

Evidence Compass



Technical Report

What are the effective psychological interventions for veterans with problematic anger and aggression?

A Rapid Evidence Assessment

September 2014



Australian Government
Department of Veterans' Affairs

Disclaimer

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Executive Summary

- Problematic anger is commonly reported in veterans and can persist for many years. It is associated with high levels of distress and can have detrimental effects on interpersonal relationships, general functioning, and increase risk of interpersonal violence. Problematic anger and aggression are also commonly associated with the experience of mental health conditions, such as posttraumatic stress disorder (PTSD).
- The aim of this rapid evidence assessment (REA) was to review effective psychological interventions for problematic anger and aggression in veterans.
- Literature searches were conducted to collect studies published from 2004-2014 that investigated interventions that targeted anger and/or aggression in veterans. Studies were excluded if: the paper was not in English, was published prior to 2004, full-text versions were not readily available, animal studies, validation studies, grey literature or the sample was not adults (mean age of sample ≤ 17 years of age). Included studies were assessed for quality of methodology, risk of bias, and quantity of evidence. In addition, all studies were rated on consistency, generalisability and applicability of the findings to the population of interest. These assessments were then collated to determine an overall ranking of level of evidence support.
- The ranking categories were 'Supported' –clear, consistent evidence of beneficial effect; 'Promising' – evidence suggestive of beneficial effect but further research required; 'Unknown' – insufficient evidence of beneficial effect; 'Not supported' – Clear, consistent evidence of no effect or negative/harmful effect.
- Thirteen studies met the inclusion criteria for review. Of these, 77% (n=10) originated from the USA. Two studies (15%) were sourced from Australia and the final study came from Germany with a sample from the Democratic Republic of Congo (8%). In terms of the year of publication, there was a notable increase in the number of studies meeting inclusion criteria in the year 2013.
- The 13 studies were divided into two groups: those which directly targeted anger in veterans (i.e. the primary focus of this REA); or those involving veteran samples where anger was not the target of the intervention, but where anger was measured as a secondary outcome (e.g. PTSD treatment studies- these studies were captured as a by-product of this REA).

- Of the four studies investigating interventions directly targeting anger in veterans, one study was CBT-based individual therapy and three studies were of CBT-based group therapy.
- Of the remaining studies in which anger was a secondary outcome, one study involved CBT-based individual therapy, three studies were CBT-based combined group and individual therapy, three studies involved alternative group therapy, one study was an alternative therapy with a combined format, and one study was an alternative therapy where the format was not specified.
- **Ratings of the evidence for interventions targeting anger in veterans (primary focus of this REA) key findings:**
 - The evidence for CBT-based individual therapy received an 'Unknown' rating.
 - The evidence for CBT-based group therapy received a 'Promising' rating.
- **Ratings of the evidence for interventions for veterans where anger was a secondary outcome key findings:**
 - The evidence for CBT-based individual therapy (CPT) received a 'Promising' rating
 - The evidence for CBT-based combined group and individual therapy received an 'Unknown' rating
 - The evidence for alternative individual therapy received an 'Unknown' rating
 - The evidence for alternative group therapy received an 'Unknown' rating
 - The evidence for alternative combined format therapy received an 'Unknown' rating
- Encouragingly, CBT-based group therapy was ranked as 'Promising'. The high levels of drop out observed in many of the studies indicate that refinement of these treatments is required to improve client engagement and retention. Further well conducted, rigorous trials are required to test the efficacy of interventions identified in this REA in the treatment of anger or aggression in veterans, which may then result in some treatments being ranked as supported in the future.

Introduction

Anger is a primary human emotion that can serve a variety of adaptive functions¹ and has been hypothesised to have evolutionary value for promoting survival in the context of threat or provocation. It is a multi-faceted construct that includes physiological, cognitive, affective and behavioural components. It can be described as a negative phenomenological (or internal) feeling state associated with specific cognitive and perceptual distortions (e.g., hostile appraisal, attributions of blame, injustice, preventability, and/or intentionality), and accompanying physiological arousal². While anger is a normal human emotion, it is considered problematic when it occurs at a level of frequency, intensity or duration to cause significant distress, actively interferes with interpersonal relationships and functioning or is associated with aggressive behaviours toward others. Despite the clear links between anger and aggression, there are a number of important differences between these two constructs. In contrast to anger, aggression is primarily behavioural, and constitutes specific behaviours that are performed with the intention to threaten or harm another³. Aggressive behaviours include acts such as verbal abuse, threats and violence (including partner and stranger violence). Despite these clear definitions for both anger and aggression, it is important to note that no formal diagnoses for problematic anger or aggression currently exist in either the Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Classification of Diseases (ICD). Rather, the diagnosis of intermittent explosive disorder (IED) is often considered as a proxy for problematic anger.

Anger is one of the most common problems reported by military personnel and veterans⁴. It is associated with high levels of distress⁵ and can have detrimental effects on social and family relationships and general functioning⁶. Anger and aggression can be environmentally and culturally reinforced for military members – due to the powerful conditioning of anger as an adaptive response to threats during training, and further reinforcement of the ‘survival’ benefit of anger on deployment – in situations of prolonged hazard and threat, and during actual combat.

Anger and aggression can become problematic however, when military members return from deployment or return to civilian life. One study showed that 57% of Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) veterans (N=754) in a VA medical sample reported increased difficulty in controlling anger since returning from combat, and 35% reported thoughts about hurting another person. The observed high incidence of anger and aggression replicates previous rates of post-deployment anger and aggression of up to 40% in OEF/OIF samples⁷.

Despite increasing numbers of veterans returning from deployment with problematic anger and aggression, the treatment of anger within this population has not been thoroughly investigated. In contrast to areas of research such as post-traumatic stress disorder (PTSD), there has been comparatively little attention directed toward other less clinically prominent behavioural outcomes of combat exposure that still have the potential to adversely impact the health and well-being of returning service members⁸. The aim of the current rapid review was to examine the scientific literature for evidence of effective interventions veterans with problematic anger and aggression.

The influence of military factors and military trauma-related experiences means that veterans may differ from members of the general community in response to treatment for anger and aggression. Although not all of those who experience anger have PTSD, for some people PTSD can also play an important role in the development of anger. An overview of the relationship between anger and PTSD is provided below, and a brief overview of the work that has been done to date examining anger treatments for adults in the general community is also provided.

Anger in the context of PTSD

The experience of anger is so frequent amongst individuals with PTSD that it is one of the hyperarousal symptoms of PTSD. Anger is often reported co-morbidly with PTSD and this relationship appears to have a unique presentation amongst veteran populations. Specifically, in a 2006 meta-analysis of anger and PTSD in trauma-exposed adults the association between anger and PTSD was even stronger in samples with military war experience compared to samples who had experienced other types of trauma⁹. Veterans with PTSD are at higher risk of committing acts of targeted aggression – such as domestic violence, as well as general aggression such as threats of violence, destruction of property and becoming involved in fights (for a review see¹⁰). Additionally, research has found that experiencing anger has been associated with poorer response to PTSD treatment among veterans^{11,12}. For these reasons, many PTSD treatments, especially those tailored to military and veteran populations include some type of anger management. However, while many effective and empirically-validated treatments and interventions exist that target PTSD in veteran and military populations, interventions that target anger directly are scarce, and a general lack of research evaluating the efficacy of anger treatments has been noted in the literature¹³. A small number of anger interventions with veterans were published prior to the search period for the current REA (i.e. 2004-2014)^{14,15}. For example, a 1997 randomised controlled trial (RCT) provided a 12 session anger management intervention for traumatised combat Vietnam veterans, and showed encouraging results¹⁴. Given that contemporary

veterans differ from previous veteran cohorts, and US studies show that contemporary veterans have reported difficulty in controlling their anger^{4,16}, there is a pressing need to re-evaluate effective anger interventions for veterans.

The link between PTSD, anger and the expression of aggression or violence may also be accounted for by other factors including medical conditions such as chronic pain and sleep difficulties, or comorbid diagnoses such as depression and alcohol and substance disorders. It may also be accounted for by skill deficits such as compromised communication abilities and poor problem solving, and experiential variables such as the nature of trauma exposure (i.e. severity and chronicity), as well as exposure to specific stressors such as atrocities (involving moral injury) and financial hardship. All of these factors may influence the efficacy of an intervention for problematic anger or aggression in veterans with PTSD.

Psychological interventions targeting anger and aggression

While there have been very few past papers published which have examined interventions that focus specifically on problematic anger and aggression in veteran populations, there is some research in civilian adults which indicates promising interventions. The results of these trials play an important role in guiding research examining the efficacy of anger and aggression interventions for veterans.

Cognitive behavioural therapies (CBTs) are the most common interventions used for anger interventions in populations such as community members, inmates and inpatients¹⁷⁻²¹. CBT-based therapies are well-established in the treatment of PTSD²², and other anxiety and mood disorders²³, and many anger interventions consist of, or include, CBT-based elements. Such elements include behavioural coping strategies and cognitive restructuring, as well as some kind of *in vivo* (i.e. in real life situations and imaginal exposure).

In addition to the widespread use of CBT-based treatments, a number of non-CBT-based treatments have also emerged in the last couple of decades, and some of these have begun to be applied to anger and anger-related problems. For example, relaxation-focused interventions are quickly gaining popularity as they are relatively simple, and some techniques can be practiced anywhere and on-the-go. These interventions may include mindfulness or yoga practices, as well as breathing exercises. Such interventions may be very useful in the treatment of anger, which has a strong physiological manifestation and in the case of PTSD, has been linked to hyperarousal symptoms^{24,25}. A yoga program may

therefore be a good adjunct or alternative to other treatments by reducing hyperarousal symptoms, thereby improving anger.

A large meta-analysis published in 2006 of anger treatments for adults in the general community, included 92 treatment interventions and a total of 1,841 participants. It found that anger treatments for adults in the general community were effective²⁶. Specifically, anger interventions showed significant reductions in the experience of anger and aggressive behaviour, as well as an increase in positive behaviours. Compared to untreated participants, those in the anger treatments showed moderate improvement on anger and large improvements across time when comparing pre-treatment to post-treatment anger scores. It should be noted that the treatments that were included in this meta-analysis ranged from meditation and biofeedback to CBT and psychoanalysis, however, no significant differences were found in effectiveness between these treatment types. The authors suggest that this may be due to the small number of studies that used each type of treatment, and that the majority of the interventions were cognitive-behavioural (so there was a general lack of variability between treatments²⁶).

Method

This literature review utilised a rapid evidence assessment (REA) methodology. The REA is a research methodology which uses similar methods and principles to a systematic review but makes concessions to the breadth and depth of the process, in order to suit a shorter timeframe. The advantage of an REA is that it utilises rigorous methods for locating, appraising and synthesising the evidence related to a specific topic of enquiry. To make a REA rapid, however, the methodology places a number of limitations in the search criteria and in how the evidence is assessed. For example, REAs often limit the selection of studies to a specific time frame (e.g., last 10 years), and limit selection of studies to peer-reviewed published, English studies (therefore not including unpublished pilot studies, difficult-to-obtain material and/or non-English language studies). Also, while the strength of the evidence is assessed in a rigorous and defensible way, it is not necessarily as exhaustive as a well-constructed systematic review and meta-analysis. A major strength, however, is that an REA can inform policy and decision makers more efficiently by synthesising and ranking the evidence in a particular area within a relatively short space of time and at less cost than a systematic review/meta-analysis.

Defining the research question

The components of the question were precisely defined in terms of the population, the interventions, and the outcomes (PICO - refer to Appendix 1). Operational definitions were established for key concepts for each question, and from this specific inclusion and exclusion criteria were defined for screening studies for this REA. As part of this operational definition, the population of interest was defined as veterans with problematic anger or aggression, and the outcome was defined as anger or aggression symptom outcomes.

Search strategy

To identify the relevant literature, systematic bibliographic searches were performed to find relevant trials from the following databases: EMBASE, MEDLINE (PubMed), PsycINFO, Cochrane, Clinical Guidelines Portal (Australia), and the National Guideline Clearinghouse (USA).

No guidelines, meta-analyses or systematic reviews were identified which covered effective interventions for the treatment of anger or aggression in veterans that met the inclusion/exclusion criteria of the current review.

Search terms

The search terms specific to anger interventions were included in searching the Title/s, Abstract/s, MeSH terms, Keywords lists and Chemical included: *anger, aggression, aggressive, aggressive behaviour, veteran, military, soldier, defence/defense, clinical trial, treatment, effectiveness, therapy, treatment study, clinical study, control study, psychological intervention, behavioral therapy, cognitive therapy, psychotherapy or psychological therapy.*

An example of the search strategy conducted in the Embase database appears in the Appendix 2.

Paper selection

Papers were included in the review of the evidence if they met all of the following inclusion criteria.

Included:

1. Internationally and locally published peer-reviewed research studies
2. Research papers that were published from **1st January 2004** to **17th April 2014** (including meta-analyses or systematic reviews that include meta-analysis)
3. Human Adults (i.e. ≥ 18 years of age)
4. English Language
5. Sample patients have problematic anger and aggression
6. Trials with outcome data that assesses anger or aggression outcomes

Excluded:

1. Non-English papers
2. Papers where a full-text version is not readily available
3. Validation study
4. Animal studies
5. Grey literature (e.g. media: newspapers, magazines, television, conference abstracts, theses)
6. No quantitative outcome data report
7. Children (Mean age of sample ≤ 17 years of age)

Information management

A screening process was adopted to code the eligibility of papers acquired through search strategy. Papers were directly imported into the bibliographic tool Endnote X5, and then processed using Excel. All records that were identified using the search strategy were screened for relevance against the inclusion criteria. Initial screening for inclusion was performed by one reviewer, and was based on the information contained in the title and abstract. Full text versions of all studies which satisfied this initial screening were obtained.

In screening the full-text paper, the reviewer made the decision on whether the paper should be included or excluded, based on criteria for the specific question. If the paper met the criteria for inclusion, then it was subject to data abstraction. At this stage in the information management process, 10% of the articles being processed were randomly selected and checked by one independent reviewer. It was found that there was 100% inter-rater agreement between the two reviewers. The following information was extracted from studies that met the inclusion criteria: (i) study description, (ii) intervention description, (iii) participant characteristics, (iv) primary outcome domain, (v) secondary outcome domain, (vi) main findings, (vii) bias and (viii) quality assessment.

Evaluation of the evidence

There were four key components that contributed to the overall evaluation of the evidence.

These components were:

- The **strength of the evidence base**, in terms of the quality and risk of bias, quantity of evidence, and level of evidence (study design)
- The **consistency** of the study results
- The **generalisability** of the body of evidence to the target population (e.g. veterans)
- The **applicability** of the body of the evidence to the Australian context

The first two components provided a gauge of the internal validity of the study data in support of efficacy (for an intervention). The last two components considered the external factors that may influence effectiveness, in terms of the generalisability of study results to the intended target population, and applicability to the Australian context.

Strength of the evidence base

The strength of the evidence base was assessed in terms of the a) quality and risk of bias, b) quantity of evidence, and c) level of evidence.

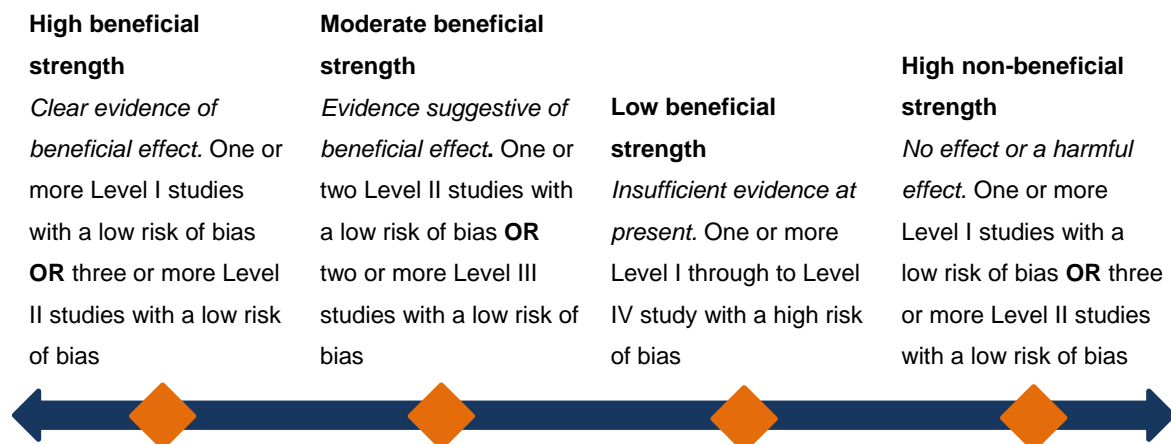
- Quality and risk of bias** reflected how well the studies were conducted, including how the participants were selected, allocated to groups, managed and followed-up, and how the study outcomes were defined, measured, analysed and reported. An assessment was conducted for each individual study with regard to the quality and risk of bias criteria utilising a modified version of the Chalmers Checklist for appraising the quality of studies of interventions²⁷ (see Appendix 3). Three independent raters rated each study according to these criteria, and together a consensus agreement was reached as to an overall rating of 'Good', 'Fair', or 'Poor'.
- Quantity** of evidence reflected the number of studies that were included as the evidence base for each ranking. The quantity assessment also took into account the number of participants in relation to the frequency of the outcomes measures (i.e. the statistical power of the studies). Small underpowered studies that were otherwise sound may have been included in the evidence base if their findings were generally similar- but at least some of the studies cited as evidence must have been large enough to detect the size and direction of any effect.

c) **Level of evidence** reflected the study design. The details of the study designs which are covered by each level of evidence are as follows:

- Level I: A systematic review of RCTs
- Level II: An RCT
- Level III-1: A pseudo-RCT (i.e. a trial where a pseudo-random method of allocation is utilised, such as alternate allocation).
- Level III-2: A comparative study with concurrent controls. This can be any one of the following:
 - Non-randomised experimental trial [this includes controlled before-and-after (pre-test/post-test) studies, as well as adjusted indirect comparisons (i.e. utilise A vs B and B vs C to determine A vs C with statistical adjustment for B)]
 - Cohort study
 - Case-control study
 - Interrupted time series with a control group
- Level III-3: A comparative study without concurrent controls. This can be any one of the following:
 - Historical control study
 - Two or more single arm study [case series from two studies. This would include indirect comparisons utilise (i.e. A vs B and B vs C to determine A vs C where there is no statistical adjustment for B)]
 - Interrupted time series without a parallel control group.
- Level IV: Case series with either post-test or pre-test/post-test outcomes

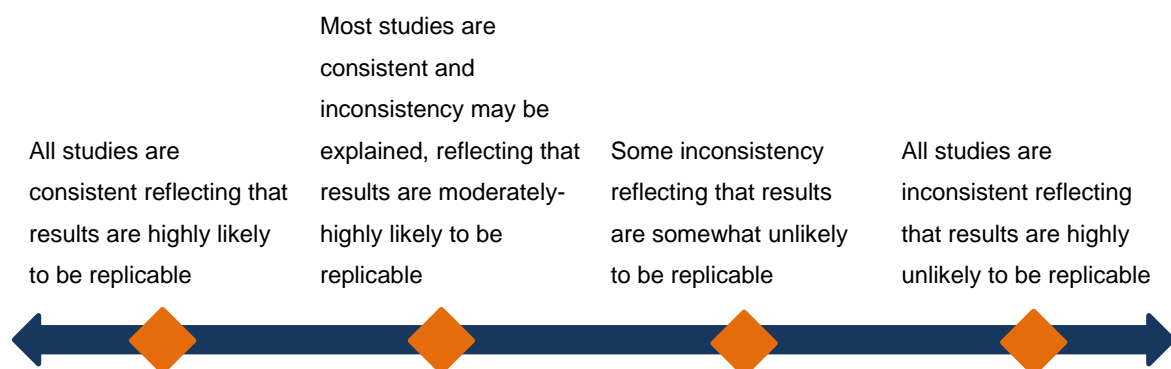
Overall strength

A judgement was made about the strength of the evidence base, taking into account the quality and risk of bias, quantity of evidence and level of evidence. Agreement was sought between three independent raters and consensus about the strength of the evidence based was obtained according to the categories on the following pages.



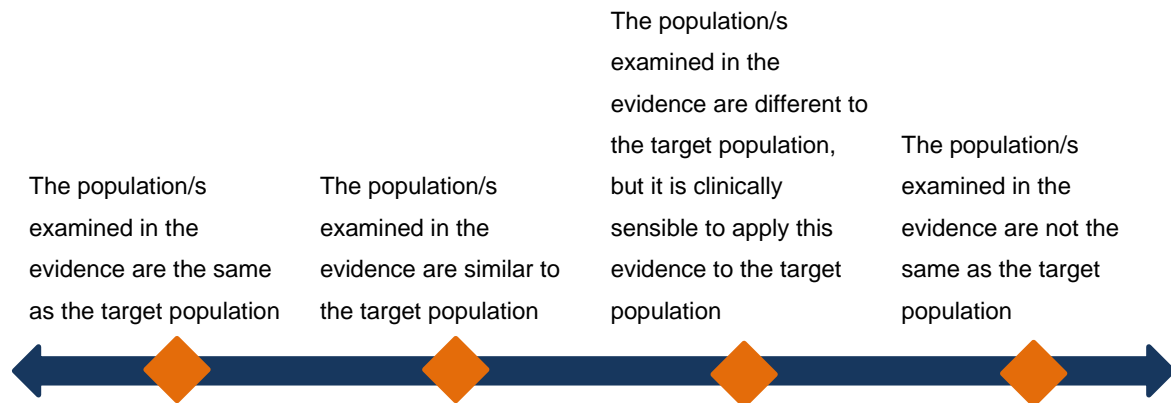
Consistency

The consistency component of the ranking system of the body of the evidence assessed whether the findings were consistent across the included studies (including across a range of study populations and study designs). It was important to determine whether study results were consistent to ensure that the results were likely to be replicable or only likely to occur under certain conditions.



Generalisability

This component covered how well the participants and settings of the included studies could be generalised to the target population. Population issues that might influence this component included gender, age or ethnicity, or level of care (e.g. community or hospital).



Applicability

This component addressed whether the evidence base was relevant to the Australian context, or to specific local settings (such as rural areas or cities). Factors that may reduce the direct application of study findings to the Australian context or specific local settings include organisational factors (e.g. availability of trained staff) and cultural factors (e.g. attitudes to health issues, including those that may affect compliance).



Ranking the evidence

On balance, taking into account the considerations of the strength of the evidence (quantity and risk of bias, quantity of evidence and level of evidence), consistency, generalisability and applicability, the total body of the evidence was then ranked into one of four categories: ‘Supported’, ‘Promising’, ‘Unknown’ and ‘Not Supported’ (see Figure 1). Agreement on ranking was sought between three independent raters. NOTE: If the strength of the evidence was considered to be low, the next steps of rating consistency, generalisability and applicability were not conducted and the evidence was rated as ‘Unknown’.

Figure 1: Categories within the intervention ranking system

| SUPPORTED | PROMISING | UNKNOWN | NOT SUPPORTED |
|---|--|---|--|
| Clear, consistent evidence of beneficial effect | Evidence suggestive of beneficial effect but further research required | Insufficient evidence of beneficial effect, and further research is required. | Clear, consistent evidence of no effect or negative / harmful effect |

Results

The following section presents figures pertaining to the volume of records identified at each stage of the rapid evidence assessment (Figure 2), the source of the records (Figure 3), and the year of publication (Figure 4). From all the sources searched, a total of thirteen papers met the inclusion criteria and were included in the final report. Of the 13 studies, 77% (n= 10) originated from the USA. A further two studies (15%) originated from Australia, and the final study had a sample from the Democratic Republic of Congo (8%). The year of publication for studies that were included in this rapid evidence assessment is presented in Figure 4. As can be seen, only three studies were published between 2004 and 2009. The final full year of the search period (2013) resulted in 46% of the publications.

Figure 2. Flowchart representing the number of records retrieved at each stage of the rapid evidence assessment

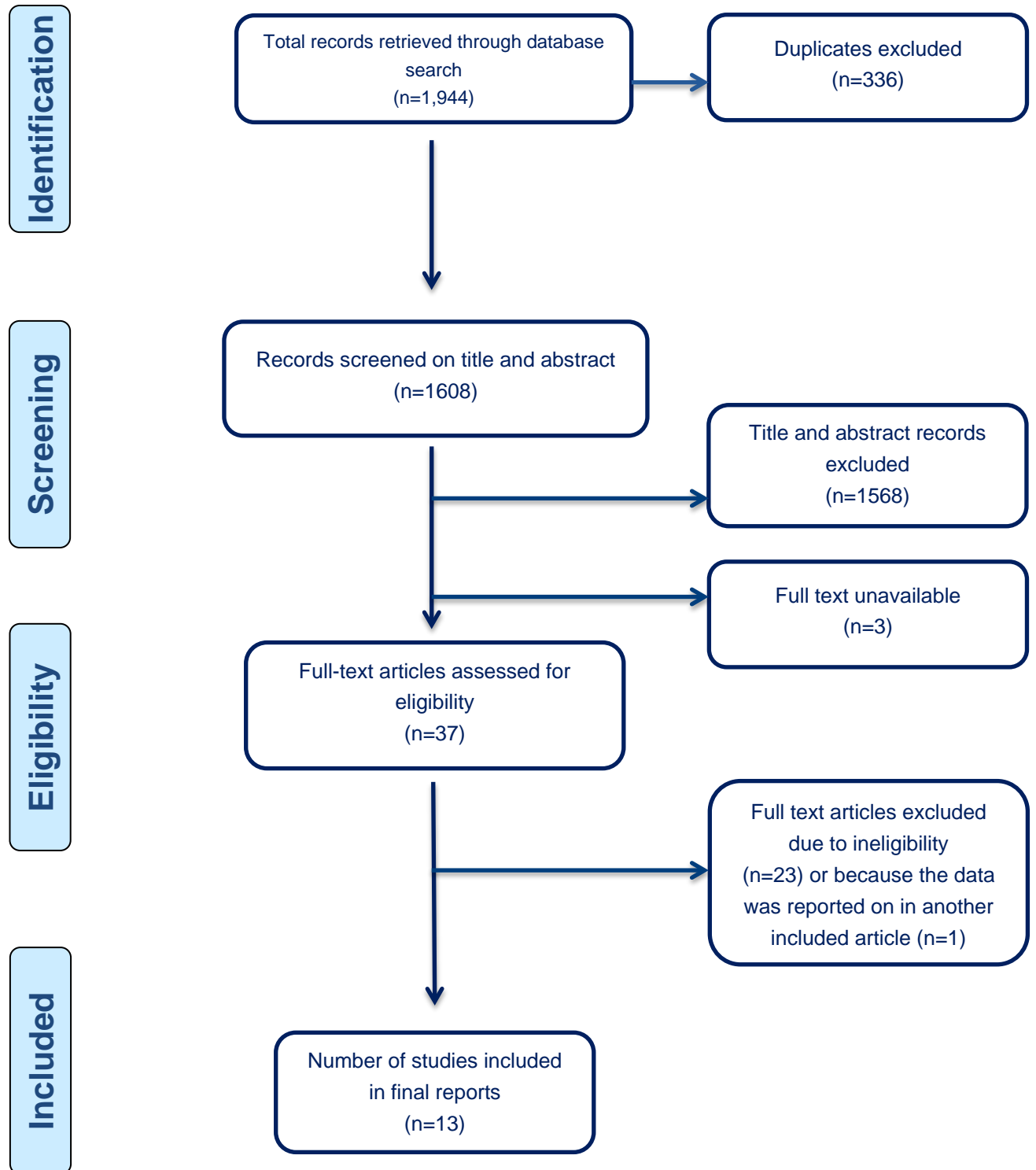


Figure 3. Origin of the sample population of studies included in the rapid evidence assessment

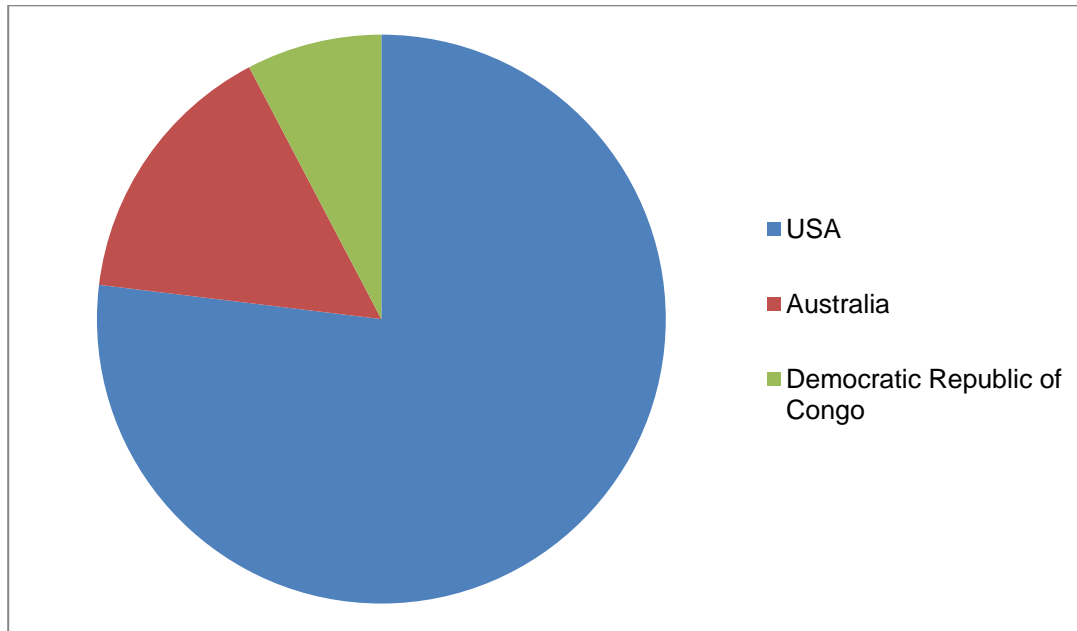
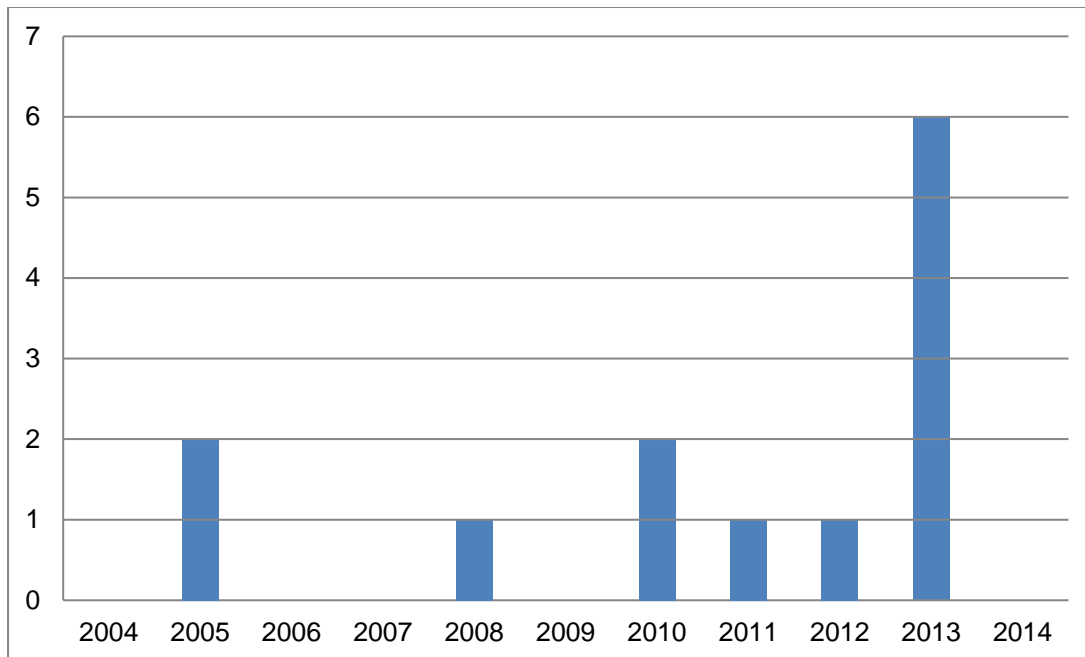


Figure 4. Year of publication of studies included in the rapid evidence assessment



Summary of the evidence

A total of 13 studies examined the effectiveness of interventions in the treatment of anger and aggression in veterans. These studies were firstly grouped according to whether the target of the intervention was anger (i.e. the primary focus of this REA), or whether anger was a secondary outcome (and not the target of the intervention). Secondly, studies were grouped according to whether the intervention was delivered in an individual or group format and whether the intervention was CBT-based or not. This is a clinically meaningful distinction, as the efficacy of an anger intervention is likely to be affected by the group format and the type of psychological intervention.

In four studies, anger was the specific focus of CBT-based individual therapy (n=1) or CBT-based group therapy (n=3). Given the small number of anger-focused treatments identified in this REA (n=4), studies where anger was a secondary outcome were also included. Most of these studies involved treatments for PTSD, where anger or aggression was assessed as a secondary outcome. If a comprehensive literature of interventions that targeted anger existed, including interventions with anger as a secondary outcome would not be typical. However, in the instance of a very small literature yield, indicating an emerging area of research, it can be useful and informative to draw on a wider area of research. As a result, an additional nine studies were included in this REA that did not target anger directly, and it was assessed as a secondary outcome of the intervention. These studies used CBT-based individual therapy (n=1), CBT-based combined group and individual therapy (n=3), alternative individual therapy (n=1), alternative group therapy (n= 3), and alternative combined format therapy (n=1). A detailed summary of the studies is located in the evidence profile presented in Appendix 4 in detail and in Appendix 5 as a brief overview.

Interventions targeting anger

CBT-based individual therapy

One study tested the effectiveness of an individual, CBT-based therapy which specifically targeted anger²⁸. The study used a RCT to compare a modified CBT-based treatment to a supportive intervention control condition in a sample of 23 OEF/OIF veterans with various psychiatric disorders, with a three month follow-up assessment. The study reported a large overall dropout rate of 39% with only 67% of participants in the intervention condition completing treatment. After receiving 12 weeks of treatment, participants who received CBT showed significantly more improvement on anger outcomes compared to controls. At follow-

up the changes from pre-treatment to post-treatment were maintained for those in the CBT condition, and further reductions were observed on some anger scales.

The strength of the evidence base was rated as low to moderate beneficial strength as there was only a single study which although it employed RCT methodology, the risk of bias was deemed moderate from the high dropout rate and small sample size. Consistency was not rated, as there was only a single study. Generalisability was considered to be high, as the sample consisted of all male US veterans. Applicability was judged to be high, as the intervention was a reasonable length and intensity, and a stand-alone in-person treatment designed for veterans. Taken together, the overall ratings for the evidence base led to the use of CBT-based individual therapy targeting anger, for the treatment of veterans with anger to be ranked as 'Unknown'.

CBT-based group therapy

Three studies tested the efficacy of CBT-based group therapy specifically targeting anger²⁹⁻³¹. Of these, one was an RCT of in-person versus video-teleconferencing anger management treatment³⁰, another study was a single group pre-post study of CBT for driving-related anger and aggression³¹, and the final study was a single group pre-post of anger management treatment²⁹. The RCT of anger management involved 12 sessions of standard anger management treatment delivered to veterans with PTSD (N=125; 76% Vietnam) over a six week period either in-person or via video-teleconferencing³⁰. There were significant reductions to anger and PTSD symptoms for both groups from pre to post-treatment, and the anger improvements were maintained at six month follow-up. Mean anger improvements was slightly larger for those in the video-teleconferencing group, as compared to those in the in-person condition, however it remains unclear as to whether this difference was statistically significant.

In the single group pre-post study of CBT for driving-related anger and aggression, veterans (N=9) completed eight sessions involving psychoeducation, *in vivo* (i.e. in real life situations) exposure and cognitive restructuring³¹. At post-treatment, 56% of participants had significant reductions in risky driving and 44% had significant reductions in anger. The second single group pre-post study examined anger management treatment with veterans with PTSD (76% Vietnam) completing 12 group sessions of discussions and skill-based exercises incorporating didactic materials (N=86). There were significant reductions in state and trait anger between pre and post-treatment, and participants reported being less physically aggressive after treatment completion.

Overall the strength of the evidence base for using anger-focused, CBT-based, group interventions to treat anger and aggression in veterans was found to be of moderate to high beneficial strength. This ranking was drawn primarily from the findings of the RCT, judged to be of good quality and low risk of bias. The consistency was rated as high, as all three studies showed an improvement on anger and/or aggression from pre to post treatment, and in the RCT these improvements were also maintained at follow-up. The generalisability of the three studies was considered to be high, as all three studies were conducted with US male veterans, the majority of which were Vietnam veterans. Applicability was judged to be high as all treatments offered in these three studies were judged to be applicable to the Australian context. Taken together, the overall ratings for the evidence base led to the use of CBT-based group therapy targeting anger for the treatment of veterans with anger being ranked as 'Promising'.

Studies where anger is a secondary outcome

CBT-based individual therapy

One study tested the effectiveness of a CBT-based individual therapy for veterans and assessed anger outcomes³². The study employed an RCT and compared Cognitive Processing Therapy (CPT) for the treatment of PTSD with controls in a sample of Australian veterans (N=59), with a three month follow-up. There was a significant reduction in anger outcomes from pre to post-treatment and a further reduction at follow-up in both groups, but reductions in anger were significantly greater for those in the CPT group than control.

The strength of the evidence base was rated to be of moderate to high beneficial strength as although there was a single study; it employed a RCT methodology ranked as good quality and low risk of bias. Consistency was not rated, due to the fact that there was only a single study. Generalisability was considered to be high, as the sample consisted of mostly male Australian veterans. Applicability was judged to be high as the treatment is of a length and intensity conducted and easily replicated in the Australian context, and is stand-alone in-person treatment designed for veterans. Taken together these findings led to CBT-based individual therapy for PTSD, where anger is not the target of treatment, ranked as 'Promising' for the treatment of anger in veterans.

CBT-based combined format therapy

Three studies investigated the effectiveness of CBT-based combined format (i.e. individual and group) therapy for veterans that assessed anger as a secondary outcome³³⁻³⁵. One study was a large (N= 496) single group pre-post study of CBT for the treatment of PTSD in

Australian veterans³⁴. A significant reduction in anger outcomes was found between pre-treatment and post-treatment, and these treatment effects remained significant at nine month follow-up. The second study was a single group pre-post study evaluating PTSD residential treatment for US veterans at a VA medical centre (N= 99)³⁵. After seven weeks of intensive PTSD treatment, there was no significant reduction in anger from pre-treatment levels. The third study was an RCT of narrative exposure therapy administered to Congolese ex-combatants for the treatment of PTSD and aggression compared with controls (N= 38)³³. Although there were significant reductions in aggression from pre to post-treatment, there was no significant difference between the groups.

Overall, the strength of the evidence base was rated to be of low to moderate beneficial strength, as one study employed an RCT, judged to be of good quality and low risk of bias but found no significant differences between treatment and control groups. The consistency of the three studies was rated as low, as the studies produced mixed results in terms of improvements to anger outcomes. The generalisability of the three studies was rated as moderate. While two studies used comparable samples (US and Australian veterans) the higher quality study, used a sample of Congolese ex-combatants which likely differs significantly from the target population. The applicability was rated as being moderate to high as the residential treatment³⁵ and stand-alone CBT³⁴ were seen as being applicable to the Australian context. The RCT, however, utilised a narrative exposure paradigm paired with vocational training³³, and this was not seen as being as applicable to the target population as the other two interventions. Taken together, the diversity and inconsistency of the few studies led to the use of CBT-based combined format therapy for veterans where anger is not the target, to be ranked as 'Unknown' for the treatment of anger in veterans.

Alternative individual therapy

One study tested the effectiveness of an alternative individual therapy, where anger was not the target of the therapy, but where anger outcomes were assessed³⁶. An RCT with three month follow-up compared the effectiveness of Accelerated Resolution Therapy (ART), a novel, brief, exposure-based therapy, with a control group in reducing PTSD symptoms in contemporary US veterans (N=57). Neither groups showed significant changes to aggression after treatment, but there were significant improvements to aggression between pre-treatment and three month follow-up in the intervention group. However, no such analyses were conducted for the control group as the control group was free to cross-over into the intervention group and receive ART (86% of controls), so it remains unclear as to whether a control group who didn't receive the intervention would have displayed similar changes.

Although this study employed an RCT with follow-up, the absence of the control group assessments at follow-up mean the study methodology effectively becomes a single group pre-post. Therefore, the strength of the evidence base was judged to be of low to moderate beneficial strength. Consistency was not rated as there was only a single study. The generalisability of the study to Australian veterans was judged to be high due to the fact that the study was conducted with contemporary US veterans and the majority of the sample was male. The applicability of the study to the Australian context was also considered to be high. Taken together, the use of alternative individual therapy for veterans with PTSD (where anger is not the target of treatment) was ranked as 'Unknown' for the treatment of anger in veterans.

Alternative group therapy

Three studies tested the efficacy of alternative group therapy for veterans, where anger was not the target of therapy, but where anger outcomes were assessed³⁷⁻³⁹. All of these studies employed a single group, pre-post design. One study investigated multifamily group treatment³⁸, the second investigated a yoga intervention for veterans³⁹, and the third study investigated a mantram repetition intervention (i.e. silently repeating a word or phrase with spiritual or personal meaning), with a three-month follow-up³⁷. The multifamily group treatment involved reducing distress in veterans with traumatic brain injury and their families (N=14 veterans plus family members)³⁸. Post-treatment, veterans reported less anger, as well as an increase in social support and occupational activity. The yoga intervention study involved veterans (N=12, 75% Vietnam) participating in 12 sessions of one hour, twice weekly yoga practices in a group setting³⁹. There were no significant improvements on anger from pre to post-treatment in the yoga intervention, nor were there improvement in total PTSD or quality of life. Participants did, however, show significant improvement on PTSD hyperarousal symptoms, and sleep quality. The final study examined the use of mantram repetition for the management of PTSD symptoms in US veterans (N=101) and found significant improvement on some anger outcomes from pre to post-treatment³⁷. However, there was no significant improvement on quality of life, anxiety or symptoms of PTSD.

All three study designs were limited by the lack of a control group, and only one of the studies had a follow-up assessment. Two of the studies also had very small sample sizes, and in the larger group study, the dropout rate from pre to post assessment was considered to be high (39%). The risk of bias was judged to be moderate to high and the strength of the evidence base for alternative group therapy, where anger outcomes were assessed was found to be of low beneficial strength. Given that the strength of the evidence base was judged to be low, the consistency, applicability and generalisability were not rated. Taken

together, alternative group therapy where anger was not the target of treatment (but where anger outcomes were assessed) ranked as 'Unknown' for the treatment of veterans with anger.

Alternative combined format therapy

One study tested the efficacy of alternative combined format (i.e. individual and group) therapy for the treatment of PTSD in veterans (i.e. anger was not the target of the therapy)⁴⁰. The study was a single group pre-post design investigating 29 sessions of individual and group Trauma Management Therapy (TMT) for a sample of US veterans (N=15) over a period of four months⁴⁰. No significant changes were found for anger outcomes between pre to post-treatment.

This single study design was limited by a lack of a control group, the small sample and lack of a follow-up assessment. Therefore, the strength of the evidence base for alternative combined format therapy for veterans, where anger outcomes are assessed was judged to be of low beneficial strength. Given the strength of the evidence base was low for the use of alternative combined format therapy for veterans, where anger outcomes are assessed, the consistency, generalisability and applicability were not assessed, and the use of alternative combined format therapy for the treatment of anger in veterans was ranked as 'Unknown'.

Discussion

The aim of this review was to assess the evidence for the efficacy of psychological interventions targeting problematic anger or aggression in veterans. Given the studies reviewed in this REA, there is currently limited research evaluating psychological interventions targeted at anger and aggression in veteran populations. This review only identified four studies that evaluated interventions targeting anger or aggression in veterans, all of which were CBT-based. Despite the small pool of studies, a diverse range of options for treatment of problematic anger and aggression were identified, including group therapy, individual therapy and use of video-teleconferencing methods. Encouragingly, CBT-based group therapy for the treatment of anger in veterans was ranked as 'Promising'. Combined with evidence for the effectiveness of CBT-based anger treatments for other populations²⁶, the evidence for CBT-based anger treatments shows significant promise, and requires only a few more RCTs with positive results in the future to receive a 'Supported' ranking. Similarly, although CBT-based individual therapy was ranked as 'Unknown', if another RCT with low risk of bias and positive results was published, this ranking could move to 'Promising'. It is important to note that only one study included a focus on aggression³³.

Given the very limited number of studies in this area more research is required to evaluate the usefulness of psychological interventions for problematic aggression in veterans.

Due to the small number of studies investigating anger or aggression treatments (n=4), the review also included studies where anger or aggression was a secondary outcome of investigation (n= 9), reflecting the emerging nature of this area of research. Results from the non-anger focused interventions were encouraging in some instances. For example, the use of individual CBT based therapy (in the form of CPT) for PTSD in veterans was rated as being 'Promising' for treating problematic anger. However, the remaining interventions with anger as a secondary outcome all received an 'Unknown' rating often because they were judged to have significant methodological drawbacks (such as lack of control group and follow-up, small sample size, high dropout). Further rigorous research on the efficacy of these interventions, in which anger or aggression is the primary focus of the study, and therefore, has been well-controlled for, is required to advance our understanding of their usefulness in treating anger. Despite the 'Unknown' ranking given to the majority of the interventions it is important to note that the emerging stage of all interventions requires initial small-scale pilot trials first, followed by larger-scale RCTs to establish efficacy⁴¹. Thus, this REA represents an initial evidence base upon which future well-conducted studies can build upon.

Many of the studies (both anger-focused and non-anger-focused) were limited in a range of ways, restricting their contribution to the strength of the evidence base. The majority of the studies identified were uncontrolled pre-post evaluations, most of which did not include follow-up assessments. Of those that did use an RCT design, many suffered limitations that restricted the study findings, such as very small sample sizes, high attrition rates, lack of follow-up, and no blinding of outcome assessors. Several studies^{28,31,37} reported high participant drop-outs, which is of concern. Studies published prior to the REA cut-off date were similarly limited by high-dropout rates (e.g. 46%¹⁴), which highlights the critical need for future research to address how to better engage and retain veterans in anger and aggression treatments. The value of interventions where such high proportions of patients drop out is limited, even if the results are beneficial for those that remain. Future controlled, well-designed trials of anger interventions with low dropout rates will help move the evidence base from being 'Unknown' to 'Promising' or 'Supported'.

Future studies should also consider the timing of the intervention in relation to the occurrence of the trauma. None of the studies included in this review evaluated the chronicity of anger or aggression problems in the veterans prior to entering treatment. In

some of the studies, the traumatic experience for the majority of the sample occurred many years ago, and no information was provided as to persistence of anger problems^{29,30,34,39}.

Implications

The reviewed interventions involved a broad range of approaches for dealing with the experience of anger or aggression. In terms of direct treatment of anger in veterans, the evidence is promising in relation to CBT based treatments across individual and group based interventions. Further research into CBT based treatments would consolidate these promising findings and provide clear guidance to the DVA regarding the planning, purchasing and/or delivery of optimal interventions for anger in veterans. Importantly however, there also remains a need to refine these existing interventions to improve rates of engagement and retention. There is also a need to examine treatments that target aggression either in isolation, or in conjunction with anger, as only one study was identified which examined effective treatment for aggression in veterans. The successful use of different treatment delivery formats (e.g. video-teleconferencing) reported in some of the included studies also holds promise to improve access to treatment for veterans in regional, rural and remote areas.

Of the CBT based approaches, CPT demonstrated a level of effectiveness in achieving reductions in anger while primarily targeting PTSD, resulting in a rating of 'Promising' for the individual CBT-based therapy category. This is encouraging; however given the finding outlined in the introduction that anger simultaneously impeded PTSD treatment effectiveness in this trial, consideration of more direct targeting of anger related themes in CPT may be warranted to improve anger and PTSD outcomes.

While the alternative approaches reviewed here were categorised as 'Unknown', future research has the capacity to strengthen the evidence base for these interventions. Alternative approaches may be a more preferable option for some veterans would provide veterans with a wider range of treatment options. Ultimately this may assist funders and services to meet the needs of the broader audience of Australian veterans.

Finally, future studies should also consider the timing of the intervention in relation to the occurrence of trauma. It is possible that anger may be more resistant to treatment or change for those with persistent anger in comparison to those with more recent onset.

Limitations of the rapid evidence assessment

The findings from this REA should be considered alongside its limitations. In order to make this review 'rapid', some restrictions on our methodology were necessary. These limitations included: the omission of potentially relevant papers that were published prior to or after the defined search period; the omission of non-English language papers; and reference lists of included papers were not hand-searched to find other relevant studies. Similarly, although we did evaluate the evidence in terms of its strength, consistency, and generalisability, these evaluations were not as exhaustive as in a systematic review methodology. Finally, we made a qualitative judgement based on the level of evidence about the certainty of our estimates of prevalence. We did not use a meta-analysis methodology to combine or synthesise the results in a statistical way.

The information presented in this REA is a summary of information presented in available papers. We recommend that readers source the original papers if they would like to know more about a particular area.

Conclusion

Based on this review, group CBT-based treatments for veterans that specifically targeted anger were ranked as 'Promising'. This result is encouraging as the 'Promising' ranking indicates a beneficial effect. However, more research is needed to confidently establish the efficacy of these treatments. The other interventions were ranked as 'Unknown', as the evidence base supporting these various interventions was regarded to be lacking in a range of aspects. The high levels of drop out observed in many of the studies identified in this REA indicate that refinement of these treatments is required to improve client engagement and retention. There is a clear need for further well conducted, rigorous trials are required to test the efficacy of interventions for the treatment of anger or aggression in veterans, which may then result in some treatments being ranked as supported in the future.

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Appendix 1

Patient Intervention Comparison Outcome (PICO) framework

This question was formulated within a Population Intervention Comparison Outcome (PICO) framework. Application of a PICO framework helps to structure, contain and set the scope for the research question. Inclusion of intervention and comparison components is dependent on the question asked, and may not be appropriate for all question types.

What are the effective psychological interventions for veterans with problematic anger and aggression?

- **PICO format: In veterans with problematic anger and aggression, which psychological interventions are effective for reducing the symptoms of anger and aggression**

| P Patient, Problem, Population | I Intervention | C Comparison (<i>optional</i>) | O Outcome <i>when defining "more effective" is not acceptable unless it describes how the intervention is more effective</i> |
|--|---|--|--|
| Patient: Veterans Problem: Problematic anger and aggression | Psychological intervention which target anger and/or aggression | <ul style="list-style-type: none"> • Psychological intervention • No-treatment/Wait list control/minimal attention • Treatment as usual • Pharmacotherapy alone • Attention/placebo control | Changes in anger as a primary/secondary outcome or changes in aggression as a primary/secondary outcome |

Appendix 2

Example search strategy

The following is an example of the search strategy conducted in the Embase database:

| Step | Search Terms | No of records |
|------|---|---------------|
| S1 | ("anger" or "aggression" or "aggressive" or "aggressive behavior" or "aggressive behaviour").mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] | 193171 |
| S2 | limit 1 to (english language and yr="2004 -Current") | 103509 |
| S3 | ("veteran*" or "military" or "soldier" or "defence" or "defense").mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] | 208216 |
| S4 | limit 7 to (english language and yr="2004 -Current") | 91394 |
| S5 | ("clinical trial" or "control trial" or "treatment" or "effectiveness" or "therapy" or "treatment study" or "clinical study" or "control study" or "psychological intervention" or "behavi*r therapy" or "cognitive therapy" or psychotherapy or "psychological therapy").mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] | 8483445 |
| S6 | limit 17 to (english language and yr="2004 -Current") | 3447557 |
| S7 | 2 and 4 and 6 | 810 |

Appendix 3

Quality and bias checklist

Chalmers Checklist for appraising the quality of studies of interventions²⁷:

| Completed | | |
|-----------|----|---|
| Yes | No | |
| | | 1. Method of treatment assignment |
| | | <ul style="list-style-type: none"> • Correct, blinded randomisation method described OR randomised, double-blind method stated AND group similarity documented |
| | | <ul style="list-style-type: none"> • Blinding and randomisation stated but method not described OR suspect technique (eg allocation by drawing from an envelope) |
| | | <ul style="list-style-type: none"> • Randomisation claimed but not described and investigator not blinded |
| | | <ul style="list-style-type: none"> • Randomisation not mentioned |
| | | 2. Control of selection bias after treatment assignment |
| | | <ul style="list-style-type: none"> • Intention to treat analysis AND full follow-up |
| | | <ul style="list-style-type: none"> • Intention to treat analysis AND <25% loss to follow-up |
| | | <ul style="list-style-type: none"> • Analysis by treatment received only OR no mention of withdrawals |
| | | <ul style="list-style-type: none"> • Analysis by treatment received AND no mention of withdrawals OR more than 25% withdrawals/loss-to-follow-up/post-randomisation exclusions |
| | | 3. Blinding |
| | | <ul style="list-style-type: none"> • Blinding of outcome assessor AND patient and care giver (where relevant) |
| | | <ul style="list-style-type: none"> • Blinding of outcome assessor OR patient and care giver (where relevant) |
| | | <ul style="list-style-type: none"> • Blinding not done |
| | | <ul style="list-style-type: none"> • Blinding not applicable |
| | | 4. Outcome assessment (if blinding was not possible) |
| | | <ul style="list-style-type: none"> • All patients had standardised assessment |
| | | <ul style="list-style-type: none"> • No standardised assessment OR not mentioned |
| | | 5. Additional Notes |
| | | <ul style="list-style-type: none"> • Any factors that may impact upon study quality or generalisability |

Appendix 4

Evidence Profile

| Authors & year | Design | Intervention (I) and Comparison (C) | Population Mean age (SD) ¹ Gender % | Delivered to | Dosage (total number of sessions) | Primary Outcome domain (Measure(s)) | Secondary Outcome domain (Measure(s)) | Total sample size | Participants | |
|--|--------------------------------|---|--|--------------|-----------------------------------|-------------------------------------|--|-------------------|--------------|-------|
| | | | | | | | | | I | C |
| THERAPY TARGETING ANGER | | | | | | | | | | |
| CBT- based | | | | | | | | | | |
| Individual | | | | | | | | | | |
| Shea, Lambert & Reddy, 2013 | RCT with three month follow-up | I: Cognitive behavioural intervention C: Supportive intervention | US veterans (OEF/OIF) Mean age: 36.3 (10.2) Gender: Male | Individual | Twelve weekly 75 minute sessions | - Anger (OAS-M; STAXI-2) | - PTSD (CAPS) - DSM-IV Axis I disorders (SCID-I/P W/PSY) - Anger (DAR7) - Outcomes (OQ) | N= 25 | n= 12 | n= 11 |
| <p>Participants who received the intervention showed significantly more improvement than controls on the STAXI-2 Anger Expression Index ($p=.019$), and improvement approached significance on the OAS-M aggression scale ($p < .06$). There was significantly more improvement for the intervention group on the DAR compared to controls ($p=.027$). At follow-up, changes for the intervention group were maintained, and on some scales scores had decreased further (STAXI-2 AX and Expression Out, OAS-M). Overall, participants in both groups rated themselves as being satisfied with treatment that they received.</p> | | | | | | | | | | |
| Group | | | | | | | | | | |
| Marshall et al., 2010 | Single group pre-post | I: Anger management treatment | US Veterans (76% Vietnam) Mean age: 55 (8.22) Gender: Male | Group | Twelve weekly 90 minute sessions | - Anger (STAXI-2) | - Conflict tactics (CTS) - Personality (MMPI-II) | N= 86 | N= 86 | N/A |
| <p>Significant reductions were found in state and trait anger from pre to post-treatment (small to medium effect sizes). Participants also reported being less physically aggressive after treatment, with an average of 1.24 fewer types of physically aggressive acts during the three months of treatments. Antisocial personality traits were significantly associated with fewer reductions in trait anger and physical aggression, but were not associated with state anger at post-treatment.</p> | | | | | | | | | | |

What are the effective interventions for veterans with problematic anger and aggression?

| | | | | | | | | | | |
|--|--|---|---|------------|--|---|---|--------|-------|-------|
| Morland et al., 2010 | RCT with six month follow-up | I1: Video-conferencing anger management I2: In-person anger management | US veterans (76% Vietnam war) In person: Mean age: 54.7 (9.7) Videoconference: Mean age = 54.8 (SD=9.3) Gender: Male | Group | Twelve sessions twice weekly | - Anger (STAXI-2; NAS-T) | - PTSD (CAPS, PCL-M) - Comorbidities (SCID) | N= 125 | n= 61 | n= 64 |
| <p>At least 9 treatment sessions were completed by n= 112 participants. Participants in both conditions showed improvement post-treatment on mean anger scores (moderate to large effect sizes). ITT analyses showed that there was significant improvement in scores on the STAXI-2 subscales and the NAS-T for both groups. Mean improvements were slightly larger in the video teleconferencing group compared to the in-person group, however, it is unclear as to whether this difference was significant (due to reporting issues). These results were maintained at six months follow up. No differences were found between groups on attendance, homework completion or frequency of dropouts. Participants in the in-person group reported higher overall group therapeutic alliance.</p> | | | | | | | | | | |
| Strom et al., 2013 | Single group pre-post with one month-follow-up | I: CBT for driving-related anger and aggression | US veterans (56% Vietnam war) Mean age: 48.2 (15.3) Gender: Male | Group | Eight sessions | - Anger (Driving Anger Scale; Driving Anger Expression Scale; Trait Anger Scale) - Survey of Driving | - PTSD (PCL-M) - Depression (CES-D) | N= 9 | N= 9 | N/A |
| <p>Results showed that 55.6% of participants demonstrated reliable change in risky driving, and 44.4% showed significant reductions in trait anger. In addition, 66.7% showed significant reductions in depressive and PTSD symptoms. Participants reported high satisfaction with the treatment: 88.9% agreed that "coming to the program made a positive difference in my life", and 77.7% reported that they would recommend the treatment to others.</p> | | | | | | | | | | |
| ANGER AS A SECONDARY OUTCOME | | | | | | | | | | |
| CBT-based | | | | | | | | | | |
| Individual | | | | | | | | | | |
| Forbes et al., 2012 | RCT with three month follow-up | I: CPT C: Treatment as usual | Australian veterans (66% Vietnam war) I: Mean age: 53.13 (13.97) Gender: Male (93%) C: Mean age: 53.62 (13.33) Gender: Male | Individual | Twelve twice weekly 60 minute sessions | - PTSD (CAPS) | - Depression (BDI) - Anxiety (STAI) - Anger (DAR7) - Alcohol Use (AUDIT) | N= 59 | n= 30 | n= 29 |
| <p>There was a significant reduction in anger from pre to post-treatment, and a further reduction at follow-up. This reduction in anger was reported for both the CPT and TAU conditions, but on all secondary outcomes the CPT group improved more than the TAU group. No differences were found between the groups in therapeutic alliance.</p> | | | | | | | | | | |
| Combined Group and Individual | | | | | | | | | | |

What are the effective interventions for veterans with problematic anger and aggression?

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|---|---|---|--|----------------------|--|--------------------------------------|--|--------|--------|-------|
| Hermenau et al., 2013 | RCT with six month follow-up | I: Narrative exposure therapy C: Controls | Congolese ex-combatants (local conflicts) Mean age: 19 (2.02) Gender: Male | Group and individual | Six sessions over two weeks | - PTSD (PSS-I) - Aggression (AAS) | Integration with civilian life and current contact with combatants (6 questions) | N= 38 | n= 19 | n= 19 |
| There was a significant reduction in aggression over time in both groups ($p < .001$) and no significant difference between groups ($p = .402$). There was a further reduction in aggression scores in both groups from post-treatment to six month follow-up. There was a trend for reduced symptoms of PTSD from pre to post-treatment in the treatment group ($p = .052$), but not in the control group ($p = .078$). The treatment group reported less PTSD symptom severity than the control group at the six month follow-up. | | | | | | | | | | |
| Khoo et al., 2011 | Single group pre-post with nine month follow-up | I: CBT | Australian veterans (68% Vietnam) Mean age: 53 (not reported) Gender: Male (99.7%) | Group and individual | Six weeks intensive, followed by six weeks of fortnightly sessions | - PTSD (CAPS, PCL) | - Alcohol use (AUDIT) - Anger (DAR7) - Anxiety and depression (HADS) - Quality of life (WHOQOL-brief) | N= 496 | N= 496 | N/A |
| There was a significant reduction in anger from pre to post-treatment, and these treatment effects remained significant at follow-up ($p < .001$). Further, 20.5% of participants demonstrated clinically significant change in PTSD scores from pre to post-treatment, and another 39.5% of participants demonstrated positive reliable change in PTSD scores. Forty percent of participants were classified as non-responders after treatment, meaning they demonstrated no reliable change in PTSD scores, or demonstrated deterioration of PTSD symptoms. | | | | | | | | | | |
| Owens, Chard & Cox, 2008 | Single group pre-post | I: PTSD Residential Rehabilitation Program using CPT at VA medical centre | US veterans (68% Vietnam war) Mean age: 52.8 (8.14) Gender: Male (80%) | Group and individual | Seven weeks intensive | - PTSD (PCL-M) | - Depression (BDI-II) - Anger (STAXI-2) | N= 99 | N= 99 | N/A |
| There was no significant change to anger from pre to post-treatment. Significant reductions were found for PTSD and depression from pre to post treatment. A significant interaction between PTSD severity and anger was also observed: Pre-treatment anger was a significant predictor of PTSD severity post-treatment, where moderate and high levels of pre-treatment anger predicted higher post-treatment PTSD severity. | | | | | | | | | | |
| Alternative therapy | | | | | | | | | | |
| Individual | | | | | | | | | | |
| Kip et al., 2013 | RCT with three month follow-up | I: Accelerated Resolution Therapy C: Attention control | US veterans (51% OIF/OEF/OND) Mean age: 41.4 (12.6) Gender: Male (80.7%) | Individual | Two to five sessions over 2 weeks, 60-75 minutes each | - PTSD (PCL-M) | - Depression (CES-D) - Anxiety (STICSA) - Aggression (AQ) - Alcohol use (AUDIT) | N= 57 | n= 29 | n= 28 |
| No significant difference was found between groups in aggression post-treatment, but there was significant within-subject improvement from pre-treatment to follow-up in aggression in the intervention group. Significant reductions were also found in symptoms of PTSD, anxiety and depression in the intervention group compared to controls. | | | | | | | | | | |
| Group | | | | | | | | | | |

What are the effective interventions for veterans with problematic anger and aggression?

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|--|--|--------------------------------|--|----------------------|---|---|---|-----------------|--------|-----|
| Bormann et al., 2005 | Single group pre-post with three month follow-up | I: Mantram repetition | US veterans Mean age: 61.8 (13.2) Gender: Male (90.3%) | Group | Five weekly classes, 90 minutes each | - Stress (Cohen's Perceived Stress Scale) - Quality of life (Endicott's QoL Enjoyment and Satisfaction Short Form) | - Anxiety (STAI) - Anger (STAXI) - PTSD (PCL) | N= 101 | N= 101 | N/A |
| There was a significant reduction in state anger ($p = .03$) and trait anger ($p = .01$) from pre to post treatment, and this time effect was mediated by mantram repetition. There were also significant improvements in quality of life ($p = .001$), reduction in PTSD symptoms ($p = .02$) and state ($p = .001$) and trait anxiety ($p = .03$). Participants rated the quality of instructors, delivery of content and classroom environment, but no means and standard deviations were reported for these items. | | | | | | | | | | |
| Perlick et al., 2013 | Single group pre-post | I: Multifamily group treatment | US OEF/OIF veterans and family members Mean age: 36.1 (9.3) Gender: Male (79%) | Group | Phase 1: Two to three sessions Phase 2: Two 3-hour educational workshops Phase 3: Bimonthly meetings for six months | Veterans: - Distress (PHQ) | Veterans: - PTSD (PCL) - Functioning (SPRS) | N=14 (veterans) | N=14 | N/A |
| Post treatment, veterans expressed less anger ($p < .01$; $d = .61$), as well as increased social support and occupational activity ($p < .05$) compared to before treatment. PTSD and depression scores were lower than before treatment, but this change was not statistically significant. Family members also reported decreased burden and increased empowerment after treatment. | | | | | | | | | | |
| Staples, Hamilton & Uddo, 2013 | Single group pre-post | I: Yoga intervention | US veterans (75% Vietnam war) Mean age = 62.2 (2.2) Gender: Male (83%) | Group | 6 week, 1 hour twice weekly (12 total sessions) | - PTSD (PCL-M) | - Sleep (PSQI) - Anger (STAXI-2) - Quality of life (OQ-45.2) | N=12 | N=12 | N/A |
| There was no significant improvement in anger from pre to post-treatment. There was significant improvement in PTSD hyperarousal symptoms, sleep quality and daytime dysfunction related to sleep ($p < .05$), but no improvement in total PTSD or quality of life. Seventy-five per cent of participants rated the yoga classes as "extremely enjoyable" with the remaining rating the class as "very enjoyable". Eighty-three per cent thought the yoga classes were helpful in improving quality of life, and all said they were likely to recommend the program to other veterans. | | | | | | | | | | |
| Combined Group and Individual | | | | | | | | | | |
| Turner, Beidel & Frueh, 2005 | Single group pre-post | I: Trauma-Management Therapy | US veterans Mean age: 47.9 (2.1) Gender: Male (100%) | Individual and group | Weekly sessions for four months | - PTSD (CAPS) | - Patient symptom ratings (sleep, nightmares, flashbacks & social activities) - Depression (BDI) - Anger (STAXI) - Global severity (CGI) | N= 15 | N= 15 | N/A |
| No significant change in anger from pre to post-treatment was found. Significant reductions in anxiety, PTSD symptoms, physiological reactivity and other symptom ratings (e.g. nightmares) were found, as well as an increase in social activities and number of hours of sleep post-treatment. Patients considered it a credible and positive therapeutic experience, and all but one indicated that they would encourage other veterans to participate in the treatment. | | | | | | | | | | |

Appendix 5

Evaluation of the evidence

| Type of Intervention | Included Studies |
|--|--|
| Supported | |
| None found | |
| Promising | |
| CBT-based individual therapy targeting anger | Shea, Lambert & Reddy, 2013 |
| CBT-based group therapy targeting anger | Strom et al., 2013 Marshall et al., 2010 Morland et al., 2010 |
| CBT-based individual therapy where anger is a secondary outcome | Forbes et al., 2012 |
| Unknown | |
| CBT-based combined group and individual therapy where anger is a secondary outcome | Owens, Chard & Cox, 2008 Khoo et al., 2011 Hermenau et al., 2013 |
| Alternative individual therapy where anger is a secondary outcome | Kip et al., 2013 |
| Alternative group therapy where anger is a secondary outcome | Perlick et al., 2013 Staples, Hamilton & Uddo, 2013 Bormann et al., 2005 |
| Alternative combined format therapy where anger is a secondary outcome | Turner, Beidel & Frueh, 2005 |