Evidence Compass

Technical Report

Meditation and Mindfulness Practices for Mental Health: A Rapid Evidence Assessment

December 2018

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Glossary of Terms

Term	Definition
AC	Active control
ACC	Anterior cingulate cortex
AD	Alcohol dependence
ANS	Autonomic nervous system
ASG	Alcohol Support Group
ASTM	Automatic self-transcending meditation
AUD	Alcohol use disorder
CAM	Complementary and alternative medicine
CAPS	Clinician-administered PTSD scale
CBASP	Cognitive Behavioural Analysis System of Psychotherapy
CBT	Cognitive behavioural therapy
CBGT	Cognitive-based Group Therapy
CPE	Cognitive psychological education
DPFC	Dorsolateral prefrontal cortex
DVA	Department of Veterans' Affairs
FDA	United States Food and Drug Administration
GABA	*Gamma*-aminobutyric acid
GAD	Generalised anxiety disorder
HEP	Health-Enhancement Program
HLW	Healthy Living Workshop
HRV	Heart rate variability
mADM	Maintenance anti-depressant medication
MAGT	Mindfulness and Acceptance-based Group Therapy
MBCT	Mindfulness-based Cognitive Therapy
MBCT-TS	Mindfulness-based Cognitive Therapy support to taper or discontinue antidepressant treatment
MBI	Mindfulness-based intervention
MBRP-A	Mindfulness-based relapse prevention for alcohol
MBSR	Mindfulness-based Stress Reduction
MDD	Major depressive disorder
MORE	Mindfulness-Oriented Recovery Enhancement

Term	Definition
MRP	Mantram repetition program
NE	Norepinephrine
OB/GYN	Obstetrician/gynaecologist
OFC	Orbitofrontal cortex
PCL	PTSD checklist
PCT	Present-centred therapy
PCGT	Present-centred group therapy
PCBMT	Primary Care Based Mindfulness Training
PFC	Prefrontal cortex
PICO	Population Intervention Comparison Outcome framework
PNS	Parasympathetic nervous system
PTSD	Posttraumatic stress disorder
RCT	Randomised controlled trial
REA	Rapid evidence assessment
SAD	Social anxiety disorder
SKY	Sudarshan Kriya Yoga
SME	Stress management education
SNS	Sympathetic nervous system
SRF	Self-referential processing
SSRI	Selective serotonin reuptake inhibitor
STAI	State-Trait Anxiety Inventory
TAU	Treatment as usual
TRD	Treatment resistant depression
UK	United Kingdom
US/USA	United States of America
VA	US Department of Veterans Affairs
VHA	US Veteran Health Administration
WL	Waitlist

Executive Summary

- The aim of this rapid evidence assessment (REA) was to assess the evidence related to meditation and mindfulness practices (meditation, transcendental meditation, mantra, yoga, and mindfulness) for posttraumatic stress disorder (PTSD), depression, anxiety, and alcohol use disorder (AUD) in adults.
- To address this aim, the research team at Phoenix Australia was commissioned by DVA to answer the following three questions:
    1. What role does meditational practice including meditation, transcendental meditation, mantra, and yoga have in mental health treatment options?
    2. What is the efficacy of mindfulness as a mental health treatment option when compared to conventional treatment?
    3. Is there any benefit for mindfulness, meditation, transcendental meditation, mantra, or yoga to be used as an adjunct with conventional therapy approaches for PTSD, depression, anxiety, or AUD?
- A literature search was conducted to identify trials that investigated the efficacy of meditation and mindfulness practices for treating PTSD, depression, anxiety, and AUD. Trials were excluded if the full text was unavailable, if the practice was not investigated as a treatment, if the paper was not peer reviewed, if the primary outcome measures were not the focus of the review (i.e., PTSD, depression, anxiety, AUD, stress, wellbeing, and arousal symptoms), and if they did not concern the population of interest (i.e., adults). Given that there was a large amount of literature found for meditation and mindfulness practices, only randomised controlled trials (RCTs) or systematic reviews and meta-analyses were examined. Other study designs were excluded. Trials were initially assessed for quality of methodology, risk of bias, and quantity of evidence. Subsequently, the consistency, generalisability, and applicability of the findings to the population of interest was assessed. Assessments were then collated for each meditation and mindfulness practice type to determine an overall ranking of level of support for each type of practice for the treatment of PTSD, depression, anxiety, and AUD.
- 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.

- Forty-eight original trials met the inclusion criteria for review. Additionally, one paper reported a secondary analysis which was conducted on an original trial, and one paper reported a longer-term follow-up of an original trial, totalling 50 papers. Approximately half (26) of the trials originated from the United States. There were three trials from Canada, two each from Sweden, Iran, India, Germany, the UK, and the Netherlands, and one each from Columbia, Taiwan, Croatia, Austria, Hong Kong, Vietnam, and Australia, totalling 48 original trials.

- Stand-alone interventions were evaluated in 79% of the total original trials. Stand-alone interventions comprised 38% yoga, 31% mindfulness-based interventions, and 10% meditational practices (meditation 2%, transcendental meditation 2%, mantram repetition meditation 4%, and combined yoga/meditation 2%), totalling 79%.

- Adjunct interventions were evaluated in 21% of the total original trials. Adjunct interventions comprised 13% yoga and 8% mindfulness-based interventions, totalling 21%. There were no meditation-based adjunct interventions.

- The most frequently investigated interventions (whether stand-alone or adjunct) were yoga (50%), followed by mindfulness (40%), mantram repetition meditation (4%), meditation (2%), transcendental meditation (2%), and a combined yoga/meditation intervention (2%).

- Most of the trials targeted depression (39%), followed by PTSD (25%), anxiety (13%), depression and anxiety together (13%), and AUD (10%).

- Meditation, including mantram meditation and transcendental meditation, was used for depression (2% of all trials) and PTSD (6%). Yoga was used mostly for depression (21%), followed by PTSD (13%), depression and anxiety (10%), AUD (4%), and anxiety (2%). Mindfulness was also used mostly for depression (15%), followed by anxiety (11%), PTSD (6%), AUD (6%), and depression and anxiety (2%). Combined meditation and yoga was used for depression rarely (2%).

- Overall, the quality of the trials was mixed, with some high and some poor quality trials. Of the final 23 groups of interventions, three stand-alone interventions were ranked as ‘Promising’ (group yoga for depression, group mindfulness for depression, and group mindfulness for anxiety). The remaining 20 groups were ranked as ‘Unknown’. A summary of the 23 groups and their rankings follows.

- The key findings for the 11 groups of *stand-alone meditational practice interventions* were that:

- the evidence for **group meditation in treating PTSD (compared to a non-active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group meditation in treating PTSD (compared to an active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **individual meditation in treating PTSD (compared to an active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group meditation in treating depression (compared to a non-active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group yoga in treating PTSD (compared to a non-active comparison)** (5 trials) received an 'Unknown' ranking
- the evidence for **group yoga in treating depression (compared to a non-active comparison)** (6 trials) received a 'Promising' ranking
- the evidence for **individual yoga in treating anxiety (compared to a non-active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group yoga in treating depression and anxiety together (compared to a non-active comparison)** (4 trials) received an 'Unknown' ranking
- the evidence for **individual yoga in treating depression and anxiety together (compared to a non-active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group yoga (hatha yoga) in treating AUD (compared to a non-active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group yoga/meditation in treating depression (compared to a non-active comparison)** (1 trial) received an 'Unknown' ranking.

- The key findings for the six groups of *stand-alone mindfulness-based interventions* compared to an active comparison group were that:
  - the evidence for **group mindfulness in treating PTSD (compared to an active comparison)** (2 trials) received an 'Unknown' ranking
  - the evidence for **group mindfulness in treating depression (compared to an active comparison)** (3 trials) received a 'Promising' ranking

- the evidence for **individual mindfulness treating depression (compared to an active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group mindfulness in treating anxiety (compared to an active comparison)** (5 trials) received a 'Promising' ranking
- the evidence for **group mindfulness in treating depression and anxiety together (compared to an active comparison)** (1 trial) received an 'Unknown' ranking
- the evidence for **group mindfulness in treating AUD (compared to an active comparison)** (3 trials) received an 'Unknown' ranking.

- The key findings for the six groups of *adjunct meditation, yoga, and mindfulness-based interventions* were that:
  - the evidence for **group adjunct yoga (adjunct to psychopharmacological treatment) in treating PTSD (compared to an active comparison)** (1 trial) received an 'Unknown' ranking
  - the evidence for **group adjunct yoga (adjunct to pharmacological treatment) in treating depression (compared to an active comparison)** (3 trials) received an 'Unknown' ranking
  - the evidence for **group adjunct yoga (adjunct to psychoeducation) in treating depression (compared to a non-active comparison)** (1 trial) received an 'Unknown' ranking
  - the evidence for **group adjunct yoga (adjunct to psychological and pharmacological treatment) in treating AUD (compared to an active comparison)**(1 trial) received an 'Unknown' ranking
  - the evidence for **group adjunct mindfulness (adjunct to pharmacological treatment) in treating PTSD (compared to an active comparison)** (1 trial) received an 'Unknown' ranking
  - the evidence for **group adjunct mindfulness in treating depression (compared to an active comparison)** (3 trials) received an 'Unknown' ranking.
- Despite the predominantly 'Unknown' rankings, the findings of this review do provide some guidance on where future research efforts should be directed. The three 'Promising' interventions (group yoga for depression, group mindfulness for depression, and group mindfulness for anxiety) require further rigorous trials to attain a 'Supported'

ranking. At this time they may be considered emerging interventions, but not first-line treatments.

- The conclusion drawn from the available evidence is that the research is not of sufficiently high quality to support any direct recommendations. Even though there is some research of sufficient quality to suggest yoga and mindfulness being useful in the treatment of depression and anxiety, there is an opportunity to focus on funding well designed, high quality research in this area to build an evidence base that would inform the use of these modalities in treatment for mental health conditions, especially as it relates to understanding the underlying mechanisms of these approaches. In the short term, further research in the areas that have a promising ranking, that is, yoga and mindfulness for treating depression and anxiety may be beneficial.

Introduction

This review examined meditation, including mantram meditation and transcendental meditation, yoga, and mindfulness. The common link between these practices is the mind-body connection,[1,2] or the interaction between the brain, mind, body, and behaviour.[3] These practices were examined in light of their psychotherapeutic applications to posttraumatic stress disorder (PTSD), depression, anxiety, and alcohol use disorder (AUD), rather than their Eastern philosophical origins.

There is much overlap between the practices in the techniques, skills, and objectives of each, and in the mechanisms of action exerted on PTSD, depression, anxiety and AUD symptomatology. Where possible, the unique aspects of each practice have been identified, but in many cases, reference is made to the more general 'meditation, yoga, and mindfulness practices'.

Meditation, mantram meditation, and transcendental meditation

The term 'meditation' encompasses a variety of practices, ranging from relaxation techniques to exercises performed with the goal of attaining a heightened sense of wellbeing.[4] There are three broad types of meditation which are differentiated based on the particular focus of attention, and the level of individual effort exerted by the practitioner.[5] The first type, concentrative (focussed attention) meditation involves voluntary and sustained attention on a chosen object, such as breath or a word or phrase (e.g., a mantram). The second type, mindful (open monitoring) meditation involves non-reactive monitoring of the moment-to-moment content of experience, for example, mindfulness meditation. And the third type, automatic self-transcending meditation (ASTM), requires the absence of both focus and individual control or effort. Mind-body practices such as yoga and tai chi have a meditation component.[6]

Yoga

Originating as a discipline to help relieve suffering and disease, today yoga is used by many people in the West as an holistic wellness approach.[7] In Australia, yoga is practised as a form of exercise (improved health, fitness, flexibility, and muscle tone), as a spiritual practice, a form of personal development, to reduce stress or anxiety, and for specific health or medical reasons.[8] There are many types of yoga which can be distinguished by the emphasis placed on particular features such as spirituality, breathing, intensity of physical postures, and relaxation. Some of the more prominent types of yoga are described here.

Hatha yoga is the foundation for all yoga styles, and refers to any practice that combines asana (physical postures), pranayama (breathing techniques), and meditation.[9] Postures are done mindfully and with awareness of breathing, reinforcing the overlap between yoga and mindfulness. Kundalini yoga is highly spiritual, involving more chanting, meditation, and mantras than other types of yoga, and promotes deep relaxation.[10] Other yoga types include Sudarshan kriya yoga, involving controlled breathing and meditation,[11] and Vinyasa yoga, which involves movement through a sequence (or 'flow') of poses.[12] Yoga nidra focusses on relaxation and is also known as yoga relaxation therapy.[13] Therapeutically, yoga is usually delivered in group format, although it can be taught individually, and may be tailored to the patient's needs. Patients are also encouraged to practise yoga skills outside of therapy sessions.[7]

Mindfulness

Mindfulness involves intentionally bringing one's attention to the internal and external experiences occurring in the present moment.[14] Although mindfulness is said have been inspired by 2500-year-old Buddhist meditation practice,[15] in contemporary Western psychology research and clinical contexts, it is usually taught independently of the cultural, religious, and ideological factors associated with its Buddhist origins.[14]

An operational working definition of mindfulness presents it as a two-component construct comprising, (1) self-regulation of attention to the present moment, coupled with (2) an attitude of acceptance towards the present moment.[16] Mindfulness may be described as a state, a trait-like or dispositional quality, or a set of skills.[17] Two key features of the definition of mindfulness are awareness and acceptance, both of which are accompanied by a nonjudgmental attitude.[18] Awareness refers to the perception of current experiences, including bodily sensations, cognitions, emotions, urges, and environmental stimuli such as sights, sounds, and scents.[17] Acceptance refers to the openness (curiosity, detachment, irregular thinking) to face personal experiences.[19] Mindfulness practice, therefore, encourages practitioners to remain in the present moment, whether pleasant, unpleasant, or neutral.[17] Awareness and acceptance are underpinned by the self-regulation of attention, and orientation toward the present moment.[20]

Therapeutic application of mindfulness

Therapeutic applications of mindfulness are commonly called mindfulness-based interventions (MBIs).[15] The first MBI, Mindfulness-Based Stress Reduction (MBSR), was developed in 1979 by Professor Jon Kabat-Zinn from the University of Massachusetts Medical Centre. The original intent of MBSR was to help outpatients attending a stress reduction clinic to relieve the suffering associated with stress, pain, and illness.[15] Since then, other programs based on the foundational and structural approach of MBSR have been developed.[21] These include Mindfulness-Based Cognitive Therapy (MBCT),[22] which was developed to treat recurrent depression, and two

addiction recovery MBIs, Mindfulness-Oriented Recovery Enhancement (MORE)[23] and Mindfulness-Based Relapse Prevention (MBRP).[24] Mindfulness components are also incorporated in Dialectical Behaviour Therapy (DBT) and Acceptance and Commitment Therapy (ACT).[25]

There are a number of mindfulness techniques taught in MBIs including: mindful breathing, mindful eating, body scan meditation, sitting meditation, mindful yoga, and walking meditation.[17] Hatha yoga is a component of MBSR,[26] and practising mindfulness is a key element to most styles of Hatha yoga.[9] All of these techniques involve paying close attention to the physical sensations and actions that are involved in otherwise automatic actions or processes. For example, during mindful breathing, individuals focus all their attention on the physical sensations associated with breathing.[27] The goal of all of these interventions is to observe and accept physical sensations in a nonjudgmental manner without trying to alter them. Appendix 6 contains a brief overview of the mindfulness practices and curriculum used in the MBIs included in this review.

Impactful components of meditation, yoga, and mindfulness

Through the use of meditation, yoga, and mindfulness techniques, practitioners acquire skills and abilities which might be thought of as the impactful components, or 'active ingredients' that underpin a range of beneficial psychological, behavioural, and neurophysiological changes. Some of the impactful components that may contribute therapeutically to the treatment of PTSD, depression, anxiety, and AUD are described briefly below.

- **Acceptance** is a central feature of mindfulness that refers to a willingness to experience the array of one's thoughts and emotions without judgement.[16,28] It aims to reduce the distress that is associated with trying to change one's thoughts or emotional states, for example, preventing individuals from feeling anxious about being anxious.[29]

- **Describing** refers to the practice of labelling sensations, perceptions, thoughts, and emotions with words, for example, 'I feel happy' or 'my heart is racing'.[30] The benefit of describing is that it allows individuals to be more keenly aware of thoughts, sensations and emotions and better able to talk about them in treatment.[28]

- **Present-centred awareness** refers to focussing on what is happening in the present moment.[31] By limiting the scope of attention to what is happening in the moment, habitual judgmental tendencies are de-automatised, meaning that instead of evaluating experiences in terms of past memories and future expectations, practitioners merely note what is taking place in the moment, and observe their experience and reactions.[28]

- **Breathing techniques** such as slowed breathing which often occur during meditation, yoga, and mindfulness practices have the effect of increasing activation of the parasympathetic nervous system (PNS), which helps to reduce stress.[32]

- **Physical postures** practised during yoga may yield the exercise-induced psychotherapeutic benefits conferred by most forms of physical activity,[33] in addition to fostering increased body awareness, including tension, and a sense of confidence and control over the body.[34]

Mechanisms underpinning meditation, yoga, and mindfulness-based interventions

A range of neurophysiological, psychological, and behavioural mechanisms have been proposed to explain why meditation, yoga, and mindfulness-based interventions may be able to reduce PTSD, depression, anxiety, and AUD symptomatology.

Neurophysiological mechanisms

Underpinning the psychological and behavioural changes associated with meditation, yoga, and mindfulness are three broad neurophysiological responses: alterations to brain function and structure,[35] neurochemical responses,[36] and re-balancing of the autonomic nervous system (ANS).[37]

- **Alterations to brain function and structure**. Brain alterations that have been reported in response to meditation, yoga, and mindfulness include both immediate and reversible changes in brain activity[38] and structure.[39] While there is evidence for meditation and mindfulness-related neuroplasticity (the capacity for creating new neural connections and growing neurons in response to experience),[40] these adaptations may reverse once the practice of the techniques ceases.[41] Taken together, these findings suggest that neural changes may occur in both brief (e.g., one session) and longer term (e.g., eight weeks) meditation, yoga, and mindfulness interventions.[41]

- **Altered neurochemistry**. Changes to brain function and structure are reflected in a range of neurochemical changes, in particular to neurotransmitters[36] and the main stress hormone cortisol.[42] Neurotransmitters (brain chemicals that transmit messages between cells) can become dysregulated in individuals with psychological disorders, for example PTSD,[43] depression,[44] and AUD.[45] Practising meditation, yoga, and mindfulness is associated with normalisation of *gamma*-Aminobutyric acid (GABA), a neurotransmitter involved in inhibition of nervous system activity,[42] and serotonin, dopamine, and norepinephrine (NE)/noradrenaline, which are neurotransmitters that are related to limbic system activity, emotional function and control, behaviour regulation, physiological arousal, mood, reward and motivation, sleep, and other functions.[36] The normalisation of neurotransmitters associated with meditation, yoga, and mindfulness may therefore lead to stabilisation of functions such as mood and sleep.[46,47]

- **Re-balancing of the autonomic nervous system (ANS)**. The ANS regulates bodily functions such as heart rate, digestion, and respiratory rate, and operates largely unconsciously.[48] Its two divisions, the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS), act together as the body's major stress response

system. During times of stress the SNS is activated, while during times of relaxation the PNS is activated.[48] Individuals with psychological disorders are often characterised by dominant SNS activity.[42]

Yoga has been associated with increased PNS activity and reduced overactivity of the SNS, thereby re-balancing the stress response system.[42] Beneficial changes in autonomic markers such as cortisol, blood pressure, resting heart rate, heart rate variability (HRV), fasting blood glucose, and cholesterol have been observed in meditation and yoga practitioners, suggesting that the practice may contribute to increased PNS activation.[37,49,50] Additional correction of PNS underactivity may occur via stimulation of the vagus nerve (two nerves that begin at the brain stem and pass through the neck, head, chest, and abdomen), the main peripheral pathway of the PNS.[42] Vagus nerve stimulation is a US Food and Drug Administration (FDA) approved treatment for depression.[51]

Psychological and behavioural mechanisms

Psychological and behavioural mechanisms of meditation, yoga, and mindfulness include improvements in self-regulation, attention regulation, and emotion regulation, reductions in negative self-referential processing, repetitive thinking, rumination, and worry, increased self-compassion, and increased sensory and body awareness.

- **Self-regulation** refers to the processes by which people manage their own goal-directed behaviour.[52] Behavioural self-regulation failure contributes to addictive behaviours,[52] depression and anxiety,[53] and PTSD.[54] Mindfulness meditation is believed to enhance self-regulation through the interaction of its core components: attention control, emotion regulation, and self-awareness.[55]

- **Attention regulation** is cultivated by meditation, yoga, and mindfulness techniques through focussing attention on a chosen object, and deliberately returning attention to the object whenever distracted.[4] These techniques aim to enhance the self-regulated ability to both sustain and switch attention.[16] Enhanced attentional regulation through meditation, yoga, and mindfulness is underpinned by evidence of increased activity in areas including the anterior cingulate cortex (ACC) and the dorsolateral prefrontal cortex (DPFC), which are neural structures involved in attentional control.[55]

- **Emotion regulation** refers to strategies that can influence which emotions arise and when, how long they occur, and how these emotions are experienced or expressed.[55] Effective emotion regulation strategies include reappraisal and support seeking, while less effective strategies include rumination, worry, and substance use.[56] There is abundant evidence linking emotion regulation difficulties with psychopathology, including depression and anxiety (E.g., [57]), anxiety and PTSD (E.g., [58]), and alcohol use disorder (AUD, E.g., [59]).

Proposed mindfulness-based emotion regulation strategies include paying more attention to emotions, and changing the way one thinks about uncomfortable or unwanted emotions.[55]

The neurophysiological underpinnings of enhanced emotional regulation relate to alterations in the emotion processing areas of the brain including the orbitofrontal cortex (OFC), ACC, amygdala, insula, prefrontal cortex (PFC), and hippocampus.[60] Importantly, it is the connectivity between the amygdala and the PFC that governs the ability to regulate emotions. The PFC acts to inhibit activity in the amygdala.[61] If the PFC is underactive, the amygdala becomes overactive.[35] Individuals with disorders such as PTSD and anxiety are characterised by an overactive amygdala and an underactive PFC.[43] Meditation and mindfulness practices have been associated with changes in activation of these brain regions, including increased activation of PFC, reduced activation of the amygdala, and increased functional connectivity between the PFC and amygdala.[60] The hippocampus, PFC, and amygdala are also implicated in fear extinction and safety signalling (or learned safety).[62]

Reduced negative self-referential processing. Self-referential processing (SRP) refers to responses made to stimuli that are intrinsically related to one's own person,[63] and can be a healthy form of self-reflection and self-regulation.[64] However, negative SRP (e.g., rumination, worry, self-criticism) frequently accompanies mental health problems.[64] Mindfulness meditation may mitigate negative SRP by a process called 'decentring' which is the process of seeing thoughts or feelings as objective events in the mind rather than personally identifying with them.[65] This has the effect of distancing oneself from negative thoughts.[22] Decentring allows an individual to become more aware of their thoughts and to observe them in a more decentred and objective way, as opposed to unconsciously identifying with them, perhaps thereby generally reducing negative SRP.[66]

Mid-cortical brain regions associated with meditative and mindfulness practices are also implicated in self-referential processing.[63]

Reduced repetitive thinking, including rumination and worry. Repetitive patterns of thought that are non-productive can be characterised as rumination, whereby individuals tend to perseverate over events that have occurred in the past (characteristic of depression), or worry about events that may occur in the future (the central defining feature of anxiety).[64] This type of thinking is thought to decrease through paying greater attention to the present moment, as paying attention to the present reduces the time spent ruminating about the past or worrying about the future.[67] Mindfulness meditation and yoga, through their cultivation of present-centred awareness, have been associated with a decrease in ruminative thought patterns.[9,68]

The process of decentring, the benefits of which were explained concerning negative SRP, is also thought to mitigate ruminative thought processes.[68] By detaching from their thoughts, individuals may relate to them more mindfully, rather than reactively and ruminatively.[68]

- **Increased self-compassion.** Self-compassion entails "*being kind and understanding toward oneself in instances of pain or failure rather than being harshly self-critical, perceiving one's experiences as part of the larger human experience rather than seeing them as isolating, and holding painful thoughts and feelings in mindful awareness rather than over-identifying with them*" (p.139).[69] Self-compassion is cultivated through loving-kindness meditation,[70] yoga,[71] and mindfulness practices.[69] There is evidence that self-compassion stimulates parts of the brain associated with compassion in general.[72,73]

- **Increased sensory and body awareness**. Body awareness is the ability to notice subtle bodily sensations, and involves focussing on sensory experiences such as breathing, or emotions.[74] These abilities are beneficial for individuals with disorders which require the modulation of physiological arousal, such as anxiety and PTSD.[32] Increased body and sensory awareness (interoceptive awareness) via mindfulness training has been associated with structural and functional changes in the brain.[75]

Meditation, yoga, and mindfulness for PTSD

Meditation, yoga, and mindfulness approaches may target core symptoms of PTSD, including avoidance, hyperarousal, emotional numbing, negative emotions, and dissociation.[35] Contributing to these therapeutic benefits may be neurophysiological changes related to emotion and stress reactivity, and at least four psychological constructs: attention regulation, present-centred awareness, nonjudgment, and self-compassion.[76] The potential neurophysiological and psychological mechanisms are discussed in detail below.

Neurophysiological mechanisms by which mindfulness, yoga, and meditation techniques may reduce PTSD symptoms include the restoration of the neurocircuitry involved in emotion regulation and fear extinction (e.g., increased amygdala-PFC connectivity),[77] structural changes to the brain that improve body and emotion awareness,[75] and tempered physiological arousal and stress reactivity.[35]

Psychological mechanisms include at least four psychological constructs. First, attention regulation may lead to reductions in attentional bias to trauma-related stimuli, which is characteristic of individuals with PTSD. Shifting attention away from trauma-related stimuli and remaining in the present moment is thought to improve intrusive and hyperarousal symptoms.[35] Second, paying attention to the present moment redirects past or future-directed thoughts and may therefore reduce repetitive thinking, such as rumination and worry.[76] Third, nonjudgmental acceptance may promote a willingness to approach fear-provoking stimuli, leading to reduced avoidance,[76] in addition to potentially reducing the symptoms of emotional numbing and suppression of intrusive thoughts.[78] It has been proposed that via the combined mindfulness skills of nonjudgmental acceptance and present-centred awareness, mindfulness meditation resembles exposure therapy.[28] In other words, sustained nonjudgmental observation and acceptance of difficult emotions, without attempts to escape or avoid them,[28] may lead to reductions in the emotional reactivity typically elicited by anxiety symptoms, and increased fear tolerance.[14] And fourth, self-compassion may promote the ability to experience positive feelings toward the self, thereby reducing the negative emotions of shame, guilt, and anger.[35]

A cautious approach is recommended when considering the therapeutic use of mindfulness to treat PTSD. People who are particularly prone to flashbacks or easily triggered trauma memories may experience additional distress given that mindfulness-based approaches increase exposure to traumatic memories by reducing avoidance. Furthermore, people who have not developed distress tolerance skills may initially have difficulty coping with unwanted intrusive images.[35]

Meditation, yoga, and mindfulness for depression

In the treatment of depression, neurophysiological mechanisms attributed to mediation, yoga, and mindfulness include neurotransmitter and hormone normalisation, and alterations to brain regions that are implicated in depression. Furthermore, commonly cited psychological and behavioural mechanisms include improved emotion regulation, reduced rumination, and negative self-referential processing (SRP), increased behavioural activation, and improved sleep regulation. The potential neurophysiological, psychological, and behavioural mechanisms are discussed in detail below.

Neurophysiologically, meditation and yoga have been reported to normalise serotonin levels[36] which are lowered in depressed individuals.[79] Additionally, yoga postures may be linked to exercise-induced increases in hippocampal volume,[80] mitigating the hippocampal atrophy seen in depressed patients.[44] Further exercise related benefits of yoga include a reduction in the stress hormone, cortisol, via normalisation of the hypothalamic-pituitary-adrenal (HPA) axis.[81]

In terms of psychological and behavioural mechanisms, improved emotion regulation, reduced rumination and negative self-focus, and improved behavioural activation are thought to decrease depressive symptomatology. Improved emotional regulation is associated with mindfulness via the increased use of an emotion regulation strategy known as reappraisal.[74] Reappraisal involves reframing a situation's meaning to alter one's emotional response to the situation.[82] Taking a nonjudgmental stance toward experience, which is in itself a form of reframing[67], is thought to underpin the increase in positive appraisal associated with mindfulness.[83] Thus, mindfulness may cultivate a more general tendency toward reappraisal of initial negative cognitions.[84]

Mindfulness and meditation are linked with reductions in rumination and negative SRP,[66,85] both of which are characteristic of depressed individuals.[86] Depression involves an increased negative self-focus, which is persistent, repetitive, and self-critical in nature.[87] Mindfulness practice, through nonjudgment, reduces the automatic engagement in, and reaction to, evaluative mental states,[88] thereby mitigating negative self-evaluative thoughts.[67]

Behavioural activation, an important treatment option for depression,[89] is promoted by both the physical activity component of yoga, and the attitude of curiosity about experiences and acceptance of distressing thoughts and emotions cultivated through mindfulness training.[9] Yoga may also improve sleep irregularities which are commonly experienced by individuals experiencing depression.[9]

Meditation, yoga, and mindfulness for anxiety symptoms

Many of the neurophysiological and psychological mechanisms presented in the section on PTSD treatment also apply to the treatment of anxiety symptoms due to several similarities. These similarities include attentional bias toward threat, worry, emotional dysregulation, and physiological reactivity.[90] Potential neurophysiological mechanisms include reduced activity in fear-related brain regions and normalisation of neurotransmitters, and psychological mechanisms may include attention regulation, reduced worry, and enhanced emotion regulation. These potential mechanisms are discussed in detail below.

The neurophysiological mechanisms in relation to anxiety symptoms closely resemble those related to PTSD, including alterations in brain regions involved in the regulation of emotion, for example, reduced amygdala activation[77] and normalisation of neurotransmitters, including GABA, serotonin, and NE.[36]

The self-regulation of attention, a central facet of meditation and mindfulness,[4] is an important therapeutic application of mindfulness for anxiety symptoms because it addresses the tendency in anxious individuals to direct attention toward hypervigilant scanning for cues of threat or danger.[91] Increasing control over the allocation of attention is therefore one conceivable way that MBIs reduce symptoms of anxiety.[91]

Contributing to hypervigilance is worry, which is a future-oriented form of repetitive thinking.[64] High levels of worry interfere with problem solving, emotional processing, and present moment focus.[92] Similarly to reductions in rumination (another type of repetitive thinking), MBIs also appear to reduce worry via the dual facets of nonjudgment and present-centred focus.[67]

Emotion regulation difficulties are thought to underpin the motivation to avoid distressing internal experiences, which is characteristic of individuals with anxiety symptoms.[93] The cultivation of awareness, acceptance, and nonjudgment via meditation, yoga, and mindfulness practices targets the avoidant responses to internal experiences by supporting the willingness to remain present in a nonjudgmental way rather than trying to control symptoms.[93]

Meditation, yoga, and mindfulness for alcohol use disorder (AUD)

Meditation, yoga, and mindfulness-based interventions are thought to improve AUD symptomatology through neurophysiological alterations in the mesolimbic dopamine system, which is involved in motivation and reward, and by increasing PNS activity, which has the effect of lowering physiological stress. Psychological and behavioural mechanisms may include improved craving management, reduced compulsive and impulsive behaviour, enhanced emotion regulation, and decreased experiential avoidance. The potential neurophysiological, psychological, and behavioural mechanisms are discussed in detail below.

The mesolimbic dopamine system plays an important role in the reinforcement of drinking behaviour.[94] AUD is associated with low dopamine levels which provides the continued motivation to drink alcohol,[95] therefore by inducing dopamine homeostasis, meditation and yoga may be beneficial for treating AUD.[96,97] Stress reduction is also therapeutic for AUD, particularly during withdrawal. Discontinuation of alcohol is associated with increased SNS activity[98] which can be mitigated by PNS activity induced by techniques such as yogic breathing.[99]

Mindfulness promotes the awareness of triggers for craving alcohol, and cultivates the ability to choose to do something else which might ameliorate or prevent craving.[100] Through nonjudgmental awareness, the habitual cue-response pattern is disrupted and the craving response accepted without analysing, or reacting.[101] In this way, meditation acts as a form of counter-conditioning, contributing to the reversal of learned responses which are implicated in addiction.[101] Mindfulness may therefore reduce both compulsive behaviour, by providing a coping strategy to deal with urges and temptations (learning to accept and tolerate urges, choosing to do something else), and impulsive behaviour, by reducing susceptibility to act in response to a cue stimulus.[101]

Alcohol misuse may be developed and sustained through dysregulated emotion and/or experiential avoidance, both of which may be mitigated by meditation, yoga, and mindfulness.[102,103] Individuals with AUD frequently display deficits in emotion regulation, using alcohol to regulate their current emotional state (e.g., to reduce negative emotion or increase positive emotion), or to regulate the experience of craving.[103] As previously described, mindfulness may enhance emotion regulation and therefore reduce reliance on alcohol to regulate emotional states.[55] The desire to avoid unpleasant life circumstances (avoidance) may also occur in the case of addiction.[104] Acceptance might be thought of as ‘experiential presence’ (the opposite of experiential avoidance), therefore, in a similar application to PTSD treatment, avoidance may be reduced through the mindfulness skill of acceptance.[102]

Method

This literature review utilised a rapid evidence assessment (REA) methodology. The REA is a research methodology that 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 an evidence assessment rapid, however, the methodology places a number of limitations on the search criteria and on 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). Furthermore, 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, the comparisons, 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 trials for this REA. As part of this operational definition, the population of interest was defined as healthy adult patients (i.e., not suffering from a life-threatening disease) with PTSD, depression, anxiety, or AUD (or subclinical features of one or more of these disorders); the intervention was defined as the administration of meditation, yoga, or mindfulness for the treatment of PTSD, depression, anxiety, or AUD; and the mental health outcomes were defined as improvements in symptoms of PTSD, depression, anxiety, AUD, stress, arousal, and improvements in wellbeing.

Question 1 in this review investigated the use of stand-alone meditation and yoga interventions to treat PTSD, depression, anxiety, and AUD. When conducting the literature search for this question, interventions compared to any comparison condition were included. These comparison conditions included pharmacotherapy, therapy, assessment only, and waitlist. However, in presenting the findings and ranking the evidence, trials comparing meditation and yoga interventions to active comparison conditions (i.e. conventional psychological or pharmacological treatments) were separated from those comparing to non-active comparison conditions (e.g. assessment only or waitlist). In order to be considered a beneficial intervention, the meditation or

yoga treatment had to yield greater benefits in symptom reduction than the non-active control conditions in superiority trials, or demonstrate non-inferiority to active comparison conditions in non-inferiority trials.

Question 2 examined the use of stand-alone mindfulness interventions for the treatment of PTSD, depression, anxiety, and AUD. For this research question, the comparison groups were limited to those providing conventional psychological or pharmacological treatments for the specified disorders. As such, in order to be considered beneficial, the mindfulness interventions had to demonstrate non-inferiority to conventional treatments.

Question 3 consisted of an investigation of meditation (including yoga) and mindfulness interventions as adjunct to conventional treatment for PTSD, depression, anxiety, and AUD. As with Question 1, the literature search included comparisons to active and non-active comparison conditions, but trials with active comparison were separated from those with non-active comparison conditions when it came to ranking the evidence and presenting the findings. In order to be considered a beneficial intervention, adjunct meditation and mindfulness treatments had to display greater benefits than the conventional treatment alone.

Search strategy

To identify the relevant literature, systematic bibliographic searches were performed to find relevant trials from the following databases: PsycInfo, EMBASE, PubMed, CINAHL, Health Collection, and the Cochrane Database of Systematic Reviews.

Search terms

Search terms specific to the meditation, yoga, and mindfulness practices, and psychiatric disorders of interest, were included. Searches were conducted between 22 and 28 June 2018 according to the following search terms and limits.

Interventions

- Mindfulness: *mindfulness, mindfulness therapy, mindfulness-based stress reduction, MBSR*
- Meditation and transcendental meditation: *meditation, transcendental meditation, meditative therapy, meditative psychotherapy, meditation therapy, meditation psychotherapy*
- Mantra: *mantra, mantra* meditation*
- Yoga: *yoga, yoga therapy, yoga treatment, yogic*

- Specific meditation/mantra/yoga terminology: *vipassana, zen, pranayama, sudarshan, kriya, qi-gong, qigong, chi kung, kundalini, chundosunbup, reiki, tai chi, relaxation therapy, asana, dhyana, dharana*.

Psychiatric disorders

- Depression: *depression, major depression, major depressive disorder, MDD*
- Anxiety: *anxiety, anxiety disorder, generali*ed anxiety, GAD*
- PTSD: *post-traumatic stress disorder, posttraumatic stress disorder, PTSD, post-traumatic stress, posttraumatic stress, traumatic stress*
- Alcohol: *alcohol, alcohol use disorder, AUD, alcohol use, alcohol abuse.*

Databases: search fields

- PsycInfo: Title, abstract, key concepts
- Embase: Title, abstract, keyword
- PubMed: Title/abstract
- CINAHL: Title, abstract
- Health Collection: Title, abstract
- Cochrane: Title.

Limits placed on searches

- All searches were limited to English language
- All searches were limited to the period 2010 to current
- For mindfulness only, search results were limited to RCTs by using the following additional search terms: *"RCT" "randomised controlled trial" "clinical trial" "random" "random allocation" "control trial" "randomized controlled trial" "systematic review" "meta-analysis" "effectiveness trial".*

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

Paper selection: Question 1 Stand-alone meditation and yoga treatments

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

Included:

1. Internationally and locally published peer-reviewed research trials.
2. Research papers that were published from 2010 to current.
3. Human adults (i.e., ≥ 18 years of age).
4. English language.
5. Sample consisting of individuals with PTSD, depression, anxiety, or AUD (clinical diagnosis or sub-clinical symptoms).
6. Trials that used meditational practices (i.e., meditation, Transcendental Meditation, mantram or yoga) to target the symptoms of PTSD, depression, anxiety, or AUD.
7. Trials with outcome data that assessed changes in one or more of the following domains:
    a. PTSD
    b. Depression
    c. Anxiety
    d. AUD
    e. Stress
    f. Wellbeing
    g. Arousal symptoms
8. Only randomised controlled trials (RCTs) were included.
9. Trials with active (e.g. present-centred therapy, prolonged exposure therapy) or non-active (e.g. treatment-as-usual, waitlist, assessment-only, standard care, attention-control) comparison conditions were included.

Excluded:

1. Non-English language.
2. Papers where a full text version was not readily available.
3. Children (mean age of sample ≤ 17 years of age).
4. Validation studies.
5. Animal studies.
6. Grey literature (e.g., media: websites, newspapers, magazines, television; conference abstracts; theses).
7. No quantitative outcome data reported.
8. Intervention targeting phobias or panic disorder.

Paper selection: Question 2 Stand-alone mindfulness treatments

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

Included:

1. Internationally and locally published peer-reviewed research trials.
2. Research papers that were published from 2010 to current.
3. Human adults (i.e., ≥ 18 years of age).
4. English language.
5. Sample consisting of individuals with PTSD, depression, anxiety, or AUD (clinical diagnosis or sub-clinical symptoms)
6. Trials that used the mindfulness practice to target the symptoms of PTSD, depression, anxiety, or AUD.
7. Trials with outcome data that assessed changes in one or more of the following domains:
   a. PTSD
   b. Depression
   c. Anxiety
   d. AUD
   e. Stress
   f. Wellbeing
   g. Arousal
8. Only randomised controlled trials (RCTs) were included.
9. Only trials with active comparison conditions were included (e.g. present-centred group therapy, primary care treatment, cognitive behavioural analysis system of psychological education, CBT, stress management education, cognitive behavioural group therapy, psychoeducation, pharmacological treatment, support groups).

Excluded:

1. Non-English language.
2. Papers where a full text version was not readily available.
3. Children (mean age of sample ≤ 17 years of age).
4. Validation studies.
5. Animal studies.
6. Grey literature (e.g., media: websites, newspapers, magazines, television; conference abstracts; theses).
7. No quantitative outcome data reported.
8. Intervention only included mindfulness as a small component. For example, Acceptance and Commitment Therapy, Dialectical Behaviour Therapy.

Paper selection: Question 3 Adjunct meditation, yoga, and mindfulness treatments

Papers were included in the review of the *meditation and mindfulness as adjunct* evidence if they met all of the following inclusion criteria.

Included:

1. Internationally and locally published peer-reviewed research trials.
2. Research papers that were published from 2010 to current.
3. Human adults (i.e., ≥ 18 years of age).
4. English language.
5. Sample consisting of individuals with PTSD, depression, anxiety, or AUD (clinical diagnosis or sub-clinical symptoms).
6. Trials that used the meditation or mindfulness practice as an adjunct to conventional psychological or pharmacological treatment to target the symptoms of PTSD, depression, anxiety, or AUD.
7. Trials with outcome data that assessed changes in one or more of the following domains:
   a. PTSD
   b. Depression
   c. Anxiety
   d. AUD
   e. Stress
   f. Wellbeing
   g. Arousal
8. Only randomised controlled trials (RCTs) were included.
9. Trials with active (e.g. psychopharmacologic treatment, pharmacological treatment, counselling) or non-active comparisons (e.g. treatment-as-usual) were included.

Excluded:

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

Information management

A screening process was adopted to code the eligibility of papers acquired through the search strategy. Papers were directly imported into the bibliographic tool Endnote X7. Screening for duplicates was performed in Endnote. References were then imported into Covidence for screening and for full text review.

All records that were identified using the search strategy were screened for relevance against the inclusion criteria. Initial screening for inclusion was performed by two reviewers using Covidence, and was based on the information contained in the title and abstract. Full text versions of all trials which satisfied this initial screening were obtained.

If the paper met the inclusion criteria it was subject to data abstraction. This involved extracting the following information: (i) trial description, (ii) intervention description, (iii) participant characteristics, (iv) primary outcome domain, (v) main findings, (vi) bias, and (vii) quality assessment. This information appears in the evidence tables in Appendix 4.

Evaluation of the evidence

There were five key components that contributed to the overall evaluation of the evidence.[105]

1. The **strength of the evidence base**, in terms of the quality and risk of bias, quantity of evidence, and level of evidence (study design).
2. The **direction** of the trial results in terms of positive, negative, or null findings.
3. The **consistency** of the trial results.
4. The **generalisability** of the body of evidence to the target population (i.e., adults/military personnel).
5. The **applicability** of the body of the evidence to the Australian context.

The first three components provided a gauge of the internal validity of the trial 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 trial 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: a) quality and risk of bias, b) quantity of evidence, and c) level of evidence.

a) **Quality and risk of bias** reflects how well the trial was conducted, including how the participants were selected, allocated to groups, and managed and followed-up, and how the trial outcomes were defined, measured, analysed, and reported. An assessment was conducted for each trial 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 interventions (see Appendix 3). Three independent raters rated each trial according to these criteria, and together reached a consensus agreement on an overall rating of 'Good', 'Fair', or 'Poor'.

b) **Quantity** of evidence reflected the number of trials that were included in 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 trials). Small, underpowered trials that were otherwise sound may have been included in the evidence base if their findings were generally similar – but at least some of the trials cited as evidence must have been large enough to detect the size and direction of any effect.

c) **Level of evidence** reflected the trial design. Details of the trial designs included in this REA were assessed against a hierarchy of evidence commonly used in Australia:[106]

    a. Level I: A systematic review of RCTs

    b. Level II: An RCT

    c. Level III-1: A pseudo-RCT (i.e., a trial where a pseudo-random method of allocation is utilised, such as alternate allocation)

    d. Level III-2: A comparative trial with concurrent controls. This can be any one of the following:

        i. Non-randomised experimental trial (this includes controlled before-and-after (pre-test/post-test) trials, 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))

        ii. Cohort study

        iii. Case-control study

        iv. Interrupted time series with a control group

    e. Level III-3: A comparative study without concurrent controls. This can be any one of the following:

        i. Historical control study

        ii. Two or more single arm study (case series from two studies. This would include indirect comparisons utilised (i.e., A vs B and B vs C to determine A vs C where there is no statistical adjustment for B))

        iii. Interrupted time series without a parallel control group

f. Level IV: Case series with either post-test or pre-test/post-test outcomes.

Overall strength

A judgment was made about the strength of the evidence base, taking into account quality and risk of bias, quantity of evidence, and level of evidence. Three independent raters rated the strength of the evidence base, and together reached a consensus agreement on an overall rating using the following categories:

High strength	Moderate strength	Low strength
One or more level I studies with a low risk of bias OR three or more level II studies with a low risk of bias	One or two level II studies with a low risk of bias OR two or more level III studies with a low risk of bias	One or more level I to level IV studies with a high risk of bias

Direction

The direction component of the ranking system makes a judgment as to whether the results are in a positive or negative direction. In cases where there are trials that show findings in different directions, preference is given to the direction of the trial findings with the highest level and best quality.

Positive direction	Unclear direction	Negative direction
The weight of the evidence indicates positive results	The evidence does not show significant effects OR the results are mixed	The weight of the evidence indicates negative results

Consistency

The consistency component of the ranking system of the body of the evidence assesses whether the findings are consistent across the included trials (including across a range of trial populations and trial designs). It is important to determine whether trial results are consistent to ensure that the results are likely to be replicable or only likely to occur under certain conditions.

All studies are consistent reflecting that results are highly likely to be replicable	Most studies are consistent and inconsistency may be explained, reflecting that results are moderately–highly likely to be replicable	Some inconsistency reflecting that results are somewhat unlikely to be replicable	All studies are inconsistent reflecting that results are highly unlikely to be replicable

Generalisability

This component covers how well the participants and settings of the included trials 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).

The population/s examined in the evidence are the same as the target population	The population/s examined in the evidence are similar to the target population	The population/s examined in the evidence are different to the target population, but it is clinically sensible to apply this evidence to the target population	The population/s examined in the evidence are not the same as the target population

Applicability

This component addresses whether the evidence base is relevant to the Australian context, or to specific local settings (such as rural areas or cities). Factors that may reduce the direct application of trial 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).

Directly applicable to the Australian context	Applicable to the Australian context with few caveats	Applicable to the Australian context with some caveats	Not applicable to the Australian context

Ranking the evidence

On balance, this next step takes 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 is then ranked into one of four categories: 'Supported', 'Promising', 'Unknown' and 'Not supported' (see Figure 1). Agreement on ranking is 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'.

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

Figure 1: Categories within the intervention ranking system

Results

The following section presents the flowcharts relating to the number of records identified at each stage of the REA (refer to Figure 2 and Figure 3). From all of the sources searched, a total of 50 papers (48 original trials) were identified.

For question one which examined meditation and yoga, 29 original trials were identified as meeting the inclusion criteria, as well as two additional secondary analyses, creating a total of 31 papers. For question two which examined mindfulness, 19 original trials were identified as meeting the inclusion criteria. Of the 48 original trials, 10 papers were separated out and used to answer question three, which examined adjunct treatments. This is explained in further detail in the Methods section.

Approximately half (n = 26) of the trials originated from the US. There were three from Canada, two each from Sweden, Iran, India, Germany, the UK, and the Netherlands, and one each from Columbia, Taiwan, Croatia, Austria, Hong Kong, Vietnam, and Australia. All trials were published between 2010 and 2018. The secondary analyses were based on two separate US trials. Approximately 80% of the trials were published in the last five years, with the remainder published prior to 2014.

It should be made clear that varying inclusion criteria were applied to each section of the review. Question one examined the role of meditational practices including meditation, mantra, and yoga in mental health treatments for PTSD, depression, anxiety, and AUD. It included RCTs that compared these interventions to any comparison (pharmacotherapy, therapy, control, or waitlist conditions). In order to be considered a significant finding of beneficial effect, those receiving the meditation or yoga-based intervention were required to show greater improvement in primary outcomes than those in a non-active comparison group, or non-inferiority to active comparison group.

For the second question, which examined the available evidence relating to mindfulness interventions, inclusion criteria specified that the comparison group must be a conventional psychological or pharmacological treatment for PTSD, depression, anxiety, or AUD. As such, in order to be considered as showing a beneficial effect, mindfulness interventions were required to be just as good as the conventional treatments, that is, demonstrate non-inferiority to conventional treatment.

The third question investigated the use of both meditational and mindfulness interventions as adjunct to conventional psychological or pharmacological treatment of PTSD, depression, anxiety, and AUD. In order to be considered to have a beneficial effect, those receiving the adjunct meditational or mindfulness interventions were required to have significantly greater improvement than the comparison group on the outcome of interest. That is, these trials were required to demonstrate a benefit from the addition of meditation, yoga or mindfulness to other psychological or pharmacological treatment.

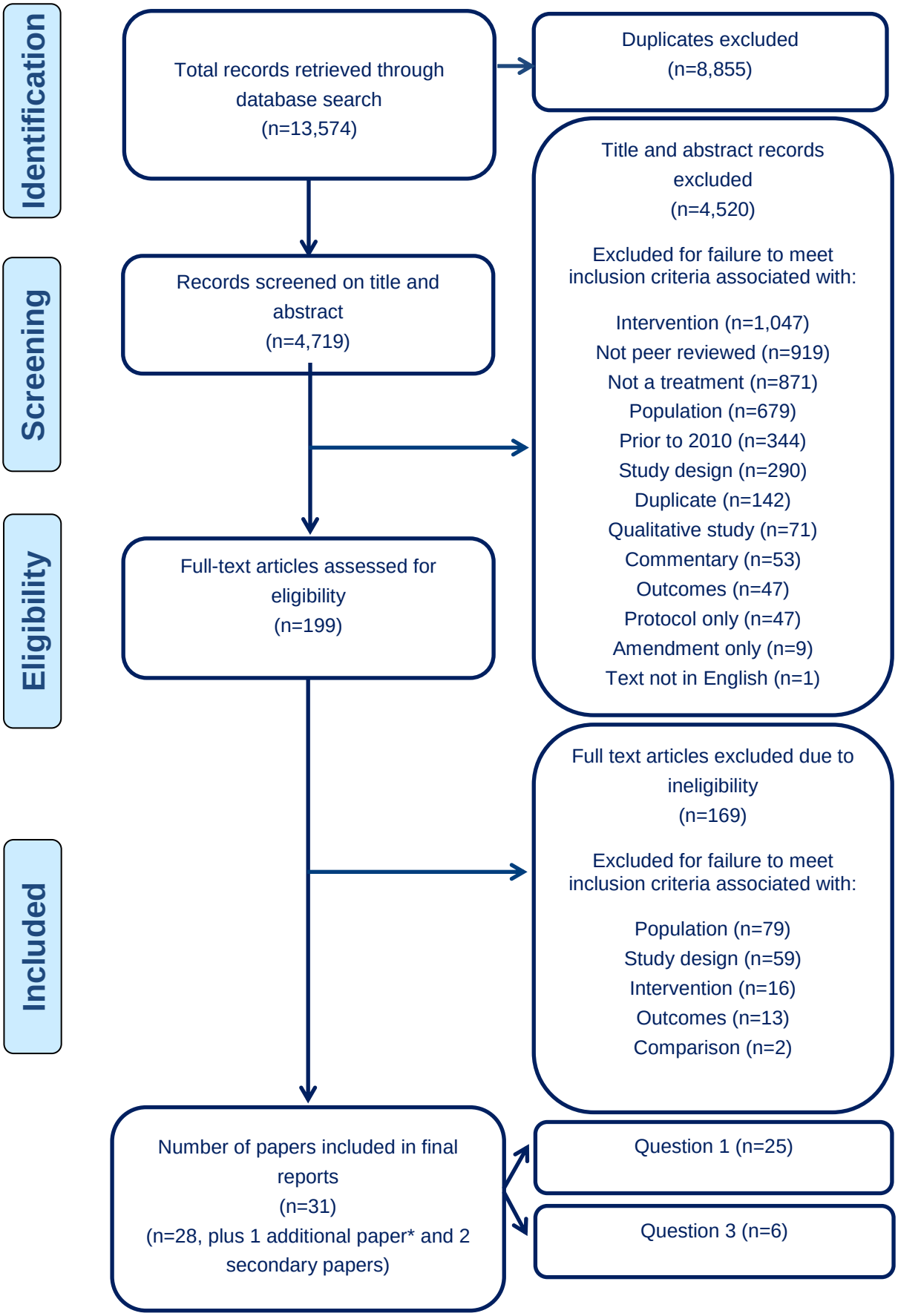

Figure 2: Flowchart representing the number of records retrieved during search for meditation and yoga trials

**Paper published during draft stage of the final report*

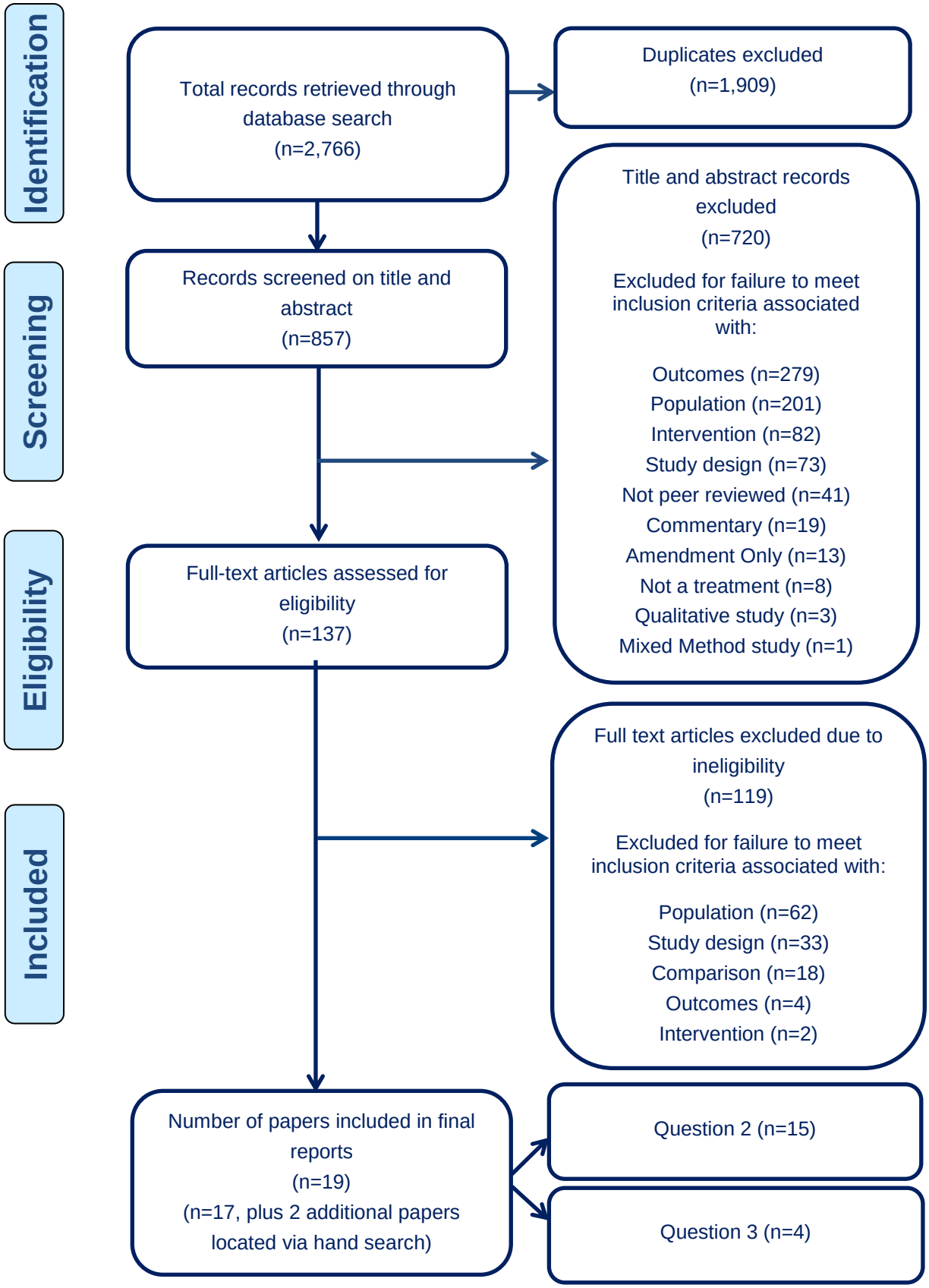

Figure 3: Flowchart representing the number of records retrieved during search for mindfulness trials

Summary of the Evidence

A total of 50 articles were included in this review. Thirty-one articles examined the use of meditation and yoga for the treatment of PTSD, depression, anxiety, and AUD, and 19 articles examined the use of mindfulness for the treatment of PTSD, depression, anxiety and AUD. Of the 50 articles, 10 articles examined the use of adjunct meditation, yoga, and mindfulness interventions for the treatment of PTSD, depression, anxiety, and AUD. A detailed summary of the trials is found in the evidence profile presented in Appendix 4, and in Appendix 5 as a brief overview.

Stand-alone meditation and yoga treatments

Meditation interventions

The first research question aimed to investigate the use of meditational and yoga interventions to treat PTSD, depression, anxiety, and AUD. These were examined in relation to any comparison groups, such that in order to be considered a 'Supported' intervention, it was required to be more effective than any comparison condition (pharmacotherapy, therapy, assessment-only, or waitlist conditions).

Group-based meditation for PTSD (compared to non-active comparison)

Only one trial investigated the effectiveness of group-based meditation to treat PTSD, compared to a non-active comparison.[107] The large single-blind RCT compared a group-based mantram repetition program combined with treatment as usual (TAU) to TAU only. The sample consisted of 146 outpatient veterans with a diagnosis of PTSD. The intervention group received six 90-minute weekly group meditation sessions, which included PTSD psychoeducation and instructions on how to choose and utilise a mantram to manage symptoms. The comparison group participants received case management as needed, in order to monitor their mental health and current treatment, as well as adherence to medication and access to future treatments. Both groups continued with any pre-existing medication regimens. Both self-reported and clinician-rated PTSD symptoms had significantly greater reductions in the intervention group compared to the comparison group. Amongst the participants who took part in the meditation intervention, 24 per cent demonstrated clinically significant reductions on the clinician-rated PTSD measure post-intervention, compared to 12 per cent of the comparison group. The intervention group showed further reductions in PTSD symptoms at the six-week follow-up assessment, but a comparison with the comparison group was not possible as they were participating in the mantram intervention at this time point. Low drop-out rates were observed in both the intervention group (7%) and the comparison group (6.7%), indicating that this intervention was acceptable to

individuals with PTSD. However, the inability to compare outcomes from the intervention group to the comparison group at the six-week follow-up assessment limited findings being made on the short-term effects of this treatment. Additionally, an overrepresentation of male participants (97%) limited generalisability of the results to females. In general, however, this was a well conducted trial that provides important preliminary findings regarding the effectiveness of mantram meditation in treating PTSD.

While the single trial examining group-based meditation interventions to treat PTSD used a large sample, given that it was the only trial, the strength, direction, consistency, and generalisability of the evidence were not rated. Therefore, the body of evidence for group-based meditation as a treatment for PTSD, compared to any control condition, was ranked as 'Unknown'.

Group-based meditation for PTSD (compared to active comparison)

One notable study was published in the Lancet Psychiatry journal in late 2018. The trial investigated the use of group-based transcendental meditation (TM) as a treatment for PTSD.[108] It included 203 US veterans from the VA San Diego Healthcare System diagnosed with PTSD, and compared three 12-week interventions: TM, prolonged exposure (PE) and PTSD health education. The TM intervention was delivered in groups, with five sessions of teaching TM technique, seven maintenance sessions, and encouragement to practice two 20-minute sessions at home daily. This intervention was compared to PE, which is currently one of the most widely accepted first-line treatments for PTSD. There was also a third group that included participants who received 12 sessions of PTSD health education following manualised instructions. Mean changes in PTSD symptoms at the end of the 12 weeks was greater for both the TM group and the PE group compared to the health education group. TM was found to be significantly non-inferior to PE in reducing clinician-rated and self-reported PTSD scores. Within the TM group, 61% of participants displayed clinically significant change, compared to 42% in the PE group and 32% in the health education group. Particularly noteworthy within this trial was the finding that when examining clinically significant change on clinician-rated PTSD scores, the TM group demonstrated a significantly higher percentage of change than the health education group, but the PE group did not display a significantly higher percentage of change than the health education group. However, when examining clinically significant symptom reduction using the self-report measures, both TM and PE had greater rates of change than the health education group. This trial provides some evidence that the benefits of TM are comparable to those of PE, indicating its potential as a viable alternative treatment. The trial had some limitations, including five significant adverse effects reported, which included suicide attempts, death (non-suicidal), drug overdose, and illness. However, none of these were concluded to be related to any treatments received in the trial. In addition, generalisability of findings was limited due to the sample of primarily male veterans with a baseline level of severe PTSD. Therefore, it is unknown of the results could be generalised to females and those with mild or moderate levels of PTSD.

High attrition rates in the PE group (38%) and the TM group (25%) also served as a potential limitation. Overall, however, this was a well-conducted and rigorous study that provided important findings with regard the use of meditation to treat PTSD, particularly in comparison with a well-supported conventional treatment.

Due to there only being one trial examining group-based meditation as a treatment for PTSD (in comparison to an active comparison condition), the strength, direction, consistency, generalisability, and applicability of this evidence could not be ranked. Therefore the body of evidence of group-based meditation as a treatment for PTSD, compared to active comparison conditions, was ranked as 'Unknown'.

Individual meditation for PTSD (compared to an active comparison)

Bormann and colleagues, who conducted the previously mentioned trial using mantram meditation to treat PTSD, extended their research to examine effects of the same intervention delivered in an individual format.[109] The trial included 173 patients from the US Veteran Health Administration (VHA), 89 of whom received the mantram repetition program via one-on-one weekly sessions and 84 of whom received present-centred therapy (PCT). Both the mantram and the PCT groups experienced clinically significant improvements in clinician-rated PTSD scores, and individuals who received the mantram intervention had significantly greater improvement compared to those who received PCT, both post-treatment and at two-month follow-up. Self-reported PTSD scores showed a significant difference between the groups post-treatment, with the mantram group showing greater symptom reduction, but there was no significant difference between groups at the two-month follow-up assessment. The discrepancy in clinician-rated and self-reported scores at follow-up suggests the long-term benefits of mantram meditation compared to PCT are somewhat unclear, but short-term improvement in PTSD symptom severity was consistent across the two measures. Within the mantram group, 59 per cent of participants no longer met criteria for PTSD at the two-month follow-up, which was significantly greater than the 40 per cent that no longer met criteria within the PCT group. Four adverse events were reported (substance abuse relapse and inpatient detoxification), but were determined by authors to be unrelated to the trial treatment. This was a well-designed trial with few methodological flaws, except for the fact that it included a higher proportion of males than females, which potentially limited the degree of generalisability to females. There was also a slightly higher drop-out rate in the mantram group (22%) compared to the PCT group (14%), however this difference was not found to be significantly different and thus was not attributed to the treatment.

The strength, direction, consistency, generalisability, and applicability of this evidence could not be ranked due to there being only one trial, despite it containing a large sample and being well

conducted. Therefore the body of evidence investigating individual meditation as a treatment for PTSD, compared to any comparison condition, was rated as 'Unknown'.

Group-based meditation for depression (compared to a non-active comparison)

A single RCT examined a group-based meditation intervention for the treatment of depression amongst older adults between the ages of 60 and 85.[110] Participants (N = 51) were allocated to either automatic self-transcending meditation (n = 26) or a waitlist TAU condition (n = 25). This form of meditation differs from previously described forms by drawing attention inward to promote mental and physical relaxation. Although it utilises a mantram, it differs from mantram meditation in that the goal is to transcend the mantram rather than sustain focus on it. This was implemented via four group meditation sessions followed by weekly reinforcement sessions that encouraged daily practice of meditation at home. Participants in the comparison group continued TAU (ongoing therapy and/or antidepressants), and were offered the opportunity to receive the meditation training after the trial. Both primary and secondary measures of depressive symptoms were significantly reduced in the meditation condition compared to the TAU group. Quality of life improved throughout the trial period in both conditions as well. The dropout rate was 18 per cent across both groups. Given that this was the only trial on meditation as a treatment for depression, it should be noted that the findings may not be representative of the effects of all types of meditation on depressive symptoms. While this in itself is not a limitation of the trial, it reduces the generalisability of its findings to the body of evidence.

As there was only one trial identified which examined group-based meditation as a treatment for depression, the strength of evidence, as well as the direction, consistency, generalisability, and applicability of the evidence were not rated. Therefore, the overall body of evidence for meditation as a treatment for depression, compared to any comparison condition, was ranked as 'Unknown'.

Individual meditation for depression

There were no trials identified which used individual meditation for the treatment of depression.

Group-based meditation for anxiety

There were no trials identified which used group-based meditation for the treatment of anxiety.

Individual meditation for anxiety

There were no trials identified which used individual meditation for the treatment of anxiety.

Group-based meditation for combined depression and anxiety

There were no trials identified which used group-based meditation for the treatment of combined depression and anxiety.

Individual meditation for combined depression and anxiety

There were no trials identified which used individual treatment for the treatment of combined depression and anxiety.

Group-based meditation for AUD

There were no trials identified which used group-based meditation for the treatment of AUD.

Individual meditation for AUD

There were no trials identified which used individual meditation for the treatment of AUD.

Yoga interventions

Group-based yoga for PTSD (compared to a non-active comparison)

Five RCTs reported on the use of yoga as a treatment for PTSD, all of which used group formats to deliver the interventions.[10,11,111-113]

The first RCT included 100 ex-combatants from illegal armed groups in Columbia being reintegrated after having been exposed to local armed conflicts.[112] Half were allocated to weekly classes of Satyananda yoga (n = 50) and the remaining half continued with the standard demobilisation program, which consisted of monthly appointments with a psychologist (n = 50). There was a large effect size for the reduction in PTSD symptoms between pre-intervention and one-month post-treatment within the yoga group (d = 1.15), whereas the comparison group demonstrated a medium effect size (d = 0.42). When symptom clusters of PTSD (re-experiencing, avoidance, and hyperarousal) were analysed separately, the yoga group also demonstrated reductions on those symptom cluster scores with large effect sizes. The post-intervention assessments at one month indicated that the mean PTSD symptom severity for the yoga group was below the clinical threshold for diagnosing PTSD, whereas for the comparison group the mean score was above this threshold. Although the dropout rate was only 10 per cent, there was no intention-to-treat analysis conducted, which introduced some risk of bias to the findings. In addition to this, while it was a relatively well conducted trial, it was limited somewhat by a lack of generalisability, attributed to a male-dominated sample as well as a unique sample of ex-combatants from illegal armed groups. This may limit the extent to which these findings can be generalised to females or traditional military populations.

A second trial investigated the effectiveness of Sudarshan Kriya yoga on US male veterans with symptoms of PTSD, using a small RCT with 21 participants.[11] Although this trial did not stipulate clinically diagnosed PTSD within its inclusion criteria, mean self-report PTSD scores for both the intervention and waitlist groups were above the suggested clinical cut-off to diagnose PTSD. The intervention consisted of daily three-hour group yoga sessions for a period of seven days, while the comparison was a waitlist group that received the same intervention at a later date. Participants also continued with pre-existing treatments. Results of the trial showed significantly lower PTSD scores for the yoga group compared to baseline at post-intervention, one month post-intervention, and one year post-intervention. The differences between groups at post-intervention, one-month follow-up, and one-year follow-up all showed large effect sizes, indicating a large magnitude of difference between groups in favour of the yoga group. While the trial was well conducted and had a low dropout rate (5%), it was limited by a small sample size of 21 participants. The sample was also limited to male participants. The small sample size introduced a degree of risk of bias, while the male-only sample limited generalisability of the findings to females.

Another small RCT (N = 38) investigated a Kripalu-based yoga intervention and compared it to an assessment-only comparison group.[111] The intervention involved 75-minute yoga and assessment sessions that could be done weekly over 12 weeks or twice-weekly over six weeks. Both the yoga and comparison groups had significant reductions in PTSD scores through the course of the intervention, however, there was no significant difference between the groups. A secondary analysis of this trial[114] found reductions in alcohol use amongst the yoga group, but this was not statistically significantly different from the comparison group. Thirty-two per cent of participants withdrew from the trial or were lost to follow-up. A female-only sample limited the generalisability of the trial's findings to males, and the small sample size increased the risk of bias.

Two more RCTs examined yoga as a treatment for PTSD but both were limited by high attrition rates.[10,113] One Canadian trial compared an eight-week Kundalini yoga intervention to a waitlist comparison group (N = 80).[10] Participants in this trial were permitted to continue concurrent outside treatment if it did not include a contemplative component. Results indicated lower self-reported PTSD scores in the yoga group compared to the comparison group post-intervention. A high drop-out rate of 51 per cent was reported for the yoga group, which was considerably higher than the overall drop-out rate for both groups (30%). The reasons for drop-out in the yoga group that were provided included scheduling conflicts, medical and health reasons, and personal reasons. This was likely to have introduced bias into the trial results. In addition, the lack of an intention to treat analysis introduced another potential source of bias, especially considering the high drop-out rate, as it limited the amount of interpretable data. The other RCT included 51 US veterans and active duty military personnel diagnosed with PTSD, who were randomly assigned

to receive a ten-week Kripalu yoga intervention or to a waitlist group.[113] Results of the trial showed reductions in clinician-rated PTSD severity for both groups, with no significant between-group differences. There were no statistically significant differences between groups for self-report PTSD symptoms. The only group that showed significant reductions in clinician-reported and self-reported PTSD scores was the waitlist group that received the yoga intervention after the original intervention group, although results should be considered in light of the small sample size for this group (n = 7). In the original yoga group, 61 per cent (n = 16) of the randomised participants dropped out or were lost to follow-up, and 16 per cent (n = 4) of the waitlist group dropped out. This attrition rate was explained by authors as the potential result of a long trial period (10 weeks), with the recruitment process slowed down by needing to wait for sufficient numbers to start yoga groups.

Although there was one relatively well conducted trial,[112] the strength of this group of evidence was rated as low. Several of the trials had methodological limitations such as small sample sizes and high attrition rates. While all trials indicated that yoga interventions were associated with improvements in PTSD symptoms, not all reported these improvements as being greater than that of comparison groups, indicating an unclear direction of evidence. The inconsistencies in sample size, follow-up assessments, and varying sample populations suggested that the results are somewhat unlikely to be replicable. While all participants were recruited from the general population, three of the five trials included only male samples, which limited the degree to which findings could be considered reflective of the general adult population. The evidence was, however, considered directly applicable to the Australian context. Overall, it was judged that although the evidence suggests some benefit of group-based yoga as a treatment for PTSD when compared to any comparison condition, there is a lack of well supported findings, and therefore it is rated as ‘Unknown’.

Individual yoga for PTSD

No trials were identified which used individual yoga as a treatment for PTSD.

Group-based yoga for depression (compared to a non-active comparison)

Six RCTs investigated the use of group-based yoga as a treatment for depression.[115-121] It should be noted that the trials included participants from specific samples, with five of the six trials including only female participants, and three of these being conducted with pregnant females to examine the effectiveness of yoga on pre-natal or post-natal depression. While this is not a limitation of these trials, it somewhat reduces the generalisability of findings to the general population.

The first trial (the only one with a mixed gender sample) was a small RCT (N = 38) implementing an eight-week Hatha yoga intervention with twice-weekly classes.[120] The comparison group

attended the same number of group sessions, but received an education module on historical figures of the yoga tradition instead of yoga classes. Adults with mild-to-moderate depression were recruited from local community and outpatient clinics. Those in the yoga group displayed a significantly greater reduction in depressive symptoms compared to the comparison group. Amongst those who completed the eight-week yoga intervention, 60 per cent achieved remission from depressive symptoms, while 10 per cent of the comparison group achieved remission. Two adverse events were reported (musculoskeletal injuries) but were not related to the yoga exercises, and additional reports of musculoskeletal discomfort during yoga classes resolved throughout the course of the intervention. Limitations of this trial include a small sample size, as well as a relatively high drop-out rate of 35 per cent, both of which introduced risk of bias to the findings. Those who dropped out of the trial did so for a variety of reasons such as scheduling conflicts and family emergencies, none of which were considered to be related to the intervention.

Another RCT investigated the use of Hatha yoga with 26 adult females with mild to moderate depression in Taiwan.[116] The yoga group (n=13) participated in twice-weekly, 60-minute group yoga classes over 12 weeks. The waitlist comparison group (n=13) was instructed not to engage in any yoga practice and maintain usual levels of physical activity, and was provided with the 12-week yoga program after the post-intervention assessment. Depressive symptoms were significantly reduced at post-intervention within the yoga group, while the comparison group showed no significant change. These results should be considered in light of the small sample size, from which 23 per cent dropped out, and also the limitation to females with mild or moderate depression. Therefore, there may be limited generalisability to a general population of adults with severe depression.

One small US RCT, published in 2013, consisted of a Hatha yoga treatment for 27 women diagnosed with Major Depressive Disorder (MDD) or dysthymia (N=27).[118] A subsequent paper, published in 2014, reported on the results of a one-year follow-up assessment of the trial participants.[119] Participants were randomised to weekly 75-minute group yoga classes and instructed to practise at home daily (n = 15) or to attend weekly 75-minute group health education classes as a comparison condition (n = 12). Results indicated no significant difference in reductions in depression severity between the yoga group and the comparison group, but all participants had reduced levels of depression severity over the course of the eight-week trial. Rumination was the only outcome that displayed greater reduction in the yoga group than in the comparison group. At the 12-month follow-up,[119] participants from both the yoga and comparison groups (N = 9) showed decreases in depression severity, with the yoga group showing a significantly greater reduction in depression severity and rumination. While the long-term follow-up provided valuable information, this trial was limited by a small sample size and high attrition rate, both in the primary analysis (33%) and in the one-year follow-up analysis (66%).

The three remaining RCTs targeting depression had samples consisting of pregnant females or females who had recently given birth.[115,117,121] Considering that the diagnosis and treatment for pre-natal and postpartum depression do not differ from that of MDD, it is reasonable to consider these trials alongside the previous trials reporting on depression. The first of these trials involved a gentle Vinyasa flow yoga intervention for females with postpartum depression who had given birth within 12 months and met criteria for MDD (N = 57).[115] The yoga group (n = 28) was compared to a waitlist comparison group (n = 29) which received the same treatment at a later time. Participants were identified and recruited using US public birth records and local advertisements. Clinician-rated depressive symptoms decreased significantly for both groups, but the difference was significantly greater in the yoga group compared to the comparison group. In the yoga group, 78 per cent of participants displayed clinically significant change at the post-treatment assessment, compared to 59 per cent of participants in the comparison group. There was an 11 per cent dropout rate across both groups, which was not judged to be dependent on group allocation.

The remaining two trials examined the effectiveness of yoga treatments on pre-natal depression amongst pregnant females.[117,121] One small RCT included 20 women who were recruited from community locations and obstetrician-gynaecologist (OB/GYN) practices in the US.[121] Women who were 12-26 weeks' pregnant with minor or major depression were randomised to a pre-natal yoga program (n = 12) or a mom-baby wellness workshop as the comparison group (n = 8). Both conditions involved weekly 75-minute classes for nine weeks, with the yoga group provided with pre-natal yoga classes and the comparison group given group workshops on postpartum health and wellness. Depression severity improved in both groups, on both the self-report and clinician-rated measures. The yoga group had greater reductions in both measures, but the difference between the yoga and comparison groups was not statistically significant. The trial had several methodological limitations that affected the degree to which its results could be considered interpretable. The randomisation method was not described, which created a potential for biased results if it was not properly conducted. Blinding was also not mentioned despite the use of a clinician-rated depression measure. In addition to a standardised clinician-rated measure for depression, the Edinburgh Postnatal Depression Scale (EPDS) was also used to monitor symptoms of depression, despite it being a diagnostic tool. It is often used to measure distress in pregnant females, but the fact that it was used to measure symptoms of depression in this trial may be a limitation. The drop-out rate was low (10%), but intent-to-treat analysis was not utilised to replace the missing data, thus further reducing the data available for analysis. These limitations, combined with the small sample size and lack of generalisability stemming from a sample made up only of pregnant females, limited the interpretability of the findings.

A second RCT examining yoga as a treatment for 84 females with pre-natal depression involved three conditions: a yoga intervention with twice-weekly 20-minute group yoga sessions, massage

therapy with twice-weekly 20-minute massages, or a standard pre-natal care comparison group.[117] Results indicated significant reductions in depression and anxiety in both the yoga group and the massage groups, but no statistical analyses were conducted to compare the effectiveness of the interventions, thus preventing any meaningful inferences to be made from this trial.

The strength of the evidence for group-based yoga for depression was rated as moderate. Of the six trials identified, there were three trials that, despite having some methodological flaws such as lack of long-term follow-up data or relatively small sample sizes, were otherwise well conducted.[115,116,120] The three remaining trials[117-119,121] had methodological limitations that included small sample sizes, high drop-out rates, lack of adequate randomisation, and lack of assessor blinding. All trials reported that yoga was associated with improvements in depressive symptoms, but not all indicated that this improvement was significantly greater than that of comparison groups. It is relevant to note that the higher quality trials consistently showed greater improvement in yoga groups than in comparison groups, while the trials showing no significant differences between yoga and comparison groups were found to have considerable methodological limitations. The direction of the evidence was therefore assessed to be positive. It was also judged that most trials were consistent, and that inconsistencies could be explained, in this case by poor methodology. As such, the results were considered somewhat likely to be replicable. The generalisability of the evidence to the target population was somewhat limited due to five of the six trials being conducted with female participants only and three including females with pre-natal or postpartum depression. The evidence was, however, judged as directly applicable to the Australian context. Although generalisability was limited, the strength, direction, consistency, and applicability of the evidence indicated that the findings were noteworthy. The evidence was thus suggestive of the beneficial effects of group-based yoga to treat depression when compared to any comparison condition, but further well conducted research is also required. Overall, the body of evidence for group yoga as a treatment for depression was ranked as ‘Promising’.

Individual meditation for depression

There were no trials identified which used individual meditation as a treatment for depression.

Group-based yoga for anxiety

There were no trials identified which used group-based yoga as a treatment for anxiety.

Individual yoga for anxiety (compared to non-active comparison)

There was one trial that investigated individual yoga as a treatment for situational anxiety within the context of surgery.[122] The RCT used sukha pranayama breathing exercises in patients before

they underwent coronary angiographies. Eighty participants recruited from a hospital in Iran, all of whom were about to undergo coronary angiographies, were randomised to a group conducting sukha pranayama breathing for five minutes (n=40), or a comparison group consisting of routine coronary angiography-related care (n=40). In order to qualify for inclusion in the trial, patients were required to be undergoing the surgery for the first time and have an anxiety score of 43 or greater on the State-Trait Anxiety Inventory (STAI). Assessments were conducted before, half an hour post, and one hour post-intervention or standard care. The intervention group displayed significant reductions in anxiety symptoms half an hour and one hour after the breathing exercises, while the comparison group displayed slight but not statistically significant decreases. Between-group differences in anxiety scores at half an hour and one hour post-intervention were both significant. This trial differed from most other trials in this report due to being a brief single-session intervention, compared to the multiple session treatments offered in other trials. As such, its efficacy as a single intervention was difficult to compare to longer-term interventions. There was no long-term follow-up to determine if decreases in anxiety symptoms were sustained, or if patients continued to practise breathing exercises. It was also conducted with patients undergoing coronary angiography and thus might not represent the same results as it would with otherwise healthy adults. This trial did, however, highlight the potential effectiveness of a single session of yoga exercises to relieve situational anxiety related to a specific event.

As there was only one trial examining yoga as a treatment for anxiety, the strength, direction, consistency, generalisability, and applicability of the evidence were not rated. Therefore, the body of evidence for individual yoga as a treatment for anxiety when compared to any comparison condition was ranked as ‘Unknown’.

Group-based yoga for combined depression and anxiety (compared to non-active comparison)

There were four RCTs that examined the use of group-based yoga as a treatment for combined depression and anxiety.[13,123-125] These trials included mixed populations of individuals suffering from depression, anxiety, or both. Most of these trials did not report results separately for the two disorders, making it difficult to determine if the intervention was more effective at treating depression or anxiety. Rather, the trials aimed to examine group yoga’s efficacy as a treatment for both depression and anxiety.

The first trial included 46 pregnant females suffering from symptoms of depression or anxiety.[123] They were randomised to either Ashtanga Vinyasa yoga (n = 23) or TAU (n = 23). Both groups were permitted to continue TAU external to the trial for depression and/or anxiety. There were no restrictions on the care received outside the trial, but participants were asked to provide information about it. Most commonly this included therapy or antidepressants, but no significant difference was found between these groups of participants. There was no significant difference in

the improvement of the yoga group and that of the comparison group in depressive symptoms, and both state and trait anxiety but both groups demonstrated significant improvement in depression scores over time. This was also the case for state and trait anxiety scores. A measure of negative affect indicated that there was a greater reduction in scores in the yoga group compared to the TAU group. This suggests that while the yoga intervention was not more effective than TAU in reducing depression and anxiety symptoms, it reduced negative affect to a significant degree. There was also a high retention rate for the yoga group (87%), as well as a relatively low dropout rate of 11 per cent. One adverse outcome was reported, in the form of premature labour, but this was not linked to the yoga intervention. The trial's limitations included a small sample size, and a lack of analysis by disorder meaning it is impossible to isolate the effects of the intervention on each condition. In addition, the lack of follow-up assessment mean that the long-term effects of the intervention are unknown.

A large RCT investigating the effectiveness of yoga, mindfulness, and a waitlist comparison group on depression and anxiety symptoms (N = 90) included adult students with a diagnosis of anxiety and/or depression recruited from a US university.[124] The participants were randomised to a Hatha yoga intervention group (n=23), a mindfulness intervention group (n=21), or a waitlist comparison group (n=23). Both intervention groups consisted of weekly 75-minute group classes for eight weeks, while the comparison group completed only assessments and had the option to be waitlisted for the intervention that demonstrated the best outcomes after the trial. Self-reported depression, anxiety, and stress symptoms reduced significantly in the yoga group, as well as in the mindfulness group between pre-intervention and post-intervention. Both groups also showed significantly greater symptom reduction than the comparison group. Scores remained similar at the 12-week follow-up assessment. This may be explained by participants not continuing to engage in yoga practices after completion of the trial, or their depression and anxiety symptoms having reached a level of stability. Due to a lack of statistical tests comparing the yoga and mindfulness groups, it was not possible to determine if yoga was more effective than mindfulness in reducing symptoms of depression and anxiety. A 20 per cent attrition rate was recorded, but was attributed to several different reasons, including conflicting work or study demands, students leaving the university, or discontinuing after the first yoga session. The sample consisted of 85 per cent females, which limited the degree of generalisability of the findings to the general population. Another limitation was the lack of reporting of baseline group characteristics of the study sample. Although a verified randomisation process was described, it was not possible to determine how effective the randomisation was without examining the baseline similarities between the study groups.

Two additional RCTs examining yoga as an intervention for depression and anxiety showed mixed results, although both were limited by several methodological flaws.[13,125] One small RCT (N = 30) implemented an twice-weekly eight-week yoga intervention targeted at reducing

symptoms of both depression and anxiety.[125] The comparison group involved participants receiving an informational pamphlet and twice-weekly newsletters about chronic low back pain. Participants had chronic low back pain and diagnoses of both depression and anxiety. Results showed significant differences between the groups, with the yoga group having significant reductions in depression scores, while the comparison group did not. The findings suggested that this yoga intervention was effective in reducing symptoms of depression but not anxiety. The small sample size as well as an unidentified randomisation process limited the degree of confidence in the findings. Dropouts were also not reported, thus preventing inferences regarding tolerability of the intervention or reliability of the findings. Another relatively large RCT (N = 150) examined yoga nidra in addition to pharmacotherapy as a treatment for depression and anxiety in women with menstrual irregularities, comparing it to pharmacotherapy only[13] Results indicated significant improvement only in participants who reported mild or moderate anxiety and depression, whereas those who started the trial with severe symptoms did not show significant improvement after six months. This trial had a number of methodological limitations, including an improper randomisation process, no assessor blinding despite using clinician-rated measures of depression and anxiety, as well as lack of intention-to-treat analysis and a relatively high dropout rate in the yoga group (23%, compared to 15% in the comparison group). It was also unclear whether the pharmacotherapy prescribed to both groups was targeting psychological symptoms or the menstrual irregularity. Due to the methodological limitations, the mixed results of these two trials are difficult to interpret.

The strength of evidence for group-based yoga to treat combined depression and anxiety was rated as low. Trials suffered from limitations including small sample sizes, lack of blinded assessment, high attrition rates, or did not document group similarity at baseline. As such, the trials were considered to have a considerable risk of bias. Inconsistency in the results suggested that the results are highly unlikely to be replicable. Although generalisability of the findings was somewhat limited, the results were still considered clinically sensible to apply to the target population because they covered a broad range of samples and comorbid conditions. The evidence was also considered to be directly applicable to the Australian context. However, due to the low strength, unclear direction, and low consistency of the evidence, the efficacy of group-based yoga as a treatment for combined depression and anxiety, when compared to any comparison condition, was ranked as ‘Unknown’.

Individual yoga for combined depression and anxiety (compared to a non-active comparison)

An Australian RCT (N = 107) evaluated the effectiveness of an individual yoga intervention to treat heterogeneous samples with depression and/or anxiety, comparing it to a TAU waitlist condition in which participants could continue ongoing treatment including therapy, counselling, psychotherapy, or medications.[126] At the six-week follow-up assessment, a statistically significant

difference was observed between the yoga and waitlist on depression scores, in favour of the yoga group. A low dropout rate of nine per cent was a strength of the trial. Trial measures were all self-reported which may have introduced reporting bias. As with the evidence from the previous category, it was not possible to distinguish the extent to which the yoga intervention implemented in this trial targeted depression, anxiety, or comorbidity or both.

The strength of the evidence for individual yoga interventions as a treatment for depression and anxiety when compared to any comparison condition was found to be low, based on a single trial. The body of evidence was therefore ranked as 'Unknown'.

Group-based yoga for AUD (compared to a non-active comparison)

There was one trial that examined the use of group-based yoga to treat AUD, which used a cross-over RCT design with a single intervention session of yoga-gymnastics, Nordic walking, or passive control (sitting and reading magazines) with 16 participants.[127] Participants were inpatients diagnosed with alcohol dependence and clinically observable cravings, but currently abstinent. Participants completed all three interventions in randomised orders, with a period of one week between the 60-minute sessions. Only one participant dropped out (6%), reportedly due to acute illness. Results from the trial indicated no significant changes in alcohol cravings after any of the three interventions. Due to the nature of the trial, which included only single interventions of yoga, it was not possible to determine if a longer period of treatment would have led to better results. The trial also included a disproportionately low number of female participants, as 80 per cent of the participants were male. This negatively impacted the generalisability of the trial, and made it difficult to compare the findings to the previous trial, which included only females.

The evidence regarding the use of group-based yoga to treat AUD in comparison to any comparison condition was ranked as 'Unknown' due to the fact that there was only one trial.

Individual yoga for AUD

There were no trials identified which used individual yoga as a treatment for AUD.

Group yoga and meditation for depression (compared to a non-active comparison)

There was only one trial that utilised an intervention comprising both yoga and meditation to treat depression. The trial was an RCT involving a 12-week yoga and meditation lifestyle intervention with five 120-minute sessions per week, compared to a routine pharmocotherapy treatment, which the intervention group also continued. targeting depressive symptoms (N = 58).[128] Participants were adults diagnosed with MDD and on routine drug treatment for at least six months, recruited from an outpatient psychiatric unit in New Delhi. There was a significantly

greater decrease in depression severity within the intervention group compared to the comparison group. There was a gender difference noted in the findings, with female participants demonstrating significantly greater clinical improvement than male participants. While this trial did not include a long-term follow-up assessment, it was well conducted with few methodological flaws. A strength of the trial was its low dropout rate (7%), which indicated limited bias to the results.

Due to there being only one trial examining yoga and meditation as a treatment for depression in comparison to any comparison condition, the body of evidence was not ranked on direction, consistency, generalisability, and applicability, and was therefore rated as ‘Unknown’.

Individual yoga and meditation for depression

There were no trials identified which used individual yoga and meditation as a treatment for depression.

Stand-alone mindfulness treatments

For the second question, which examined the available evidence relating to mindfulness interventions, inclusion criteria specified that the comparison group must be a conventional psychological or pharmacological treatment for PTSD, depression, anxiety, or AUD. As such, in order to be considered as showing a beneficial effect, mindfulness interventions were required to be just as good as the conventional treatments, that is, demonstrate non-inferiority to conventional treatment. For this research question, all interventions were compared to active comparison conditions.

Group-based mindfulness for PTSD

Mindfulness Based Stress Reduction (MBSR) was used in two trials conducted in the US, investigating its effectiveness compared to an active intervention for the treatment of PTSD.[129,130] Both trials used veteran samples with formal PTSD diagnoses recruited from US Department of Veterans Affairs (VA) medical centres.

A trial recruited veterans diagnosed with PTSD (N =116) from a VA medical centre, and were randomly assigned to receive MBSR (n = 58) or present-centred group therapy (PCGT; n = 58).[129] PCGT is a therapy which has been shown to benefit PTSD patients. It consists of nine sessions focussed on managing current life problems related to PTSD. The results indicated that MBSR demonstrated greater improvement than PCGT in self-reported PTSD symptom severity at post-treatment, as well as at two-month follow-up. Although participants in the MBSR group were more likely to show clinically significant improvement in self-reported PTSD symptom severity at two-month follow-up, they were no more likely to have a loss of PTSD diagnosis. One serious adverse event was reported in the PCGT group, in which a patient made a suicide attempt. One of the trial limitations was that MBSR received longer total in-session time than the PCGT group, which may have impacted on the treatment effects. However, the dropout rate (15%) was relatively low.

A trial conducted in a VA primary care setting involved 62 veterans diagnosed with PTSD who were randomly assigned to either primary care brief mindfulness training (PCBMT) for four weeks (n = 36), or to continue with their primary care treatment as usual (PCTAU; n = 26).[130] PCBMT was adapted from manualised MBSR, and included much of the MBSR content but with a shorter session duration and fewer sessions overall. TAU in this trial typically included mental health integrated care such as medications and brief psychotherapy delivered in primary care settings. Participants who were randomised to PCBMT experienced similar decreases in PTSD symptom severity compared with TAU participants at post-treatment and at 8-week follow-up, and there were no significant differences in PTSD symptom severity between the two groups. The results indicated a significant difference for reduction in depressive symptom severity between the groups, with the PCBMT group showing a greater reduction in self-reported

depressive symptom severity. It is important to note that only 44 per cent of people in the intervention arm completed at least three out of the four sessions. This may have caused some attrition bias, however, intent-to-treat analysis was used to address this.

Overall, the strength of the evidence for group mindfulness interventions being effective for treating PTSD and PTSD-related symptoms was rated as low due to the limited number of trials identified. This rating was based on two RCTs, with one trial at risk of attrition bias due to a low patient retention rate. Despite one trial demonstrating that the MBSR group exhibited greater improvement in PTSD symptoms than PCGT, the MBSR group and PCGT group had similar rates of loss of PTSD diagnosis at the end of a two-month follow-up. This demonstrates the potential for MBSR to be as effective as PCGT, a treatment known to be effective in treating PTSD. The other trial found no significant difference between mindfulness and conventional treatments in PTSD symptom severity at eight-week follow-up. Finally, it was determined that this evidence is directly applicable to the Australian context. However, given that the strength of the evidence was low, the body of evidence for group mindfulness intervention as a treatment for PTSD, compared to other conventional (active) treatment, was ranked as 'Unknown'.

Individual mindfulness for PTSD

No RCTs were identified which examined mindfulness delivered to individuals, for the treatment of PTSD.

Group-based mindfulness for depression

A total of three RCTs investigated the effectiveness of mindfulness for the treatment of depression compared to other active interventions.[131-133] All three trials used MBCT as the mindfulness intervention for depression, and examined more severe forms of depression including MDD and chronic depression.

One trial from the UK with a large sample size (N = 274) compared the effectiveness of MBCT (n = 108) with cognitive psychological education (CPE; n = 110) and TAU (n = 56) in preventing MDD relapse.[133] TAU included a range of ongoing treatments that participants had started prior to the trial, including antidepressants, psychiatric care, counselling or therapy. Participants were in remission from MDD following at least three previous depressive episodes. MBCT had no significant effect on risk of relapse over 12 months compared to CPE, but MBCT was associated with a significantly lower likelihood of relapse relative to TAU, indicating that MBCT was a more effective intervention when compared to TAU. There was no evidence, however, that MBCT was more effective than CPE. One serious adverse reaction was reported as potentially arising from the trial – an episode of serious suicidal ideation following discussion of different coping responses to low mood in the CPE group. A low drop-out rate of seven per cent was observed. A limitation of the trial includes data being analysed 'as treated' rather than 'as randomised'. This can introduce bias associated with the non-random loss of participants from the trial.

A three-arm, bi-centre RCT recruited 106 chronically depressed patients from Germany from two treatment sites. This trial compared the efficacy of MBCT plus TAU (n = 36), with the Cognitive Behavioural Analysis System of Psychotherapy (CBASP) plus TAU (n = 35), which included continuing current medication or therapy appointments. and TAU alone (n = 35).[131] The CBASP is a manualised talking therapy that connects patients perceptually and behaviourally to the interpersonal world. The trial results at two sites were inconsistent, showing MBCT was no more effective than TAU in reducing depressive symptoms at one of the treatment sites, but MBCT was significantly superior to TAU at the other treatment site. CBASP was significantly more effective than TAU in reducing depressive symptoms in the overall sample and at both treatment sites. Overall, the direct comparison of MBCT and CBASP in terms of changes in depression scores at post-treatment did not reveal any statistical significance for a difference between the two groups. Similarly for remission rates, no significant difference between MBCT and CBASP groups was observed. Apart from suffering from a 20 per cent attrition rate, this was a well conducted trial.

One well-designed RCT recruited 92 younger patients (mean age = 34.9 years) in remission from MDD with residual depressive symptoms and evaluated the comparative effectiveness of MBCT (n = 46) versus an active comparison (AC; n = 46).[132] There was a 35 per cent overall drop-out rate. The active comparison condition was based on the validated and manualised Health Enhancement Program (HEP) and involved delivering classes in four therapeutic components with no elements of mindfulness. This US-based trial found that over the 60-week follow-up period, both groups experienced significant and equal reductions in depressive symptoms and improvements in life satisfaction, and MBCT did not differ from ACC on rates of depression relapse, symptom reduction, or life satisfaction on a statistically significant level. These results suggested that MBCT is as effective for preventing depression relapse and reducing depressive symptoms as the ACC, but not superior. Despite being a well conducted trial, it was limited by a high level of drop-outs in both groups, which can introduce attrition bias.

Overall, the strength of the evidence for group mindfulness interventions to treat depression and depression-related symptoms as effective treatments was found to be moderate to high. All three trials had respectable sample sizes and low risk of bias, but one trial suffered from high attrition rates. The direction of the evidence was consistent, with all three trials yielding pre-post improvements in depression outcomes in the mindfulness group, and there were non-significant differences between the mindfulness and comparison groups, indicating similar efficacy. The trials were consistent in terms of the all the mindfulness treatments being manualised MBCT. A low level of heterogeneity (i.e., population and patient recruitment methods) was detected and therefore conferred high consistency between the three trials. The evidence suggested that these findings are directly applicable to the Australian context. The body of evidence for group mindfulness intervention as a treatment for depression, compared to other conventional treatment, was ranked as ‘Promising’, and the consistent results indicated that mindfulness was

non-inferior to other conventional treatments for depression, specifically a more severe form of depression such as MDD and chronic depression. While being consistently recommended in a number of guidelines, future research is warranted to further strengthen this evidence base.

Individual mindfulness for depression

There was one trial in which mindfulness was delivered to individuals. The Dutch trial compared the effectiveness of individual MBCT (n = 31) with cognitive behavioural therapy (CBT; n = 32) and waitlist controls (n = 31) in patients diagnosed with type-I or type-II diabetes showing depressive symptoms (N = 94).[134] The results indicated that both MBCT and CBT significantly decreased depression symptoms compared to the waitlist group at post-treatment. However, direct comparisons between MBCT and CBT groups yielded no significant differences on depression outcome. There were several limitations to this trial including a smaller sample size limiting the statistical power. Secondly, attrition rates in both MBCT and CBT were high, with only around 70 per cent of the randomised participants completing the treatments. In addition, the trial sample was a group of patients diagnosed with diabetes comorbid with depression, hence the results may not be generalisable to all types of depression.

The strength of the evidence, along with direction, consistency, generalisability, and applicability of the evidence were not rated, as a single trial does not provide sufficient evidence for interpretation on these aspects. The body of evidence for individually administered mindfulness intervention as a treatment for depression, compared to other conventional treatment, was ranked as ‘Unknown’.

Group-based mindfulness for anxiety

The largest group of trials for this section of the review, with a total of five RCTs, investigated the effectiveness of mindfulness intervention compared to an active intervention for the treatment of anxiety.[135-139] All of the RCTs delivered interventions in group-based settings, with in-person contact with the therapists.

A trial that was well conducted from Hong Kong randomly assigned 182 patients diagnosed with generalised anxiety disorder (GAD) to MBCT (n = 61) or CBT-based psychoeducation (n = 61), and TAU (n = 60), and compared the changes in anxiety levels.[139] With a low drop-out rate (2%), the trial results demonstrated there were significant decreases in anxiety levels at two and five months compared to baseline assessment in both MBCT and psychoeducation groups, with no significant change observed in the TAU group. However, there were no significant differences between the MBCT and psychoeducation groups for anxiety at any time points. Some limitations of the trial include much lower adherence for MBCT group than the psychoeducation group. The outcome measures were based on self-reported questionnaires, and no clinician-rated instruments or diagnostic interviews were used.

A trial based in Canada focussed on social anxiety disorder (SAD) recruited 137 SAD patients and randomly assigned them to receive Mindfulness and Acceptance-based Group Therapy (MAGT; n = 53), Cognitive-based Group Therapy (CBGT; n = 53), or waitlist (WL; n = 31) as control.[138] MAGT entails a combination of Acceptance and Commitment Therapy (ACT) and mindfulness training. The primary outcome measure, social anxiety symptom severity, was measured at baseline, treatment midpoint, post-treatment, and at three-month follow-up. MAGT and CBGT were both more effective than WL at reducing symptom severity, but the trial showed no significant reduction in social anxiety. The dropout rate was high, and the reason commonly provided for exiting the trial was time commitment. Much of the trial data relied on self-report, and therefore increased the risk of reporting bias. There was significant attrition (30% for MAGT group, 40% for CBGT group), particularly affecting the follow-up data, with a total of 40 per cent participants lost to follow-up in the MAGT group and 51 per cent in the CBGT group, impairing the validity of the inferences drawn from the trial.

A three-arm RCT randomised a group of 108 patients from the US diagnosed with SAD into receiving CBGT (n = 36), MBSR, (n = 36) or WL (n = 36).[136] Results showed that CBGT and MBSR both significantly reduced anxiety symptoms when compared to WL at one-year follow-up. Both treatments yielded similar treatment efficacy, with no significant differences between CBGT and MBSR groups. In further results looking at maintenance of reduced social anxiety symptoms, there were no significant differences between CBGT and MBSR, suggesting similar sustained clinical long-term outcomes at the one-year follow-up period. Drop-out from treatments was low and did not differ significantly between the three arms (CBGT: 6%; MBSR: 8%; WL: 3%). Limitations included that this trial used self-reported measures, which can introduce reporting bias.

A US-based RCT included veterans (N = 105) who were suffering from anxiety disorders, who were randomised into an adapted MBSR intervention (n = 45) or group-based CBT (n = 60).[135] The adapted MBSR was shortened in duration from the manualised MBSR in order to match the length of CBT. Reductions in anxiety symptoms between the two arms were compared. Both groups showed large and equivalent improvements on principal disorder severity at post-treatment and three-month follow up, with no significant differences between groups. CBT outperformed MBSR on anxious arousal outcome at follow-up, whereas MBSR reduced worry to a greater extent than CBT. No significant difference between the two groups was observed for change in depression outcome, though the results favoured the MBSR group when effect sizes were taken into account. The attrition rates were high, with only about half of patients completing an adequate dose of treatment, with the dose defined as participation in at least 70 per cent or 10.5 hours of treatment. The sample size was reasonable, but the authors noted that it was statistically underpowered to detect group differences of smaller effect size, and this was exacerbated by attrition (43% drop-out in MBSR and 56% drop-out in CBT). In addition, the

sample is relatively diverse, consisting of patients suffering from a spectrum of anxiety disorders, which represents a limitation to distinguishing the effects on a specific disorder.

A sample of 93 patients diagnosed with GAD from the US was randomised to either MBSR (n = 48) or Stress Management Education (SME; n = 45) to compare the effects of these interventions on anxiety symptoms.[137] The results revealed that both MBSR and SME led to significant reductions in anxiety scores at post-treatment compared to baseline, however, there was no significant difference between the two groups. MBSR was associated with a significantly greater reduction in anxiety symptoms when compared to SME at post-treatment. A low drop-out rate was observed in the mindfulness group (6% in MBSR and 24% in SME). One participant in the MBSR group reported muscle soreness and one participant in the SME group reported sleep disruption as adverse events.

These trials manifested a moderate to high strength of evidence for the group mindfulness intervention, as an effective treatment for anxiety and anxiety-related symptoms. Some common methodological limitations were identified, including a proportion of the data being lost to follow-up, and a risk of reporting bias arising from the use of self-report measures. The direction of the results on primary outcomes was consistent, with mindfulness interventions reducing anxiety symptoms from baseline to follow-up, and the mindfulness interventions being as effective as the comparison interventions. There were, however, some inconsistencies across the trials due to the range of anxiety disorders that were targeted. Overall, these five trials were well conducted, with good generalisability of the evidence, and direct applicability to the Australian context. Despite some inconsistencies between trials, all trials had respectable sample sizes, with results accordant to each other. With the methodological limitations in mind, the body of evidence for group mindfulness intervention as a treatment for anxiety, compared to other conventional treatment, was ranked as ‘Promising’, as the evidence is suggestive of beneficial effect.

Individual mindfulness for anxiety

No RCTs were identified which examined mindfulness delivered to individuals for the treatment of anxiety.

Group-based mindfulness (mindfulness group therapy) for combined depression and anxiety

A heterogeneous sample consisting of 215 individuals suffering from depression, anxiety, stress, and adjustment disorders were recruited from 16 primary care clinics in South Sweden to explore the efficacy of MBCT (n = 110) versus TAU (n = 105) (the majority of participants received individual CBT for TAU) on depression and anxiety symptoms.[140] The trial suffered from a 21 per cent drop-out rate. Both MBCT and TAU groups exhibited significant reductions in depression and anxiety symptom severity, however, there were no significant group differences post-treatment. The trial sample was a mix of patients diagnosed with depression, anxiety, stress, and

adjustment disorders, and therefore it was difficult to clearly distinguish the effect of the mindfulness practices on one targeted disorder.

Given there was one single trial which examined group-based mindfulness as a treatment for combined anxious and depressed patients, the strength of the evidence, as well as the direction, consistency, generalisability and applicability of the evidence were not rated. The body of evidence for mindfulness intervention for treating heterogeneous depression and anxiety, compared to other conventional treatment, was ranked as 'Unknown'.

Individual mindfulness for combined depression and anxiety

No RCTs were identified which examined mindfulness delivered to individuals for the treatment of combined depression and anxiety.

Group-based mindfulness for AUD

Three RCTs, all of which were US-based, investigated the effectiveness of a group-based mindfulness intervention compared to an active intervention for the treatment of AUD.[141-143]

Garland and colleagues from the US[141,142] adapted a mindfulness intervention for depression, MBCT, to specifically target addiction, called Mindfulness-Oriented Recovery Enhancement (MORE). Both trials recruited patients from a modified therapeutic community in an urban area in the US. In the 2010 RCT consisting of 53 alcohol-dependent adults, the pilot study compared the effectiveness of MORE (n = 27) to an Alcohol Support Group (ASG; n = 26) on psychosocial factors related to alcohol dependence and stress.[141] The study had approximately 31 per cent of participants drop out. While MORE led to significant decreases in thought suppression, ASG led to increased thought suppression. Comparing the two groups, MORE significantly reduced stress and thought suppression, increased physiological recovery from alcohol cues, and modulated alcohol attentional bias when compared to the ASG group. Furthermore, the post-treatment results indicated both MORE and ASG led to significant reductions in perceived stress over time. However, the findings should be interpreted with caution, as the study suffered from several limitations including a small sample size which limited the statistical power and generalisability. Another notable limitation was that self-report measures were administered through face-to-face interviews which may have led to social desirability bias in these self-reported outcomes.

In a 2016 RCT[142], Garland et al. conducted a trial consisting of a larger sample size of 180 men with co-occurring substance use and psychiatric disorders, comparing the effectiveness of MORE (n = 64) to CBT (n = 64) and TAU (n = 52) on alcohol craving, as well as symptom severity of PTSD, anxiety and depression. Of this sample, 45 per cent had an alcohol dependence diagnosis. There was an approximately 29 per cent drop-out rate. In the MORE group, there was a significant decrease in alcohol craving at post-treatment. There was also a significant reduction in PTSD, depression, and anxiety symptom severity in the MORE group. Significant differences were not observed among the CBT group, with only depression symptom

severity showing moderate reduction at post-treatment. Comparing MORE to CBT, the MORE group showed better improvement in alcohol craving, as well as a significantly greater reduction in PTSD symptom severity. However, the trial sample included patients with different types of substance use disorders including alcohol, opioids, cannabis and hallucinogens. Therefore, the effects on AUD-only patients cannot be clearly distinguished. The male sample population may limit the generalisability of the findings to women.

A parallel RCT in the US investigated the effectiveness of mindfulness-based relapse prevention for alcohol (MBRP-A) compared to TAU on self-reported alcohol problems in 123 alcohol dependent adults recruited from eight local addiction treatment centres.[143] The participants were randomised to either receive MBRP-A (n = 64), or to continue their TAU (n = 59), which typically included motivational enhancement, relapse prevention, and 12-step facilitation strategies. Twenty-eight per cent of the participants from the MBRP-A group failed to complete more than four sessions. At the end of treatment, the intervention group reported a mean score of 5.8 for change in alcohol problems since starting the trial on a self-report measure, indicating substantial improvements in alcohol problems. This outcome was not assessed in the comparison group, however, and no statistical comparison was made between the two groups, which represents a major limitation of the trial. In addition, the primary outcome measure used in this trial had not been validated, and the outcomes were not based on any standard clinical assessments.

Overall, the strength of the evidence for group mindfulness interventions to effectively treat AUD and AUD-related symptoms was found to be low. This rating was based on three trials which were all susceptible to a high level of risk for bias. In the two trials by Garland et al., which used MORE to treat alcohol-use symptoms, the 2010[141] trial used a small sample of alcohol-dependent patients hence limiting the statistical power; the 2016[142] trial was well conducted and had a large sample size, however, the trial used patients suffering from a range of substance-use disorders with 45 per cent diagnosed with alcohol dependence, greatly limiting the generalisability of the results to AUD-only patients. The third trial, by Zgierska et al.,[143] which used MBRP-A as a mindfulness intervention, lacked statistical comparison to the comparison group. In addition, the primary outcome measure was not validated. The findings from these three trials are equivocal due to high risk of bias and methodological limitations, and therefore the body of evidence for mindfulness intervention as a treatment for AUD, compared to other conventional treatment, was ranked as ‘Unknown’.

Individual mindfulness for AUD

No RCTs were identified which examined mindfulness delivered to individuals for the treatment of AUD.

Adjunct meditation, yoga and mindfulness treatments

A group of literature was identified, which examined meditation, yoga, and mindfulness as an adjunct treatment to established psychological or pharmacological treatments for PTSD, depression, anxiety, and AUD. This part of the review aims to look at whether adjunct meditation, yoga, or mindfulness therapies confer additional benefits in synergy with conventional treatments. That is, these trials were required to demonstrate a greater benefit deriving from the addition of meditation, yoga, or mindfulness to other psychological or pharmacological treatment. These results are illustrated below.

Adjunct meditation

Adjunct meditation for PTSD

There were no trials identified which used adjunct group-based or individual meditation for the treatment of PTSD.

Adjunct meditation for depression

There were no trials identified which used adjunct group-based or individual meditation for the treatment of depression.

Adjunct meditation for anxiety

There were no trials identified which used adjunct group-based or individual meditation for the treatment of anxiety.

Adjunct meditation for AUD

There were no trials identified which used adjunct group-based or individual meditation for the treatment of AUD.

Adjunct yoga

Adjunct group-based yoga for PTSD (compared to active comparison)

A US trial examined the effectiveness of trauma-informed group yoga compared to supportive women's health education, both adjunct to psychopharmacologic treatments for a group of women with chronic, treatment-resistant PTSD.[144] Trauma-informed group yoga is a manualised ten-week program incorporating the central element of Hatha yoga that emphasises curiosity about bodily sensation. The women's health education intervention aimed to increase women's self-efficacy to seek medical services and improve self-care. A low drop-out rate was observed (6%). Patients (N = 64) were randomly assigned to either trauma-informed yoga (n = 32) or supportive women's health education (n = 32); outcome measurements were taken pre, mid, and post-treatment. For the primary outcome, PTSD symptom scores, both groups exhibited

significant decreases on the clinician-rated PTSD symptoms, with a statistically significantly greater magnitude of reduction in symptoms observed in the yoga group compared to the comparison group. Both groups also demonstrated significant decreases on self-reported PTSD symptoms, but there was no significant difference between the groups in reductions. During the first half of the treatment, these improvements were maintained throughout treatment in the yoga group, but not in the comparison group. The trial sample consisted only of treatment-resistant adult women with chronic PTSD secondary to interpersonal assaults that started in childhood, limiting the generalisability of findings.

Since there was only a single RCT examining group-based yoga as an adjunct treatment for PTSD, the strength of the evidence, as well as the direction, consistency, generalisability, and applicability of the evidence were not rated. The body of evidence for group-based yoga intervention as an adjunct to other conventional treatment for PTSD was ranked as 'Unknown'.

Adjunct individual yoga for PTSD

There were no trials identified which used adjunct individual yoga for the treatment of PTSD.

Adjunct group-based yoga for depression (compared to active comparison)

Three trials compared group-based yoga as an adjunct treatment for depression with active controls.[145-147]

A trial from the US compared the effectiveness of Hatha yoga to a 'Healthy Living Workshop' (HLW) intervention as adjunct treatments to antidepressant medication for treating MDD.[147] Post-treatment, no statistically significant difference in depression symptom severity was observed between the yoga group (n = 63) and the comparison group (n = 59). When baseline depression severity was controlled for, there was no significant difference in depression symptoms between the two groups post-treatment. Yoga participants showed significantly fewer depression symptoms than HLW participants at both three-month and six-month follow-up, suggesting that the benefits of yoga may accumulate over time. The trial had a low drop-out rate (8%). A limitation of this trial was that the sample was predominantly females which may limit generalisability to other populations.

One pilot RCT (N = 25) conducted in the US evaluated the efficacy of Sudarshan Kriya Yoga (SKY) as an adjunct intervention for patients diagnosed with MDD who were taking anti-depressants.[146] The SKY intervention consisted of two phases of a manualised group program, featuring a breathing-based meditative technique. Patients with MDD and more than eight weeks of antidepressant treatment, were randomised to SKY (n = 13) or a waitlist control arm (n = 12) for eight weeks. A 24 per cent overall drop-out rate was observed. Results indicated that the SKY group showed a greater improvement in depression symptoms, compared to the waitlist control from baseline to two-months follow-up. The results from this pilot study suggested that an

adjunct SKY-based intervention may be promising for treating patients with MDD with the caveat that the very small sample size considerably limits the statistical power of the study.

A German RCT (N = 53) compared the effectiveness of Hatha yoga as an adjunct treatment to atypical antipsychotic drugs with antidepressant properties (n = 22) with a comparison group (n = 31) receiving antipsychotic drugs only for treating MDD.[145] A statistically significant reduction in depressive symptoms at post-treatment was observed in both groups over time, but there was no significant group difference. The drop-out rate was not specified. The trial was limited by a small sample size and an unequal number of participants in the intervention and comparison arms. The sample was also predominantly male, limiting the generalisability of findings.

Overall, there is low evidence for adjunct group-based yoga to treat depression and depression-related symptoms, when compared with an active comparison. It should be noted that within this group of studies, active comparison treatments were limited to pharmacotherapy as no trials were identified that compared adjunct group-based yoga to psychological therapy. The three RCTs each suffered from some methodological limitations, for example, small sample sizes[145,146] and poor randomisation processes which resulted in unequal numbers of participants in the intervention and comparison arms.[145] The direction of the results of the three trials was shown to be positive, demonstrating that yoga interventions exerted additional beneficial effects as an adjunct treatment for depression when compared to the comparison groups. Some inconsistencies existed in sample populations, comparison interventions, sample size, and outcome assessments, suggesting that the results are somewhat unlikely to be replicable. Nevertheless, these variations in demographic representation amount to good generalisability for the trial findings, as the three trials recruited different demographic groups comprising both males and females of varying age groups. The populations examined in the evidence are overall representative and comparable to the target population. The evidence was considered to be directly applicable to the Australian context. While the results were shown to be pointing towards a positive direction, the evidence for adjunct group-based yoga for depression was ranked as 'Unknown', due to the high risk of bias across the trials which impeded the evidence from being ranked as promising. Nonetheless, there is an apparent positive effect of yoga intervention as an adjunct to pharmacological treatment for depression when compared to an active comparison group. Therefore further research is necessary to explore this association, and to examine the impact of adding group-based yoga as an adjunct to psychological therapy.

Adjunct group-based yoga for depression (compared to non-active comparison)

An RCT recruited 56 depressed patients from a district hospital in Vietnam to examine the effectiveness of a yoga intervention as an adjunct intervention to psychoeducation, compared to TAU [148] Thirty-four patients were randomised to receive the adjunct yoga intervention and 22 patients were randomised to continue their treatment as usual. The intervention group had a significantly greater reduction in depression symptoms on average than the comparison group at

post-treatment. Almost half of the patients in the intervention group no longer met criteria for a diagnosis of depression, whereas no one from the comparison group lost their depression diagnosis. However, it should be emphasised that there were some weaknesses in the randomisation procedure that resulted in unequal numbers of participants in the intervention arm and comparison arm, which can seriously confound the analyses. In addition, a self-report measure was used as the single outcome measure for depression, potentially reducing the reliability of the findings. This trial had a 20 per cent drop-out rate. A major design shortcoming was that those in the intervention group received both yoga and psychoeducation, while those in the comparison group received neither. This hampered our ability in interpreting the results as it is difficult to know what to attribute the improvements to – the yoga or the psychoeducation intervention. Another significant limitation was the fact that the study did not state what the TAU condition consisted of, thus limiting the level of inference that could be made regarding the comparison between the intervention and comparison conditions.

As there was only a single RCT which compared group-based yoga as an adjunct treatment for depression with a non-active comparison, the strength of the evidence, as well as the direction, consistency, generalisability, and applicability of the evidence were not rated. The body of evidence for group-based yoga intervention as an adjunct to other conventional treatment for depression, compared to a non-active comparison, was ranked as 'Unknown'.

Adjunct individual yoga for depression

There were no trials identified which used adjunct individual yoga for the treatment of depression.

Adjunct group-based yoga for anxiety

There were no trials identified which used adjunct group-based yoga for the treatment of anxiety.

Adjunct individual yoga for anxiety

There were no trials identified which used adjunct individual yoga for the treatment of anxiety.

Adjunct group-based yoga for AUD (compared to an active comparison)

A Swedish pilot study examined the adjunct use of 10 weeks of yoga with TAU compared to TAU alone for changes in alcohol consumption, affective symptoms, quality of life, and stress.[149] TAU consisted of individual counselling sessions with a CBT focus, typically one hour per week led by a medical doctor or psychologist, with the prescription of medication for alcohol dependence as required. Assessments were taken at baseline and six-month follow-up; there was no assessment at post-treatment, representing a major design flaw. Eighteen participants were randomised to the two groups, but due to drop-out the final analyses included 14 participants, representing a 22 per cent overall drop-out rate. Both groups improved from baseline to six-month follow-up on all measures, however, there were no significant differences between the

groups. This suggested that adding yoga to TAU was no more effective in reducing alcohol consumption, alcohol dependence, and stress, and improving mood and quality of life, than TAU alone. The study suffered from limited statistical power due to a very small sample size, no post-treatment assessment, and a high drop-out rate.

Given that there was only one single poor quality pilot study looking at adjunct group-based yoga as a treatment for AUD, the strength of the evidence was found to be low. The direction, consistency, generalisability, and applicability of the evidence were not rated due to the lack of an evidence base. The evidence for group-based yoga as an adjunct to other conventional treatment for AUD was ranked as 'Unknown'.

Adjunct individual yoga for AUD

There were no trials identified which used adjunct individual yoga for the treatment of AUD.

Adjunct mindfulness

Adjunct group-based mindfulness for PTSD (compared to an active comparison)

A single RCT compared the effectiveness of MBCT with socio-therapeutic events (STE) as add-on treatment to selective serotonin reuptake inhibitor (SSRI) medication in a group of veterans diagnosed with PTSD.[150] Socio-therapeutic events included participating in a range of social activities such as talking about daily life experiences, playing board games, and undertaking short trips. Male outpatient military veterans (N = 48) diagnosed with PTSD were recruited from a psychiatric hospital in Iran, with participants randomised to receive yoga plus medication intervention (n = 22) or medication and STE (n = 31). Assessments were taken at pre and post-treatment. No participant from either arm dropped out of the trial. The trial results indicated that overall, PTSD symptom severity was lower at post-treatment compared to baseline in both conditions, with the MBCT group exhibiting greater mean significant reductions from pre to post-treatment than the comparison group. The results suggest that MBCT as an adjunct to standard SSRI medication is an effective intervention for reducing symptoms of PTSD among veterans. There were several limitations of the trial, including a relatively small sample size which limited the statistical power. The trial participants were all male, reducing the generalisability of the results. In addition, all outcome measures relied on self-report entirely. Using clinician ratings may have made the data more robust. The trial did not collect any follow-up data, and therefore the long-term effectiveness of MBCT as an add-on treatment for PTSD cannot be determined.

Due to there being only a single trial examining the effectiveness of adjunct group-based mindfulness to treat PTSD, the strength of the evidence was found to be low. The direction, consistency, generalisability, and applicability of the evidence were not rated due to the lack of the evidence base. The evidence for group-based mindfulness an adjunct to other conventional treatment for PTSD was ranked as 'Unknown'.

Adjunct individual mindfulness for PTSD

There were no trials identified which used adjunct individual mindfulness for the treatment of PTSD.

Adjunct group-based mindfulness for depression (compared to an active comparison)

A total of three RCTs investigated the effectiveness of adjunct mindfulness interventions, delivered in face-to-face group settings, for the treatment of depression.[151-153]

A large-scale well-designed RCT from the UK (N = 424) compared MBCT with support to taper or discontinue anti-depressant treatment (MBCT-TS; n = 212) with maintenance anti-depressant medications (mADM; n = 212), in a group of patients with recurrent MDD.[151] There was an overall 13 per cent drop-out rate, with the majority of the drop-out occurring in the mADM-only group (23.6% drop-out rate). At 24-month follow-up, the time to relapse or recurrence of depression did not differ significantly between the two groups. There was no significant difference in either depression-free days or in residual depressive symptoms between the two groups. The trial found no evidence to suggest that MBCT-TS was more effective than mADM alone in preventing depressive relapse/recurrence among at-risk individuals. Both treatments appeared to confer protective effects against depression relapse/recurrence. This was a well conducted trial overall with no obvious limitations, strengthened by a large sample size providing ample statistical power. It should be noted that ten serious adverse events were reported, four of which resulted in death. It was concluded that these adverse events were not attributable to the intervention or the trial.

An RCT conducted in the Netherlands with a relatively small sample size (N = 68) examined the effectiveness of adding MBCT to the treatment routine of a group of recurrently depressed patients in remission who were using mADM.[153] There was A 15 per cent drop-out rate in the MBCT plus mADM group, and a 40 per cent non-adherence rate in the mADM-only group. This trial yielded similar results to the UK trial,[151] with no significant differences in relapse/recurrence rates between the two groups within the 15-month follow-up period. There was no difference in time to relapse/recurrence between the two conditions. Patients maintained mild levels of depression over the 15-month follow-up period, and the course of depression did not differ significantly between the conditions. Therefore, adding MBCT to mADM did not further reduce the risk of relapse/recurrence or residual depressive symptoms. However, the results were confounded by the increasing availability of MBCT in the Netherlands – almost a quarter of the individuals who were randomised into the comparison condition decided to participate in an MBCT course elsewhere, outside of the trial.

Based on previous work, one RCT was conducted in the US (N = 173) which compared the effectiveness of MBCT (n = 87) with a Health-Enhancement Program (HEP) (n = 86) as an adjunct to pharmacotherapy in a group of patients with treatment-resistant MDD.[152] HEP

included many therapeutic components, such as aerobic exercise, music therapy, functional movement, and dietary education. There was a drop-out rate of 16.3 per cent in HEP, and 12.7 per cent in the MBCT group. Relative to the HEP condition, the results yielded supporting evidence for MBCT as an effective intervention in reducing depressive symptom severity, showing a greater mean per cent reduction at 12-month follow-up, and a significantly higher rate of treatment responders than the HEP group. However, when compared to HEP, although numerically superior for MBCT than for HEP, the rate of remission did not differ significantly between the two groups over the 12-month follow-up period. Limitations of the trial included that the two interventions were delivered by two different sets of instructors, introducing a potential source of bias.

The strength of the evidence for mindfulness group-based intervention as an adjunct treatment for depression was found to be moderate. All trials in this category examined mindfulness as an adjunct to pharmacotherapy, with the comparison groups receiving pharmacotherapy interventions only. All trials manifested good consistency. However, the trials revealed differences in direction of the results, with one trial concluding that the MBCT group showed greater improvement than the comparison group, while the other two trials showed non-significant results between groups. These mixed results may indicate that adding a mindfulness intervention to pharmacotherapy confers no additional benefit. All three trials used samples with a higher proportion of female participants, limiting the generalisability. The mindfulness interventions were considered to be highly applicable to the Australian context. The evidence for mindfulness as an adjunct to other conventional treatment for depression was ranked as ‘Unknown’. Despite the trials in this category being generally of good quality, this rating was affected by the different direction of the results on depression outcomes.

Adjunct individual mindfulness for depression

There were no trials identified which used adjunct individual mindfulness for the treatment of depression.

Adjunct group-based mindfulness for anxiety

There were no trials identified which used group-based mindfulness for the treatment of anxiety.

Adjunct individual mindfulness for anxiety

There were no trials identified which used individual mindfulness for the treatment of anxiety.

Adjunct group-based mindfulness for AUD

There were no trials identified which used group-based mindfulness for the treatment of AUD.

Adjunct individual mindfulness for AUD

There were no trials identified which used individual mindfulness for the treatment of AUD.

Discussion

The aim of this review was to assess the evidence related to the efficacy of meditation, yoga, and mindfulness interventions to treat PTSD, depression, anxiety, and AUD in adults. Although there is substantial overlap in the components, effects, and mechanisms of these three types of interventions, distinctions have been drawn in this review where possible. The interventions examined in the current review were divided into two main categories, stand-alone and adjunct treatments, and these treatments were further separated into two modes of treatment delivery, individual or group-based. For Questions 1 and 3, these were further divided based on the type of comparison condition (active or non-active comparison condition).

The results of the REA showed that three stand-alone group interventions – group-based yoga to treat depression, group-based mindfulness to treat depression, and group-based mindfulness to treat anxiety – were ranked as 'Promising', while the remaining categories were ranked as 'Unknown'. However, the 'Unknown' categories contained findings that are potentially relevant to future research in these areas, which we discuss in the section below.

Despite limiting the included study designs to RCTs, which are the most rigorous study design, the majority of the evidence was considered insufficient to support the use of these meditation, yoga and mindfulness interventions to treat PTSD, depression, anxiety, or AUD. The key limitations of the trials included in this review were small sample sizes, inconsistent results, and high attrition rates, which all impact on the quality of the trials and the certainty that can be placed on the trial findings.

In considering the strength and consistency of the evidence, it is important to note the varying inclusion criteria that existed for each section of the review. The first question regarding the role of meditational practices including meditation, mantram, and yoga in mental health treatments for PTSD, depression, anxiety, and AUD included RCTs that compared these interventions to any comparison (pharmacotherapy, therapy, control, or waitlist conditions). Results separated RCTs comparing meditation and yoga to active comparison conditions from those comparing to non-active comparison conditions. In order to be considered a significant finding of beneficial effect, those receiving the meditation or yoga-based interventions comparing to non-active comparison conditions were required to show greater improvement in primary outcomes than those in the comparison condition, while for those comparing to an active condition were required to show non-inferiority to the comparison treatment. For the second question, however, which examined the available evidence relating to mindfulness interventions, inclusion criteria specified that the comparison group be a conventional psychological or pharmacological treatment for PTSD, depression, anxiety, or AUD. As such, in order to be considered as showing a beneficial effect, mindfulness interventions were required to be just as good as the conventional treatments, that

is, demonstrate non-inferiority to conventional treatment. The third question investigated the use of both meditational and mindfulness interventions as adjunct to conventional psychological or pharmacological treatment of PTSD, depression, anxiety, and AUD. In order to be considered as showing a beneficial effect, those receiving the adjunct meditational and mindfulness interventions were required to have significantly greater improvement than the comparison group on the outcome of interest. The comparison groups included those with active and non-active comparison conditions, and these were separated in the reporting of results. They were required to demonstrate a benefit to adding meditation, yoga or mindfulness to other psychological or pharmacological treatment.

Stand-alone meditation and yoga treatments

Group-based yoga was ranked as 'Promising' in the treatment of depression, as it was found to be more effective than comparison groups that consisted primarily of waitlist control conditions. As only one trial within this group included a long-term follow-up, the finding of group-based yoga being a promising treatment for depression can only be applied to short-term outcomes. Further research with long-term follow-up assessment is required to ascertain if the benefits of yoga on depressive symptoms are sustained over time. Additional research with larger sample sizes and more representative samples that include a more balanced ratio of males and females from the general population could provide more substantial evidence that could promote group-based yoga to be ranked 'Supported' in the treatment of depression.

There are several mechanisms cited in the literature that support the use of group-based yoga as a promising intervention for depression. While it is beyond the scope of this review to draw conclusions on which mechanisms are involved in this finding, there are a number of potential mechanisms that can be considered. The literature suggests that self-regulatory aspects of yoga can target specific cognitive symptoms such as rumination and dysfunctional beliefs.[85] Decentring, previously mentioned in the introduction as a process by which one's thoughts and feelings are viewed as being objective events rather than identified with oneself, is promoted in yoga and meditational practices. This process allows individuals to observe negative thoughts in an objective manner and minimise ruminative thoughts.[68] Evidence from the current review supports this potential mechanism, as one of the included trials identified rumination as the only outcome with a significant reduction in the yoga group compared to the comparison group immediately post-intervention, with a sustained reduction in rumination and overall depressive symptoms at one-year follow-up.[118,119]

An association between depression and autonomic dysfunction also suggests a potential mechanism for yoga to improve depressive symptoms. Yoga practice is associated with increased parasympathetic activity and reduction in overactive sympathetic nervous system activity.[42] The breathing techniques practised in yoga result in adjustment of the imbalance in

the autonomic nervous system and particularly increased parasympathetic activity, thus resulting in a state of relaxation. [32,116]

Reductions in cortisol levels are associated with the practice of yoga, and also with reductions in depressive symptoms.[117] Within this context, it is somewhat difficult to separate the benefits of yoga with that of exercise more broadly. Exercise is known to improve depressive symptoms,[80] reportedly though behavioural activation, which involves the process of altering lifestyle choices to disrupt depressive routines.[120] The exercise component of yoga may thus utilise similar mechanisms to relieve depressive symptoms. One of the reviewed papers examined group-based yoga amongst pregnant women with depression and anxiety and found that participants in both the yoga and comparison condition all reported improved depressive symptoms, with no significant difference between groups. Participants in both groups engaged in physical activity levels that were higher than that of the general population of pregnant women.[123] This may have contributed to the reduction in depressive symptoms such that the effects of yoga could not be distinguished.

The evidence for group-based yoga as a treatment for PTSD was ranked as 'Unknown,' but the findings were suggestive of the potential benefits of yoga on re-experiencing, avoidance, and hyperarousal symptoms. The wider literature has identified the role of body awareness as a mechanism by which yoga can facilitate an enhanced awareness of physiological states in order to more effectively regulate arousal.[11,32] The modulation of physiological arousal is particularly important for those suffering from PTSD, and findings from this investigation suggest that breathing practices can reduce hyperarousal symptoms, while increased awareness can reduce re-experiencing symptoms.[112] Yoga and breathing exercises have been suggested as more suitable for individuals with PTSD than mindfulness and other types of meditation, as it may be difficult for those with high physiological arousal to sit silently.[11] Due to the methodological limitations of small sample sizes and high attrition rates, however, the evidence considered in this current review was not considered supportive of the use of group-based yoga to treat PTSD. The comparison groups in these trials suggest other factors may contribute to the efficacy of yoga as a treatment. Despite being waitlist, TAU, or assessment-only conditions, most of the comparison groups engaged in some self-monitoring and social interaction as part of assessments. This may have contributed to reduction of symptoms in comparison groups, thus leading to lack of significant differences between the comparison and yoga groups.[113] Individual motivation is also suggested to play a role in the efficacy of yoga interventions. One of the trials within this review found that while there was no significantly greater reduction in symptoms in an initial yoga group compared to comparison, there was significant symptom reduction in self-selected participants in the waitlist group who chose to participate in the yoga intervention. Future trials taking these factors into consideration, as well as implementing more rigorous

methodologies, may provide more information about the potential of group-based yoga as a treatment for PTSD.

In the treatment of PTSD, mantram meditation was also found to have findings of particular interest. Only one trial examined group-based mantram meditation and one examined individual mantram meditation, and therefore the evidence could not be ranked. However, both trials were well conducted and indicated support of the mantram repetition program.[107,109] Short-term benefits of this intervention were supported by both trials, and it was found to be effective in both group-based and individually-delivered formats. Mantram meditation in particular is known to increase present-centred awareness and promote a focus on the present rather than past trauma-related memories, which in turn can reduce intrusive and hyperarousal symptoms.[35] These findings may warrant future research examining mantram repetition programs as a treatment for PTSD.

As the evidence for group-based yoga for treatment of depression was found to be 'Promising', it was somewhat surprising that the same was not found for evidence regarding group-based yoga to treat combined samples of depression and anxiety. This evidence was ranked as 'Unknown', primarily due to methodological limitations such as sample sizes, unclear randomisation methods, lack of blinded assessment, and high attrition rates. It was also not possible to determine if the intervention was only effective for treating depression, anxiety, or both, given that separate analyses were not conducted.

The evidence for individual yoga for anxiety and group-based yoga for AUD was ranked as 'Unknown' due to having only one trial within each group. Insufficient evidence within both of these categories warrants the support of future research examining yoga as an intervention for these disorders. For anxiety in particular, the literature suggests benefits of yoga intervention that are similar to those of PTSD, with body awareness reducing physiological arousal, which is characteristic of anxiety.[32]

Stand-alone mindfulness treatments

Two manualised treatments, MBSR and MBCT, emerged as the most promising mindfulness interventions in this review. MBCT appeared to be more widely used in trials targeting depression symptoms, and MBSR is more commonly used to treat anxiety.

The evidence for mindfulness as a treatment for depression in the current review was ranked as 'Promising', indicating that MBCT is a treatment that is as effective as other conventional treatments for treating depression. MBCT may be particularly effective as a treatment for depression relapse prevention in those suffering from recurrent depression, and this effect was more pronounced in those who exhibit residual depressive symptoms.[154] MBCT has been consistently recommended in a number of guidelines for treating depression, especially for

recurrent depression. However, these guidelines commonly report the efficacy of mindfulness in comparison to TAU or non-active comparison conditions. As such, it is not possible to compare these guidelines with findings from the current review, which compared mindfulness to active comparison treatments. As this review only focussed on the strength of the evidence regarding whether mindfulness is of equal effectiveness to other conventional (active) treatments for depression, further trials are warranted in exploring this specific aspect.

MBCT is thought to exert such benefits via a range of mechanisms. Reductions in negative self-referential processing and improvements in attention regulation are associated with mindfulness meditation, which may lead to gradual, but sustained reductions in depression symptoms.[132] Learning self-compassion was also found to have a mediating effect in the association between MBCT participation and depression over a 15-month follow-up.[155] Self-compassion is associated with more adaptive coping responses, greater engagement in proactive problem-solving, and decreases in negative affect.[156]

Evidence for mindfulness as a treatment for anxiety was also considered as 'Promising'. The mechanism of actions in ameliorating anxiety symptoms seems to differ between MBSR and CBT. Researchers theorised that MBSR may be effective at improving cognitive symptoms of anxiety, such as ruminative worry processes, however, when compared to CBT, MBSR may be less effective in improving the physical symptoms of anxiety, which includes perceived arousal symptoms.[135] MBSR has also been proposed to reduce worry via greater awareness of thoughts and physiological states and encouraging non-reactivity to such states.[157]

Several neurobiological mechanisms have also been suggested for the utility of MBSR for anxiety disorders. Changes in the dorsomedial pre-frontal cortex were observed in a trial of social anxiety; this region of the brain is thought to be involved in creating a sense of the self, and associated with significant reductions in social anxiety.[158] A separate trial of MBSR detected changes in the ventrolateral pre-frontal regions as well as in amygdala-prefrontal connectivity, which is involved in emotion regulation and fear extinction.[159]

While there is evidence suggesting that mindfulness-based treatments work via these hypothesised mechanisms, this area of research did not achieve a 'Supported' ranking, therefore no direct recommendation can be made for mindfulness being the first-line treatment for depression or anxiety. There is also a lack of rigour in the methodologies of trials examining the mechanism of action, which precludes any definitive conclusions being made.

Two trials examined the effectiveness of mindfulness for the treatment of PTSD, and both trials utilised MBSR. Although MBSR was associated with a decrease in PTSD symptomology over time, the strength of the evidence base was low due to a limited number of studies. In addition, some researchers have suggested that mindfulness-based practices may destabilise patients who are susceptible to flashbacks and rumination, or prone to trauma-triggered memories.[35]

Future trials are needed to ascertain whether mindfulness-based treatments are appropriate for PTSD and to understand the impact of patient symptomatology and characteristics.

The trials included in this review, provide supporting evidence for mindfulness practices leading to post-treatment improvement in substance use behaviour, such as decreasing alcohol craving, thought suppression, increasing physiological recovery from alcohol cues, and modulating alcohol attentional bias.[141] However, the evidence that informed these findings was of poor quality, meaning that we can have limited confidence in these findings at the present time. This aspect is worth further investigation, as there is preliminary evidence suggesting efficacy of mindfulness practices in the treatment of AUD.

Adjunct meditation, yoga and mindfulness treatments

All of the evidence for the effectiveness of yoga and mindfulness as adjunct treatments for PTSD, anxiety, depression, and AUD was rated as 'Unknown'. This was somewhat surprising given that both mindfulness and yoga were ranked as 'Promising' for certain populations when delivered as stand-alone treatments. Given that CBT has been found to be more effective when augmented with other standard treatments such as medication,[152] it may be expected that there would be similar results when yoga and mindfulness interventions were delivered as adjunct treatments to standard treatment, particularly for the treatment of depression and anxiety, for which promising evidence was found in stand-alone treatments. Four trials examined the efficacy of adjunct group-based yoga to treat depression with a positive direction indicating that yoga interventions demonstrated additional benefits as adjunct treatments when compared to comparison groups. However, due to high risk of bias resulting from methodological limitations of the trials reviewed, the evidence base for adjunct group-based yoga as a treatment for depression was rated as 'Unknown'.

The evidence examining adjunct group-based mindfulness for depression was also ranked as 'Unknown'. As previously discussed, mindfulness practices work through teaching participants to self-regulate attention to the present moment in a non-judgmental, accepting way.[16] It should be highlighted that all trials in this category examined mindfulness as an adjunct to pharmacotherapy, with the comparison groups receiving pharmacotherapy interventions only. This was also the case for most of the trials investigating yoga as an adjunct treatment for depression. This suggests that the influence of yoga may have been too small to detect alongside antidepressant medication, particularly with the low frequency of yoga sessions.[145] However, all the trials examining yoga as a treatment, as well as those pertaining to adjunct mindfulness interventions, suggest that these interventions are associated with minimal adverse effects. Adverse effects reported in the trials were deemed unrelated to the intervention or the trial. While psychiatric medications can be powerful and potent, they can have undesirable side effects, so it may be beneficial to further investigate the potential of MBSR/MBCT for tapering or

ceasing the use of pharmacotherapy. One trial found evidence to support MBCT in tapering or discontinuing antidepressant treatment (MBCT-TS) as an alternative to maintenance antidepressants for prevention of depressive relapse, also showing comparable cost-effectiveness.[151] Given that the findings of these trials examining meditational and mindfulness interventions as adjunct treatments are highly dependent on the type of intervention that they are delivered alongside, further research is required before determining whether this format of delivery is more effective than stand-alone interventions. Research comparing these interventions with various types of standard treatments, including pharmacotherapy and psychological therapy, is warranted in order to make larger inferences.

The evidence for adjunct treatment approaches for PTSD were all ranked as 'Unknown', however, this was due to a paucity of research, with only one trial in each of the groups. While one trial was found to have greater benefits for PTSD symptomatology in those participating in group-based yoga as an adjunct to pharmacotherapy,[144] there was insufficient evidence for this treatment to be considered 'Promising'. The literature provides some guidance regarding the role of meditational and yoga practices in the treatment of PTSD, suggesting that yoga might reduce aspects of PTSD symptoms such as those linked to stress and hyperarousal, so as to prepare individuals for more intensive trauma-focussed therapies.[10] Further research is warranted in order to better understand the benefits of participating in yoga or meditation prior to psychological therapy.

Limitations

The findings from the REA should be considered alongside its limitations. It is important to note that several caveats were associated with the methodology in order to make the review 'rapid'. A stringent criteria for study inclusion was applied: publications that were not in English were omitted; reference lists of the included papers were not hand-searched to retrieve any additional relevant studies. 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. A meta-analytic methodology was not applied to synthesise these results quantitatively. Furthermore, the studies were limited to RCTs which may have led to exclusion of potentially relevant findings from well conducted observational studies. Finally, trials published prior to 2010 were not included in the current review.

Implications

The current review suggests a range of promising interventions, particularly in targeting depression and anxiety. The use of group-based yoga to treat depression, group-based mindfulness to treat depression, as well as group-based mindfulness to treat anxiety were

ranked as ‘Promising’ interventions based on current empirical research. While no interventions were ranked as ‘Supported’, those considered ‘Promising’ may progress toward being supported as advancements are made within these fields of research. Within the short term, a focus on using mediation and mindfulness-based interventions to treat depression and anxiety may be beneficial. There is also greater scope for directing funding towards conducting more rigorously-designed research to examine the use of these interventions to treat mental health conditions more broadly. It is possible that with a growth in the evidence base for meditation, yoga, and mindfulness, the benefits of these interventions could be ascertained. For example, one of the notable and rigorously-conducted studies (Nidich et al., 2018) included in this review indicated substantial benefits of transcendental meditation to treat PTSD. More of such trials could more clearly establish the benefits of these interventions to treat a range of mental health conditions. While the use of traditional first-line psychological and pharmacological interventions would likely remain the preferred approach for the treatment of these disorders, in some cases where patients do not respond to or do not engage with first-line treatments, these interventions may potentially present a feasible option to the use of first-line treatments. At this time, however, these may be considered emerging interventions that demonstrate potential but are not considered to be first-line treatments.

When considering meditational, yoga, and mindfulness interventions for the treatment of PTSD, depression, anxiety, and AUD, it is possible that such treatment approaches may not be suitable to all individuals. Aspects of the interventions may be more appealing to some and may not be feasible for others. For example, mindfulness strategies may be useful to prevent hyperarousal states, but the effects occur gradually over time. Therefore, they may be particularly challenging for those who have not yet developed appropriate emotion regulation or tolerance skills for handling high arousal states. Mindfulness-based practices should also be administered with caution to patients with PTSD, as these practices may distress and destabilise patients.[35]

As such, the context in which these interventions are recommended to individuals should be considered before they can be prescribed or recommended. Remaining engaged with the scientific study of these interventions, however, is likely to be beneficial as the interventions develop further to target psychological symptoms.

Conclusion

The current evidence base for using meditation, yoga and mindfulness as treatment for PTSD, depression, anxiety and AUD is lacking, and therefore the most judicious inference that can be drawn from the results is that the research is of insufficiently high quality to support any direct recommendations. The findings of this review do, however, provide some guidance on where future research efforts could be directed, should there be interest in this area. Several

‘Promising’ rankings indicate benefits of yoga and mindfulness, but further research is required prior to making recommendations about the benefits of these modalities in the treatment of mental health conditions for particular populations. As such, there is an opportunity for funders and researchers to consider high quality research within this field.

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Appendix 1

Population Intervention Comparison Outcome (PICO) framework

Question 1

What role does meditational practice including meditation, transcendental meditation, mantra and yoga have in mental health treatment options?

When the PICO formula was applied, the question was defined in the following terms.

PICO format:

In people with PTSD, depression, anxiety or AUD, is there evidence that meditation, transcendental meditation, mantra or yoga will lead to improved mental health outcomes?

P Patient, Problem, Population	**I** Intervention	**C** Comparison (*optional*)	**O** Outcome (*"more effective" is not acceptable unless it describes **how** the intervention is more effective)*
Population – adults (i.e. those aged 18 and over) Patient – adults with one or more of the following: • PTSD • Depression • Anxiety • AUD Problem – one or more of the following: • PTSD • Depression • Anxiety • AUD	Meditation, transcendental meditation, mantra, or yoga which targets PTSD, depression, anxiety, or AUD	Any comparison (no limits)	Primary outcomes: Improvements in one or more of the following: • PTSD • Depression • Anxiety • Alcohol use • Stress • Wellbeing • Arousal symptoms

Question 2

What is the efficacy of mindfulness as a mental health treatment option when compared to conventional treatment?

When the PICO formula was applied, the question was defined in the following terms:

PICO format:

In people with PTSD, depression, anxiety, or AUD, is there evidence that mindfulness will improve mental health outcomes in a way that is comparable to conventional psychological or pharmacological treatment?

P Patient, Problem, Population	**I** Intervention	**C** Comparison (*optional*)	**O** Outcome (*"more effective" is not acceptable unless it describes **how** the intervention is more effective)*
Population – adults (i.e. those aged 18 and over) Patient – adults with one or more of the following: • PTSD • Depression • Anxiety • AUD Problem – one or more of the following: • PTSD • Depression • Anxiety • AUD	Mindfulness, which targets PTSD, depression, anxiety, or AUD	Conventional psychological or pharmacological treatment	Primary outcomes: Improvements in one or more of the following: • PTSD • Depression • Anxiety • Alcohol use • Stress • Wellbeing • Arousal symptoms

Question 3

Is there any benefit for mindfulness, meditation, transcendental meditation, mantra, or yoga to be used as an adjunct with conventional therapy approaches for PTSD, depression, anxiety, or AUD?

When the PICO formula was applied, the question was defined in the following terms:

PICO format:

In people with PTSD, depression, anxiety, or AUD, is there evidence that mindfulness, meditation, transcendental meditation, mantra, or yoga, used as an adjunct with conventional therapy approaches, will lead to improved mental health outcomes?

P Patient, Problem, Population	**I** Intervention	**C** Comparison (*optional*)	**O** Outcome (*"more effective" is not acceptable unless it describes **how** the intervention is more effective)*
Patient – adults with one or more of the following: • PTSD • Depression • Anxiety • AUD Problem – one or more of the following: • PTSD • Depression • Anxiety • AUD Population – adults	Mindfulness, meditation, transcendental meditation, mantra, or yoga as an adjunct with conventional therapy approaches, which targets PTSD, depression, anxiety, or AUD	Any comparison (no limits)	Primary outcomes: Improvements in one or more of the following: • PTSD • Depression • Anxiety • Alcohol use • Stress • Wellbeing • Arousal symptoms

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	("mindfulness" or "mindfulness therapy" or "mindfulness-based stress reduction" or "MBSR").ab,kw,ti.	6851
S2	(depression or "major depression" or "major depressive disorder" or "MDD").ab,kw,ti.	434806
S3	("RCT" or "randomised controlled trial" or "clinical trial" or "random" or "random allocation" or "control trial" or "randomized controlled trial" or "systematic review" or "meta-analysis" or "effectiveness trial").ab,kw,ti.	766419
S4	1 and 2 and 3	560
S5	limit 4 to (english language and yr="2010 -Current")	531

Appendix 3

Quality and bias checklist

Chalmers Checklist for appraising the quality of studies of interventions.[160]

Completed		
Yes	No	
		1. **Method of treatment assignment**
		• Correct, blinded randomisation method described OR randomised, double-blind method stated AND group similarity documented
		• Blinding and randomisation stated but method not described OR suspect technique (e.g., allocation by drawing from an envelope)
		• Randomisation claimed but not described and investigator not blinded
		• Randomisation not mentioned
		2. **Control of selection bias after treatment assignment**
		• Intention to treat analysis AND full follow-up
		• Intention to treat analysis AND <25% loss to follow-up
		• Analysis by treatment received only OR no mention of withdrawals
		• Analysis by treatment received AND no mention of withdrawals OR more than 25% withdrawals/loss-to-follow-up/post-randomisation exclusions
		3. **Blinding**
		• Blinding of outcome assessor AND patient and care giver (where relevant)
		• Blinding of outcome assessor OR patient and care giver (where relevant)
		• Blinding not done
		• Blinding not applicable
		4. **Outcome assessment (if blinding was not possible)**
		• All patients had standardised assessment
		• No standardised assessment OR not mentioned
		5. **Additional notes**
		• Any factors that may impact upon study quality or generalisability

Appendix 4

Evidence profile: Stand-alone meditation and yoga treatments

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
MEDITATION							
Meditation for PTSD							
Group-based meditation for PTSD (compared to non-active comparison)							
Bormann, Thorp, Wetherell, Golshan & Lang (2013)	RCT	N = 146	I = Mantram repetition program (MRP) + treatment as usual (TAU) (n = 71) C = TAU (n = 75)	I = MRP intervention - Delivered to augment TAU in six 90-min weekly group sessions. - Each class was attended by three to nine veterans C = TAU - Case management, as needed, to evaluate mental health status and to monitor treatments and ongoing medication	USA Outpatient veterans with PTSD diagnosis confirmed by the medical record and the CAPS Mean age = 57 [10.10] Female gender = 3%	PTSD symptoms: - CAPS - PCL	Depressive & anxiety symptoms: - BSI-18 Quality of Life: - SF-12
This randomised controlled trial (RCT) examined the effects of the mantram repetition program (MRP) on treatment of PTSD amongst veterans recruited from an outpatient PTSD clinic. Results indicated that self-reported PTSD symptoms, as measured using the PCL, decreased by 5.62 points in the MRP group (n = 71) and 2.47 points in the TAU control group (n = 75) ($p < .05$). Clinician-rated symptoms measured using CAPS at post-intervention assessment had a clinically significant change (indicated by a 10-point reduction and CAPS score of 45 or less) in symptom severity in 24% of participants within the MRP group, and 12% of the TAU control group. Effect size calculations of differences in pre-treatment and post-treatment PTSD symptoms indicated significant but small effect size interactions in symptoms measured by the PCL ($p = .05$) as well as the CAPS ($p = .05$). Within the CAPS measurements, the subscale of hyperarousal had a							

[1] Mean age and SD is given when provided, alternatively age range is provided

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
significant effect size, while re-experience and avoidance did not. Amongst the secondary outcomes, depressive symptoms showed significant reduction in the intervention group (p=.0001), while anxiety did not (p = .31). No adverse effects of the treatment were reported, and equal drop-out rates (7%) were found for both the MRP and TAU control groups. A limitation of the trial is the short follow-up of six weeks, which did not include data from the control group, thus preventing group comparison of follow-up data. There was also an overrepresentation of male participants (97%), limiting the generalisability of results to females.							
Group-based meditation for PTSD (compared to active comparison)							
Nidich, Mills, Rainforth, Heppner, Schneider, Rosenthal, Salerno, Gaylord-King & Rutledge (2018)	RCT	N = 203	I = Transcendental meditation (TM) (n = 68) C = Prolonged exposure (PE) (n = 68) C = PTSD Health education (n = 67)	I = Transcendental meditation - Delivered in 12 sessions over 12 weeks, with sessions 1 – 5 consisting of teaching TM technique, and seven maintenance sessions. - Participants were encouraged to practice two 20-minute TM sessions at home each day. C = Prolonged exposure - Delivered individually in 12 weekly sessions over 12 weeks C = PTSD health education - 12 weekly sessions of PTSD education following manualised instructions - Conducted in groups of 2-4 participants	USA Veterans from the VA San Diego Healthcare System with a current diagnosis of PTSD and CAPS score of 45 or higher Mean age: TM = 46.4 [14.3] PE = 48.5 [15.6] HE = 46.2 [16.4] Female gender: TM = 18% PE = 18% HE = 15%	PTSD symptoms: - CAPS - PCL-M	Depressive symptoms: - PHQ-9
This three-armed RCT examined the use of transcendental meditation (TM) (n = 68), prolonged exposure (PE) (n = 68), and health education (n = 67) to treat PTSD in US veterans recruited from the VA San Diego Healthcare system. Results indicated that mean changes in PTSD scores after the three-month intervention was greater than the health education comparison group for the TM group (d = 0.82) and the PE group (d = 0.49). A Non-inferiority analysis indicated that TM was significantly non-inferior to PE in reducing PTSD symptoms, as measured using the CAPS and PCL-M (p = .0002). Within the TM group, 61% of participants displayed clinically significant reductions in PTSD symptoms on the CAPS (classified as a 10-point reduction in scores), whereas 42% of participants in the PE group and 32% of participants in the health education group displayed clinically significant reductions. The amount of clinically significant reduction in the TM group was statistically significantly greater in the TM group compared to the health education group (p = .001) but was not significantly greater in the PE group compared to the health							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
education group (p = .30). When examining clinically significant symptom reduction using the self-report PCL-M, however, both TM and PE had greater rates of change than the health education group (p = .0005; p = .029). Three adverse events were reported within the TM group (two suicide attempts, one non-suicidal death), two in the PE group (one drug overdose, one illness) and two in the health education group (psychiatric hospitalisations), but none of these were found to be related to the treatment administered. The study was limited by a lack of generalisability or results resulting from having a sample of primarily male veterans with a baseline level of severe PTSD. There were also relatively high attrition rates reported in all groups, with the highest in the PE group (38%) and the lowest in the TM group (25%).							
Individual meditation for PTSD (compared to active comparison)							
Bormann, Thorp, Smith, Glickman, Beck, Plumb, Zhao, Ackland, Rodgers, Heppner, Herz, Elwy (2018)	RCT	N = 173	I = MRP (n = 89) C = Present-Centred Therapy (PCT) (n = 84)	I = MRP - Delivered one-on-one in weekly one-hour sessions over 8 weeks - Participants were encouraged to practise skills as needed to manage hyperarousal, anger, irritability, insomnia, flashbacks, and numbing/avoidance C = PCT - Delivered one-on-one in weekly one-hour sessions over 8 weeks - Participants given daily diary to record stressors	USA Veterans Health Administration Patients met DSM-IV-TR criteria for PTSD, and all met symptom severity cut-off scores of ≥45 on the CAPS and ≥50 on the PCL-M Mean age: MRP = 48.3 [14.63] PCT = 49.5 [14.50] Female gender: MRP = 18% PCT = 12%	PTSD symptoms: - CAPS - PCL-M	Depressive symptoms: - PHQ-9 Spiritual Well-being: - Functional Assessment of Chronic Illness Therapy–Spiritual Well-Being questionnaire Quality of Life: - WHOQoL-BREF
This RCT compared two treatments that were conducted on an individual basis; mantram repetition (n = 89) and present-centred therapy (PCT) (n = 84) in patients from the Veteran Health Administration. Results indicated significantly greater improvement in CAPS scores within the mantram group when compared to the comparison group, at the post-treatment assessment (between-group difference = -9.98, 95% CI = -3.63, -16.00, p = .006) as well as at the two-month follow-up assessment (between group difference = -9.34, 95% CI = -1.50, -17.18, p = .04). In the mantram group, 75% of participants (n = 49) displayed clinically significant improvement in CAPS scores, compared to 61% of the PCT group (n = 43), which was not a significant difference. Self-reported PTSD symptoms on the PCL-M indicated a significant difference between groups at post-treatment assessment (-5.83, 95% CI = -1.73. -9.93, p = .04) with the mantram group showing greater reduction in symptoms, but not at the two-month follow-up assessment (p = 0.25). At the post-treatment assessment, there was no significant difference in the number of participants who no longer met criteria for PTSD between the mantram group (48%, n = 32) and the PCT group (35%, n = 24). Amongst participants who completed the two-month follow-up							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
assessment, 59% of the mantram group no longer met criteria for PTSD (n = 36), compared to 40% of the present-centred therapy group (n = 26), which represented a significant difference (X^2 = 4.55, p < .04). Four adverse events were reported, but the authors stated they were unrelated to the study treatments. The mantram group displayed higher attrition rates than the PCT group at both post-treatment (22% compared to 14%) and follow-up assessments (26% compared to 15%) but these difference were not significant. Limitations of the trial include a use of a self-selected sample of veterans from only two centres within the US, thus somewhat limiting the generalisability of results.							
Meditation for depression							
Group-based meditation for depression (compared to non-active comparison)							
Vasudev, Arena, Burhan, Ionson, Hirjee, Maldeniya, Wetmore, & Newman (2016)	RCT (preliminary analysis)	N = 51	I = Automatic self-transcending meditation (ASTM) (n = 26) C = Waitlist TAU (n = 25)	I = ASTM - Four two-hour meditation sessions in groups of 3-8, followed by 11 one-hour weekly reinforcement sessions. - Participants were asked to practise ASTM at home 20-minutes a day and attend 75% of reinforcement sessions C = Continued existing antidepressants and/or therapy and were offered meditation training after the study period	Canada Adults between 60-85 years old diagnosed with mild-to-moderate MDD (either unipolar or bipolar depression) based on a HAMD-17 score of 8-22 Mean age: Meditation = 68.33 [6.12] Control = 66.95 [6.31] Female gender: Meditation = 53% Control = 73%	Affective symptoms of depression: - HAMD-17	Geriatric depression: - GDS Geriatric anxiety: - GAI Quality of life: - QOLSV
This RCT examined the effectiveness of a training program involving the use of automatic self-transcending meditation (ASTM) to treat late-life depression in seniors aged 60 and above recruited from primary and secondary health centres in Ontario. The trial was ongoing at the time of publication, but preliminary analyses revealed that the primary outcome measure of depressive symptoms, the HAMD-17 score, was significantly reduced in the ASTM condition compared to TAU (p < .05). Secondary depression outcome measures also demonstrated significant changes over time, with significant interactions between score and condition in both the GDS (p < .05) and GAI (p < .05). Quality of life improved throughout the study period in both conditions (p < .05).							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
The mean dropout rate was 18% (22% for ASTM and 13% for TAU), and none of the dropouts were related to adverse events. The small sample size was a limitation of the trial, as well as the lack of long-term follow-up to determine enduring effects of the intervention. This was a preliminary analysis of an RCT, and thus does not provide the full analysis, which further limits interpretation of the results.							
Individual meditation for depression							
No studies identified							
Meditation for anxiety							
Group-based meditation for anxiety							
No studies identified							
Individual meditation for anxiety							
No studies identified							
Meditation for combined depression and anxiety							
Group-based meditation for heterogeneous groups of depression and/or anxiety							
No studies identified							
Individual meditation for heterogeneous groups of depression and/or anxiety							
No studies identified							
Meditation for AUD							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Group-based meditation for AUD							
No studies identified							
Individual meditation for AUD							
No studies identified							
YOGA							
Yoga for PTSD							
Group-based yoga for PTSD (compared to non-active comparison)							
Jindani, Turner, Khalsa (2015)	RCT	N = 80	I = Kundalini Yoga (KY) (n = 59) C = Waitlist (WL) (n = 21)	I = Kundalini yoga classes - Weekly 90-minute group classes for eight weeks, including a 15-minute daily home practice guided by a YouTube video C = WL received the same intervention at a later date All participants were permitted concurrent outside treatment provided it did not have a contemplative component	Canada Adults with score above 57 on the PCL-17 Median age: 41 (Age range: 18-64) Female gender: KY = 93% WL = 76%	PTSD symptoms: PCL	Perceived Stress: - PSS Depression, Anxiety, Stress: - DASS-21
This RCT was conducted to compare the effects of an eight-week Kundalini Yoga intervention on PTSD symptoms (n = 59), compared to a waitlist group (n = 21) in adults recruited from a community population in Toronto. Results indicated that post-intervention PTSD symptoms, as measured using the PCL, were significantly lower in the yoga group compared to the watilist group ($p < .05$). Secondary outcomes of perceived stress decreased by about half, which was significantly greater than reductions in the waitlist group ($p < .05$). DASS score reductions were also significantly greater in the yoga group in the domains of anxiety ($p < .05$) and stress ($p < .05$).							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
The overall dropout rate for the trial was 30%, but substantially more dropouts were observed in the yoga group (51%). The lack of follow-up assessment in this trial was considered a limitation, as the long-term impact of the intervention could not be determined.							
Mitchell, Dick, DiMartino, Smith, Niles, Koenen, Street (2014) Reddy, Dick, Gerber, & Mitchell (2014)	RCT	N = 38	I = Kripalu-based yoga (n = 20) C = Assessment control group (n = 18)	I = Kripalu-based yoga classes - Participants were given the option to attend 12 weekly yoga sessions or 12 twice-weekly sessions over 6 weeks, but were not allowed to switch from one group to the other once the intervention had begun. - All sessions were 75-minutes long C = Assessments - Met once per week for 12 weeks in groups of 4-5 to complete weekly questionnaires	USA Veteran and civilian adult women who scored positive on the Primary Care PTSD screen (PC-PTSD) Mean age: 44.37 [12.37] Female gender: 100%	PTSD severity - PC-PTSD - PCL Depressive symptoms: - CES-D Anxiety symptoms: - STAI	Alcohol use: - AUDIT
Participants in this RCT received either Kripalu yoga-based intervention (n = 20) targeting PTSD or subthreshold PTSD and completed weekly assessments, or completed the assessments only (n = 18). Participants included veteran and civilian adult women recruited through a Veterans Affairs (VA) medical centre. Clinically significant decreases in PCL total scores were observed in both the intervention and control groups, with no significant effect of group on symptom reduction (p = .591). The yoga group had significant reductions in PCL scores throughout the course of the intervention (p = .003), while the assessment control group had marginally significant decreases (p = .02). When examining specific subscales of the PCL, there were also no significant effects of group on reductions in re-experiencing (p = .409), avoidance (p = .806), and hyperarousal (p = .850). Decreases in depressive and anxiety symptoms, as measured by the CES-D and STAI, also demonstrated no significant effect of group, although STAI scores decreased significantly for both groups. A secondary analysis of the results found that immediately after the 12-week intervention and at the 1-month follow-up, alcohol use (AUDIT) decreased in the yoga group and increased in the control group. However the difference between these groups was not statistically significant. No adverse events were reported, but 32% of randomised participants withdrew from the trial or were lost to follow-up, although dropout rates were similar for both groups. Participants who did not complete treatment or control assessments had higher PCL scores (marginally significant at p = .032) than those who completed treatment, suggesting that more severe symptomatology may have decreased tolerance for participation in the trial. Limitations of the trial included a small sample size, a short follow-up period of one month, and a female-only sample, which reduces generalisability to male populations.							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Quinones, Maquet, Velez, Lopez (2015)	RCT	N = 100	I = Satyananda Yoga (n = 50) C = Continued the regular demobilisation program (n = 50)	I = Satyananda yoga classes - Twice-weekly one-hour classes taught for 16 weeks - Participants were encouraged to practice at home using a CD and handbook C= Mandatory ordinary assistance protocol for reintegrating individuals - Monthly appointment with a trained psychologist designed to follow up on individual progress in the reintegration process - Placed on a waiting list for yoga classes	Columbia Ex-combatants with diagnosis of PTSD confirmed by a minimum total PCL score of 44. Mean age: N.A. Female gender: I = 30% C = 24%	PTSD symptoms: - PCL	
This trial investigated the use of Satyananda Yoga as a treatment for PTSD symptoms in adults recruited from a population of illegal armed group ex-combatants reintegrating after being exposed to armed conflict in Columbia. Both the yoga group (n = 50) and the control group (n = 50) demonstrated significant decreases in PTSD symptoms according to the PCL. The yoga group experienced a large treatment effect, as indicated by a large effect size (d = 1.15), while the control group showed a medium effect size (d = 0.42). Large effect sizes were also found for all symptom clusters for the yoga group, including re-experiencing (d = 1.40), avoidance (d = 1.09), and hyperarousal (d = 0.99). The clinical improvement in PTSD symptoms was significantly greater in the yoga condition compared to the control condition ($p < .05$). At the post-intervention assessment, the mean PCL score for the yoga condition (38.84) was below the clinical cut-off of 44 for diagnosing PTSD, while the mean score for the control condition (48.26) was above the cut-off. No serious adverse effects were reported, but two participants reported minor headaches. A limitation of this trial was the short follow-up period of one month. There were also higher proportions of males than females in both the intervention group (70%) and the control group (76%).							
Reinhardt, Taylor, Johnston, Zameer, Cheema, Khalsa (2018)	RCT	N = 51	I = Kripalu Yoga (n=26) C = Waitlist control (n=25)	I = Kripalu yoga - Twice weekly 90-minute group yoga sessions over 10 consecutive weeks including discussion on specific themes.	USA Veterans or active duty military personnel with PTSD diagnosis based on DSM-IV-TR Mean age:	PTSD symptoms: - PCL - CAPS Distress: - IES-R	

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				- Participants were asked to practice yoga at home for 15-minute with audio recording C = WL group could chose to receive the same yoga intervention at a later date	Yoga = 44.13 [13.97] WL = 56.15 [1.39] Assessment group = 46.58 [12.66] Female gender: Yoga = 8% WL = 15% Assessment group = 17%		
Participants for this RCT were recruited from VA hospitals, and included veterans and active duty military personnel, with the aim of treating PTSD symptoms. Results of the trial indicated that while participants in the yoga and comparison groups both had average CAPS scores in the severe range, the yoga group's average symptom severity dropped to the moderate range after the intervention, and the comparison group's remained in the severe range. Both groups had reductions in total CAPS scores and subscales, but only the subscale of re-experiencing yielded significant differences (p = .02). There were no significant between-group differences in total CAPS scores when comparing the yoga and comparison groups. Self-report PCL-M scores indicated a reduction in PTSD symptoms in the yoga group and slight increase in the comparison group, but these differences were not significant. The waitlist yoga group, which included participants who chose to receive the yoga intervention at a later date (n = 7) demonstrated significant reductions in CAPS past-month scores (p = 0.02). A major limitation of this trial was the high dropout rate of 51%. Over half the yoga group (62%) dropped out of the treatment, and 46% of the waitlist yoga group dropped out.							
Seppala, Nitschke, Tudorascu, Hayes, Goldstein, Nguyen, Perlmanm & Davidson (2014)	RCT	N = 21	I = Sudarshan Kriya yoga (n = 11) C = Waitlist (n = 10)	I = Sudarshan Kriya yoga - Daily three-hour group yoga sessions for seven days C = Waitlist group - Received the same intervention at a later date Participants in both groups were encouraged to continue concurrent treatment	USA Male veterans with service in Afghanistan or Iraq Mean age: Yoga = 28.09 [2.91] WL = 29.20 [6.66] Female gender: 0%	PTSD symptoms: - PCL-M	Anxiety and depression: - MASQ
This RCT examined the effects of Sudarshan Kriya yoga on male veterans recruited from military and veteran organisations with symptoms of PTSD, compared to a waitlist control group. While clinical diagnosis of PTSD was not in the inclusion criteria, mean scores on the PCL-M were above the clinical cut-off of in both groups. Results indicated that the yoga group had significantly fewer PCL-M symptoms at the post-intervention assessment, 1 month post-intervention, and 1 year post-intervention compared to pre-intervention assessment. The differences between the yoga group and watilist group were significant and demonstrated large effect sizes at post-intervention (d = 1.16, 95% CI = 0.20, 2.04), 1 month post-intervention (d = 0.94, 95% CI = 0.00, 1.80),							

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and 1 year post-intervention (d = 1.00, 95% CI = 0.05, 1.86). Similar results were found for anxiety and depression (MASQ) scores (d = 0.96, 95% CI = 0.02, 1.82; d = 1.11, 95% CI = 0.15, 1.98; d = 0.99, 95% CI = 0.05, 1.86). No adverse events were reported by participants. Limitations of the trial included a small sample size as well as an all-male sample, both of which limit the generalisability of the findings. Twenty-five percent of the sample was lost at the 1 year follow-up, but an intent to treat analysis was used to replace missing data.							
Individual yoga for PTSD							
No studies identified							
Yoga for depression							
Group-based yoga for depression (compared to non-active comparison)							
Buttner, Brock, O'Hara, & Stuart (2015)	RCT	N = 57	I = Gentle vinyasa flow yoga classes (n = 28) C = Waitlist (n = 29)	I = Vinyasa flow yoga classes - 16 one-hour yoga classes over eight weeks - Participants were asked to practice at least once a week at home with a DVD including a 30-minute yoga routine C = WL group - Received the same treatment at a later date	USA Adult females who had given birth within 12 months and met criteria for MDD using a HDRS score greater than 12. Mean age: Yoga = 29.81 [5.17] Control = 32.45 [4.78] Female gender: 100%	Depression: - HDRS	Depression: - PHQ-9 - SCID-I - IDAS Health-related quality of life: - SF-36
This RCT investigated the effectiveness of a postpartum yoga class (n = 28) compared to a waitlist group (n = 29) amongst women aged between 18 and 45 who had given birth within the past 12 months, identified and recruited using public birth records. Depression symptoms (HDRS) decreased significantly within the entire sample (p < .001), but the decrease was greater for the yoga group than for the waitlist group (p = .005). In the yoga group, 78% of participants reported clinically significant change at the post-treatment assessment, compared to 59% of participants in the waitlist group.							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
There was no long-term follow-up reporting the enduring effects of the intervention, which was a limitation of the trial. Generalisability was also limited by the non-representative sample (women who had recently given birth).							
Chu, Wu, Lin, Chang, Lin, & Yang (2017)	RCT	N = 26	I = Yoga group (n = 13) C = Waitlist - Instructed not to engage in any yoga practice and maintain usual level of physical activity (n = 13)	I = Yoga classes - Twice weekly 60-minute yoga classes over 12 weeks. - Classes comprised of three to five participants C = Waitlist - Provided with a free 12-week yoga program following post-test assessment completion	Taiwan Adult females with mild to moderate depressive symptoms, as characterised by BDI-II score of 14-28 Mean age: Yoga = 33.08 [9.11] Control = 32.38 [8.27] Female gender: 100%	Depressive symptoms: BDI-II	Perceived stress: - PSS Heart rate variability - ECG heart rate recording
This trial aimed to examine the effectiveness of a 12-week yoga program (n = 13) to decrease depressive symptoms and heart rate compared to a waitlist group (n = 13) in depressed women recruited from a university and the surrounding community. There was a significant group x time interaction effect for depressive symptoms but not for perceived stress. Results indicated that the yoga group reported significantly reduced BDI-II scores (p=.005) while the waitlist group reported no significant change. Perceived stress, assessed using the perceived stress scale (PSS) was also significantly reduced in the yoga group (p=.003) and not in the waitlist group. No adverse events were reported in response to the yoga intervention. The trial was limited by a small sample size and lack of follow-up data to determine long-term effects of the yoga intervention.							
Field, Diego, Medina, Delgado, & Hernandez (2012)	RCT	N = 84	I = Yoga (n= not reported) I = Massage therapy (n= not reported) C = Standard prenatal care (n = not reported)	I = Twice weekly 20-minute group yoga sessions for 12 weeks. Groups consisted of approximately eight participants I = Twice weekly 20-minute massage C = Standard prenatal care	USA Adult females in second trimester of pregnancy between 18 and 22 weeks with a diagnosis of depression based on SCID Mean age:	Depression: - CES-D	Anxiety: - STAI

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
					26.6 (Age range: 18-40) Female gender: 100%		
This trial examined the efficacy of yoga, massage therapy, and standard prenatal care amongst adult females in their second trimester of pregnancy who were screened for depression at two medical school prenatal ultrasound clinics. Results indicated significant reductions in depression, as measured using the CES-D, and anxiety (measured using the STAI) in both the yoga group ($p < .001$) and the massage group ($p < .001$) but not the control group. The difference in mean CED-D scores at baseline and post-intervention was greater in the massage group (mean difference = 11.77) than in the yoga group (mean difference = 8.23) but a significance test was not conducted, making it unclear whether these differences represented a statistically significant reduction in depression. The trial was limited by a lack of follow-up, as well as poor generalisability as the sample consisted only of pregnant females.							
Kinser, Bourguignon, Whaley, Hauenstein, & Taylor (2013) Kinser, Elswick, & Kornstein (2014)	RCT	N = 27	I = Hatha yoga (n = 15) C = Attention-control (n = 12)	I = Hatha yoga classes - Weekly 75-minute group yoga class for 8 weeks - Daily home practice with a DVD and handouts C = Health education classes - Weekly 75-minute group health education class for eight weeks	USA Adult females with a diagnosis of MDD or dysthymia based on MINI or a score of 9 or above on PHQ-9 Mean age: 43.26 [15.57] Female gender: 100%	Depression severity: - PHQ-9	Stress: - PSS-10 Anxiety: - STAI Rumination: - RSS
This trial tested Hatha yoga as a treatment for women with MDD recruited from a community population in the US. A subsequent paper reported the results of a one-year follow-up. Initial results indicated that all participants had decreasing levels of depression over the course of the 8-week trial, but there was no significant difference in reductions in the yoga group compared to the comparison group (as indicated by PHQ-9 scores). There were also no significant differences in levels of stress or anxiety between the two groups. The only outcome that demonstrated a significant group x time effect was rumination, which demonstrated greater reductions in the yoga group compared to the comparison group. The 1-year follow-up analysis (Kinser, Elswick & Kornstein, 2014) included nine participants from the original trial, tested on all outcome measures one year after the completion of the intervention. Participants in both groups experienced a decrease in depression, but the yoga group had a significantly greater reduction in depression severity ($p < .001$) and rumination ($p = .017$). There was no statistically significant difference in reductions in other outcomes, including perceived stress and anxiety.							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
The limitations of this trial include a small sample size and a high drop-out rate, both in the primary analysis (33%) and in the follow-up analysis (66%).							
Prathikanti, Rivera, Cochran, Tungol, Fayazmanesh, Weinmann (2017)	Parallel RCT	N = 38	I = Hatha yoga (n = 20) C = Attention Control (AC) (n = 18)	I = Hatha yoga classes - Twice weekly 90-minute yoga classes for eight weeks C = Yoga history module - 8 twice weekly 90-minute yoga history module with short lectures and documentary clips focussing on historical figures of the yoga tradition	USA Adults who met diagnostic criteria for mild-to-moderate major depression using MINI and BDI-II score of 14-28 Mean age: 43.40 [14.8] Female Gender: 68%	Depressive symptoms: BDI-II	
This RCT compared a group yoga intervention (n = 20) to an attention control education group (n = 18) for treating mild-to-moderate depression in individuals recruited from the local community and outpatient clinics. The group-time interaction was found to be significant, indicating that participants in the yoga group displayed a greater reduction in depression symptoms on the BDI-II when compared to the comparison group (p = .034). Between the baseline and 8-week assessments, BDI scores in the yoga group decreased by an average of 9.47 points (95% CI = 6.57, 12.37), while scores in the comparison group decreased by an average of 2.99 (95% CI = 0.45, 6.43). The difference between the two groups was statistically significant (p = .005), and the effect size was large (d = -0.96, 95% CI = -1.81, -0.12). Among those who completed the 8-week intervention, 60% achieved remission, while in the comparison group 10% achieved remission (remission was defined by a BDI score of 9 or less at the final assessment). Adverse events included two reports of musculoskeletal injury that were unrelated to yoga exercises, and musculoskeletal discomfort during yoga classes, which resolved throughout the course of the intervention. The trial was limited by a small sample size and lack of follow-up assessment.							
Uebelacker, Battle, Sutton, Magee, & Miller (2016)	RCT	N = 20	I = Prenatal yoga program (n = 12) C = Mom-baby wellness workshop (n = 8)	I = Prenatal yoga classes - Weekly 75-minute group prenatal yoga classes for nine weeks C = Mom-baby wellness workshop - Weekly 75-minute group workshops focussed on	USA Adult females 12-26 weeks pregnant with minor or major depression based on scores between 7 and 20 on QIDS Mean age:	Depression severity: - QIDS - EPDS	Injuries - Asked participants in the intervention group if they had experienced any injuries or medical problems due to yoga

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				postpartum health and general wellness	28.4 [5.8] Female gender: 100%		Amount of yoga: - Amount of home yoga practice
This pilot RCT aimed to reduce depression amongst pregnant females with depression who were recruited from community locations and OB/GYN practices. The trial compared prenatal yoga (n = 12) to perinatal health workshops (n = 8). Both the QIDS and EPDS showed improvement in depression severity in both groups, but these changes were not significant. The yoga group had greater reductions in depression severity according to the QIDS and EPDS, with medium effect sizes, but these differences were not statistically significant. Limitations of this trial included a small sample size and a lack of blinding of assessors despite use of a clinician-rated assessment depression severity. There were additional methodological limitations that introduced risk of bias, including an unknown randomisation process and lack of intent-to-treat analysis.							
Individual yoga for depression							
No studies identified							
Yoga for anxiety							
Group-based yoga for anxiety							
No studies identified							
Individual yoga for anxiety (compared to non-active comparison)							
Bidgoli, Taghadosi, Gilasi, & Farokhian (2016)	RCT	N = 80	I = Sukha pranayama breathing exercises (n = 40) C = Routine coronary angiography-related care services (n = 40)	I = Sukha pranayama - Five minute breathing exercise before undergoing coronary angiography procedure C = Routine angiography care without breathing exercises	Iran Adults undergoing coronary angiography for the first time with an anxiety score of 43 or greater based on SAI Mean age:	Anxiety: - SAI	

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
					Yoga = 55.50 [7.36] Control = 62.70 [6.28] Female gender: Yoga: 55% Control: 45%		
This RCT examined the effects of a single dose of pranayama breathing on anxiety in patients undergoing coronary angiography recruited from a hospital in Iran. The experimental group had a session of sukha pranayama breathing before undergoing the surgery, while the comparison group received only the routine pre-angiography care. The experimental group had significant reductions in anxiety scores half an hour and one hour after the intervention ($p < .001$). The comparison group also experienced a slight, but non-significant, decrease in anxiety. There were also between group differences in anxiety levels in the experimental and comparison groups at all time points ($p < .05$). The trial included only a single intervention session, which differs from other trials in the review which implemented multiple treatment sessions. This should be considered when comparing this trial with others included in the table. There was no long-term follow-up to track if the decrease in anxiety continued or if patients continued to utilise breathing exercises to relieve anxiety. Generalisability was also limited due to the sample comprising of coronary angiography patients, who may have different health profiles from healthy adults.							
Yoga for combined depression and anxiety							
Group-based yoga for combined depression and anxiety (compared to non-active comparison)							
Davis, Goodman, Leiferman, Taylor, & Dimidjian (2015)	RCT	N = 46	I = Ashtanga Vinyasa yoga and TAU (n = 23) C = TAU (n = 23)	I = Ashtanga Vinyasa yoga classes - Weekly 75-minute group yoga classes over eight weeks C = TAU - Participants were asked to report outside treatments received	USA Adults females who were pregnant (up to 28 weeks) with depression score of nine or greater on EPDS, and/or anxiety score of 35 or greater on STAI Mean age: 30.15 [4.92] Female gender: 100%	Depression: - EPDS Negative affect: - PANAS-N State and trait anxiety: - STAI	

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
This trial randomly assigned pregnant women with symptoms of depression and anxiety to an Ashtanga Vinyasa yoga program (n = 23) or TAU (n = 23) after they were recruited through community advertisements and health care provider referral. Both groups demonstrated a significant improvement in depression scores (EPDS) but there was no significant difference in the improvement between the yoga and comparison groups (p = .55). There was a significantly greater reduction in negative affect (PANAS-N) in the yoga group compared to the comparison group, indicating that the yoga group had less negative affect (p = .011). Both state and trait anxiety reductions were significant within each group, but there was no significant group difference in these reductions. Only one participant reported medical complications, in the form of premature labour, but this was not linked to the yoga intervention. The trial's limitations include potentially reduced generalisability due to a sample including only pregnant females. There was also a small sample size, and results did not separate scores for those with anxiety symptoms from those with depressive symptoms, thus making it difficult to isolate the effects of the intervention on either disorder.							
Falsafi (2016)	Repeated measures RCT	N = 90	I = Hatha yoga (n = 23) I = Mindfulness (n = 21) C = Waitlist (n = 23)	I = Hatha yoga classes - Weekly 75-minute group yoga classes for eight weeks - Yoga materials provided to practice at home I = Mindfulness and self-compassion intervention - Weekly 75-minute group mindfulness training for eight weeks C = Waitlist - Only assessments with option to receive intervention that provided best outcomes after the trial	USA Adult students with a diagnosis of depression and/or anxiety Mean age: 22.1 (Age range: 18-50) Female gender: 86%	Depression: - BDI Anxiety: - HAS Stress: - Student-Life Stress Inventory	
This trial investigated Hatha yoga (n = 23) and mindfulness (n = 21) treatments, in comparison to a waitlist group (n = 23). Participants were recruited from a mid-size public US university Compared to the waitlist group, depression, anxiety, and stress symptoms scores in the yoga group reduced significantly from pre-intervention to follow-up assessment (p < .01). The scores remained similar at the 12-week follow-up assessment compared to post-intervention assessment. The dropout rate for the trial was 20%, and limitations included a potential lack of generalisability due to the sample being 85% female and 90% Caucasian.							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Kuvacic, Fratini, Padulo, Iacono, & Giorgio (2018)	RCT	N = 30	I = Yoga (n = 15) C = Pamphlet (n = 15)	I = Yoga classes - Twice-weekly group yoga classes over eight weeks C = Pamphlet - Received a pamphlet about chronic low back pain	Croatia Adults with pervasive chronic low back pain and depression and anxiety based on Zung self-rating depression and anxiety scales Mean age: 34.30 [4.52] Female gender: 47%	Depression: - SDS Anxiety: - SAS	Low back pain: - ODI-I Pain: - NRS 0-10
This trial compared an 8-week yoga program (n = 15) with an informational pamphlet (n = 15) in adults with chronic low back pain diagnosed with depression and anxiety. Results indicated a significant time x group interaction (p = .021). The yoga group had a significant decrease in depression scores (p < .01) whereas the comparison group did not, and the difference between these groups was statistically significant (p <.001). For anxiety, only the yoga group showed a significant decrease (p < .01), but the between group difference when compared to the comparison group was not significant. The yoga group demonstrated significant decreases in pain levels and this was significantly different between groups (p < .001). Limitations of this trial include a small sample size and a lack of follow-up assessment, which limited the information known about the long-term effectiveness of this intervention, as well as a small sample size.							
Rani, Tiwari, Singh, & Srivastava (2012)	RCT	N = 150	I = Yoga nidra and pharmacotherapy (n = 65) C = Pharmacotherapy only (n = 61)	I = Yoga nidra classes - Daily 35-minute group yoga classes five days a week for six months C = Pharmacotherapy only	India Adult females between 18 and 45 years with menstrual irregularities Mean age: Yoga = 27.67 [7.85] Control = 26.58 [6.87] Female gender: 100%	Anxiety: - HAM-A Depression: - HAM-D	

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
This trial examined the use of yoga nidra as a treatment for anxiety and depression in females with menstrual disorder who were recruited from a medical university. Participants were allocated to the yoga nidra group (n = 65) or the comparison group with pharmacotherapy only (n = 61). Results showed significant improvement in anxiety and depression symptoms six months after the yoga intervention in those with mild or moderate anxiety and depression at baseline (mild: p < .01; moderate: p < .02). In those who started the intervention with severe anxiety and depression symptoms, there was no significant change in scores after six months. When compared to the comparison group, the yoga group reported significantly greater improvement in anxiety (p < .003) and depression (p < .02). Limitations of this trial include the fact that not all participants had clinical levels of depression and anxiety when assessed at baseline. In the intervention group, 86% reached criteria for clinical anxiety, 89% for clinical depression. In the comparison group, 90% with anxiety and 84% had depression. Results did not differentiate the effects of the treatment on those with and without clinical levels of anxiety and depression. There was also high levels of attrition, with 23% of the comparison group and 15% of the intervention group lost to follow up. Additionally, it was not clear from this trial if the medication prescribed was targeting psychological symptoms or menstrual irregularities.							
Individual yoga for combined depression and anxiety (compared to non-active comparison)							
de Manincor, Bensoussan, Smith, Barr, Schweickle, Donoghoe et al. (2016)	RCT (single group cross-over design)	N=101	I = Yoga intervention plus TAU (n = 47) C = Waitlist control plus TAU (n = 54)	I = Yoga classes - Four individual one-hour consultations/lessons over a six-week period with a qualified yoga teacher. - Individualised yoga practice was developed for each participant for home practice according to their presenting symptoms, needs, abilities, goals, and circumstances. Yoga practice included postures, movement, breathing exercises, relaxation, mindfulness and meditation, cultivation of positive values, thoughts, attitudes, and lifestyle changes. C = 6-week TAU only (waitlist)	Australia Adults with at least mild, moderate, or severe depression or anxiety according to the DASS-21 Mean age: Yoga = 39.5 [11.3] Control = 38.2 [11.2] Female gender: Yoga = 87% Control = 74%	Depression and anxiety: - DASS-21 Psychological distress/wellbeing: - K10 - SPANE	Resilience: - CD-RISC 2 Health: - SF-12
Participants for this RCT were recruited through referrals from local psychologists, GPs, mental health service providers, advertisements, email newsletters, and social media. A total of 107 participants were randomised into a yoga intervention (n = 47) or waitlist group with TAU (n = 54) to treat depression and/or anxiety, however there were six post-randomisation exclusions. Assessments were taken at baseline, at the end of the intervention, and six weeks after the end of the intervention. The post-intervention analysis included data from 101 participants (47							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
intervention, 54 waitlist), while follow-up analyses included the 37 intervention group participants. At six-week follow-up, statistically significant differences were observed between the yoga and watilist groups on reduction of depression scores (-4.30; 95% CI: -7.70-0.01; p = .01). Differences in reduction of anxiety scores were not significant (-1.91; 95% CI: -4.58-0.76; p = .16). Statistical significant differences in favour of the yoga group were observed on total DASS (p = .03), K10, SF12 mental health, SPANE, FS and resilience scores (p < .01). Differences in stress and SF12 physical health scores were not statistically significant. No adverse effects related to the yoga intervention were reported. Limitations of the current study include that the majority of participants (n = 61) presented with comorbidity of elevated symptoms in both depression and anxiety. The extent to which the yoga intervention implemented in this study targeted depression, anxiety or both is unclear and the effects on targeted conditions cannot be separated. Study measures were all self-reported which may introduce reporting bias. Some participants were eligible before randomisation, but because re-assessment occurred before commencing the intervention, some participants were no longer eligible only a single assessment for elevated symptoms of depression and/or anxiety scores on DASS subscales was used at screening, they were no longer eligible at commencement of the trial. Using diagnostic criteria for assessment to determine eligibility at the screening stage is recommended.							
Yoga for AUD							
Group-based yoga for AUD (compared to non-active comparison)							
Bichler, Miedermeier, Fruhauf, Langle, Fleischhacker, Mechtcheriakov, Kopp (2017)	Cross-over RCT	N = 16	I = Yoga-gymnastic (YG) (n = 16) C = Nordic walking (NW) (n = 16) C = Passive control (PC) (n = 16)	YG = Hatha yoga classes - 60-minute of training in Hatha-yoga, a practice of postures, controlled breathing and meditation. - Patients performed exercise with intensity of 11-14 on Rating of Perceived Exertion - Groups of 3-5 NW = Nordic walking - 60-minute Nordic walking using sticks to perform moderate intensity outdoor walking on uneven terrain - Groups of 3-5 PC = Sitting in gym while reading magazines	Austria Inpatients diagnosed as alcohol dependence with clinical observable cravings, but currently abstinent without relapse Mean age: 47.3 [7.9] Female gender: 20%	Alcohol craving: - AUQ Affective responses: - Feeling Scale - Felt Arousal Scale	

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				- Groups of 3-5			
This cross-over RCT investigated the use of single session interventions consisting of yoga, Nordic walking, and reading magazines with inpatients recruited during withdrawal treatment, after they had undergone alcohol detoxification at psychiatric hospitals. All 16 participants participated in all three activities in randomised orders, with a one-week wash-out period between activities. Results indicated no significant changes in alcohol cravings (as measured by the AUQ) over time in any of the groups. This trial involved only single session interventions limiting the ability to determine the ongoing efficacy of the interventions. The small sample size and 80% male sample also limited the generalisability of these results.							
Individual yoga for AUD							
No studies identified							
YOGA/MEDITATION							
Yoga/meditation for PTSD							
No studies identified							
Yoga/meditation for depression (compared to non-active comparison)							
Tolahunase, Sagar, Faiq, & Dada (2018)	RCT	N = 58	I = Yoga and meditation, in addition to routine drug treatment (n = 29) C = Routine drug treatment (n = 29)	I = Yoga and meditation intervention - 12-week yoga-and-mediation-lifestyle intervention - Five 120-minute sessions per week of theory and practice C = Continued routine drug treatment	India Adults diagnosed with MDD based on DSM-5 criteria and on routine drug treatment for at least six months Mean age: Intervention = 36.94 [8.94] Control = 39.10 [9.26]	Depression severity: - BDI-II	

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[1] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
					Female gender: Intervention = 55% Control = 52%		
This RCT examined a mixed yoga and meditation intervention along with routine drug treatment in adults with MDD who were recruited from an outpatient psychiatric unit in New Delhi. The intervention group (n = 29) was compared to a group with only routine drug treatment (n = 29). There was a significant decrease in BDI score in the intervention group compared to the comparison group (-5.83, 95% CI = -7.27, -4.49, p < .001). The results also indicated that females in the intervention group demonstrated significantly more clinical improvement than males, with a larger difference of change (females: -6.12, p = .003; males: -3.86, p = .032). This trial was limited by a lack of long-term follow-up, which makes it unclear whether the benefits of this intervention persisted long-term.							
Yoga/meditation for anxiety							
No studies identified							
Yoga/meditation for mixed depression and anxiety							
No studies identified							
Yoga/meditation for AUD							
No studies identified							

N.B:

AUDIT = Alcohol Use Disorder Identification Test; AUQ = Alcohol Urges Questionnaire; BDI-II = Beck Depression Inventory; BSI -18 = Brief Symptom Inventory 18; CAPS = Clinician Administered PTSD scale; CD-RISC = Connor-Davidson Resilience Scale; CES-D = Center for Epidemiologic Studies Depression Scale; DASS-21 = Depression, Anxiety and Stress Scale; DUDIT = Drug Use Disorders Identification Test; EPDS = Edinburgh Postnatal Depression Scale; GAI = Geriatric Anxiety Inventory; GDS = Geriatric Depression Scale; FFMQ = Five Facet Mindfulness Questionnaire; HAM-A: Hamilton Anxiety Scale; HAM-D: Hamilton Rating Scale for Depression; HAM-D17 = Hamilton Depression Rating Scale 17-item version; HAS = Hamilton Anxiety Scale; HDRS = Hamilton Depression Rating Scale; K10 = Kessler Psychological Distress Scale; MASQ = Mood and Anxiety Symptoms Questionnaire; MINI = Mini Neuropsychiatric Interview; MRP = Mantram Repetition Program; NRS 0-10 = Numeric rating scale for pain; ODI-I = Owestry low back pain disability questionnaire; PCL = PTSD Checklist; PCL-M = PTSD Checklist-Military; PC-PTSD = The Primary Care PTSD Screen; PHQ = Patient Health Questionnaire; PSS = Perceived Stress Scale, QIDS = Quick Inventory of Depressive Symptomatology; QOLSV = Quality of Life Profile Seniors Version; RSS = Ruminative Response Scale; SAI = Spielberger State Anxiety Inventory (SAI); SAS = Zung self-rating anxiety scale; SDS = Zung self-rating depression scale; SF-12 = Health Survey Short Form-12; SPANE = Scale of Positive and Negative Experience; STAI = State-Trait Anxiety Inventory; WHOQoL-BREF = WHO Quality of Life-BREF

Evidence profile: Stand-alone mindfulness treatments

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)[2] Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Mindfulness for PTSD							
Group-based mindfulness for PTSD							
Polusny, Erbes, Thuras, Moran, Lamberty, Collins, Rodman, Lim (2015)	Clinical RCT	N = 116	I = MBSR (n = 58) C = Present Centred Group Therapy (PCGT) (n = 58)	I = MBSR - 8 weekly 2.5 h group sessions - A daylong retreat, focused on teaching participants to attend to the present moment in a non-judgemental, accepting manner C = PCGT - 9 weekly 1.5 h group sessions focused on current life problems	USA Veterans with PTSD diagnosis according to DSM-IV or subthreshold PTSD Mean age: MBSR = 57.6 [10.4] PCGT = 59.4 [9.2] Female gender: MBSR = 21% PCGT = 10%	PTSD symptom severity: - PCL	Diagnosis and symptom severity of PTSD: - CAPS Depressive symptom severity: - PHQ-9 Quality of life: - WHOQoL-BREF Mindfulness: - FFMQ
This randomised clinical trial involving 116 veterans with PTSD compared the efficacy of MBSR to PCGT on PTSD symptom severity. Patients were recruited through advertisements and clinical referrals at a large VA medical centre. Outcomes were assessed before, during, and after treatment and at 2-month follow-up. Participants receiving MBSR demonstrated greater improvement in self-reported PTSD symptom severity during treatment (change in mean PCL scores from 63.6 to 55.7 vs 58.8 to 55.8 with present-centered group therapy; between-group difference = 4.95; 95% CI [1.92-7.99]; p = 0.002) and at 2-month follow-up (change in mean PCL scores from 63.6 to 54.4 vs 58.8 to 56.0, respectively); between-group differences = 6.44; 95% CI [3.34-9.53], p <0.001). Although participants in the MBSR group were more likely to show clinically significant improvement in self-reported PTSD symptom severity (49% vs 28% with present-centered group therapy; difference, 21%; 95%CI [2.2-39.5]; p = 0.03) at 2-month follow-up, they were no more likely to have loss of PTSD diagnosis (53% vs 47%, respectively; difference, 6.0%; 95%CI [14.1 - 26.2]; p = 0.55). For secondary outcomes, the MBSR group showed significantly better outcomes in mindfulness (p <0.001) and quality of life (p = 0.004) at 2-month follow-up when compared to the PCGT group. There is a trend toward significant difference for depression symptom severity between the two groups at 2-month follow-up (p = 0.06). There was one serious adverse event in the PCGT group, in which a patient made a suicide attempt. Study limitations include that PCGT may not have fully accounted for all nonspecific factors present in MBSR, with MBSR received longer total in-session time than the PCGT group.							

[2] Mean age and SD is given when provided, alternatively age range is provided

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Possemato, Bergen-Cico, Treatman, Allen, Wade, Pigeon (2016)	Clinical RCT	N = 62	I = Primary Care Brief Mindfulness Training (PC-BMT) + Primary Care Treatment as Usual (PC-TAU) (n = 36) C = PC-TAU (n = 26)	I = PC-BMT - 4 weekly 1.5 h group sessions, adapted from MBSR - Provided with CDs with audio files to support home practice, which is a 2-minute Chill Out to be used at least once daily for all weeks C = PC-TAU Received usual PC treatment, could include primary care mental health integrated (PCMHI) care, including medications and brief psychotherapy provided by mental health clinicians	USA Veterans with subthreshold or diagnostic-level PTSD according to DSM-IV Mean age: PCBMT = 46.3 [16.4] PC-TAU = 47.4 [16.2] Female gender: PCBMT = 17% PC-TAU = 8%	PTSD Symptoms severity: - CAPS - PCL-S	Depressive symptoms severity: - PHQ-9
This parallel, two-arm, single-blinded randomised clinical trial recruited 62 veterans from VA primary care clinics with subthreshold or diagnostic-level PTSD. This study tested whether a brief mindfulness training (BMT) offered in primary care can decrease PTSD severity. PCBMT was adapted from manualised MBSR, and included much of the MBSR contents but with a shorter session duration and fewer sessions overall. The outcomes were measured pre- and post- treatment using CAPS and PCL-S, and at 8-week follow-up using PCL-S. Intention-to-treat analysis results indicated no statistical significance for differences in CAPS and PCL-S scores between PCBMT and PCTAU groups when followed up after 8 weeks. For the secondary outcomes, results indicated a significant difference between PCBMT and PCTAU groups for depressive symptoms (p = 0.04), with PCBMT group showing a greater reduction in depressive symptom severity measured by PHQ-9. Due to low participation rate in the PCBMT group (44.4% completed PCBMT, defined as completing at least three sessions), the study subsequently grouped the non-completers for PCBMT with the PCTAU group and compared to the individuals who completed PCBMT. PTSD severity decreased in both groups, although the PCBMT completers reported significantly larger decreases in PTSD and depression from pre- to post-treatment and maintained gains at the 8-week follow-up compared with the comparison group. Significant differences were observed in both CAPS and PCL-S measures (p= 0.001 and p = 0.04 respectively). No adverse event reported. Limitation of the study include a low rate of participant engagement in the PCBMT arm (44% completed PCBMT).						
Individual mindfulness for PTSD							
No studies identified							
Mindfulness for depression							

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Group-based mindfulness for depression							
Michalak, Schultze, Heidenreich, Schramm (2015)	Three-arm clinical RCT	N = 106	I = MBCT (n = 36) C = Cognitive behavioural analysis system of psychotherapy (CBASP) (n = 35) C = TAU (n = 35)	I = MBCT - 1 individual pre-class interview - 8 weekly 2.5 h group sessions - Group size = 6 C = CBASP - 2 individual treatment sessions - 8 weekly 2.5 h group sessions TAU = Patients were encouraged to continue any current medication and to attend appointments with their psychiatrist or psychotherapist	Germany Patients with a current major depressive episode defined by the DSM-IV and had experienced depressive symptoms for more than 2 years without remission Mean age: MBCT +TAU = 48.4 [11.5] CBASP + TAU = 50.2 [10.5] TAU = 54.0 [13.24] Female gender: MBCT +TAU = 58% CBASP + TAU = 63% TAU = 66%	Depressive symptoms severity: - HAM-D	Depressive symptoms severity: - BDI Quality of Life: - SF-36
This was a bi-centre, three-arm randomised clinical trial, designed to evaluate the effects of MBCT compared to CBASP on depressive symptoms for patients with a current DSM-IV defined major depressive episode and persistent depressive symptoms for more than 2 years. At Site A all patients were recruited by media announcements; at Site B patients were recruited from community health care facilities or private practices. MBCT and CBASP groups were set up at each site, with four of each at Site A, and two of each at Site B. The group size was restricted to six patients per class in the present trial in both treatment conditions. The pre- and post-assessment results indicated that MBCT was no more effective than TAU in reducing depressive symptoms ($p = 0.76$) at Site A, although it was significantly superior to TAU at treatment Site B ($p = 0.01$). CBASP was significantly more effective than TAU in reducing depressive symptoms in the overall sample and at both treatment sites (Ps <0.01). Overall, the direct comparison of MBCT and CBASP in terms of changes in depression scores at post-treatment did not reveal any statistical significance for a difference between the two groups. Similarly for remission rates, no significant difference between MBCT and CBASP groups was observed. Both treatments had only small to medium effects on social functioning and quality of life. No adverse events were reported. There was no follow-up data for the studies and therefore long-term outcomes cannot to be determined.							
Shallcross, Gross, Visvanathan, Kumar, Palfrey,	RCT	N = 92	I = MBCT (n = 46)	I = MBCT - 8 weekly 2.5 h group sessions	USA Participants with confirmed MDD-related and co-morbid Axis	Relapse and time to relapse for depression: - SCID	Depressive symptoms severity: - BDI

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Ford, Dimidjian, Shirk, Holm-Denoma, Goode, Cox, Chaplin, Mauss (2015)			C = Active control (AC) (n = 46)	- Outside of class for homework (approximately 50 minutes per day) - Group size = 10-12 C = AC was based on the validated and manualised Health Enhancement Program (HEP) - 8 weekly 2.5 h group sessions - Outside of class for homework (approximately 50 minutes per day) - Group size = 10-12	I/II diagnostic eligibility based on Clinical Interview for the DSM-IV (SCID I/II) Mean age: MBCT = 36.7 [12.8] AC = 33 [9.6] Female gender: MBCT = 76% ACC = 76%		Life satisfaction: - SWL
This RCT evaluated the comparative effectiveness of MBCT versus an active comparison condition for depression relapse prevention, depressive symptom reduction and improvement in life satisfaction. Participants were recruited from an urban area through referrals from community mental health centres and local advertisements. Intention-to-treat analyses indicated no differences between MBCT and AC in depression relapse rates (OR = 1.10, 95% CI [0.42-2.92], p = 1) or time to relapse over a 60-week follow-up using a survival analysis (HR = 0.945, 95% CI [0.36-2.45], p = 0.91). Both groups experienced significant and equal reductions in depressive symptoms and improvements in life satisfaction. The AC group experienced immediate symptom reduction post-intervention and then a gradual increase over the 60-week follow-up. The MBCT group experienced a gradual linear depression symptom reduction. The pattern for life satisfaction was identical but only marginally significantly different to each other. Limitations of the study include small effect sizes for analyses and therefore only confer modest statistical power. There was also a high level of drop-outs in both groups which can introduce attrition bias.							
Williams, Crane, Barnhofer, Brennan, Duggan, Fennell, et al. (2014)	Three-arm RCT	N = 274	I = MBCT (n = 108) C = cognitive psychological education (CPE) (n = 110) C = TAU (n = 56)	I = MBCT - 1 individual Pre-class interview - 8 weekly 2 h classes - Participants were invited to 2h follow-up classes taking place 6 weeks and 6 months post-treatment - Each follow-up class included meditation, discussion of discoveries and difficulties	UK Patient with a history of at least three episodes of major depression meeting DSM–IV Mean age: MBCT = 43.99 [11.55] CPE = 43.86 [12.92] TAU = 43.43 [12.03]	Time until relapse to major depression: - SCID criteria for at least 2 weeks since the previous assessment Depression symptom severity: - HAM-D	

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				since the course ended, and how these were being dealt with by participants C = CPE comprised all elements of the MBCT program except the experiential cultivation of mindfulness through meditation practice - 8 weekly 2 h classes - Follow-up classes at 6 weeks and 6 months C = TAU = Receive treatment as usual, with 21% received on or more new antidepressants prescriptions, 11% saw psychiatrist or community psychiatric nurse, 21% saw counsellor, psychologist or psychotherapist during follow-up	Female gender: MBCT = 71% CPE = 74% TAU = 70%	- BDI	
This RCT compared mindfulness-based cognitive therapy (MBCT) with both cognitive psychological education (CPE) and treatment as usual (TAU) for preventing relapse to major depressive disorder (MDD) in people currently in remission following at least 3 previous episodes. Participants recruited through referrals from primary care and mental health clinics and advertisements in the community. Participants were allocated to MBCT plus TAU, CPE plus TAU, and TAU alone. MBCT was delivered in accordance with its published manual, modified to address suicidal cognitions; CPE was modelled on MBCT, but without training in meditation. Both treatments were delivered through 8 weekly classes. Follow-up measurements took place at 3, 6, 9, 12 months after randomisation. Allocated treatment had no significant effect on risk of relapse to MDD over 12 months follow-up (hazard ratio for MBCT vs. CPE = 0.88, 95% CI [0.58, 1.35]). Among participants above median severity, the hazard ratio was 0.61, 95% CI [0.34, 1.09], for MBCT vs. CPE. For those below median severity, there were no such differences between treatment groups. Fifteen serious adverse events were reported to the research team, with five arising from MBCT and 10 from CPE. Only one of these serious adverse reaction was potentially arising from a trial treatment – an episode of serious suicidal ideation following discussion of different coping responses to low mood in CPE. Others involved an overnight hospital admission, with 13 for physical health problems and 1 following an overdose during follow-up in a patient received MBCT. One participant died from an unrelated medical condition after partially withdrawing from trial follow-up due to illness. A limitation of the study includes data being analysed 'as treated'. This can introduce bias associated with the non-random loss of participants (i.e,. attrition).						
Individual mindfulness interventions for depression							

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Tovote, Fleer, Snippe, Peeters, Emmelkamp, Sanderman, Links, Schroevers (2014)	RCT	N = 94	I = Individual MBCT (n = 31) C = CBT (n = 32) C = Waitlist (WL) (n = 31)	I = MBCT - Delivered individually - 8 weekly sessions - Each session lasts for 45-60 minutes - Daily 30 minutes homework C = CBT - Delivered individually - 8 weekly sessions - Each session lasts for 45-60 minutes - Daily 30 minutes homework C = WL Participants in the WL condition received no psychological intervention for 3 months.	The Netherlands Participants were adult patients with type I or II diabetes diagnosed at least 3 months prior to inclusion, and having symptoms of depression as indicated by a Beck Depression Inventory-II (BDI-II) score of ≥14 Mean age: MBCT = 49.8 [13.3] CBT = 54.6 [11.3] WL = 54.7 [10.5] Female Gender: MBCT = 55% CBT = 50% WL = 48%	Depressive symptom severity: - BDI-II - HAM-D7	Wellbeing: - WHO-5 Anxiety symptom severity: - GAD-7
This RCT from the Netherlands examined the effectiveness of individual MBCT and CBT for depressive symptoms in patients with diabetes in comparison with a waitlist condition. Patients were recruited from four hospitals in the northern part of Netherlands. The pre-post treatment results for primary outcome on depression showed that both MBCT and CBT had significantly decreased BDI-II scores than the WL group at post-treatment ($p = 0.004$ and $p < 0.001$, respectively). However, when compared between MBCT and CBT groups directly, no significant differences were observed. Assessing depressive symptoms using the HAM-D7 revealed similar results: both MBCT and CBT had significantly higher outcome improvement than WL condition ($p < 0.001$ and $p = 0.001$, respectively). For secondary outcomes, comparing MBCT and CBT groups with the WL group, individuals in both MBCT and CBT exhibited greater improvement in levels of wellbeing (both Ps <0.001) and anxiety symptom severity ($p = 0.004$ and $p = 0.01$, respectively). No adverse event reported. Several limitations to this study including a smaller sample size limiting the statistical power. Secondly, attrition rates in both MBCT and CBT were high, as only around 70% of the randomized participants completed treatment. In addition, the study sample is a group of patients diagnosed with diabetes comorbid with depression, hence the results may not be generalisable to all types of depression.							
Mindfulness for anxiety							

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Group-based mindfulness for anxiety							
Arch, Ayers, Baker, Almklov, Dean, Craske (2013)	RCT	N = 124	I = MBSR (n = 45) C = CBT (n = 60)	I = MBSR - 10 weekly 1.5 h group sessions - One 3 h onsite mindfulness retreat in week 7 served as the treatment session of that week C = Group-based CBT - 10 weekly 1.5 h group sessions	USA Veterans satisfy the DSM-IV diagnosis of heterogeneous anxiety disorders including panic disorder with or without agoraphobia (PD/A), generalized anxiety disorder (GAD), social anxiety disorder (SAD), specific phobia (SP), obsessive-compulsive disorder (OCD) or civilian posttraumatic stress disorder (PTSD) Mean age: MBSR = 46.48 [14.45] CBT = 45.50 [13.21] Female gender: MBSR = 21% CBT = 14%	Anxiety disorder diagnosis: - PSWQ-16 - Principal CSR	Depressive symptoms severity: - BDI-II Arousal symptoms: - MASQ-Anxious Arousal
This randomised controlled trial compared an adapted mindfulness-based stress reduction with cognitive behavioural therapy for the group treatment of 105 veterans with one or more anxiety disorders (PD, GAD, SAD, PTSD, SP and OCD). Veterans were recruited from an outpatient VA Healthcare System Medical Centre specialise in treatment of anxiety disorders. The results indicate both groups showed large and equivalent improvements on principal disorder severity through 3-month follow up ($p < 0.001$, $d = -4.08$ for adapted MBSR; $d = -3.52$ for CBT). For anxious arousal outcomes at follow up, CBGT group showed better performance than the MBSR group ($p < 0.01$, $d = 0.49$), whereas adapted MBSR reduced worry at a greater rate than CBGT ($p < 0.05$, $d = 0.64$). For the secondary outcome, no between-group difference for depressive symptoms were observed at a statistically significant level. No adverse effects were reported. The study recruited a particularly complex patient population which meant that attrition rates were high, and only about half of patients completed an adequate dose of treatment (defined as 70% or 10.5h). The sample size is respectable, but somewhat underpowered to detect group differences of medium effect size, and this was exacerbated by attrition. In addition, the sample is relatively diverse, consisting of patients suffering from a spectrum of anxiety disorders, which represents a limitation to distinguishing the effects on a specific disorder.							
Goldin, Morrison, Jazaieri,	Three-arm RCT	N = 108	I = MBSR (n = 36)	I = MBSR - 12 weekly 2.5 h sessions	USA	Social anxiety symptoms severity:	N/R

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Brozovich, Heimberg, Gross (2016)			C = Cognitive-based group therapy (CBGT) (n = 36) C = WL (n = 36)	- Modified so that the 1-day meditation retreat was converted to four additional weekly group sessions between the standard Class 6 and 7 C = CBGT was delivered by two doctoral clinical psychologists - 12 sessions of 2.5 h each (total time= 30 h) - Groups size = 6	Patients met DSM-IV-TR criteria for a principal diagnosis of generalised SAD Mean age: CBGT = 34.1 [8.0] MBSR = 29.9 [7.6] WL = 34.1 [7.8] Female gender: CBGT = 56% MBSR = 56% WL = 56%	- LSAS-SR	
This randomised controlled trial investigated treatment outcomes for cognitive behavioural group therapy (CGGT) versus mindfulness-based stress reduction (MBSR) versus WL in patients with generalised social anxiety disorder (SAD). Patients were recruited through clinician referrals and community listings. Unmedicated patients (N = 108) meeting DSM-IV-TR criteria for a principal diagnosis of generalised SAD were included, and subsequently randomised to CBGT, MBSR or WL. Assessments were completed at baseline, post-treatment/WL, and at 1-year follow-up. Both CBGT and MBSR yielded improvements in social anxiety symptoms (p <0.001), with greatest reduction of social anxiety symptoms measured by LSAS-SR observed in the CBGT group, with 48% change from baseline level. The MBSR group showed 40% reduction of social anxiety symptoms from baseline. However, there was no significant difference for CBGT versus MBSR (p = 0.18), indicating similar treatment efficacy. In addition, the study looked at whether there was equivalent maintenance of reduced social anxiety symptoms from immediately after treatment to 1-year post treatment. Results indicated no significant differences (p = 0.11), suggesting similar sustained clinical improvement during the 1-year follow-up period between CBGT and MBSR groups. No adverse events were reported. Dropout from treatment was low and did not differ between the three arms (CBGT: 6%; MBSR: 8%; WL: 3%). Limitations included self-reported measures which can introduce reporting bias.							
Hoge, Bui, Marques, Metcalf, Morris, Robinaugh, Worthington, Pollack, Simon (2013)	RCT	N = 93	I = MBSR (n = 48) C = Stress Management Education (SME) (n = 45)	All participants were given the 'Trier Social Stress Test' before and at the end of the trial. TSST consists of an 8-minute public speaking task and a subsequent 5-minute mental arithmetic task (serial subtraction) performed in front of two strangers I = MBSR - 8 weekly 2 h group classes	USA Patients with DSM-IV criteria for current primary GAD and designated GAD as the primary problem Mean age: MBSR = 41 [14] SME = 37 [12] Female gender:	Anxiety symptoms severity: - HAM-A - CGI-S & CGI-I - BAI	Stress reactivity: - STAI

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				- A single 4 h weekend 'retreat' day - Daily 20 minutes home practice guided by audio recordings C = SME course was designed as an active control, for comparison with MBSR, and did not contain any mindfulness components - 8 weekly 2 h group classes - A single 4 h weekend "Special Class" - Daily 20 minutes home practice guided by audio recordings	MBSR = 48% SME = 54%		
This randomised controlled trial compared the manualised Mindfulness-Based Stress Reduction (MBSR) program with Stress Management Education in 93 patients with a diagnosis for GAD based on DSM-IV. Anxiety symptoms were measured with the Hamilton Anxiety Scale (HAM-A, primary outcome measure), the Clinical Global Impression of Severity and Improvement (CGI-S and CGI-I), and the Beck Anxiety Inventory (BAI). Stress reactivity was assessed by comparing anxiety and distress during pre- and post-treatment Trier Social Stress Tests (TSST). Participants were recruited by referral and media advertisement. A modified intent-to-treat analysis including participants who completed at least one session of MBSR (N = 48) or SME (N = 41) showed that both interventions led to significant reductions in HAM-A scores at endpoint ($p < 0.0001$), but did not significantly differ from each other. MBSR, however, was associated with a significantly greater reduction in anxiety as measured by the CGI-S, the CGI-I, and the BAI (all Ps <0.05). MBSR was also associated with greater reductions than SME in anxiety and distress ratings in response to the TSST stress challenge ($P < 0.05$), and a greater increase in positive self-statements ($P = 0.004$). One participant in the MBSR group reported muscle soreness and one participant in the SME group reported sleep disruption as adverse events.							
Kocovski, Fleming, Hawley, Huta, Antony (2013)	RCT	N = 137	I = mindfulness and acceptance-based group therapy (MAGT) (n = 53) C = cognitive behavioural group therapy (CBGT) (n = 53)	I = MAGT - 7 sessions, each starting with a mindfulness exercise (lasting approx. 15 minutes) followed by inquiry - Homework was reviewed after the mindfulness exercise and	Canada Patients with a principal diagnosis of SAD, Generalised using DSM-IV-TR Mean age:	Social anxiety symptom severity: - SPIN - LSAS	Depressive symptoms severity: - BDI Mindfulness: - FMI

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
			C = WL (n = 31)	consisted of mindfulness exercises C = CBGT - First two sessions in CBGT focused on an introduction to the CBT model and cognitive restructuring - Sessions 3 to 11 focused on in-session exposures (using an extinction rationale) with cognitive restructuring prior to each exposure and cognitive debriefing afterwards - Homework, consisting of exposures and cognitive restructuring, was reviewed and set each week In both CBGT and MAGT, session 12 and the briefer follow-up session focused on review and planning	MAGT = 34.94 [12.52] CBGT = 32.66 [9.07] WL = 36.55 [11.58] Female gender: MAGT = 49 % CBGT = 53% WL = 65%		
This randomised controlled trial compared mindfulness and acceptance-based group therapy (MAGT) with cognitive behavioural group therapy (CBGT) in a group of individuals diagnosed with SAD. Participants were recruited via advertisements in local Newspapers, letters sent to physicians informing them of the study, and flyers posted in clinics and other public places. The primary outcome was social anxiety symptom severity assessed at baseline, treatment midpoint, treatment completion, and 3-month follow-up. MAGT and CBGT were both more effective than the WL group (p <0.001) but did not significantly differ from one another on social anxiety reduction and most other variables assessed. No adverse effects were reported. Dropout rate was high (include percentage/rate of dropout) and commonly the reason for exiting the study was time commitment. Much of the data presented in the study relied on self-report, and therefore increased the risk of reporting bias. There was significant attrition (30% for MAGT, 40% for CBGT), and the follow-up data may have been particularly affected by attrition bias with only around half of patients providing follow-up data.							
Wong, Yip, Mak, Mercer, Cheung, Ling, Lui, Tang, Lo, Wu, Lee, Gao,	Three-arm RCT	N = 182	I = MBCT (n = 61) C = Psychoeducation (n = 61)	I = MBCT - 8 weekly 2 h group session - Modification included discussing the cognitive-	Hong Kong Patients with a DSM-IV principal diagnosis of GAD on a SCID and a score of 19 or above using	Anxiety symptoms severity: - BAI (Chinese version)	Depressive symptoms severity: - CES-D (Chinese version)

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Griffiths, Chan, Ma (2016)			C = TAU (n = 60)	behavioural model of GAD, automatic anxiety thoughts, reactive–avoidance and ruminative worrying and the development of an action plan in line with personal values and relapse prevention of anxiety - Group size = 15 C = Psychoeducation - 8 weekly 2 h group session - With didactic teaching and minimal group interaction and discussion - Group size = 15 C = TAU Participants did not receive any specific intervention but allowed unrestricted access to primary care services	the Chinese version of BAI at baseline Mean age: MBCT = 50.40 [9.95] Psychoeducation = 50.79 [9.57] TAU = 48.78 [10.59] Female gender: MBCT = 79% Psychoeducation = 79% TAU = 80%		Health-related quality of life: - MCS-12 - PCS-12

This RCT compared changes in anxiety levels among participants with GAD who were randomly assigned to MBCT, cognitive-behavioural therapy-based psychoeducation and usual care. Participants with GAD were assigned to the three groups and followed for 5 months after baseline assessment with the two intervention groups followed for an additional 6 months. Primary outcomes were anxiety levels. All participants were recruited from: (a) advertisements placed in the health education columns of local newspapers; (b) public general practice or family medicine clinics; and (c) non-governmental organisations and community centres that cater for people with chronic conditions.

The results from BAI indicated significant decreases from baseline in both MBCT and psychoeducation groups at both 2-months and 5-months follow-up ($F(4,148) = 5.10$, $p = 0.001$), but no significant relative change between MBCT and Psychoeducation groups. For secondary outcomes, significant group differences were seen for CES-D and MCS-12 scales between the psychoeducation and usual care groups at 2- and 5-months after baseline assessment. No significant group differences were observed between the MBCT and TAU groups or the MBCT and psychoeducation groups at these time points. In addition, no significant group differences in these outcomes between MBCT and psychoeducation groups at 8 and 11 months.

Limitations include much lower adherence for MBCT group than the psychoeducation group. The outcome measures were based on self-reported questionnaires, and no clinician-rated instruments or diagnostic interviews were used at follow-up. As a result, it is unknown whether the improvements in anxiety symptoms led to clinical remission of GAD. In addition, participants had at least moderate levels of generalised anxiety symptoms at the time of recruitment based on validated self-reported questionnaires, and the majority of the participants were recruited via advertisements. As a result, the

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
results may not be generalisable to patients who experience a milder degree of anxiety symptoms or to all patients in clinical settings. There may also have been a selection bias of recruited participants being more motivated when compared with those patients seen in clinics.							
Individual mindfulness for anxiety							
No studies identified							
Mindfulness for combined depression and anxiety							
Group-based mindfulness for combined depression and anxiety							
Sundquist, Lilja, Palmer, Memon, Wang, Johansson, Sundquist (2015)	RCT	N = 215	I = Mindfulness group therapy (n = 110) C = TAU = Pharmacological treatment and psychotherapy or counselling (76% of control received CBT) (n = 105)	I = Mindfulness group therapy, a combination of MBSR and MBCT - 8 weekly 2 h group sessions - Home mindfulness practice for 20 min/day using a compact disc, a training manual and a diary C = The control group received TAU, which sometimes included pharmacological treatment and in most cases also psychotherapy or counselling. 76% of patients in the control group received CBT. The average number of individual CBT sessions was six	Sweden Patients newly diagnosed with psychiatric disorders based on ICD-10 diagnostic criteria or those who had a history of psychiatric disorders who sought treatment Mean age: Mindfulness = 42 [11] TAU = 41 [11] Female gender: Mindfulness = 81% TAU = 90%	Depressive symptoms severity: - MADRS-S - HADS-D - PHQ-9 Anxiety symptoms severity: - HADS-A	N/R
This study explored the efficacy of MBCT versus TAU (mostly individual CBT) in terms of reducing depression and anxiety symptoms. The sample was heterogeneous, consisting of 215 individuals suffering from depression, anxiety, stress and adjustment disorders recruited from 16 primary care clinics in South Sweden. Comparing pre- and post-treatment data, both MBCT and TAU groups exhibited significant reduction in depression and anxiety symptom severity ($p<0.001$), however, the results did not significantly differ from each other between groups (MDRS-S: OR = 1.04, 95% CI [0.49-2.22], p = 0.92; HADS-D: OR = 0.59, 95% CI [0.28-1.25], p = 0.17; HADS-A: OR = 0.83, 95% CI [0.39-1.75], p = 0.62; PHQ-9: OR = 0.75, 95% CI [0.35-1.59], p = 0.45). No adverse events were reported. Limitations included that all measures were self-report measures, which introduced a risk of reporting bias. The study sample was a very heterogeneous group with a mix of patients with depression, anxiety, stress and adjustment disorders, and therefore it was difficult to determine the effect of the mindfulness intervention on specific types of disorder.							

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Individual mindfulness for combined depression and anxiety							
No studies identified							
Mindfulness for AUD							
Group-based mindfulness for AUD							
Garland, Roberts-Lewis, Tronnier, Graves, Kelley (2016)	Three-arm RCT	N = 180	I = Mindfulness-Oriented Recovery Enhancement (MORE) (n = 64) C = CBT (n = 64) C = TAU (n = 52)	I = MORE - 10 session adapted as a treatment for alcohol dependence from MBCT - 15 minutes per day C = CBT - 10 group 2 h sessions - Participants were asked to do daily homework C = TAU - TAU in the modified therapeutic community consisted of: participation in a therapeutic milieu - psychoeducation on topics related to addiction; client-centred, supportive-expressive group therapy and coping skills group	USA Patients with co-occurring substance use and psychiatric disorders, defined by the DSM-IV Mean age: MORE = 37.7 [10.4] CBT = 36.5 [11.2] TAU = 38.7 [9.8] Female gender: 0%	Alcohol craving: - PACS	PTSD symptoms severity: - 17-item PTSD Checklist-Civilian version (PCL-C) Depression and anxiety severity: - Subscales of BSI
This randomised controlled trial consisted of three arms, compared Mindfulness-Oriented Recovery Enhancement (MORE) to group-based Cognitive-Behavioural Therapy (CBT) and TAU. The study participants were recruited from a modified therapeutic community in an urban area. Men with co-occurring substance use and psychiatric disorders, as well as extensive trauma histories were included. In the study sample, 47% of the participants had alcohol dependence.							

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
The study results indicated improvements in substance craving (p = 0.03), post-traumatic stress (p = 0.04), and negative affect (p = 0.04) in the MORE group when compared to CBT; however, depression and anxiety outcome measures using BSI did not exhibit any statistical significance between the two groups. Limitations included a lack of biochemical measures of abstinence, these types of measures may be better at measuring abstinence than self-report measures, which may increase the risk of reporting bias. Another limitation was that less than half of the sample had alcohol dependence, therefore the effects of mindfulness on treating AUD specifically cannot be determined.							
Garland, Gaylord, Boettiger, Howard (2010)	RCT	N = 53	I = MORE (n = 27) C = Alcohol Support Group (ASG) (n = 26)	I = MORE - 10 session adapted as a treatment for alcohol dependence from MBCT - 15 minutes per day C = ASG - 10 session consisted of social support groups derived from the active, evidence-based treatment condition outlined in the Matrix Model intensive outpatient treatment manual	USA Patients who met lifetime DSM-IV for alcohol dependence Mean age: MORE = 39.9 [8.7] ASG = 40.7 [10.2] Female Gender: MORE = 19% ASG = 23%	Psychosocial factors related to alcohol dependence: - BSI - IRISA - WBSI Stress: - PSS-10	Mindfulness: - FFMQ
This randomised controlled trial recruited 53 alcohol-dependent adults recruited from a modified therapeutic community in an urban area. The study participants were randomised to mindfulness training (MORE) or a support group (ASG). 37 participants completed the interventions. Outcome measures were taken before the intervention and 10 weeks post-intervention. The results indicated both MORE and ASG led to significant reductions in perceived stress over time (F (1, 35) = 18.11, p <0.001). MORE led to significantly larger decreases in perceived stress (mean difference = 3.3, 95% CI [3.09- 3.51], p = 0.03) and thought suppression (mean difference = 6.1, 95% CI [5.77-6.43], p = 0.04) over the 10-week period than ASG. The results also indicated increased physiological recovery from alcohol cues, and modulated alcohol attentional bias among the MORE participants. Limitations of the study included a small sample size which therefore limited the statistical power and generalisability. Another notable limitation was that self-report measures were administered through face-to-face interviews, which may have led to social desirability bias in self-reported outcomes.							
Zgierska, Shapiro, Burzinski, Lerner, Goodman-Strenski (2017)	Parallel RCT	N = 123	I = Mindfulness-Based Relapse Prevention for Alcohol (MBRP-A) (n = 64) C = TAU (n = 59)	I = MBRP-A - 8 weekly, therapist-led, manual-driven 2 h group sessions - Participants were asked to practice Mindfulness	USA Adult patients with a SCID-confirmed diagnosis of alcohol dependence in an early remission Mean age:	Alcohol problem: - Self-reported helpfulness of the program for alcohol problem	N/R

Authors (Year)	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment session, treatment duration, treatment frequency, group size	Country Population Mean age (SD)2 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				Meditation at home throughout the 26-week study C = TAU=Typically included motivational enhancement, relapse prevention, and 12-step facilitation strategies	41.2 [11.9] Female gender: 43%		
This parallel randomised controlled trial investigated the effectiveness of a mindfulness-based relapse prevention for alcohol intervention compared to TAU on self-report alcohol problem severity in 123 alcohol dependent adults. Participants were alcohol dependent adults in early recovery recruited from eight local addiction treatment centres. The participants were randomised into receiving either MBRP-A, or continued their treatment as usual, which typically include motivational enhancement, relapse prevention, and 12-step facilitation strategies. Overall change in alcohol problem at the 8-week follow-up in the intervention group reported a mean score of 5.8 [SD=0.9] (On a 1-7 Likert Scale, with 1=very much worse, 7=very much improved), indicating that their "alcohol problem" improved since their study enrolment and rating the intervention as helpful for their "alcohol problem" (1.7 [SD=0.7]; 1-5 Likert scale, with 1=very helpful, 5=not helpful and has made things worse). No comparison was made to the TAU comparison group. In addition, the outcome measure has not been validated in other studies, and the outcomes were not based on clinical assessments.							
Individual mindfulness for AUD							
No studies identified							

N.B:

BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; BSI = Brief Symptom Inventory; CAPS = Clinician-Administered PTSD Scale; CEDS = the Center for Epidemiologic Studies Depression Scale; CGI-S = Clinical Global Impression of Severity and Improvement; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders 4th Edition; FMI = 14-item Freiburg Mindfulness Inventory; GAD-7 = Generalized Anxiety Disorder-7 scale; HAM-A = Hamilton Anxiety Rating Scale; HAM-D17 = 17-item Hamilton Depression Rating Scale; IRISA = Impaired Alcohol Response Inhibition Scale; LSAS = 24-item Liebowitz Social Anxiety Scale; mADM = maintenance antidepressant medication; MBCT = Mindfulness-Based Cognitive Therapy; MBSR = Mindfulness-Based Stress Reduction; MCS-12 = the Mental Component Summary; N/A = Not Available; N/R = Not Reported; PACS = Penn Alcohol Craving Scale; PCGT = Present Centred group therapy; PCL = PTSD Checklist; PCL-C = PTSD Checklist – Civilian; PCL-M = PTSD Checklist – Military; PCL-S = PTSD Checklist - Specific; PCS-12 = Physical Component Summary; PHQ = Patient Health Questionnaire; PSS-10 = The 10-item Perceived Stress Scale; PSWQ = Penn State Worry Questionnaire; SCID = Structured Clinical Interview for DSM-IV; SCL-90 = Symptom Distress Checklist; SF-36 = Short Form Health Survey 36-item; SPIN = Social Phobia Inventory; STAI = State-Trait Anxiety Inventory; TAU = Treatment as Usual; TSST = Trier Social Stress Tests; QOLI = Quality of Life Inventory; WBSI = White Bear Suppression Inventory; WHO-5 = The Well-Being Index; WHOQoL-BREF = World Health Organization Quality of Life –BREF

Evidence profile: Adjunct meditation, yoga and mindfulness treatments

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
ADJUNCT MEDITATION AND TRANSCENDENTAL MEDITATION							
Adjunct meditation for PTSD							
No studies identified							
Adjunct meditation for depression							
No studies identified							
Adjunct meditation for anxiety							
No studies identified							
Adjunct meditation for AUD							
No studies identified							
ADJUNCT YOGA							
Adjunct group yoga for PTSD (compared to active comparison)							
van der Kolk, Stone, West, Rhodes, Emerson, Suvak, &	RCT	N = 64	I = Trauma-informed yoga + psychopharmacologic treatment (supportive therapy, pharmacologic treatment) (n = 32)	I = Protocolised trauma-informed yoga intervention incorporating the central elements of Hatha yoga including breathing, posture and meditation	USA Women with chronic, treatment-resistant PTSD based on CAPS score (if greater than 45). Chronicity was based on meeting criteria	PTSD symptom severity: - CAPS - DTS	Depressive symptom severity: - BDI-II

[3] Mean age and SD is given when provided, alternatively age range is provided

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Spinazzola (2014)			C = Supportive women's health education + Psychopharmacologic treatment (supportive therapy, pharmacologic treatment) (n = 32)	- 10 weekly 1 hr group classes C = Women's health education focused on active participation and support - 10 weekly 1 hr group classes	for PTSD in relation to an index trauma that occurred at least 12 years prior to intake. Mean age: Yoga = 41.5 [12.2] Control = 44.3 [11.9] Female gender: 100%		
This study assessed the efficacy of trauma-informed yoga adjunct to psychopharmacologic treatment versus supportive women's health education adjunct to psychopharmacologic treatment on chronic, treatment-resistant PTSD in women. The participants were recruited via newspaper and radio ads, website, and solicitation from mental health professionals. The study randomly assigned 64 women with chronic, treatment-resistant PTSD to receiving trauma-informed yoga or supportive women's health education interventions, with primary outcome of interest being change in PTSD symptom severity measured by CAPS. Depressive symptom severity measured by BDI-II were secondary outcomes in this study. Assessments were conducted at pre-treatment, mid-treatment and post-treatment. For primary outcome measure, both groups exhibited significant decreases on the CAPS score, with the decrease falling in the large effect size range for the yoga group (d = 1.07) and the medium to large effect size decrease for the comparison group (d = 0.66). Both groups exhibited significant decrease in PTSD symptoms measured by DTS during the first half of the treatment from pre-treatment to mid-treatment assessment (yoga: p = 0.02; d = -0.37, comparison: p = 0.001; d = -0.54), with the improvements maintained in the yoga group, while the comparison group relapsed after its initial improvement. For secondary outcome, the BDI-II scores decreased significantly in both groups, with the yoga group showing a medium effect size decrease (d = -0.60) and the comparison condition exhibiting a small to medium effect size decrease (d = -0.39). However, the differences between the two groups were not statistically significant. No adverse events were reported. The study sample consisted only of treatment-resistant adult women with chronic PTSD secondary to interpersonal assaults that started in childhood, limiting the generalisability of findings.							
Adjunct individual yoga for PTSD							
No studies identified							
Adjunct group yoga for depression (compared to active comparison)							
Sarubin, Nothdurfter, Schule, Lieb, Uhr, Born et al. (2014)	RCT	N = 53	I = Hatha Yoga + atypical antipsychotic drug with antidepressant properties (Quetiapine fumarate extended release (QXR)	I = Hatha yoga + antipsychotic drug - 5 weeks with either QXR (300mg/day) or ESC	Germany In-patients suffering from MDD according to DSM-IV Mean age:	Depressive symptom severity: - 21-HAMD	N/R

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
			or Escitalopram (ESC)) (n = 22) C = Atypical antipsychotic drug with antidepressant properties only (Quetiapine fumarate extended release (QXR) or Escitalopram (ESC)) (n = 31)	(10mg/day) plus Hatha yoga (60 min/week) - Maximum group size = 15 C = antipsychotic drug only - 5 weeks with either QXR (300mg/day) or ESC (10mg/day)	Yoga = 37.27 [11.85] Control = 42.36 [12.85] Female gender: Yoga = 36% Control = 23%		
This RCT evaluated the effectiveness of Hatha yoga as an add-on treatment to atypical antipsychotic drugs in a group of patients suffering from MDD. In-patients suffering from MDD (n = 53) were randomised to a 5-week treatment with yoga in addition to their medication (either QXR or ESC) or continuing their medication only without receiving any yoga intervention. The 21-HAMD was used weekly to measure the change in depressive symptom severity. There were no baseline differences between the two groups for 21-HAMD total score (p=0.46). A statistically significant reduction in depressive symptoms as measured by 21-HAMD after five weeks of treatment compared to baseline was observed in both groups. When comparing the two groups at follow-up, there was no statistically significant group effect (F=0.003; p=0.935). No adverse events were reported. The study was limited by a small sample size and an unequal number of participants in the intervention and comparison arms.							
Sharma, Barrett, Cucchiara, Gooneratne, & Thase (2017)	Randomised pilot study	N = 25	I = Sudarshan Kriya Yoga (SKY) + antidepressant (n = 13) C = WL + antidepressant (n = 12)	I = The SKY yoga intervention consisted of two phases of a manualised, group program featuring a breathing-based meditative technique. SKY includes a series of sequential, rhythm-specific breathing exercises that bring practitioners into a restful, meditative state. - During the first phase, participants need to complete six-session SKY program for 3.5 hours per day - During the second phase, participants attended weekly	USA Outpatients with MDD (defined by DSM-IV-TR), with ≥8 weeks of stable dose of antidepressant treatment and total scores ≥14 on the HDRS-17 Mean age: SKY = 39.4 [13.9] WL = 34.8 [13.6] Female gender: SKY = 69% WL = 75%	Depressive symptom severity: - HDRS-17	Depressive symptom severity: - BDI Anxiety symptom severity: - BAI

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				SKY follow-up sessions for 1.5 hours per session - Participants were also asked to complete a home practice version of SKY (20-25 minutes per day) C = Participants maintained their antidepressant dose and were offered the yoga intervention after completing the study			
A randomised pilot study evaluated the efficacy of Sudarshan Kriya Yoga (SKY) as an adjunct intervention in patients with major depressive disorder (MDD). Outpatient with MDD (defined by DSM-IV-TR) despite ≥8 weeks of antidepressant treatment were randomized to SKY or a WL (delayed yoga) arm for 8 weeks. Results from the ITT sample (N=25), indicated that the SKY group showed a greater improvement in HDRS-17 total score compared to the WL from baseline to 2 months follow-up (-9.77 vs 0.50, p = 0.0032). For secondary outcomes, the SKY group also showed greater reduction in BDI total score compared to the waitlist condition at 2 months follow-up (-17.23 v.s. -1.75, p = 0.0101). In addition, mean changes in BAI total score were significantly greater for SKY than waitlist at 2-months follow-up (-5.19, 95% CI -9.34 to -0.93, p = 0.0097). No adverse events were reported. The statistical power of the study was limited by a small sample size. The study sample was a group of treatment-resistant MDD patients suffering from a severe form of depression, therefore limiting the generalisability of results.							
Uebelacker, Tremont, Gillette, Epstein-Lubow, Strong, Abrantes et al. (2017)	RCT	N = 122	I = Hatha yoga + antidepressant medication (n = 63) C = Healthy living workshop + antidepressant medication (n = 59)	I = Hatha yoga - Manualised program - Introductory individual meeting with yoga instructor (20-30 mins) - Two group yoga classes offered per week, with the expectation for participants to attend at least one class per week with the option of attending two per week - 10 weeks of 80-minute yoga classes	USA Individuals with elevated depression symptoms who met criteria for MDD based on SCID; and currently taking antidepressant at maintained dose with demonstrated effectiveness according to American Psychiatric Association practice guidelines Mean age: Yoga = 46.78 [12.27] Control = 47.2 [12.13]	Depressive symptom severity: - QIDS	Depressive symptom severity: - PHQ-9 Wellbeing: - SF-20

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				C = Health Living Workshop (HLW) - Group HLW used detailed manual - Initial individual orientation, meeting with instructor - Participants were invited to attend at least one and up to two HLW class - 10 weeks of 60-minute HLW classes in total	Female gender: Yoga = 86% Control = 83%		
The RCT examined the effectiveness of weekly yoga classes versus HLW in individuals with elevated depression symptoms who were currently using antidepressant medication. Follow up assessments took place 3 and 6 months after the intervention. The primary outcome was depression symptom severity, at post-treatment, no statistical significant difference between groups in depression symptoms was observed (b=-0.82, p=0.36). Over the entire intervention and at 3-month and 6-month follow up, when controlling for baseline, the yoga group showed lower levels of depression than the HLW group (b=-1.38, p=0.02). At 6-month follow-up, 51% of yoga participants demonstrated a greater than 50% reduction in depression symptoms, compared to 31% of HLW participants (OR=2.31; p=0.04). Although there was no significant differences in depression symptoms at the end of the intervention period, yoga participants showed fewer depression symptoms over the entire follow-up period, suggesting that the benefits of yoga may accumulate over time. No serious adverse events related to the study procedures were reported. The study sample was predominantly female and white, this may limit the generalisability of the study findings.							
Adjunct group yoga for depression (compared to non-active comparison)							
Niemi, Kiel, Allebeck, & Hoan (2016)	Cluster-randomised controlled trial	N = 56	I = Yoga + Psychoeducation (n = 34) C = TAU (n = 22)	I = The yoga course lasted 8 weeks with one session per week, using the MANAS manual in a group setting. The yoga course include some components derived from Qigong. Patients also received 8-week course of psychoeducation in a group setting	Vietnam Patients classified as moderately and severely depressed through the PHQ-9 questionnaire (PHQ-9 score >9), were also diagnosed by trained general doctor according to the ICD-10 and DSM-IV criteria using MINI	Depressive symptom severity: - PHQ-9	N/R

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				C = Provided with TAU	Median age (Age range): Yoga = 63 (56-69.5) Control = 64.5 (58-69) Female gender: Yoga = 38% Control = 50%		
This cluster-randomised controlled trial evaluated the effectiveness of a community-based intervention including psychoeducation and yoga for depression management at the primary healthcare level in one district in Ha Nam province in Vietnam. The study participants were recruited from 21 community health centres and a district hospital, using a cluster randomisation, with 10 communes randomised to the intervention group and 11 communes randomised to comparison group. Eligible participants were classified as moderately and severely depressed through the PHQ-9 questionnaire (PHQ-9 score >9), and were also diagnosed by trained doctor according to the ICD-10 and DSM-IV criteria using MINI. Both groups had similar PHQ-9 scores at baseline (p = 0.91). The intervention group had on average significantly lower PHQ-9 scores after the intervention than the comparison group (p <0.001) at post-treatment. Almost half of the patients in the intervention group recovered from depression (43%), whereas no one from the comparison group had lost their depression diagnosis as measured by PHQ-9 (0%) after 8 weeks of treatment. No adverse events were reported. The study had a relatively small sample size and hence may be underpowered. The weak randomisation procedure resulted in an unequal number of participants in the intervention and comparison arms. In addition, there was only a single outcome measure (PHQ-9), potentially reducing the reliability of the findings.							
Adjunct individual yoga for depression							
No studies identified							
Adjunct group yoga for anxiety							
No studies identified							
Adjunct individual yoga for anxiety							
No studies identified							
Adjunct group yoga for depression and anxiety							
No studies identified							

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
Adjunct individual yoga for depression and anxiety							
No studies identified							
Adjunct group yoga for AUD (compared to active comparison)							
Hallgren, Romberg, Bakshi, & Andreasson (2014)	Pilot RCT, feasibility study	N = 18	I = Yoga plus TAU (n = 9) C = TAU (n = 9)	I = Yoga classes combined breathing techniques, yoga postures (light physical exercise), meditation, and deep relaxation. - 10 weekly group yoga sessions (1.5 hours each) - Participants were also encouraged to practice yoga at home once per day - In addition to yoga, participants also received standard treatment which typically include psychotherapeutic interventions (CBT and/or motivational interviewing) with appropriate pharmacological interventions C = TAU = Psychological and pharmacological interventions for alcohol dependence. These were individual counselling sessions with a CBT and/or motivational interviewing focus, typically one hour per week conducted with a medical doctor or psychologist, and the prescription of medication	Sweden Participants were diagnosed with AD according to the DSM-IV criteria Age and gender information were not reported, however the inclusion criteria included being over 18 years of age, and both males and females were invited to participate	Alcohol consumption: - Timeline follow-back (TLFB) method Alcohol dependence: - DSM-IV criteria for alcohol dependence - SADD	Depression and anxiety: - HADS Health related quality of life: - SDS Stress: - PSS - Saliva cortisol

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				for alcohol dependence (AD) as required			
This study examined the adjunct use of 10 weeks of yoga with TAU for changes in alcohol consumption, affective symptoms, quality of life, and stress. Alcohol-dependent participants were recruited from an outpatient alcohol treatment clinic in Stockholm, Sweden. Assessments were taken at baseline and six-month follow-up. Two participants withdrew from the treatment for personal reasons, and two additional participants could not be reached for follow-up. Therefore the analyses included 14 participants (eight TAU plus yoga, and six TAU alone). Both groups improved from baseline to six-month follow-up on all measures, however improvements were not significantly different between the groups (All Ps >0.10). This suggests that adding yoga to TAU was no more effective in reducing alcohol consumption, alcohol dependence, and stress, and improving mood and quality of life, than TAU alone. The study suffered from limited statistical power due to a very small sample size.							
ADJUNCT MINDFULNESS							
Adjunct group mindfulness for PTSD (compared to active comparison)							
Jasbi, Sadeghi Bahmani, Karami, Omidbeygi, Peyravi, Panahi, Mirzaee, Holsboer-Trachsler, Brand (2018)	RCT	N = 48	I = MBCT + medication treatment with SSRI (Citalopram) (n = 24) C = Socio-Therapeutic Events (STE) + medication treatment with SSRI (Citalopram) (n = 24)	I = MBCT - Eight weekly group sessions lasting for 60-70 minutes - Group size = 7-12 C = Socio-therapeutic group events - Eight weekly socio-therapeutic group events such as sharing their daily life experiences, playing board games, undertaking short trips in the immediate countryside, checking medication adherence and checking blood pressure - Socio-therapeutic group events lasted between 70 minutes to 3 hours - Group size = 6-12	Iran Outpatient military veterans diagnosed with PTSD based on DSM-5; and PTSD is due to war experience during the Iraq-Iran war Mean age: MBCT = 53.03 [2.45] STE = 52.91 [2.91] Female gender: 0%	PTSD symptom severity: - PCL-5	Symptoms of depression, anxiety and stress: - DASS

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				Standard treatment for all patients consisted of citalopram (30-50 mg/day at therapeutic dosages)			
This RCT explored the effectiveness of MBCT vs socio-therapeutic events as an add-on to standard treatment with citalopram. 48 male outpatient military veterans diagnosed with PTSD were recruited from a psychiatric hospital in Tehran in Iran. Assessments were taken at pre- and post-treatment. The primary outcome of the study was PTSD symptom severity using the PCL-5, reporting on four subscales; re-experiencing, avoidance, negative mood and cognition, and hyperarousal. The study results indicated PTSD symptom severity measured by PCL-5 was lowered when compared to baseline in both treatment conditions, with the MBCT group exhibiting greater mean differences from pre- to post-treatment than the comparison group (All ps <0.01 for all PCL-5 subscales). Measures of depression, anxiety and stress yielded similar results, with both treatments arms showing reduction in DASS scores at post-treatment compared to baseline (All ps <0.01 for all DASS subscales), but the MBCT group had a greater effect size than the comparison group. At post-treatment, comparing the intervention to the comparison, all PCL-5 subscales exhibited large effect sizes (Re-experiencing the events: d = 1.70; Negative mood and cognitive: d = 4.21; hyperarousal: d = 2.56), with the exception of avoidance subscale (d = 0.69), exhibiting only a medium effect size. For the DASS scores, all subscales had a large effect size (depression: d = 2.15; anxiety: d = 1.47; stress: d = 3.26) at post-treatment between the two groups. The data suggest that MBCT is an effective intervention as an adjunct to standard Selective Serotonin reuptake inhibitor (SSRI) medication in reducing symptoms of PTSD, depression, anxiety and stress among veterans. No adverse events were reported. There were several limitations of the study including a relatively small sample size which limited the statistical power. The study participants were all male therefore reducing the generalisability of the results. In addition, all outcome measures relied on self-report entirely, using experts' rating may have made the data more robust. The present study did not collect any follow-up data, and therefore the long-term effectiveness of MBCT as an add-on cannot be determined.							
Adjunct individual mindfulness for PTSD							
No studies identified							
Adjunct group mindfulness for depression (compared to active comparison)							
Eisendrath, Gillung, Delucchi, Segal, Nelson, McInnes, Mathalon, Feldman (2016)	RCT	N = 173	I = MBCT + TAU Pharmacotherapy (n = 87) C = Health-Enhancement Program (HEP) + TAU Pharmacotherapy (n = 86)	I = MBCT with modifications for Treatment Resistant Depression (TRD) - 8 weekly 2.25 h group sessions + 45 minutes homework 6 days per week - Group size = 6-12	USA Patients satisfying the DSM-IV diagnostic criteria for unipolar MDD, and taking antidepressant medications with evidence of two or more adequate trials prescribed during the current episode assessed with the Antidepressant Treatment History Form (ATHF)	Depressive symptoms severity: - HAMD17	Depression treatment response and remission: - HAMD17 Mindfulness: - FFMQ

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				C = HEP with modifications for TRD, included discussion on mood, aerobic exercise, music therapy, dietary education and functional movement - 8 weekly 2.25 h group sessions + 45 minutes homework 6 days per week - Group size = 6-12 Participants in both conditions were asked to continue their antidepressant treatment	Mean age: MBCT = 47.1 [13.46] HEP = 45.2 [11.19] Female gender: MBCT = 76% HEP = 77%		
This single site, RCT compared 8-week courses of MBCT vs Health-Enhancement Program (HEP) as adjuncts to pharmacotherapy. Participants were recruited from outpatient psychiatry and general medicine clinics, an outpatient psychiatry clinic and from the community. At the end of 8-week treatment, a multivariate analysis showed that relative to the HEP condition, the MBCT condition was associated with a significantly greater mean percent reduction on the HAM-D17 (37% versus 25%; p=0.01) and a significantly higher rate of treatment responders (30% versus 15%; p=0.03). Although numerically superior for MBCT than for HEP, the rates of remission did not significantly differ between treatments (22% versus 14%; p=0.15). One limitation of the study included that the two interventions were delivered by two different sets of instructors.							
Huijbers, Spinhoven, Spijker, Ruhe, van Schaik, van Oppen, Nolen, Ormel, Kuyken et. al. (2015)	RCT	N = 68	I = MBCT + mADM (n = 33) C = mADM alone (n = 35)	I = MBCT - 8 weekly 2.5 h group sessions - One day of silent practice between the 6th and 7th session - Participants were encouraged to practise meditation at home for about an hour a day using CDs - Group size = 8-12 C = Continuing their mADM was defined as using a therapeutic dose of mADM at each follow-up	Netherlands Patients with DSM-IV history of at least three depressive episodes Mean age: MBCT + mADM = 51.9 [14.4] mADM = 51.6 [14.2] Female gender: MBCT + mADM = 73% mADM = 71%	Depressive relapse/recurrence: - SCID-I	Recurrence and depression severity: - Time to relapse/recurrence Severity of (residual) depressive symptoms: - IDS-C Quality of life: - WHOQoL short version

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
				contact during the observed time period			
This randomised controlled trial compared the combination of MBCT and maintenance anti-depressant medication (mADM) to mADM alone on depressive relapse and recurrence in a group of recurrently depressed patients in remission. Patients were referred by mental health professionals, general practitioners, or recruited via advertisements in the media (TV, magazines, and newspapers). There were no significant differences in relapse/recurrence rates between the two groups (p=0.95) within the 15 month follow-up period. Results from a survival curve for time to relapse showed that there was no difference in time to relapse/recurrence between the two conditions (HR=0.87, 95% CI 0.40-1.90, p=0.72). The latent growth curve analysis for severity of residual depressive symptoms over the 15-month follow-up period showed that patients maintained mild levels of depression throughout the study period, with the course of depression not significantly different between the conditions (p=0.69). There were no significant differences between the conditions with regard to quality of life. The results were confounded by the increasing availability of MBCT in the Netherlands, almost a quarter of the individuals who were randomised into the comparison condition decided to participate in MBCT course elsewhere outside the trial, thus greatly compromised the ITT analyses.							
Kuyken, Hayes, Barrett, Byng, Dalgleish, Kessler, Lewis, Watkins, Brejcha, Cardy, Causley, Cowderoy, et al. (2015)	RCT	N = 424	I = MBCT with support to taper or discontinue antidepressant treatment (MBCT-TS) (n = 212) C = mADM (n = 212)	I = MBCT-TS - 8 weekly 2.5 h group sessions - 4 refresher sessions offered roughly every 3 months for the following year - Patients in the MBCT-TS group received support to taper or discontinue their maintenance antidepressants C = mADM Patients in the maintenance antidepressant group received support from their GPs to maintain a therapeutic-level of antidepressant medication for the 2-year follow-up period	UK Patients with a diagnosis of recurrent major depressive disorder in full or partial remission according to the DSM-IV, with three or more previous major depressive episodes. Patients were also required to be on a therapeutic dose of maintenance antidepressant drugs in line with the British National Formulary (BNF) and NICE guidance Mean age: MBCT-TS = 50 [12] mADM = 49 [13] Female gender: MBCT-TS = 71% m-ADM = 82%	Time to relapse/recurrence of depression: - SCID	Number of depression free days: - SCID Residual depressive symptoms severity: - GRID-HAMD - BDI-21 Quality of life: - WHOQOL-BREF Health-related quality of life: - EQ-5D-3L

Authors & year	Design	Total sample size	Intervention (I) and Comparison (C) and participants for I and C	Number of treatment sessions, treatment duration, treatment frequency, group size	Country Population Mean age (SD)3 Gender (%)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))
This is a single-blind, parallel randomised controlled trial, involving adult patients (N = 424) with three or more previous major depressive episodes who were taking a therapeutic dose of maintenance antidepressants. Participants were recruited from general practices in urban and rural settings in four UK centres. The time to relapse or recurrence of depression did not differ between MBCT-TS and mADM over 24 months (HR = 0.89, 95% CI 0.67–1.18; p=0.43). No significant differences were observed between the two groups in depression-free days, residual depressive symptoms (as measured by the BDI and GRID-HAMD) over the follow-up period. Non-significance for a difference in quality of life between groups (p = 0.07). The study sample consisted of a group of individuals who were currently taking antidepressants and were considered a high risk of depressive relapse or recurrence, therefore the study results may not be generalisable to most people with depression. A total of ten serious adverse events were reported, four of which resulted in death. However the trial steering committee concluded that these adverse events were not attributable to the intervention or the trial.							
Adjunct mindfulness for anxiety							
No studies identified							
Adjunct mindfulness for AUD							
No studies identified							

N.B.:

AD = Alcohol Dependence; ATHF = Antidepressant Treatment History Form; BAI = The Beck Anxiety Inventory; BDI = The Beck Depression Inventory ; BNF = British National Formulary; CAPS = Clinician Administered PTSD Scale; CD-RISC2 = Connor-Davidson Resilience Scale; DASS-21 = Depression Anxiety Stress Scale; DTS = Davidson Trauma Scale; EQ-5D-3L = EuroQol 5 dimensions 3 levels; ESC = Escitalopram; FFMQ = Five Facet Mindfulness Questionnaire; HADS = the Hospital Anxiety and Depression Scale; HAMD-21 = Hamilton Depression Rating Scale (21 items); HEP = Health Enhancement Program; HDRS-17 = Hamilton Rating Scale for Depression; HLW = Healthy Living Workshop; HR = Hazard Ratio; IDS-C = Inventory of Depressive Symptomatology; mADM = Maintenance Anti-depressant medication; MBCT = Mindfulness-Based Cognitive Therapy; MBCT-TS = Mindfulness-Based Cognitive Therapy with support to taper or discontinued antidepressant treatment; MDD = Major Depressive Disorder; NICE = National Institute for Health and Care Excellence; OR = Odds Ratio; PHQ-9 = Patient Health Questionnaire; PSS = Perceived Stress Scale; QIDS = Quick Inventory of Depressive Symptomatology; QXR = Quetiapine fumarate extended release; SADD = Short Alcohol Dependence Data questionnaire; SCID = Structured Clinical Interview for DSM-5; SDS = Sheehan Disability Scale; SF12 = Short-Form Healthy Survey; SKY = Sudarshan Kriya Yoga; SSRI = Selective Serotonin Reuptake Inhibitor; TAU = Treatment as usual; TRD = Treatment Resistant Depression; WHOQOL-BREF = World Health Organization Quality of Life

Appendix 5

Evaluation of the evidence

Type of Intervention	Included Studies
Supported	
Promising	
Group yoga (stand-alone) for depression (compared to a non-active comparison) • Six original trials plus one follow-up paper	• Prathikanti et al. (2017) • Chu, Wu, Lin, Chang, Lin, and Yang (2017) • Buttner, Brock, O'Hara, and Stuart (2015) • Field, Diego, Medina, Delgado, and Hernandez (2012) • Kinser, Bourguignon, Whaley, Hauenstein, and Taylor (2013) • Kinser, Elswick, and Kornstein (2014) (*follow-up paper*) • Uebelacker, Battle, Sutton, Magee, and Miller (2016)
Group mindfulness (stand-alone) for depression • Three original trials	• Michalak, Schultze, Heidenreich, Schramm (2015) • Shallcross et al. (2015) • Williams et al. (2014)
Group mindfulness (stand-alone) for anxiety (compared to an active comparison) • Five original trials	• Arch, Ayers, Baker, Almklov, Dean and Craske (2013) • Goldin, Morrison, Jazaieri, Brozovich, Heimberg, Gross (2016) • Hoge et al. (2013) • Kocovski, Fleming, Hawley, Huta, Antony (2013) • Wong et al. (2016)
Unknown	
Group meditation, using mantram repetition (stand-alone) for PTSD (compared to non-active comparison) • One original trial	• Bormann, Thorp, Wetherell, Golshan, and Lang (2013)

Group meditation (stand-alone(transcendental meditation) for PTSD (compared to active comparison) • One original trial	• Nidich et al. (2018)
Individual meditation, using mantram repetition (stand-alone) for PTSD (compared to an active comparison) • One original trial	• Bormann et al. (2018)
Group meditation (stand-aloneautomatic self-transcending meditation) for depression (compared to a non-active comparison) • One original trial	• Vasudev et al. (2016)
Group yoga (stand-alone) for PTSD (compared to a non-active comparison) • Five original trials plus one secondary analysis	• Mitchell et al. (2014) • Reddy, Dick, Gerber, and Mitchell (2014) (secondary analysis of Mitchell et al., 2014) • Jindani, Turner, and Khalsa (2015) • Quinones, Maquet, Velez, and Lopez (2015) • Reinhardt et al. (2018) • Seppala et al. (2014)
Individual yoga (stand-alone sukha pranayama yoga for anxiety (compared to a non-active comparison) • One original trial	• Bidgoli, Taghadosi, Gilasi, and Farokhian (2016)
Group yoga (stand-alone) for combined depression and anxiety (compared to a non-active comparison) • Four original trials	• Davis, Goodman, Leiferman, Taylor, and Dimidjian (2015) • Falsafi (2016) • Kuvacic, Fratini, Padulo, Iacono, and Giorgio (2018) • Rani, Tiwari, Singh, and Srivastava (2012)
Individual yoga (stand-alone) for combined depression and anxiety (compared to a non-active comparison) • One original trial	• de Manincor, Bensoussan, Smith, Barr, Schweickle, Donoghoe et al. (2016)
Group yoga (stand-alone hatha yoga) for AUD (compared to a non-active comparison) • One original trial	• Bichler et al. (2017)
Group yoga/meditation (stand-alone) for depression (compared to a non-active comparison) • One original trial	• Tolahunase, Sagar, Faiq, & Dada (2018)

Group mindfulness (stand-alone) for PTSD • Two original trials	• Polusny et al. (2015) • Possemato, Bergen-Cico, Treatman, Allen, Wade, Pigeon (2016)
Individual mindfulness (stand-alone) for depression • One original trial	• Tovote et al. (2014)
Group mindfulness (stand-alone) for combined depression and anxiety • One original trial	• Sundquist et al. (2015)
Group mindfulness (stand-alone) for AUD • Three original trials	• Garland, Roberts-Lewis, Tronnier, Graves, Kelley (2016) • Garland, Gaylord, Boettiger, Howard (2010) • Zgierska et al. (2017)
Group yoga (adjunct to psychopharmacological treatment) for PTSD (compared to an active comparison) • One original trial	• van der Kolk et al. (2014)
Group yoga (adjunct to pharmacological treatment) for depression (compared to an active comparison) • Three original trials	• Sarubin et al (2014) • Sharma, Barrett, Cucchiara, Gooneratne, Thase (2017) • Uebelacker et al. (2017)
Group yoga (adjunct to psychoeducation) for depression (compared to a non-active comparison) • One original trial	• Niemi, Kiel, Allebeck, Hoan (2016)
Group yoga (adjunct to psychological and pharmacological treatment) for AUD (compared to an active comparison) • One original trial	• Hallgren, Romberg, Bakshi, Andreasson (2014)
Group mindfulness (MBCT adjunct to pharmacological treatment) for PTSD (compared to an active comparison) • One original trial	• Jasbi et al. (2018)
Group mindfulness (adjunct) for depression (compared to an active comparison • Three original trials	• Eisendrath et al. (2016) • Huijbers et al. (2015) • Kuyken et al. (2015)

Appendix 6

Description of mindfulness-based interventions program curricula

Mindfulness-Based Stress Reduction (MBSR)[161]
• A group program which combines training in mindfulness skills, developed for populations with a wide range of chronic pain and stress-related disorders.[14] • Program structure: One orientation session, eight weekly sessions, and one all-day silent retreat. • Each weekly session covers a different theme based on the mindfulness tenets including non-judging, non-striving, acceptance, letting go, patience, trust, and non-centring. Each session also trains participants in mindfulness exercises including standing yoga stretches, mindfulness breathing, body scan meditation, raisin eating exercise, eating meditation, sitting meditation, silence, and Aikido-based 'pushing exercises'.
Mindfulness-Based Cognitive Therapy (MBCT)[22]
• The overarching aim of MBCT is to help people who have suffered from depression in the past to learn skills to help prevent depression relapse. The core skill that the MBCT program aims to teach is "*the ability, at times of potential relapse, to recognise and disengage from mind states characterised by self-perpetuating factors of ruminative, negative thoughts*".[22] • Program structure: One initial assessment interview and eight weekly sessions. • Each weekly session covers a different mindfulness theme, and contains exercises including raisin exercise, body scan exercise, recorded meditations, sitting meditation, mindfulness of the breath, mindful movement, mindful walking, and marble, stone, or bread meditation.
Mindfulness-Oriented Recovery Enhancement (MORE)[23]
• A mindfulness intervention adapted from MBCT and tailored to apply mindfulness principles to addiction-related topics. • MORE was designed to disrupt cognitive, affective, and physiological risk mechanisms implicated in stress-precipitated relapse to alcohol consumption. • Program structure: A 10-session structured program including the mindfulness techniques of mindful breathing, body scan, mindful decentring, mindfulness of craving, mindful walking, compassion meditation, and imaginal rehearsal of mindful relapse prevention.

-Based Relapse Prevention for Addictive Behaviours (MBRP)[24]
• An integration of standard cognitive behavioural-based relapse prevention treatment with mindfulness meditation practices. • The program is informed by MBSR, MBCT and Daley and Marlatt's[162] relapse prevention protocol. • Program structure: A structured protocol of eight, two-hour sessions, each including formal mindfulness practices and exercises and skills designed to bring the practices to daily life, specifically into situations in which an individual is at high risk for relapse. Formal mindfulness practices include body scan, mindful movement, sitting meditation, walking meditation, and mountain meditation.
Mindfulness-Based Relapse Prevention for Alcohol Dependence (MBRP-A)[143]
• A program designed to prevent relapse for alcohol dependence. • Program structure: Eight-week structured program comprising themes such as automatic pilot and relapse, awareness of triggers and cravings, mindfulness in daily life, self-care and life balance, and building support networks. • Mindfulness techniques taught during the program include the raisin exercise, breath meditation, body scan, mindful hearing or seeing, sitting meditation, mindful walking, and loving kindness meditation.