group CPT or group PCT was not associated with statistically significant improvements on insomnia and nightmares, at one-year follow-up.<sup>24</sup>

Interpersonal trust

One non-RCT examined the effect of group CPT and LTP on interpersonal trust, and indicated that patients treated with LTP was related to greater improvement in interpersonal trust, compared with group CPT, although the between-group difference was not statistically significant.<sup>25</sup>

Adverse events

In the RCT by Resick et al. (2017), two unsuccessful suicide attempts were reported in the group CPT arm, one occurred before the start of the treatment and the other during the treatment. However, neither of them was considered to be study-related.

2. *What are the evidence-based guidelines associated with the group cognitive processing therapy for adults with post-traumatic stress disorder, anxiety disorders, or mood disorders?*

Recommendations of the Australian clinical practice guidelines indicate that group CBT (trauma-focused or non-trauma-focused) may be provided as adjunctive to, but not be considered an alternative to, individual trauma-focused therapy. The strength of the recommendation was graded as C, indicating that the body of evidence provides some support for the recommendation but care should be taken in its application.<sup>15</sup>

### Limitations

The evidence regarding the clinical effectiveness of group CPT was limited to one SR, two RCTs and two non-RCTs. The investigated intervention was a cognitive processing therapy carried out in group formats. Among the five RCTs included in the SR, group CPT was examined in only one RCT. The quality of the majority of the identified primary studies was compromised by high patient attrition rate,<sup>22</sup> insufficient power to detect statistically significant between-group differences if there were any, insufficient data reporting (patient characteristics, therapist experience, and investigated intervention), or the study design of non-RCTs.<sup>23-25</sup> Therefore, results from all studies should be interpreted with caution.

None of the included studies were carried out in Canada; therefore the generalizability of the study findings to a Canadian population may be limited.

One evidence-based clinical practice guideline was identified for this review. Guidance on treatment for patients with PTSD was provided for group cognitive behavioral therapy, instead of group cognitive processing therapy.

### Conclusions and Implications for Decision or Policy Making

In total, one systematic review, two randomized controlled trials and two non-randomized controlled trials have been examined in the current report. All patients (military personnel or civilians) had a diagnosis of PTSD. Sample size ranged from 16 to 268 inpatients. The group CPT was carried out as 12 90-minute sessions, twice weekly for six consecutive weeks. The treatment effect of group CPT was compared with individual CPT or other group therapies, such as PCT, MeST or LTP.

Evidence from these studies suggests that compared with other group therapies, group CPT had similar treatment effect in improving clinical symptoms (PTSD symptoms, depressive symptoms or sleep disorders). Results from a non-randomized trial suggested that group CPT was superior to long-term process group in reducing PTSD symptoms, but the latter was superior to group CPT in improving interpersonal trust. On the other hand, individual treatment resulted in greater improvement in PTSD severity than group treatment in one RCT. Depression and suicidal ideation improved equally with both formats. However, the clinical effectiveness of group CPT relative to other treatments for PTSD should be interpreted with caution, due to the compromised quality and the small sample size in the majority of the included trials.

Additional evidence from high quality studies with longer-term follow-up, especially in a Canadian setting, would be required to formulate solid conclusions regarding clinical effectiveness of group CPT in adult patients with PTSD or other mood disorders.

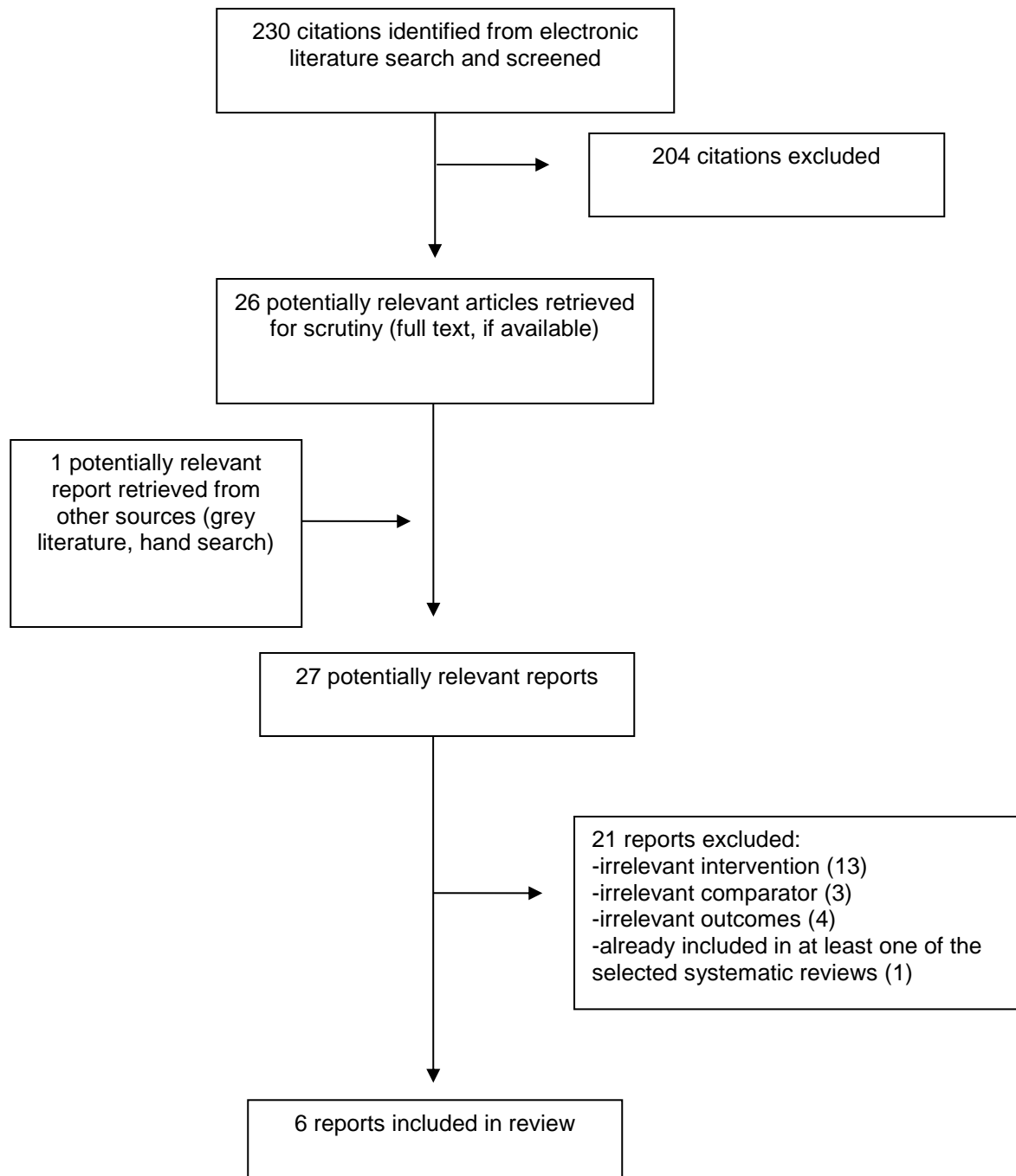
One evidence-based clinical practice guideline developed in Australia suggests that group cognitive behavioral therapy may be provided as adjunctive to, but not be considered an alternative to, individual trauma-focused therapy.

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## Appendix 1: Selection of Included Studies



## Appendix 2: Characteristics of Included Publications

**Table 1: Characteristics of Included Systematic reviews**

Publication Year, Country	Types and numbers of primary studies included	Population Characteristics	Intervention	Comparator(s)	Clinical Outcomes, Length of Follow-Up
<b>Steenkamp 2015, US<sup>21</sup></b>	5 RCTs of CPT (1 examined group therapy)	Military personnel or veterans with PTSD symptoms	CPT offered in individual or group settings.  Group therapy: 1 RCT  Individual therapy: 4 RCTs	Other active psychological treatments (i.e. PCT, MeST);  Usual care or no treatment (wait-list)	% attaining clinically meaningful change at post-treatment; between-group effect size from pre- to post-treatment.  Follow-up: 12 months

CPT = cognitive processing therapy; PCT = present-centred therapy; PE = prolonged exposure therapy; PTSD = post-traumatic stress disorder; RCT = randomized controlled trial.

**Table 2: Characteristics of Included Clinical Studies**

First Author, Publication Year, Country, Study Name	Study Design	Patient Characteristics	Intervention(s)	Comparator(s)	Clinical Outcomes
<b>Resick 2017, US<sup>22</sup></b>	Open-label RCT  Follow-up: 6 months	Active-duty US army soldiers seeking treatment for PTSD after deployments to or near Iraq or Afghanistan.  Randomized: n = 268	Group CPT: n = 133  (8-10 patients /group, met twice weekly for 6 weeks for 90-minute sessions)	Individual CPT n = 135  (60-minute session, twice weekly)	PSS-I  PCL-S  BDI-II  Adverse events
<b>Maxwell 2016, US<sup>23</sup></b>	RCT  Follow-up: 3 months	Adult patients (≥18 years of age) in the local community who have experienced traumatic event(s) and possible PTSD symptomatology	Group CPT: n = 8  (12 biweekly 90-minute sessions for 6 weeks)	Group MeST: n = 8  (6 weekly 90-minute sessions)	PTSD symptoms (MPSS-SR)  BDI-II  Global functioning (the GAF scale)  Overgeneral memory (AMT)
<b>Pruiksma 2016, US<sup>24</sup></b>	Secondary analysis of an RCT (Resick 2015) <sup>26</sup>	Active-duty US army soldiers who had completed at least 1	Group CPT-C: n = 56  (8-10 patients/	Group PCT: n = 52  (8-10 patients/	Sleep parameters (PCL-S items 2 and 13)

**Table 2: Characteristics of Included Clinical Studies**

First Author, Publication Year, Country, Study Name	Study Design	Patient Characteristics	Intervention(s)	Comparator(s)	Clinical Outcomes
	Follow-up: 12 months	deployment in support of the wars in Iraq and Afghanistan	group; 12 biweekly 90-minute sessions for 6 weeks)	group; 12 biweekly 90-minute sessions for 6 weeks)	
<b>Williams 2014, US<sup>25</sup></b>	Comparative non-RCT  Follow-up: 12 weeks for group CPT, 25 weeks for LTP	Male Vietnam combat veterans with PTSD recruited from one medical center	Group CPT: n = 10  (12-week session)	Group LTP: n = 6  (weekly 90-minute sessions of psychodynamic psychotherapy for 25 weeks; patients in this group had > 5 years of group psychotherapy treatment and were participating in an ongoing process group)	Interpersonal trust (the Iterated Trust Game, measured with IR)  PTSD symptoms (PCL-M)

AMT = Autobiographical Memory Task; BDI-II = the Beck Depression Inventory-II; BSSI = the Beck Scale for Suicidal Ideation; CPT = cognitive processing therapy; CPT-C = cognitive processing therapy-cognitive only version; GAF = the Global Assessment of Functioning scale; IR = investment ratio (the fraction of points invested across the 10 rounds – used to quantify a veteran’s behavioral level of trust); LTP = long-term process group; MeST = memory specificity training; PCL = Posttraumatic Stress Symptom Checklist-Military; PCL-S = stressor-specific version of the Posttraumatic Stress Disorder Checklist; PCT = present-centered therapy; PSS-I = the Posttraumatic Symptom Scale-Interview Version; RCT = randomized controlled trial.

## Appendix 3: Critical Appraisal of Included Publications

**Table 3: Strengths and Limitations of Systematic Reviews using AMSTAR<sup>18</sup>**

Strengths	Limitations
Steenkamp 2015 <sup>21</sup>	
<ul style="list-style-type: none"> <li>A comprehensive literature search of multiple databases was performed</li> <li>Diagnostic criteria of PTSD was standardized across the included primary studies</li> </ul>	<ul style="list-style-type: none"> <li>No a priori published research objectives or protocol described</li> <li>Unclear if study selection and data extraction was performed by 2 independent reviewers</li> <li>Quality assessment of the included primary studies was not reported</li> <li>Excluded studies list not provided</li> <li>Characteristics of included studies were not described in sufficient details</li> <li>Conflict of interest for the authors and sources of funding were not reported</li> </ul>

PTSD = Post-traumatic stress disorder.

**Table 4: Strengths and Limitations of Randomized Controlled Trials and Non-Randomized Studies using the Downs and Black Checklist<sup>19</sup>**

Strengths	Limitations
Resick 2017 <sup>22</sup>	
<ul style="list-style-type: none"> <li>The study objective was clearly described</li> <li>Patient inclusion and exclusion criteria were provided</li> <li>Interventions, comparators, and main outcomes were clearly described in the methods section</li> <li>Adverse events associated with intervention were considered</li> <li>Actual probability values reported</li> <li>All interview and self-reported measures were administered by independent evaluators who were masked to treatment condition</li> <li>Appropriate statistical tests were used to assess the main outcomes; analysis was based on intention-to-treat</li> <li>Main outcome measures were clearly described</li> <li>Patients in both treatment groups were recruited from the same facility, over the same period of time</li> <li>Sample size calculation was performed</li> <li>Conflict of interest and funding sources were reported</li> </ul>	<ul style="list-style-type: none"> <li>Patients were not blinded to the intervention they received</li> <li>45% of patients treated with group CPT and 39% treated with individual CPT did not complete the intervention; 31% of patients treated with group CPT and 33% with individual CPT did not complete post-treatment assessment; 49% of patients treated with group CPT and 39% with individual CPT did not complete 6-month follow-up</li> </ul>
Maxwell 2016 <sup>23</sup>	
<ul style="list-style-type: none"> <li>The study objective was clearly described</li> <li>Patient inclusion and exclusion criteria were provided</li> <li>Interventions, comparators, and main outcomes were clearly described in the methods section</li> <li>All interviewers were blinded to the assigned treatment condition for each participant</li> <li>there were no dropouts</li> <li>Main outcome measures were accurate</li> </ul>	<ul style="list-style-type: none"> <li>Patients were not blinded to the intervention they received</li> <li>Study participants were recruited via advertisements throughout the local community; therefore they may not be representative of the overall patient population</li> <li>Adverse events associated with intervention were not considered</li> <li>Small sample; power calculation was not performed</li> <li>Conflict of interest and funding sources were not reported</li> </ul>



**Table 4: Strengths and Limitations of Randomized Controlled Trials and Non-Randomized Studies using the Downs and Black Checklist<sup>19</sup>**

Strengths	Limitations
Pruiksma 2016 <sup>24</sup> (using data from an RCT conducted by Resick 2015) <sup>26</sup>	
<ul style="list-style-type: none"> <li>• The study objective was clearly described</li> <li>• Patient inclusion and exclusion criteria were provided in the original study</li> <li>• Interventions, comparators, and main outcomes were clearly described in the methods section in the original study</li> <li>• Main findings clearly described</li> <li>• Actual probability values reported</li> </ul>	<ul style="list-style-type: none"> <li>• Sleep outcomes in the study population was examined using single items from a PTSD scale</li> <li>• Confounders not described, and it is unclear whether they were adjusted for in the statistical models</li> <li>• Unclear how many patients were lost to follow-up, in particular at the 12-month follow-up</li> </ul>
Williams 2014 <sup>25</sup>	
<ul style="list-style-type: none"> <li>• The study objective was clearly described</li> <li>• Patient inclusion and exclusion criteria were provided in the original study</li> <li>• Interventions, comparators, and main outcomes were clearly described</li> <li>• Main findings clearly described</li> <li>• Power calculation performed</li> <li>• Actual probability values reported</li> <li>• Conflict of interest and funding sources provided</li> </ul>	<ul style="list-style-type: none"> <li>• Unclear whether patients in the intervention and control groups were recruited over the same period of time</li> <li>• Small sample</li> <li>• insufficient details provided for intervention/comparators</li> </ul>

CPT = cognitive processing therapy; RCT = randomized control trial.

## Appendix 4: Main Study Findings and Author’s Conclusions

**Table 5: Summary of Findings of Included Studies**

Main Study Findings	Author’s Conclusion
Systematic Reviews and Meta-Analyses	
Steenkamp 2015 <sup>21</sup>	
<ul style="list-style-type: none"> <li>Decrease in PTSD symptoms from baseline using PSS-I: 4.7 for group CPT vs. 3.2 for group PCT</li> <li>% attaining clinically meaningful change in PCL at post-treatment: 15 patients (49%) for group CPT vs. 14 (34%) for group PCT</li> <li>within-group effect size for CPT: <math>d = 1.10</math></li> <li>between-group effect size from pre-treatment to post-treatment: <math>d=0.21</math> for post-treatment, 6-month follow-up and 12-month follow-up</li> </ul>	<ul style="list-style-type: none"> <li>“self-reported PTSD symptoms improved in both groups but statistically significantly more so in the CPT group. Between-group differences were small and not significant for interviewer-assessed PTSD symptoms at posttreatment, 6-month and 12-month follow-up. There were no significant differences between groups in the percentage of patients attaining clinically significant change in self-reported symptoms at posttreatment, 6-month, or 12-month follow-up.” Page 493</li> <li>“CPT was marginally superior to active, non-trauma-focused control comparisons”. Page 493</li> </ul>
Primary Clinical Studies (RCTs)	
Resick 2017 <sup>22</sup>	
<p><u>Post-treatment</u> Change in PSS-I total score from baseline (mean±SE): -4.0±1.0 for group CPT vs. -7.8±1.0 for individual CPT; between-group difference -3.7±1.4, <math>p=0.006</math></p> <p>Change in PCL-S total score from baseline (mean±SE): -6.3±1.4 for group CPT vs. -12.6±1.4 for individual CPT; between-group difference -6.3±1.9, <math>p=0.001</math></p> <p>% of patients with remission of PTSD diagnosis (%±SE): 37%±5 for group CPT vs. 49%±5 for individual CPT; between-group difference 12%±8, <math>p=0.11</math>; NNT=8.3</p> <p>Depression measured by BDI-II from baseline (cohen d): 0.5 for group CPT vs. 0.8 for individual CPT; <math>p &gt; 0.05</math></p> <p><u>6-month follow-up</u> Change in PSS-I total score from baseline (mean±SE): -5.2±1.1 for group CPT vs. -7.1±1.1 for individual CPT; between-group difference -1.9±1.6, <math>p=0.22</math></p> <p>Change in PCL-S total score from baseline (mean±SE): -6.5±1.7 for group CPT vs. -10.7±1.6 for individual CPT; between-group difference -4.2±2.3, <math>p=0.06</math></p> <p>% of patients with remission of PTSD diagnosis (%±SE): 39%±7 for group CPT vs. 43%±6 for individual CPT; between-group difference 4%±9, <math>p=0.64</math>; NNT=24.3</p>	<p>“individual treatment resulted in greater improvement in PTSD severity than group treatment. Depression and suicidal ideation improved equally with both formats.” Page 28</p>

**Table 5: Summary of Findings of Included Studies**

Main Study Findings	Author's Conclusion
<p>Depression measured by BDI-II from baseline (cohen d): 0.7 for group CPT vs. 0.8 for individual CPT; <math>p &gt; 0.05</math></p> <p>2 unsuccessful suicide attempts in group CPT (1 before the start of treatment and 1 during the treatment, neither was judged to be study related as per participant report)</p>	
Maxwell 2016 <sup>23</sup>	
<p><u>MPSS-SR total score (mean ± SD)</u>                      Baseline: 54.13±24.87 for group CPT vs. 63.50±18.37 for group MeST                      Post-treatment: 38.13±15.06 for group CPT vs. 49.00±26.60 for group MeST                      3-month follow-up: 25.13±23.31 for group CPT vs. 33.5±25.39 for group MeST                      Cohen <math>d = 0.50</math></p> <p><u>BDI-II score (mean ± SD)</u>                      Baseline: 23.63±16.27 for group CPT vs. 26.13±11.31 for group MeST                      Post-treatment: 14.75±10.99 for group CPT vs. 20.25±16.03 for group MeST                      3-month follow-up: 11.38±11.08 for group CPT vs. 18.13±13.27 for group MeST                      Cohen <math>d = 0.40</math></p> <p><u>GAF total score</u>                      Post-treatment: 69.44±10.04 for group CPT vs. 67.25±16.60 for group MeST                      Cohen <math>d = -0.16</math> (data at other timepoints were not reported)</p> <p><u>AMT total score (the ability to retrieve specific memories)</u>                      Baseline: 8.25±1.49 for group CPT vs. 7.75±2.32 for group MeST                      Post-treatment: 9.88±0.35 for group CPT vs. 9.13±0.99 for group MeST                      3-month follow-up: 9.13±0.83 for group CPT vs. 8.63±2.00 for group MeST                      Cohen <math>d = -1.01</math></p>	<p><i>“MeST and CPT were both found to be efficacious at reducing symptom distress among individuals with PTSD... PTSD symptom reduction was maintained at 3 months for both the MeST group treatment and the CPT active control group. In addition, overall psychological function increased comparably in both groups from baseline to posttreatment and was also maintained at follow-up. The findings also revealed that individuals in both groups comparably increased in their ability to retrieve specific memories, underscoring the findings from the animal and preclinical studies that elucidated the potential role memory specificity during reconsolidation leading to diminished fear responding”. Page 442-443</i></p> <p><i>“Improvement in PTSD symptoms, depressive symptoms, and global functioning were similar between MeST and CPT”. Page 433</i></p>
Primary Clinical Studies (non-RCTs)	
Pruiksma 2016 <sup>24</sup>	
<p><u>% reporting insomnia on PCL-S, item 13</u>                      Baseline: 95% for group CPT-C vs. 88% for group PCT                      Posttreatment: 73% for group CPT-C vs. 74% for group PCT                      12-month follow-up: 78% for group CPT-C vs. 75% for group PCT                      (All <math>p</math> values for within-group significance tests across different post-treatment timepoints <math>&gt; 0.05</math>)</p> <p><u>% reporting nightmares on PCL-S, item 2</u>                      Baseline: 63% for group CPT-C vs. 75% for group PCT                      Posttreatment: 50% for group CPT-C vs. 52% for group PCT                      12-month follow-up: 55% for group CPT-C vs. 49% for group PCT                      (All <math>p</math> values for within-group significance tests across different post-treatment timepoints <math>&gt; 0.05</math>)</p>	<p><i>“Insomnia was found to be one of the most prevalent and persistent problems among service members receiving PTSD treatment. Nightmares were relatively more positively responsive to treatment.” Page 698</i></p>

**Table 5: Summary of Findings of Included Studies**

Main Study Findings	Author's Conclusion
Williams 2014 <sup>25</sup>	
<p><u>Average PCL-M total score (mean ± SD)</u>                      Baseline: 61.60±14.52 for group CPT vs. 58.17±10.98 for group LTP                      Post-treatment: 46.15±12.95 for group CPT vs. 56.83±13.38 for group LTP                      Pre-Post change: -15.45±6.78 for group CPT vs. -1.33±12.21 for group LTP, p value for between-group comparison = 0.003</p> <p><u>Average score for interpersonal trust (mean% ± SD)</u>                      Baseline: 31.3±15.0 for group CPT vs. 59.1±29.6 for group LTP                      Post-treatment: 33.9±24.6 for group CPT vs. 86.8±16.8 for group LTP                      Pre-Post change: 2.6±25.0 for group CPT vs. 27.8±38.5 for group LTP, p value for between-group comparison = 0.264</p>	<p><i>“CPT treatment may be better than LTP treatment for improving PTSD symptoms, but LTP therapy may be better than CPT therapy for improving interpersonal trust in veterans with PTSD”. Page 336</i></p>

AMT = Autobiographical Memory Test total score; BDI-II = the Beck Depression Inventory 2<sup>nd</sup> edition (higher scores indicate more severe symptom); CPT = cognitive processing therapy; CPT-C = cognitive processing therapy-cognitive only version; GAF = Global Assessment of Functioning (higher scores indicate better functioning); MeST = memory specificity training; MPSS-SR = Modified PTSD Symptom Scale-Self-report (higher scores indicate more severe symptom); NNT = number needed to treat; PCL = PTSD checklist (higher scores indicate more severe symptom); PCL-S = stressor version of the PTSD checklist; PCT = present-centered therapy; PSS-I = PTSD Symptom Scale Interview (higher scores indicate more severe symptom); PTSD = post-traumatic stress disorder; SE = standard error; SD = standard deviation.