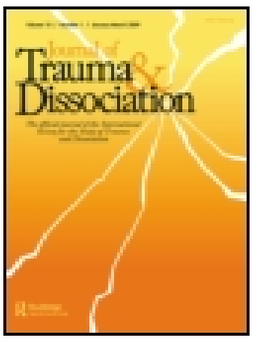

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Mindfulness and yoga for psychological trauma: systematic review and meta-analysis

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ABSTRACT

Mindfulness-based interventions (MBIs), with postures, breath, relaxation, and meditation, such as Mindfulness-based Stress Reduction (MBSR) and yoga, are complex interventions increasingly used for trauma-related psychiatric conditions. Prior reviews have adopted a disorder-specific focus. However, trauma is a risk factor for most psychiatric conditions. We adopted a transdiagnostic approach to evaluate the efficacy of MBIs for the consequences of trauma, agnostic to diagnosis. AMED, CINAHL, Central, Embase, Pubmed/Medline, PsycINFO, and Scopus were searched to 30 September 2018 for controlled and uncontrolled trials of mindfulness, yoga, tai chi, and qi gong in people specifically selected for trauma exposure. Of >12,000 results, 66 studies were included in the systematic review and 24 controlled studies were meta-analyzed. There was a significant, pooled effect of MBIs (g = 0.51, 95%CI 0.31 to 0.71, $p < .001$). Similar effects were observed for mindfulness (g = 0.45, 0.26 to 0.64, $p < .001$), yoga (g = 0.46, 0.26 to 0.66, $p < .001$), and integrative exercise (g = 0.94, 0.37 to 1.51, $p = .001$), with no difference between interventions. Outcome measure or trauma type did not influence the effectiveness, but interventions of 8 weeks or more were more effective than shorter interventions (Q = 8.39, df = 2, $p = .02$). Mindfulness-based interventions, adjunctive to treatment-as-usual of medication and/or psychotherapy, are effective in reducing trauma-related symptoms. Yoga and mindfulness have comparable effectiveness. Many psychiatric studies do not report trauma exposure, focusing on disorder-specific outcomes, but this review suggests a transdiagnostic approach could be adopted in the treatment of trauma sequelae with MBIs. More rigorous reporting of trauma exposure and MBI treatment protocols is recommended to enhance future research.

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Introduction

Exposure to a traumatic event, such as actual or threatened death, serious injury, abuse, neglect, or sexual violence, is a diagnostic criterion in the DSM-5 for

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trauma- and stressor-related disorders, such as post-traumatic stress (PTSD), attachment, and adjustment disorders (APA, 2013). Global prevalence of PTSD is 6%, with the highest risk in interpersonal violence, such as rape (19%), physical abuse by a romantic partner (12%), and kidnapping (11%) (Kessler et al., 2017; Stein et al., 2014). However, most individuals, directly or indirectly, will be exposed to a traumatic event in their lifetime. In the WHO's World Mental Health Surveys, 70% of all respondents reported one of 29 specific lifetime traumas with an average of three per person (Kessler et al., 2017). This demonstrates weak specificity for outcomes following trauma exposure and no evidence that those diagnosed with traumatic disorders experience more serious trauma than any other psychiatric disorder, particularly in childhood. Therefore, this review departs from the disorder-centric model and adopts a trauma exposure-based, transdiagnostic approach.

Trauma exposure is a risk factor for all psychiatric, and many physiological, disorders. It has been causally associated with anxiety, mood, impulse, psychosis, substance, personality, and conduct disorders as well as lifetime suicidality (Kessler et al., 2005; Pietrzak et al., 2011). It has been identified in both somatoform and alexithymic disorders, as well as disordered eating, and self-harm behaviors (Ludwig et al., 2018; Molendijk et al., 2017; Witt et al., 2019). It has been linked to cardiovascular, gastric, endocrine, and inflammatory diseases, as well as cancer (Brudey et al., 2015; Porges, 2007). Therefore, negative consequences of trauma have individualized, polysymptomatic, and polysyndromal presentations contrary to the disorder model and more suited to a transdiagnostic approach.

The relationship between trauma exposure, proximity, and outcomes is also not linear (Manning-Jones et al., 2017). Witnesses, first-responders, family, and friends may also experience grave effects (Taylor et al., 2018). While the risk of negative outcomes increases along a spectrum from one-off /simple to multiple/complex trauma, a history of trauma exposure is probabilistic, not deterministic, of a psychiatric disorder (Cloitre et al., 2013). Other mediating factors include age, context, social support, prior trauma, and posttraumatic growth (Cloitre et al., 2009).

Evidence supports the long-term efficacy of psychotherapy as the "gold-standard" treatment for trauma, establishing safety and stabilization before cognitive processing (Herman, 1997; Kline et al., 2018). Those with exposure to complex trauma are often resistant to cognitive-based interventions, dropout is high, and adherence can be poor (D'Andrea & Pole, 2012; Niles et al., 2018). Symptoms of trauma are also physiologically affective, putatively by the dysregulation of the autonomic nervous system (ANS) and immune system via the hypothalamic-pituitary-adrenal (HPA) axis (De Kloet et al., 2006; Yehuda, 2006). Trauma affects sensory systems and interoception. When processing of signals from the body to the anterior insula and anterior cingulate cortices is disrupted by emotion or dysfunction, physical symptoms

of hyper- and/or hypo-arousal may be produced out of context (A. D. Craig, 2003). As a result, complex MBIs, with physiological and psychological targets, are often used adjunctive to psychotherapy (Davis & Hayes, 2011).

In contrast to Western pharmacological and cognitive therapeutic approaches, other cultures treat trauma exposure with interventions such as mindfulness, movement, rhythms, and action (Van der Kolk, 2014). MBIs are complex interventions consistent with the British Medical Research Council (MRC) definitions (P. Craig et al., 2006). Mindfulness is derived from complex, eight-limb Buddhist philosophy, and describes the training of present-moment attention or awareness, cultivating compassion without judgment or criticism (Jon Kabat-Zinn, 2005). Mindfulness-based interventions (MBIs) also use complex, eight-limb Hindu, and Daoist systems. For example, the eight limbs of yoga include: philosophy (two limbs); physical postures/movement; breath training; relaxation; concentration; meditation; and the integration or meditative absorption. Other reviews have previously separated contemplative from physical practices (Cramer et al., 2018). However, this review recognizes most MBIs as complex and systemic, inherently having more than one 'limb.' As a result, we adopt a multi-limb definition of MBIs, only excluding reductionist or mechanistic studies, such as those that focus on physical postures- or breath-only designs.

Previous reviews of MBIs for psychological trauma have also maintained a disorder-based approach, usually PTSD, following trauma exposure (Boyd et al., 2018; Grasser & Javanbakht, 2019; Mahoney et al., 2019).

Mindfulness and meditation

Recent meta-analyses of controlled trials report small-moderate effect sizes for MBIs on: PTSD (g = −0.34, −0.49 to −0.18, $p < .001$, nine studies, Gallegos et al., 2017; g = −0.44, −0.61 to −0.27, $p < .001$, 18 studies, Hopwood & Schutte, 2017); and post-traumatic growth (g = 0.34, 0.23 to 0.44, 11 studies, Shiyko et al., 2017).

Meditation-based interventions for PTSD show similar effect sizes (g = −0.38, −0.63 to −0.14, $p = .002$, five studies, Gallegos et al., 2017; SMD = −0.43, −2.23 to 1.37, three studies, Hilton et al., 2017). Another recent meta-analysis of MBIs for alcohol and drug use disorders reported small-moderate effects on abstinence (d = 0.37, 0.30 to 0.45, $p < .001$, Cavicchioli et al., 2018).

Yoga

Two recent meta-analyses of yoga found strong effects on PTSD (SMD = −1.10, −1.72 to −0.47, seven studies, Cramer et al., 2018; g = −0.71, −1.44 to 0.02, four studies, Gallegos et al., 2017). However, both reviews were subject to small study numbers and high heterogeneity. An earlier meta-review of 13 reviews of 185 studies found yoga beneficial for anxiety, depression, and PTSD, but with studies lacking trauma-specificity and methodological quality (Macy et al., 2015).

It wasn't uncommon for these reviews to assess yoga, mindfulness, and meditation together as MBIs (Niles et al., 2018). However, few reviews have examined either intervention complexity or trauma exposure as a transdiagnostic risk factor with polysymptomatic or polysyndromal presentation. Only Cramer et al. (2018) performed a subgroup analysis of yoga with physical postures. Another meta-analysis investigated multiple outcomes (PTSD, anxiety, and depression) in meditation interventions, but did not distinguish between single-limb mantram repetition, and complex systemic interventions, such as MBSR and yoga (Hilton et al., 2017).

Trauma exposure was scarcely reported in tai chi and qi gong literature. One review examined these MBIs for psychiatric disorders, but no trauma studies other than traumatic brain injury were reported (TBI, Abbott & Lavretsky, 2013). Another meta-analysis of tai chi and qi gong for depressive symptoms indicated moderate effect sizes, but did not report trauma exposure (d = −0.48, −0.48 to −0.12, 30 studies, Liu et al., 2015). Another review of MBIs for PTSD, included one case series for refugees and survivors of torture (Kim et al., 2013). This field predominantly focuses on healthy aging and fall prevention with recent work in chronic pain (Hall et al., 2017).

Therefore, this review will address three gaps in the existing literature. Firstly, we adopt a transdiagnostic approach by requiring a trauma-exposed sample rather than a trauma-related, diagnosed disorder. Secondly, we include mindfulness, yoga, tai chi, and qi gong as integrative, mind-body interventions with a historical and epistemological relationship. Lastly, we recognize these interventions as complex, multi-limbed systems rather than individual techniques. Therefore, we limit interventions considered to those with two limbs or more of yoga to eliminate mechanistic studies.

As a result, this meta-analysis and systematic review aims to:

- Evaluate the effects of mindfulness-based and yoga interventions with at least two limbs on outcomes in people with a reported history of trauma;
- Identify characteristics that influence the efficacy of these interventions.

Material and Methods

A literature search was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Shamseer et al., 2015).

Inclusion and exclusion criteria

The aim of the search was to identify all published, peer-reviewed clinical trials, including randomized controlled (RCTs), controlled, and uncontrolled

pre-post trials using a mindfulness, yoga, tai chi, or qi gong intervention. To be included, the intervention had to be conducted in adults with a recorded exposure to trauma and have a minimum of two practice limbs, such as postures and meditation. Studies with single-limb interventions, such as transcendental meditation-only, and Sudarshan Kriya (SKY) and Sahaj breath-only yoga studies, were excluded in this review.

Studies of MBIs in samples with any psychiatric disorder, except neurodegenerative disorders such as dementia, were included as long as trauma exposure was ascertained and reported. Samples with explicit trauma exposure, such as natural disaster or incarceration, were included, regardless of diagnosis. However, studies were required to measure psychiatric outcomes. Primary outcomes of state/trait mindfulness or other mechanistic designs were excluded.

Search strategy

Searches were conducted for (yoga OR Yogi* OR mindful* OR tai chi OR qi gong) AND (trauma* OR PTSD OR [disorder]) to 30 September 2018 in: Allied and Complementary Medicine (AMED); Cochrane Central Register of Controlled Trials (Central); Cumulative Index to Nursing and Allied Health Literature (CINAHL); Embase; Medline; PsycINFO; and Scopus. Bibliographies of systematic reviews and author libraries were also searched for relevant texts. A sample search is included in Table 1.

A PRISMA diagram is included as Figure 1. Search results yielded 12,576 studies. Duplicates of 3,356 were removed resulting in 9,220 studies being screened for eligibility, with 8,105 studies excluded in the title and abstract screening. The full text of 1,115 studies was reviewed. After duplicates were removed, two reviewers (JT and ES) assessed articles by title and abstract and full-text review using Covidence Systematic Review Software (Web-based, Veritas Health Innovation, 2016). Eligibility was assessed in phases: title and abstract; full-text review; quality assessment; and data extraction. Discrepancies were resolved in consultation with the guarantor (NG) resulting in 66 studies being included for a systematic review. Thirty-one studies had no/inadequate controls. A further ten studies were excluded during quality review and data extraction, leaving 25 studies for meta-analysis.

Risk of bias

Risk of Bias was performed at the level of individual studies using the Cochrane's Risk of Bias tool (Sterne et al., 2011). Due to the nature of the interventions, participants could not be blinded and at least 18 studies used passive controls. Therefore, five of the six Cochrane items were used: sequence generation; allocation concealment; assessor blinding; incomplete outcome data; and

Table 1. Sample search strategy.

Intervention	Trauma Exposure	Outcome/Main Condition
Yoga	Trauma	Trauma*
Yogi*	Violence	PTSD
Mindful*	Abuse	Post-Traumatic Stress Disorder [MESH]
MBSR	Neglect	Personality Disorders [MESH]
	Multiple Trauma [MESH]	Borderline Personality Disorder [MESH]
	Cumulative Trauma [MESH]	Depression [MESH]
		Depressi*
		Anxiety
		Anxiety Disorders [MESH]
		Anxi*
		Eating Disorders [MESH]
		Somatoform Disorders [MESH]
		Somat*
		Conversion
		Substance
		Substance Use Disorders [MESH]
		Substance-Related Disorders [MESH]
		Dissociat*
		Dissociative Disorder [MESH]
		Depersonalization
		Self-harm
		Self-injurious Behavior

selective outcome reporting. Meta-bias was also considered due to moderate intervention heterogeneity.

Data analysis

Data analysis was performed on reported original score pre-post means, standard deviations, and sample sizes. Only studies with control groups and complete data were considered for meta-analysis. A glossary of outcome measures is included in Table 2, and in the event of multiple outcomes, PTSD, stress, or anxiety outcomes were preferred in that order. Intent-to-treat (ITT) data was preferred where reported. The summary measure of standardized mean difference (SMD) was used to calculate Cohen's *d* and Hedges' *g* with 95% confidence intervals using Comprehensive Meta-Analysis™ (CMA) software. Hedges' g was reported here due to greater sensitivity in small samples (Borenstein et al., 2009).

A positive effect size was used to indicate that the intervention group effects exceeded those of the control group. Using standard measures of effect size, factors of 0.2 were considered small, 0.5 moderate, and 0.8 large (Higgins & Green, 2008). Heterogeneity of real effects across studies was quantified using the I^2 statistic to estimate the proportion of observed variance not due to sampling error. DerSimonian and Laird method random effects were used due to intervention heterogeneity (Higgins & Green, 2008, p. 264). A funnel plot was generated to examine bias and systematic heterogeneity.

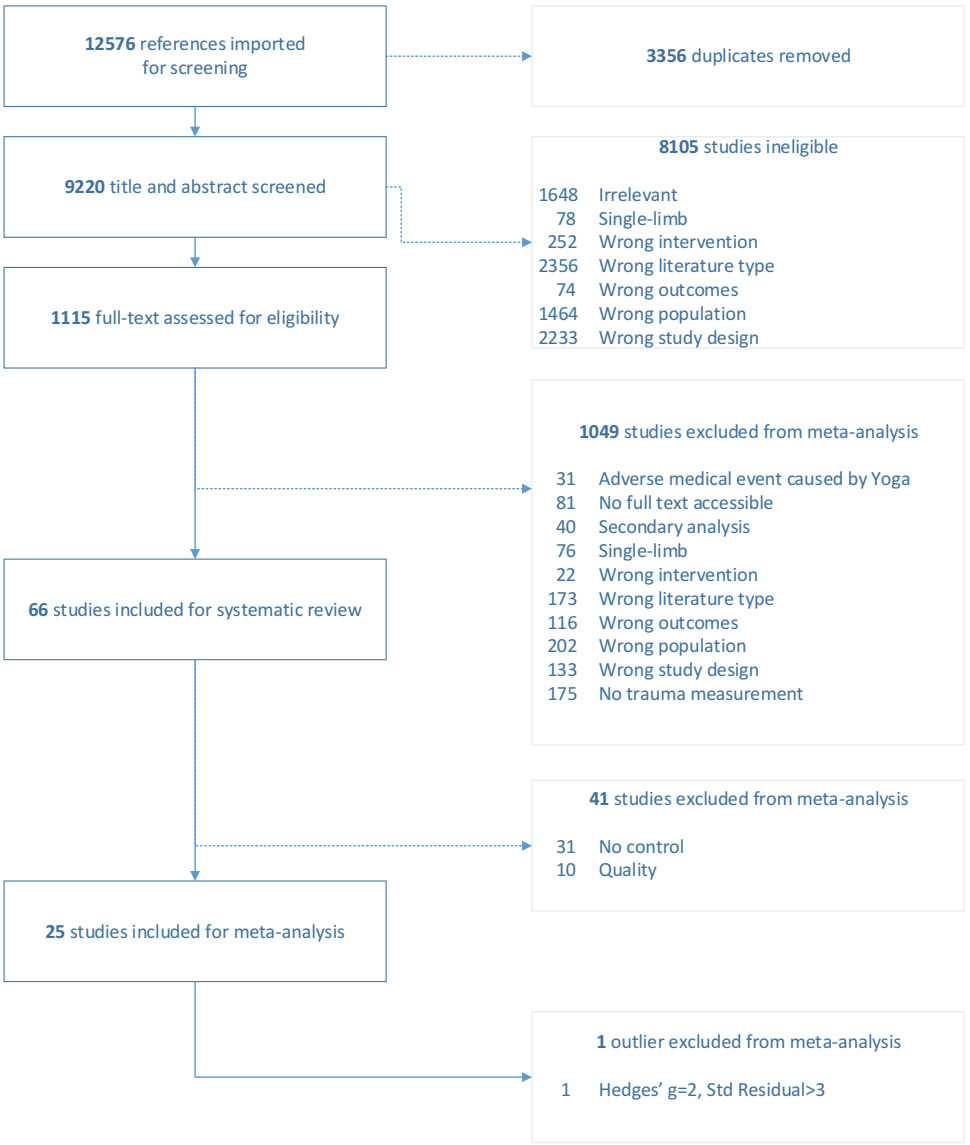

Figure 1. PRISMA diagram.

Results

Systematic review study characteristics

The characteristics of 66 systematic review studies are described in detail in Table 3. These studies comprise an intent-to-treat (ITT) total population of 5,659 that is 50% female with 24% average attrition in intervention and 15% in control groups (where used). The difference in these attrition rates is likely due to the inclusion of uncontrolled studies for review compared to controlled studies used in meta-

Table 2. Glossary.

Abbreviation	Description
AAQ-II	Acceptance and Action Questionnaire second version
ANEDT	Attachment Narrative Emotional Disclosure Task
ANT	Attention Network Task
BIS	Barrett Impulsivity Scale
BSI	Brief Symptom Inventory
BREQ	Behavioral Regulation in Exercise Questionnaire
BRUMS	Brunel Mood Scale
CES-D	Center for Epidemiological Studies – Depression Scale
CAPS	Clinician-Administered PTSD Scale
CAR	Cortisol Awakening Response
CEQ	Credibility/Expectancy Questionnaire
CES	Combat Exposure Scale
CDRS-SR	Cornell Dysthymia Rating Scale – Self Report
CRP	C-Reactive Protein
CT	Controlled Trial
CTQ	Childhood Trauma Questionnaire
DTS	Davidson Trauma Scale
DAS	Dysfunctional Attitudes Scale
DASS	Depression Anxiety Stress Scale
DES	Dissociative Experiences Scale
DERS	Difficulties in Emotion Regulation Scale
DTCQ	Drug Taking Confidence Questionnaire
ECR	Experiences in Close Relationships Questionnaire
ERQ	Emotion Regulation Questionnaire
FAQ	Feasibility and Acceptability Questionnaire
FFMQ	Five Facet Mindfulness Questionnaire
GFQ	General Follow-Up Questionnaire
GLTEQ	Godin Leisure-Time Exercise Questionnaire
GPSE	General Perceived Self-Efficacy Scale
GIC	Global Impression of Change
GODIN	Godin Leisure-Time Exercise Questionnaire
HDRS	Hamilton Rating Scale for Depression
HR-QOL	Health-related Quality of Life
HRV	Heart Rate Variability
ISI	Insomnia Severity Index
ILS	Institute of Living Scale
ICQ	Instructor Credibility Questionnaire
IPV	Interpersonal Violence
ITS	Intrusive Thoughts Scale
IASC	Inventory of Altered Self-Capacity
LEC	Life Events Checklist
MAAS	Mindful Attention Awareness Scale
MBSR	Mindfulness-based Stress Reduction
MBI	Mindfulness-based intervention
MICAS	Mindfulness Intervention for Child Abuse Survivors
MPQ	McGill Pain Questionnaire
OCSS	Overall Course Satisfaction Survey
PHQ-9	Patient Health Questionnaire
PACS	Penn Alcohol Craving Scale
PEQ	Program Evaluation Questionnaire
PSQI	Pittsburgh Sleep Quality Index
PANAS	Positive and Negative Affect Schedule
PET	Positron-Emission Tomography
PC-PTSD	Primary Care Post-Traumatic Stress Disorder

(*Continued*)

Table 2. (Continued).

Abbreviation	Description
PCL	PTSD Checklist. Also known as the PCL-17, PCL-C (Civilian), PCL-M (Military), and PCL-S (Specific).
PDS	PTSD Diagnostic Scale
PSS	Perceived Stress Scale
PSS-I	PTSD Symptom Scale – Interview
PSS-SR	PTSD Symptom Scale – Self-Report
PTCI	Post-traumatic Cognitions Inventory
QOLS	Flanagan's Quality of Life Scale
QPA	Questionnaire of Automatic Thoughts (le Questionnaire des pensées automatiques)
REAC^2 H	Restoring Embodied Awareness, Compassionate Connection, and Hope
RCT	Randomized Controlled Trial
RRQ	Rumination-Reflection Questionnaire
RSQ	Relationship Structures Questionnaire
RS-25	Resilience Scale
RSQ	Response Style Questionnaire
SCID	Structured Clinical Interview for DSM-X
SD	Standard Deviation
SEE	Self-Efficacy for Exercise (transtheoretical model measure)
SMD	Standardized mean difference
SLESQ	Stressful Life Events Screening Questionnaire
STAI	Speilberger State-Trait Anxiety Inventory
TLEQ	Trauma Life Events Questionnaire
TMMS	Trait Meta-Mood Scale
TMT	Trail Making Test
TNF	Tumor Necrosis Factor
UPID	UCLA PTSD Index for DSM-IV
UPPS	Impulsive Behavior Scale (Urgency, Premeditation, Perseverance, Sensation Seeking)
URICA	University of Rhode Island Change Assessment
WHOQOL	World Health Organization Quality of Life
Y-BOCS	Yale-Brown Obsessive-Compulsive Scale

analysis. However, it is also possible that mindfulness-interventions face other challenges, such as engagement and nocebo bias.

Systematic review study attributes are further summarized in Table 4. There was a relatively even distribution of MBSR (k = 18/66, 27%), other mindfulness (k = 21/66, 32%), and yoga studies (k = 22/66, 33%). MBSR participants accounted for n = 2724/5659 (48%) of total participants and were 60% male, mostly due to one large correctional study (Samuelson et al., 2007). Yoga studies were conducted in n = 1166/5659 (21%) of total participants and were 58% female.

The number of studies and sample proportions were also matched between trauma types of combat (k = 27/66, 41%, n = 1,397/5,659, 25%) and other lifetime trauma (k = 29/66, 44%, n = 1,593/5,659, 28%). However, incarceration studies and participants (k = 6/66, 9%, n = 2,466/5,659, 44%) were also impacted by Samuelson et al. (2007). For this reason, and only having a 'quasi' control, this study was removed from meta-analysis. Only nine (k = 9/66, 14%) systematic review studies used active controls. Most

Table 3. Study characteristics.

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
MBSR INTERVENTIONS								
1.	Amaro et al., 2014 [UCT] USA, Public	Low income (318) 34 ± 7 100% Female	Substance Use Community Lifetime	MBRP-W (177) PDS ASI, PSS, PDS, LSC-R	None NA Completer	9 x 120 m (+4 h silent retreat) 10 w 1320 m	Not reported NA NA	High Excluded – no control 64% (114)
2.	Bhatnagar et al., 2013 [UCT] USA, Unfunded	Veteran (8) 60y 13% Female	PTSD Outpatient Combat	MBSR (8) SCID **CAPS***, HRV	None Not reported ITT	Not reported 8 w, FU1 12 w >720 min	Not reported NA NA	High Excluded – no control 0%
3.	Bremner et al., 2017 [RCT] USA, Public	Veteran (26) 34 ± 7y 0.0% Female	PTSD Outpatient Combat/Chronic	MBSR (17) SCID or prior **CAPS***, FFMQ, FACIT-Sp, PET imaging	PCGT (9) Active ITT [B]	1 x 150 m (+6 h) 8 w, FU1 6 m 1560 m	Mindfulness 30 m Audio	Low Included 34.6% (9,8)
4.	Cole et al., 2015 [UCT] USA, Public	Veterans (10) 46 ± 12y Not reported	PTSD & mTBI VA clinic Combat	MBSR (10) PCL-C **PCL-C***, CogState attention	None	1 x 50 m (+7 h) 8 w, FU1 3mo 1620 m	45 m 6d Audio	High Excluded – no control 10% (1)
5.	Gallegos et al., 2015[UCT] USA, Public	Community (50) 44 ± 11y 100% Female	Stress Local Healthcare Interpersonal	MBSR (42) TLEQ & MMSE **PSS***, STAI, CES-A, DERS, MPSS-SR, FFMQ, IL-6, TNF, CRP	None NA Completer	1 x 120 m(+4 h) 8 w, FU1 4 w 1200 m	Not reported NA NA	High Excluded – no control 42% (21)
6.	Goldsmith et al., 2014[UCT] USA, NGO	Community (10) 44 ± 18 90% Female	PTSD Outpatient Multiple	MBSR (9) CTQ, LEC, PHQ-9, BDI-II, PCL-C*, AAQ-II, TAQ,	None NA Completer	Not reported 8 w Est. ~960 m	Practice	High Excluded – no control 10% (1)
7.	Harding et al., 2018[UCT] USA, Not reported	Veteran (55) 53 ± 12 15% Female	PTSD+IBS Outpatient Combat/Chronic	MBSR (55) PCL-C PCL, Rome III, IBS-SSS, VSI, PHQ-9, PROMIS, FFMQ	None NA Completer	1 x 150 m (+7 h) 8 w 1620	Not reported	High Excluded – no control 53% (29)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
8.	Kearney et al., 2012 [UCT] USA, Public	Veteran (92) 51 ± 11 23.9% Female	PTSD Veterans' health Combat Chronic	MBSR (92) PCL-C PHQ-9, BADS, SF-8, AAQ, Mindfulness	None NA ITT	1 x 150 m/w 8 w 1620 m	Mindfulness 45/d, 6d/w audio	High Excluded – no control 19.6%, (18)
9.	Kearney et al., 2013 [RCT] USA, Public	Veteran (47) 52 ± 13y 19% Female	PTSD Outpatient Combat/Chronic	MBSR (25) PCL, LEC **PCL-17***, PHQ-9, HRQOL	TAU (22) Passive ITT+Compl.	1 x 150 m (+7 h) 8 w, FU1 16 w 1620 m	Yoga 45 m Audio	Low Included 9% (4,0)
10.	Kearney et al., 2016[RCT] USA, Public	Veterans (55) 52 ± 7 15% Female	Pain Outpatient Combat/Chronic	MBSR (26) PSS-I MPQ, MFI, CFQ, **PSS-I***, PHQ-9	TAU (29) Passive ITT	1 x 150 m/w (+7 h) 8 w 1620 m	Mindfulness 30–45 m/d 6d/w Audio, Written	Low Included 15% (5,3)
11.	Kelly & Garland, 2016 [RCT] USA, NGO	Community (45) 42 ± 15y 100% Female	PTSD Research IPV/Chronic	Trauma-Informed MBSR (23) IPV History, PCL-C **PCL-C***, BDI-II, RSQ-1	Waitlist (22) Passive ITT+Compl.	1 x 150 m (+7 h) 8 w 1620 m	Mindfulness 15 m Practice	Low Included 13% (4,2)
12.	Kimbrough et al., 2010 [UCT] USA, NGO	Community (27) 45 ± 11y 89% Female	PTSD Community CSA	MICAS/MBSR (23) History, BSI BDI-II, **PCL***, BSI, MAAS	None NA Completer	150–180 m (+5 h) 8 w, FU1 24 w <1500 m	Practices 20–30 m Paper form	High Excluded – no control 15% (4)
13.	Maddock et al., 2017 [UCT] Ireland, Public	Homeless (12) 40y 0% Female	Impulsivity Community Lifetime	MBSR (12) None BSI-II, ERS, HADS	None NA Completer	1 x 2 h/w 8 w 960 m	Mindfulness/ yoga Not reported Not reported	High Excluded – no control 42% (5)
14.	Muller-Engelman et al., 2017 [UCT] Germany, NGO	Community (14) 47 ± 11 71% Female	PTSD Outpatient IPV	MBSR (9) SCID-IV CAPS, DTS, BDI-II, FFMQ, QeP	None NA Completer	1 x 150 m (+7 h) 8 w 1680 m	Mindfulness Not reported Not reported	High Excluded – no control 36% (5)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
15.	Omidi et al., 2013 RCT Iran, unfunded	Veteran (62) 39–59 0% Female	PTSD VA Medical Center Combat	MBSR SCID (DSM-IV) **BRUMS***	MBSR (31) TAU (31) Not reported	1 x 120 m 8 w 960 m	Mindfulness Not reported Not reported	High Excluded – Quality Not reported
16.	Polusny et al., 2015 RCT USA, Public	Veteran (116) 59 ± 10 16% Female	PTSD Outpatient Combat	MBSR (52) PCL CAPS, PHQ, WHOQOL-BREF, FFMQ, CEQ	PCGT (57) Active ITT	1 x 150 m (+6.5 h) 8 w 1590 m	Mindfulness Not reported Not reported	Low Included 6% (6,1)
17.	Samuelson et al., 2007 UCT USA, Not reported	Incarcerated (1953) Not reported 31% Female	Mood Correctional Lifetime	MBSR None **POMS***, CMH, SES	Waitlist (180) Passive Completer	1 x 60–90 m 6–8 w 360–720 min	Not reported	High Excluded – no control 31% (603)
18.	Serpa et al., 2014 UCT USA, Public	Veteran (105) 60 ± 7 11% Female	Anxiety Outpatient Combat Chronic	MBSR (79) None FFMQ, PEG, PHQ-9, GAD-7, SF-12	None NA Completer	1 x 120 m/w (+7 h) 9 w 1500 m	Mindfulness/ Yoga 30 m/d Not reported	High Excluded – no control 25% (26)
OTHER MINDFULNESS								
19.	Allen, K. & Wozniak, D. 2011 UCT USA, NGO	Community (11) m = 35y 100% Female	PTSD Local health Domestic violence	Rites of Passage (11) Custom PCL, Qualitative	None NA ITT	1 x 60 m/w 10 w 600 m	Not reported	High Excluded no control 0%
20.	Bowen et al., 2017 UCT USA, NGO	Methadone Maintenance (15) 44 ± 3y 67%	SUD Local Health Lifetime	MBRP (15) None BDI-II, PACS, **PCL-C***, AAQ, OCSS	None NA	1 x 120 m 6 w 720 m	Mindfulness Not reported	High Excluded – no control 53% (8)
21.	Caldwell & Shaver, 2015 RCT USA, NGO	Community (48) 47 ± 14y 100%	None Local trauma center Childhood	REAC^2 H CTQ ECR, ERG, TMMS, RRQ, PANAS*, DERS, FFMQ, HBPS, PEQ, ANEDT	Waitlist Passive Completer	8 h/d 3d, FU1 5 w 1440 m	Written Not reported Not reported	Low Excluded – quality 19% (9)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
22.	Ferszt et al., 2015 [UCT] USA, NGO	Incarcerated (37) 35 ± 11y 100% Female	Stress Correctional Lifetime/Acute	Mindfulness (37) None PSS, STAI, PSQI, CES-D10	None NA Completer	1 x 1.5 h/w 12 w 1080 m	Meditation 10 m/day Audio	High Excluded – no control 11% (4)
23.	Frye, L. & Spates, C. 2012 [UCT] USA, Unfunded	Community (1) 19y Female	PTSD Research CSA	PE with Mindfulness CAPS, SCID-IV CAPS, ASI, ERQ, TAS, KIMS, BDI-II	None NA ITT	840 m 10 w 1020 est.	Mindfulness Not reported Audio	High Excluded – no control NA
24.	Garland et al., 2010 [RCT] USA, Public	Residential (53) 40 ± 9y 21% Female	Alcohol Dependence Residential IPV	MORE (27) SCID & Custom **PSS***, FFMQ, BSI, ATT, PACS, IRISA, WBSI, HRV, Alcohol Attentional Bias	Alcohol Support Group (26) Active Completer	1 x 90 m 10 w 900 m	Mindfulness 15 m Exercises	Low Excluded – quality 30% (9,7)
25.	Garland et al., 2016 [RCT] USA, Public	Homeless (180) 38 ± 10y 0% Female	SUD Residential Lifetime/Chronic	MORE (64) MINI & Custom Screen PACS, **PCL***, BSI, FFMQ, PANAS, URICA	CBT (64), TAU (52)* Active ITT, max. like. est.	1 x 120 m 10 w 1200 m	Mindfulness 15 m Practice	Low Included 28.9% (45, 48, 35)
26.	Ghahari et al., 2017 [CT] Iran, Not reported	Community (30) Not reported 100% Female	Depression Outpatient Domestic Violence Chronic	MBCT (15) BDI-II STAI	Waitlist (15) Passive Not reported	1 x 45 m/w 8 w 360 m	Mindfulness Not reported Not reported	High Excluded – quality Not reported
27.	Goldstein et al., 2018[RCT] USA, Public	Veteran (47) 47 ± 15y 19% Female	PTSD Outpatient Combat/Chronic	Integrative Exercise (21) SCID & CAPS **CAPS***, WHOQOL, FAQ, GODIN	Waitlist (26) Passive ITT, all avail.	3 x 60 m 12 w 2160 m	Exercises 60 m Audio	Low Included 19.2% (16, 22)
28.	Jasbi et al., 2018 [RCT] Iran, Not reported	Veteran (48) 53 ± 3y 0% Female	PTSD Outpatient Combat Chronic	MBCT (24) CAPS PCL-5, DASS	Socio-therapeutic (24) ITT	1 x 70 m/w 8 w 560 m	Mindfulness Not reported Not reported	Low Included M-A 0% (0)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
29.	Kim, S. 2013a[RCT] USA, Public	Nursing (29) 48 ± 8y 96.6% Female	PTSD Hospital Occupational/ Chronic	Mindfulness-based stretching/deep breathing (11) PCL-C Serum cortisol, ACTH, DHEA, **PCL-C***	**CON (11)***, BASE (7) Passive ITT, Carried fwd.	2 x 60 m 8 w, FU1 16 w 960 m	None	Low Included 3.5% (11,10,7)
30.	King et al., 2013 [RCT] USA, NGO	Veteran (37) 60 ± 10y 0% Female	PTSD Outpatient Combat/Chronic	MBCT (20) CAPS **CAPS***, PDS, PCTI	TAU (17) Passive ITT+Compl.	1 x 8 h 8 w 3840 m	Mindfulness 15–20 m Audio	Low Included 24% (15,13)
31.	King et al., 2016 [RCT] USA, Public	Veteran (43) 32 ± 8y 0% Female	PTSD Outpatient Combat/Chronic	MBET (26) CAPS CAPS, fMRI	PCGT (17) Active Completer	1 x 2 h/w 16 w 1920 m	Mindfulness Not reported Not reported	Low Included 47% (13,3)
32.	Marzabadi, E. & Zadeh, S. 2014 [RCT] Iran, Not reported	Veteran (28) 35–60y 0% Female	PTSD Inpatient Combat	Mindfulness Training (14) SCID-IV **WHOQOL**	TAU (14)	2 x 90 m 4 w, FU1 2 mo 720 m	Mindfulness-based 20 min	High Excluded – quality 0%
33.	Michalopoulou et al., 2015 [RCT] Greece, Not reported	Community (35) M = 41y (19–55y) 100% Female	PTSD Community Domestic Violence	RB & PMR (16) Custom PSS, HLC, WCCL	Waitlist (18) Passive Completer	2/d x 25 m 8 w 2800 m	RB & PMR 2/d x 25 m Audio CD	High Excluded – quality 3% (1)
34.	O'Connor et al., 2014 [CT] Denmark, NGO	Elderly (36) 78 ± 5y 68% Female	Depression Community Bereavement	MBCT (18) HTQ BDI-II, ICG-R, CES-B, LNSeq	Waitlist (18) Passive ITT+Completer	1 x 120 m/w 8 w 960 m+ boosters	Mindfulness 40 m/d Audio CD	Low Included M-A 17% (6)
35.	Possemato et al., 2016 [RCT] USA, Public	Veteran (62) 47 ± 16y 13% Female	PTSD Primary Care Combat Chronic	PC-BMT (36) CAPS, BOMC, CSSR **CAPS***, PCL-S, PHQ-9, MAAS, FFMQ	PCTAU (26) Passive ITT+Compl.	1 x 90 m 4 w, FU1 8 w 360 m	Mindfulness 2 m Audio	Low Included 20% (29,21)
36.	Price, C. J. et al., 2018 [RCT] USA, Public	Community (217) M = 35y (22–61y) 100% Female	SUD Outpatient Interpersonal Chronic	MABT (93) TLEQ MAIA, FMI, DERS, RSA, BDI-II, TLFB	WHE (56) TAU (68) Active & Passive	1 x 90 m/w 8 w 720 m	Mindfulness Not reported Not reported	Low Included 14% (31)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
37.	Przekop et al., 2018 [UCT] USA, NGO	Community (150) 48 ± 16y 58% Female	SUD Private Inpatient Lifetime	Qi Gong Custom BDI-II, BPI-SF, WHYMPI, MPQ-SF-2, GIC	None NA Completer	15.5 h/w 4–6 w 3720–5580 m	NA	High Excluded – No control 19% (28)
38.	Reb et al., 2017 [UCT] USA, Public	Veterans (23) 35 ± 9y 23% Female	Stress Outpatient Combat/Chronic	Integral Qi Gong MMSE PSS, PHQ, PSQI	None NA Completer	2 x 60 m 10 w 1200	Qi Gong 20 m/d Not reported	High Excluded – no control 9% (2)
39.	Spidel et al., 2017 [RCT] Canada	Community (50) 40y 52% Female	Psychosis Local health	ACT (30) TSC-40 CERQ, BPRS-E, GAD-7, SEG-14	TAU (20) Passive ITT	1 x 90 m/w 8 w 720 m	Not reported	High Excluded – quality
40.	Thieleman et al., 2014 [UCT] USA, Unfunded	Community (42) 39 ± 11y 71%	Bereaved Local health Loss	ATTEND IES-R ***IES-R***, HSCL	Mindfulness None Completer	Not reported m = 19.18 w Av 878 m	Practice Not reported Not reported	Low Included
41.	Tsai et al., 2018 [UCT] USA, NGO	Community (13) 55 ± 10y 27% Female	PTSD & pain Local Health Lifetime	Tai Chi (Sun Style) (11) PCL-C PROMIS, Medication, NIHTEB, 6 m walk	None NA Completer	3 x 60 m/w 12 w 2160 m	None	High Excluded – No control 31% (4)
42.	Waelde et al., 2018 [UCT] Philippines, Not reported	Mental Health Workers (68) 37 ± 12y 75% Female	PTSD Community Natural Disaster	Mindfulness (62) SCID-IV CES-D	None NA Completer	2 x 4 h 12 w 2640 m	Mindfulness 30 m/d, 6d/w Meditation	High Excluded – no control 46% (31)
43.	Wahbeh et al., 2016 [RCT] USA, Public	Veteran (56) 50 ± 13 5.8% Female	PTSD Local Health Combat	Mindfulness Meditation + Slow Breathing (28) SCID (DSM-IV), CAPS, LEC, CES **PCL***, ITS, PSS, BDI, PANAS, GPSE, PSQI, FFMQ, ANT, CEQ, GIC, ICQ, HRV, CAR	Sitting Quietly (28) Passive Completer	1 x 20 m 6 w 120 m	6 x 20 m 6 w Audio	Low Included 11% (3,3)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
44.	Wilson et al., 2012 [UCT] USA, Not reported	Community (41) m = 39y 100%	Coping Local Health CSA	Stress Mgt. (32) None WOCQ	None NA Completer	Not reported 4 w NA	Not reported NA NA	High Excluded – no control 22% (9)
45.	Zalta et al., 2018 [UCT] USA, Public	Veteran (191) 41 ± 9y 37% Female	PTSD Outpatient Combat/Military Sexual Trauma	MBRT (191) PCL-5 PHQ-9, PTCI	None NA Completer	15 x 90 m, 15 × 90 m, 13 × 90 m, 12 x 60 m, (+4 h) 3 w 4590 m	CPT and Mindfulness 15 m/d Worksheets	High Excluded – no control 8% (15)
YOGA INTERVENTIONS								
46.	Avery, T. et al., 2018 [UCT] USA, Public	Veterans (9) 60 ± 11y 22.0% Female	PTSD VA Healthcare Combat-related	Hatha Yoga (9) PCL-5 PSS, LEC, PCL-5, AAQ, TMT	None NA Completer	Multiple 60 m 16 w Av. 108 m (71)	Not reported NA NA	High Excluded – no control 0%
47.	Bilderbeck, A et al., 2013[RCT] UK, NGO	Incarcerated (167) 37 ± 2y 8% Female	Impulsivity Correctional Lifetime	Hatha Yoga (87) BIS BIS, PANAS, **PSS***, BSI	Waitlist (80) Passive Completer	1 x 120 m 10 w 1200 m	None	Low Included 40% (42, 25)
48.	Brown, J. 2017 [UCT] USA, Not reported	Low-income with mental illness (18) 36 ± 10y 100%	Depression, Anxiety or PTSD Local health Lifetime	Yoga Therapy (18) PCL-C QOLS, **UPID***, STAI	None	Not reported 6 w, FU1 6mo Not known	None NA NA	High Excluded – no control 33% (3,3)
49.	Butler et al., 2008 [RCT] USA, NGO	Community (46) 50 ± 15y 74% Female	Dysthymia Outpatient Lifetime trauma	Meditation+Yoga (15) SCID & custom CDRS-SR, **HRSD**	Hypnosis (11/15) **Psychoeducation (16)*** Active	1 x 120 m(+4 h) 8 w, FU1 6mo, FU2 9mo 1200 min	30 min Manual, Audio	High Excluded – Excluded PTSD 48% (22)
50.	Clark et al., 2014[(mostly) UCT] USA, Public	Community (17) 43 ± 9y 100%	Anxiety/PTSD Local Health Domestic Violence	Trauma-sensitive Yoga (8) PCL-C PHQ-9, HADS, STAI	TAU (9) Passive 30%	1 x 30–40 m 12 w ~360–480 m	None NA NA	High Excluded – no control 29% (5)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
51.	Cushing, R. et al., 2018 [UCT] USA, Public	Veterans (23) 43 ± 10y 50% Female	PTSD VA Center Combat	Trauma-Sensitive Yoga (23) PCL **PCL***, PHQ, BAI, PSQI, MAAS	None Completer	1 x 60 m 6 w 360 m	None NA NA	High Excluded – no control 22% (5)
52.	Danielly, Y. 2017[RCT] USA, NGO	Incarcerated (62) 38 ± 10y 100% Female	Stress Correctional Lifetime/Acute	Trauma-sensitive Yoga (33) None **PSS***, FFMQ, DASS, Rumination, Brief Control	Waitlist (17) Passive Completer	1 x 60 m 10 w 600 m	None NA NA	High Included 19% (12)
53.	Harner et al., 2010 [UCT] USA, NGO	Incarcerated (21) 43 ± 5y 100% Female	Depression Correctional Lifetime	Iyengar Yoga (17) None BDI, BAI, PSS	None NA ITT	2 x 120 m/w 12 w 2880 m	None NA NA	High Excluded – no control 71% (15)
54.	Jindani, et al., 2015[RCT] Canada, Unfunded	Community (80) M = 41y 89% Female	PTSD Local Health Lifetime/Chronic	Trauma-sensitive Kundalini Yoga (49) PCL-17 **PCL-17***, RS-25, PANAS-20, FFMQ-39, ISI, PSS, DASS	Waitlist (21) Passive Completer	1 x 90 m/w 8 w 720 m	Yoga 15 m YouTube Video	Low Included 38% (30)
55.	Johnston et al., 2015 [UCT] USA, Public	Active duty or veteran (38) 51 ± 8y 8% Female	PTSD Community Combat-related	Kripalu Yoga (12) SCID, CAPS **CAPS***, RS, FFMQ,	None NA Completer	1 x 90 m/w 10 w 90 m	Practice 15 m Audio	High Excluded – no control 40% (8)
56.	Kerekes et al., 2017 [RCT] Sweden, Public	Incarcerated (226) 36 ± 9y 13% Female	Stress Correctional Lifetime Acute	Yoga (134) None PSS, PAMA, PANAS, CPT II, PSQI, BSI	Waitlist (92) Passive Completer	1 x 90 m 10 w 900 m	None NA NA	Low Included 33% (57,17)
57.	McCarthy et al., 2017 [UCT] Australia	Veteran (30) 64 ± 8y 3% Female	PTSD Outpatient Combat Chronic	Trauma-Sensitive Hatha Yoga (28) PCL PCL, DASS, PSQI, ASP, SF36, interview	None NA Completer	1 x 90 m 8 w 720 m	Yoga Not reported Audiovisual	High Excluded – no control 7% (2)
58.	Mitchell et al., 2014 [RCT] USA, Public	Vet./Civilian (38) 44 ± 12y 100% Female	PTSD Local Health Lifetime Chronic	Trauma-sensitive Kripalu Yoga (20) SCID-IV, PSS-I, PC-PTSD **PCL-C***, TLEQ, CES-D, STAI,	Assessment (18) Passive ITT, all avail.	1 x 75 m 12 w, FU1 4 w 900 m	Mindfulness Not reported Not reported	Low Included 32% (6,6)

(*Continued*)

Table 3. (Continued).

Ref	First Author, Year[StudyDesign] Country, Funder	Population (N) Mean Age±SD % Female	Main outcome Setting Trauma Type	Intervention (N) Trauma Screen Outcomes	Control (N) Type Analysis	Dose (mins./wk.) Duration (wks.) Total mins.	Homework Min/Day Type	Cochrane Risk of Bias Meta-analysis inclusion? Attrition (n)
59.	Price, M. et al., 2017 [UCT] USA, Not reported	Community (9) M = 41y 100%	Chronic PTSD Trauma Center Lifetime	Trauma-sensitive Hatha Yoga (6) CAPS CAPS*, DTS, DES, GAF	None NA ITT+Completer	1 x 60 m 20 w, FU1 2mo 1200 m	Practice 3 x 30 m/w Audio/video	High Excluded – no control 33% (3)
60.	Quinones et al., 2015 [RCT] Colombia, Mixed	Ex-Militia (100) Not reported 27% Female	PTSD Secured Violence Acute/ Chronic	Satyananda Yoga (50) PCL-C PCL-C*	TAU (50) Passive ITT, no imputation missing <5%	1 x 60 m 16 w, FU1 4 w 960 m	Yoga Not reported Audio, Handbook	Low Included 6.0% (2,4)
61.	Reinhardt et al., 2017[RCT] USA, Public	Veteran (51) 48 ± 14 11% Female	PTSD Outpatient Combat Chronic	Kripalu Yoga (26) CAPS **PCL-M***, PCL-C, IES-R	Waitlist (25) Control (12) Completer	2 x 90 m 10 w, FU1 12 w 1800 m	Not reported NA NA	Low Included 70.6% (17,19)
62.	Staples et al., 2013 [UCT] USA, Unfunded	Veteran (15) 62 ± 2 17% Female	PTSD Outpatient Combat Chronic	Yoga (12) PCL-M PCL-M, PSQI, STAI, OQ	None NA Completer	2 x 60 m/w 6 w 720 m	Not reported NA NA	High Excluded – no control 20% (3)
63.	Telles, S. et al., 2007 [UCT] India, NGO	Community (47) 28–50y Not reported	Anxiety Temporary camps Natural disaster	Vivekananda Yoga None VAS, HRV	None NA ITT	1 x 60 m 8d 480 m	Not reported NA NA	High Excluded – no control Not reported
64.	Telles et al., 2010 [RCT] India, NGO	Community (22) 35 ± 7y 0% Female	PTSD Temporary Camp Natural Disaster Acute	Swami Ramdev Yoga (11) SQD HRV, **VAS** (Fear, **Anxiety***, Disturbed Sleep, Sadness)	Waitlist (11) Passive ITT	7 x 60 m 1 w 420 m	Not reported NA NA	High Included 0%
65.	Thordardottir, K. 2014[CT] Iceland, NGO	Community (66) 23–66y 93% Female	Stress Localized/Village Natural Disaster Acute/Chronic	Hatha Yoga (31) PSS-10 **PSS-10***, PDS, BDI-II*, BAI, IQL,	Waitlist (35) Passive Completer	2 x 60 m/w 6 w 720 m	Not reported NA NA	High Included 14% (5,4)
66.	Van der Kolk, 2014 [RCT] USA, Public	Community (64) 43 ± 12 100% Female	PTSD Trauma Center Multiple/IPV	Trauma-Sensitive Yoga (32) SCID-IV, CAPS, GAF **CAPS***, DES, IASC, DTS, BDI-II	Health Ed. (32) Active ITT, max. like.	1 x 60 m 10 w 600 m	None	Low Included 6% (1,3)
67.	**Total**	**Total n = 5659 50% Female**			**Completer n = 4150**			**27% Attrition**

Table 4. Systematic review summary.

Subgroup	Total Studies	% Studies	Total (n)	% N	% Female	INT (n)	CON (n)	% INT Av. Attrition	% CON Av. Attrition	% Overall Attrition
MBSR	18	27	2724	48	40	2490	350	28	5	21
Other Mindfulness	21	32	1507	27	52	956	340	19	24	15
Yoga	22	33	1166	21	58	697	406	24	20	29
Integrative exercise	5	8	262	5	45	216	37	14	26	16
Total	**66**		**5659**		**50**	**4359**	**1133**	**24**	**23**	**15**
Trauma Type										
Combat-related	27	41	1397	25	17	950	394	25	17	19
Incarcerated	6	9	2466	44	57	2261	369	33	12	34
Natural disaster	4	6	203	4	56	122	44	15	3	31
Other lifetime	29	44	1593	28	79	1026	326	23	16	23
Control Type										
Active	9	14	725	13	34	355	292	23	19	24
Passive	27	41	3479	61	46	2797	841	19	14	17
None	30	45	1455	26	60	1207	-	29	-	27

studies (k = 27/66, 41%) used passive controls, but k = 30/66 (45%) did not use controls and were also excluded from meta-analysis.

Of the remaining 35 studies, a further ten studies were excluded for methodological or quality issues. Butler et al. (2008) investigated long-term depression and screened for trauma, but did not report trauma exposure. Caldwell and Shaver (2015) examined attachment-based mindfulness in women maltreated in childhood, but used outcomes of rumination and emotion regulation. Marzabadi and Zadeh (2014) used nonspecific quality of life outcomes. Despite follow-up, Clark et al. (2014) did not have sufficient control data and Garland et al. (2010) had a sample without 100% trauma exposure. Ghahari et al. (2017), Omidi et al. (2013), and Michalopoulou et al. (2015) reported insufficient data for extraction, and Spidel et al. (2017) reported low baseline symptoms.

Meta-analysis

Initial meta-analysis with 25 studies demonstrated a pooled moderate effect with moderate-large heterogeneity (g = 0.57, 0.38 to 0.76, I^2 = 69.45%, $p < .001$). However, as demonstrated in the funnel plot at Figure 2, there was a significant outlier in Garland et al. (2016). This transdiagnostic study had large effects, g = 1.99, 1.54 to 2.43, $p < .001$, and a relative weight of 4.59% with a high standard residual of 3.19. There were also three other potential outlier studies with effect sizes greater than one and residuals greater than two. However, the funnel plot did not show other significant asymmetry on 25 (Egger's β = 1.09, −1.73 to 3.90 two-tailed $p = .43$) or 24 studies (β = 1.48, −0.39 to 3.34, two-tailed $p = .12$).

To check this, a Duval and Tweedie's trim and fill analysis with random effects were run on 25 studies, trimming five studies to the right of the mean, and strengthening effects (g = 0.70, 0.51 to 0.89, Q = 118.16). After removing Garland et al. (2016), a Duval and Tweedie's trim and fill on 24 studies trimmed just one study to the right of the mean with a marginal reduction in effects (g = 0.51, 0.37 to 0.64, Q = 39.64). This confirmed the 24-study analysis.

The final meta-analysis of 24 studies demonstrated a pooled, significant, moderate effect (g = 0.48, 0.35 to 0.62, $p < .001$) with more moderate heterogeneity (Q = 35.70, df = 23, $p = .04$, I^2 = 35.58). Subgroup analysis by intervention in Figure 3 marginally strengthened the pooled effect (g = 0.51, 0.31 to 0.71, $p < .001$). Twelve MBSR and other mindfulness studies were combined for a significant, moderate, overall pooled effect (g = 0.45, 0.26 to 0.64, $p < .001$) with low heterogeneity (Q = 9.00, df = 11, $p = .62$, $I^2 < 0.001$). Ten yoga studies had a similar effect (g = 0.46, 0.26 to 0.66, $p < .001$) with moderate-large heterogeneity (Q = 21.69, df = 9, $p = .01$, I^2 = 58.50). Integrative exercise had a strong overall effect, but just two studies (g = 0.94, 0.37 to 1.51, $p = .001$) and some heterogeneity (Q = 1.62,

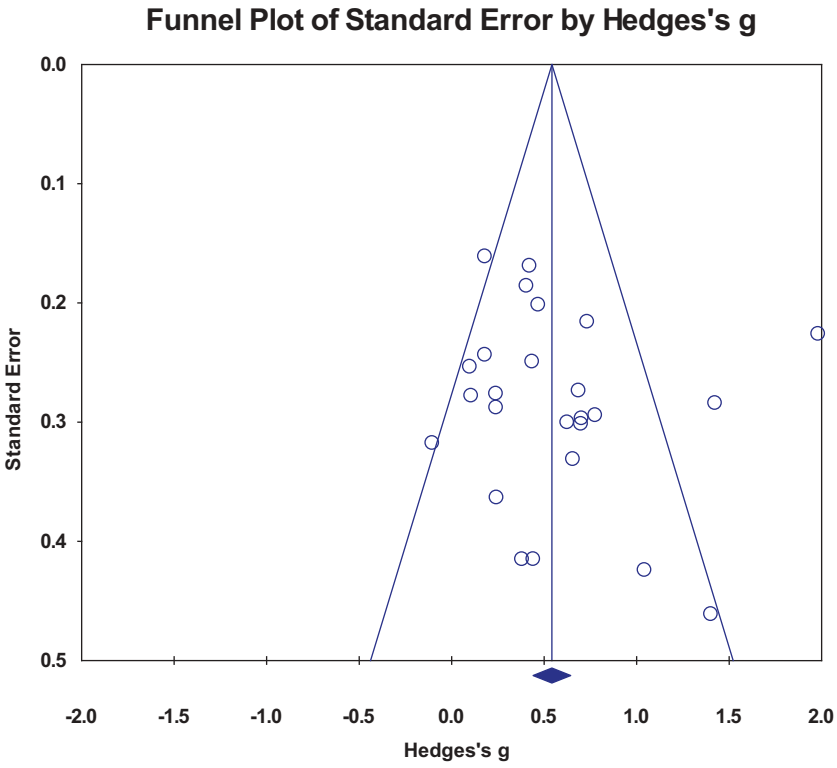

Figure 2. Funnel plot of 25 studies.

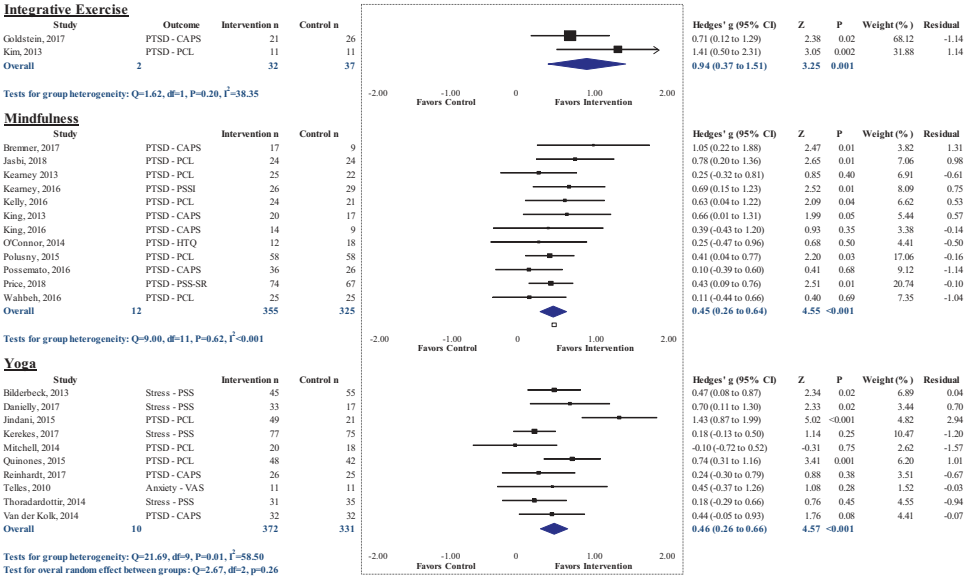

Figure 3. Meta-analysis by intervention type – 24 studies.

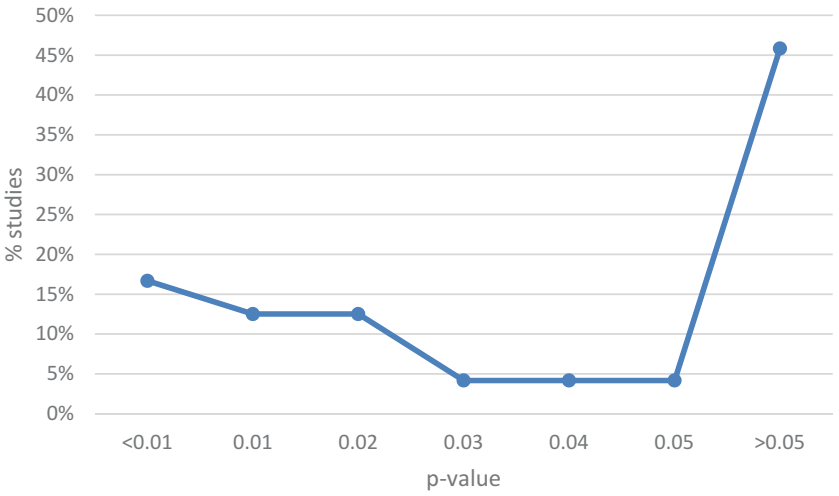

Figure 4. P-curve analysis for publication bias.

df = 1, p = .20, I^2 = 38.35). In random effects analysis, there was no significant heterogeneity between intervention types (Q = 2.67, df = 2, p = .26), although fixed effects sensitivity analysis showed greater heterogeneity within studies (Q = 32.30, df = 21, p = .055). At this stage, only two studies remaining in the meta-analysis were classified as high risk of bias, both of yoga. All others were low risk. A sensitivity analysis to excluding these two high-risk studies resulted in a very small increase in effect size for yoga from 0.46 to 0.48. Publication bias was also further tested with a p-curve analysis at Figure 4.

The results of other subgroup analysis are described in Table 5. There was no significant different between trauma types in this meta-analysis. Studies in combat-related (k = 13/24, 54%, g = 0.45, p < .001), incarcerated (k = 3/24, 13%, g = 0.56, p = .02), and lifetime (k = 6/24, 25%, g = 0.58, p < .001), trauma demonstrated significant, moderate effects, but not in natural disaster (k = 2/24, 8%, g = 0.27, p = .32). Lifetime trauma showed moderate-large heterogeneity (I^2 = 68.75%): O'Connor et al. (2014) investigated elderly bereavement; Kim et al. (2013) assessed occupational trauma exposure in nurses; and the remaining four studies examined community samples exposed to a high proportion of interpersonal violence, including childhood sexual abuse.

Outcomes were also not significantly different, although most outcomes were trauma-related. Seven (k = 7/24, 29%) studies used the Clinician-Administered PTSD Scale (CAPS) as primary outcome with moderate effects (g = 0.46, p < .001). Nine studies (k = 9/24, 38%) used the self-report PTSD checklist (PCL-5) with stronger effects (g = 0.58, 0 < 0.001). Four studies (k = 4/

Table 5. Other subgroup meta-analysis.

Subgroup	Studies	Weight (%)	Hedges' g (95% CI)	P	Q	df	P	I^2
Trauma Type								
Combat	13	54%	0.45 (0.25 to 0.65)	<0.001**	14.38	12	0.28	16.53
Incarceration	2	8%	0.56 (0.10 to 1.03)	0.02*	0.40	1	0.53	0.00
Natural disaster	2	8%	0.27 (−0.26 to 0.81)	0.32	0.30	1	0.59	0.00
Lifetime trauma	7	29%	0.58 (0.32 to 0.84)	<0.001**	19.20	6	0.004**	68.75
Total within					**34.27**	**20**	**0.02***	
Total between random effects					**1.34**	**3**	**0.72**	
Overall random effects	**24**		**0.49 (0.33 to 0.65)**	**<0.001****				
Outcomes								
Other	4	17%	0.47 (0.12 to 0.81)	0.01*	1.09	3	0.78	0.00
PTSD – CAPS	7	29%	0.46 (0.19 to 0.74)	0.001**	5.56	6	0.47	0.00
PTSD – PCL	9	38%	0.58 (0.35 to 0.82)	<0.001**	22.68	8	0.004*	64.73
Stress – PSS	4	17%	0.35 (0.05 to 0.66)	0.02*	3.19	3	0.36	6.05
Total within					**32.53**	**20**	**0.04***	
Total between random effects					**1.48**	**3**	**0.69**	
Overall random effects	**24**		**0.48 (0.33 to 0.63)**	**<0.001****				
Study Funding								
Non-government (NGO)	7	29%	0.53 (0.30 to 0.76)	<0.001**	4.16	6	0.66	0.00
Not reported/funded	2	8%	1.12 (0.70 to 1.53)	<0.001**	2.49	1	0.11	59.90
Public	15	63%	0.38 (0.24 to 0.51)	<0.001**	16.58	14	0.28	15.55
Total within					**23.23**	**21**	**0.33**	
Total between random effects					**11.15**	**2**	**0.004***	
Overall random effects	**24**		**0.62 (0.28 to 0.96)**	**<0.001****				
Intervention Duration								
<8 weeks	4	17%	0.18 (−0.13 to 0.48)	0.26	0.56	3	0.91	0.00
8–9 weeks	10	42%	0.69 (0.48 to 0.89)	<0.001**	16.07	9	0.07	43.98
≥10 weeks	10	42%	0.42 (0.25 to 0.59)	<0.001**	9.22	9	0.42	2.42
Total within					**25.85**	**21**	**0.21**	
Total between random effects					**8.39**	**2**	**0.02***	
Overall random effects	**24**		**0.44 (0.17 to 0.72)**	**0.001****				
Session duration								
≤75 minutes	10	42%	0.50 (0.28 to 0.73)	<0.001**	14.16	9	0.12	36.42

(*Continued*)

Table 5. (Continued).

Subgroup	Studies	Weight (%)	Hedges' g (95% CI)	P	Q	df	P	I^2
>75 minutes	14	58%	0.47 (0.30 to 0.65)	<0.001**	21.32	13	0.07	39.02
Total within					**35.48**	**22**	**0.03***	
Total between random effects					**0.04**	**1**	**0.84**	
Overall random effects	**24**		**0.48 (0.35 to 0.62)**	**<0.001****				
Total contact timee								
≤600 minutes	5	21%	0.41 (0.09 to 0.73)	0.01*	5.13	4	0.27	22.03
>600 minutes	19	79%	0.50 (0.35 to 0.65)	<0.001**	30.26	18	0.03*	40.52
Total within					**35.39**	**22**	**0.04***	
Total between random effects					**0.28**	**1**	**0.60**	
Overall random effects	**24**		**0.48 (0.35 to 0.62)**	**<0.001****				
Control type								
Active	8	33%	0.49 (0.25 to 0.72)	<0.001**	5.14	7	0.64	0.00
Passive	16	67%	0.48 (0.31 to 0.66)	<0.001**	30.56	15	0.01*	50.92
Total within					**35.70**	**22**	**0.03***	
Total between random effects					**0.00**	**1**	**0.98**	
Overall random effects	**24**		**0.48 (0.35 to 0.62)**	**<0.001****				
Condition type								
Acute	5	21%	0.36 (0.09 to 0.63)	0.01*	3.27	4	0.51	0.00
Chronic	19	79%	0.52 (0.37 to 0.68)	<0.001**	30.23	18	0.04*	40.46
Total within					**33.51**	**22**	**0.055**	
Total between random effects					**1.03**	**1**	**0.31**	
Overall random effects	**24**		**0.48 (0.34 to 0.62)**	**<0.001****				
Homework								
No	8	33%	0.41 (0.18 to 0.64)	<0.001**	8.73	7	0.27	19.77
Yes	16	67%	0.52 (0.35 to 0.69)	<0.001**	25.46	15	0.04*	41.09
Total within					**34.19**	**22**	**0.05***	
Total between random effects					**0.53**	**1**	**0.47**	
Overall random effects	**24**		**0.48 (0.35 to 0.62)**	**<0.001****				
Retreat								
No	20	83%	0.48 (0.32 to 0.63)	<0.001**	32.44	19	0.03*	41.44
Yes	4	17%	0.53 (0.19 to 0.86)	0.002*	3.16	3	0.37	5.19
Total within					**35.61**	**22**	**0.03***	

(*Continued*)

Table 5. (Continued).

Subgroup	Studies	Weight (%)	Hedges' g (95% CI)	P	Q	df	P	I^2
Total between random effects					**0.07**	**1**	**0.79**	
Overall random effects	**24**		**0.48 (0.35 to 0.62)**	**<0.001****				
Trauma Sensitive								
No	14	58%	0.45 (0.26 to 0.64)	<0.001**	14.25	13	0.36	8.74
Yes	10	42%	0.53 (0.32 to 0.73)	<0.001**	21.08	9	0.01*	57.32
Total within					**35.33**	**22**	**0.04***	
Total between random effects					**0.29**	**1**	**0.59**	
Overall random effects	**24**		**0.48 (0.35 to 0.62)**	**<0.001****				

*p ≤ 0.05, **p ≤ 0.001

24, 17%) used the Perceived Stress Scale (PSS) in mostly acute settings, three correctional; and one natural disaster, with weaker effects (g = 0.35, p = .02).

Other outcomes demonstrated moderate effects (g = 0.47, p = .01). A natural disaster study used a visual analogue stress scale (VAS, Telles et al., 2010). A study with a depression primary outcome, also measured trauma symptoms with the Harvard Trauma Questionnaire (HTQ) so this was extracted (O'Connor et al., 2014). Another study used the short-form McGill Pain Questionnaire (MPQ) as primary outcomes, but also used the PTSD Symptom Scale Interview (PSS-I) and this was extracted (Kearney et al., 2016). The final study used mindfulness and interoception as primary outcomes, but also measured trauma symptoms with the self-report PTSD Symptom Scale (PSS-SR) so this was used in meta-analysis (Prince & Hooven, 2018; Price et al., 2018).

Study funding sources did show significant between-group heterogeneity (Q = 11.15, df = 2, p < .001). Two studies without funding declarations reported strong effects (g = 1.12, p < .001), compared to NGO- (g = 0.53, p < .001) or publicly funded (g = 0.38, p < .001) studies. NGO-funded studies were smaller and used marginally more yoga (k = 4/7, 57%, n = 250/368, 64%) than mindfulness interventions (k = 3/7, 43%, n = 118/368, 32%). Publicly funded studies were larger and used more mindfulness (k = 8/15, 53%, n = 554/1,176, 47%), than yoga (k = 5/15, 33%, n = 546/1,176, 46%) or integrative exercise (2/15, 13%, n = 76/1,176, 7%).

Total intervention duration was also significant between-groups (Q = 8.39, df = 2, p = .02), and interventions of 8–9 weeks were more effective (g = 0.69, p < .001) than longer (g = 0.42, p < .001) or shorter durations (g = 0.18, p = .26). Ten studies (10/24, 42%) used interventions of 8–9 weeks: eight mindfulness; one yoga; and one integrative exercise. Ten studies (10/24, 42%) used longer interventions: seven yoga; two mindfulness; and one integrative exercise. Of four studies (4/24, 17%) with durations less than 8 weeks, two were yoga and two were mindfulness.

Other factors were not significantly different between-groups. Sessions up to 75 minutes were as effective (g = 0.50, p < .001) as longer sessions (g = 0.47, p < .001). Interventions with up to 600-min total contact time (75 min once a week for 8 weeks) were only marginally less effective (g = 0.41, p < .001) than interventions with more contact time (g = 0.50, p < .001). Effect sizes were also similar between studies with active (g = 0.49) and passive control groups (g = 0.48), with (g = 0.52) and without (g = 0.41) homework, and with (g = 0.53) and without (g = 0.48) a retreat.

Although trauma-specific interventions had marginally larger effects (g = 0.53, p < .001) than those without (g = 0.45, p < .001), the difference was not statistically significant. Similarly, these interventions had greater effects on chronic (g = 0.52) rather than acute (g = 0.36) trauma exposure, but the difference between groups was not significant.

Four studies reported adverse effects and these were mild (Kearney et al., 2013; Mitchell et al., 2014; Quinones et al., 2015; Telles et al., 2010). Wider search results returned 32 reports of adverse medical events caused by yoga and most of these were individual, musculoskeletal case-studies. There was one case study of psychosis relapse following a Bikram yoga instructor training seminar.

Discussion

In this meta-analysis, mindfulness (g = 0.45, $p < 0001$) and yoga (g = 0.46, $p < .001$) interventions showed similar, moderate effects, and two studies of integrative exercise showed large effects (g = 0.94, $p < .001$). As other reviews found, heterogeneity was significant and moderate-high in yoga interventions ($Q = 21.69$, $df = 9$, $p = .01$, $I^2 = 58.50$). However, it may be due to greater clinical diversity, such as trauma types, intervention complexity, and settings, rather than methodological diversity, given 70% of yoga studies used passive controls. Small sample sizes also contribute to this finding (Higgins & Green, 2008).

This review found that only 55% (36/66) of all published studies evaluating the effectiveness of mindfulness, yoga, and integrative exercise for trauma-exposed people, used controls to assess intervention efficacy. Moreover, 75% (27/36) of these used passive controls. Therefore, as other reviews have found, more randomized, active-controlled studies are needed.

While the lack of active controls in this literature may be funding-related, it may also be a product of the characteristics of such interventions. MBIs are low-cost, moderate-high acceptability interventions that can be delivered safely in adjunctive and trauma-informed modalities. They demonstrate moderate overall effects on psychiatric symptoms and appear effective for different trauma types with minimal adverse effects.

Two characteristics of MBIs, funding source and intervention duration, were significantly different between groups in this review. Seven NGO-funded studies reported higher effect sizes compared to 15 publicly funded studies, but with only one more yoga than mindfulness intervention. This is insufficient evidence of publication bias by intervention type and, as such, public funding of yoga and integrative exercise, as well as mindfulness research, should not be discouraged. This and the overall findings of this review are contrary to the current exclusion of yoga in contemporary public health funding (Department of Health, 2019; Patwardhan & Lloyd, 2017).

Intervention duration also demonstrated a statistically significant difference between groups. Interventions less than 8 weeks duration was not effective, and those lasting 8–9 weeks were more effective (g = 0.69), than longer studies (g = 0.42). While this is encouraging from a cost and implementation perspective, it may also be due to consistent use of the 8-week MBSR protocol, even in 'other mindfulness' interventions.

In the mindfulness literature, the MBSR protocol is notable for its lengthy 1620 min total contact time, with 2.5-h weekly sessions and 7-h retreat over 8 weeks (J. Kabat-Zinn et al., 1992). However, this analysis did not find significant between-group differences in these characteristics. Interventions with a session duration of 75 minutes or less were as effective, although non-significant, as those with longer sessions. Interventions with a total contact time of 600 minutes or less, as well as those without a retreat, reported similar non-significant effects. This is relevant in trauma-informed care where participant attention, engagement, and adherence may already be challenging. Nonetheless, yoga and integrative exercise interventions should adopt such a consistent, minimum protocol to reduce heterogeneity.

A minimum protocol might include a minimum of weekly 1-h sessions over 8 weeks with an active control and optional intensive session. The intervention might be trauma-informed, but may not need to be trauma-specific. While trauma screening should be undertaken and trauma symptom measurement included, eligibility should not be limited to trauma-specific disorders in line with a transdiagnostic approach.

This review identified key gaps in the literature surrounding trauma and MBIs. The second most common reason for excluding a study of an MBI from the systematic review was lack of systematic ascertainment of trauma exposure, or at least a failure to report this, in clinical samples defined by diagnoses other than PTSD. This information is commonly gathered in diagnostic or clinical interviews rather than being screened for like most other risk factors or known causes of mental ill-health. Systematic ascertainment of key trauma exposure characteristics such as type, frequency and number of events and age at the event should be standard enabling the impact of trauma to be evaluated across the spectrum of conditions. A useful transdiagnostic approach is to evaluate MBI effectiveness in samples defined by their exposure to trauma by either context (as in four studies of incarceration or occupation in this review) or events (three studies of natural disaster or bereavement), with results suggesting lower efficacy in people targeted for exposure to natural disasters.

Of the remaining "clinical" studies that we could include in the meta-analysis, 15/18 (83%) were of samples defined by a PTSD diagnosis, two by SUD and one each by depression and bereavement, preventing any trans-diagnostic analysis or interpretation. Given trauma is a risk for all psychiatric conditions and MBIs are not defined by diagnoses, intervention studies in mixed clinical samples from primary and secondary care settings, rather than very restricted and poorly generalizable "diagnostic-based" samples, such as combat-related or gender-related PTSD, are warranted.

The other gap in the literature appears to be a measurement of trauma exposure and psychiatric symptoms for occupational or secondary traumatic stress. It is widely accepted in military occupations, but studies in trauma-exposed civilian occupations, such as first-responder, medical, and health-care professionals, prefer

to measure stress and burnout rather than trauma exposure or psychiatric symptoms which warrants further investigation (Argentero et al., 2015; Chopko & Schwartz, 2013; Christopher et al., 2016; Palmer et al., 2014).

Limitations

These findings should be interpreted with caution. While there are common treatment components, the complexity of the mindfulness and yoga interventions discussed impacts analysis. It is also a limitation that this analysis has been constrained to published studies. We are unaware if the inclusion of unpublished studies would have yielded higher or lower effects, although the latter is more likely as null trials are less likely to be submitted and/or published (Song et al., 2017). This analysis has also used immediate post-intervention outcomes in the analysis which may under- or overstate medium and long-term intervention impacts, depending on whether the effect decays or leads to longer-term changes. Several of these complex interventions also included cognitive therapeutic components that may influence findings (Jasbi et al., 2018; A.P. King et al., 2013; O'Connor et al., 2014; C. J. Price et al., 2018).

Conclusion

Mindfulness, yoga, and integrative exercise interventions are effective adjuncts to clinical programs targeting trauma-exposed people. Further research with long term follow-up is required, but a transdiagnostic approach that treats trauma exposure as a psychiatric risk, rather than diagnostic, factor is advised.

Contributions

NG is the guarantor. JT drafted the manuscript. All authors contributed to selection criteria and strategy for the risk of bias assessment and data extraction. JT and ES assessed individual articles for inclusion. Any discrepancies were resolved by NG.

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References

Abbott, R., & Lavretsky, H. (2013). Tai Chi and Qigong for the treatment and prevention of mental disorders. *Psychiatric Clinics of North America*, *36*(1), 109–119. https://doi.org/10.1016/j.psc.2013.01.011

Allen, K. N., & Wozniak, D. F. (2011). The language of healing: Women's voices in healing and recovering from domestic violence. *Social Work in Mental Health*, *9*(1), 37–55. https://doi.org/10.1080/15332985.2010.494540

Amaro, H., Spear, S., Vallejo, Z., Conron, K., & Black, D. S. (2014). Feasibility, acceptability, and preliminary outcomes of a mindfulness-based relapse prevention intervention for culturally-diverse, low-income women in substance use disorder treatment. *Substance Use and Misuse*, *49*(5), 547–559. https://doi.org/10.3109/10826084.2013.852587

APA. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Fifth ed.)

Argentero, P., Setti, I., Piccoli, B., & Bellotto, M. (2015). The impact of mindfulness on psychosomatic complaints among firefighters: The mediator role of vicarious traumatization. *International Journal of Business Research*, *15*(2), 7–12. https://doi.org/10.18374/IJBR-15-2.1

Avery, T., Blasey, C., Rosen, C., & Bayley, P. (2018). Psychological flexibility and set-shifting among veterans participating in a yoga program: A pilot study. *Military Medicine*. doi: 10.1093/milmed/usy045

Bhatnagar, R., Phelps, L., Rietz, K., Juergens, T., Russell, D., Miller, N., & Ahearn, E. (2013). The effects of mindfulness training on post-traumatic stress disorder symptoms and heart rate variability in combat veterans. *The Journal of Alternative and Complementary Medicine*, *19*(11), 860–861. https://doi.org/10.1089/acm.2012.0602

Bilderbeck, A. C, Farias, M, Brazil, I. A, Jakobowitz, S, & Wikholm, C. (2013). Participation in a 10-week course of yoga improves behavioural control and decreases psychological distress in a prison population. *Journal Of Psychiatric Research*, *47*(10), 1438-1445. doi: http://dx.doi.org/10.1016/j.jpsychires.2013.06.014

Borenstein, M., Hedges, L. V., Higgins, J. P. T. and Rothstein, H. R. (Eds.). (2009). Chapter 4 Effect Sizes Based on Means in Introduction to Meta-Analysis (pp. 21–32). Chichester, UK: John Wiley & Sons Ltd. https://doi.org/10.1002/9780470743386.ch4

Bowen, S., Somohano, V. C., Rutkie, R. E., Manuel, J. A., & Rehder, K. L. (2017). Mindfulness-based relapse prevention for methadone maintenance: A feasibility trial. *The Journal of Alternative and Complementary Medicine*, *23*(7), 541–544. https://doi.org/10.1089/acm.2016.0417

Boyd, J. E., Lanius, R. A., & McKinnon, M. C. (2018). Mindfulness-based treatments for posttraumatic stress disorder: A review of the treatment literature and neurobiological evidence. *Journal of Psychiatry and Neuroscience*, *43*(1), 7–25. https://doi.org/10.1503/jpn.170021

Bremner, J. D., Mishra, S., Campanella, C., Shah, M., Kasher, N., Evans, S., Fani, N., Shah, A. J., Reiff, C., Davis, L. L., Vaccarino, V., & Carmody, J. (2017). A pilot study of the effects of mindfulness-based stress reduction on post-traumatic stress disorder symptoms and brain response to traumatic reminders of combat in operation enduring freedom/ operation Iraqi freedom combat veterans with post-traumatic stress disorder. *Frontiers in Psychiatry*, *8*(AUG), 157. https://doi.org/10.3389/fpsyt.2017.00157

Brown, J. L. C., Eubanks, C., & Keating, A. (2017). Yoga, quality of life, anxiety, and trauma in low-income adults with mental illness: A mixed-methods study. *Social Work in Mental Health*, *15*(3), 308–330. doi: 10.1080/15332985.2016.1220441

Brudey, C., Park, J., Wiaderkiewicz, J., Kobayashi, I., Mellman, T., & Marvar, P. J. (2015). Autonomic and inflammatory consequences of posttraumatic stress disorder and the link

to cardiovascular disease. *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*, *309*(4), R315–R321. https://doi.org/10.1152/ajpregu.00343.2014

Butler, L. D., Waelde, L. C., Hastings, T. A., Chen, X. H., Symons, B., Marshall, J., Kaufman, A., Nagy, T. F., Blasey, C. M., Seibert, E. O., & Spiegel, D. (2008). Meditation with yoga, group therapy with hypnosis, and psychoeducation for long-term depressed mood: A randomized pilot trial. *Journal of Clinical Psychology*, *64*(7), 806–820. https://doi.org/10.1002/jclp.20496

Caldwell, J. G., & Shaver, P. R. (2015). Promoting attachment-related mindfulness and compassion: A wait-list-controlled study of women who were mistreated during childhood. *Mindfulness*, *6*(3), 624–636. https://doi.org/10.1007/s12671-014-0298-y

Cavicchioli, M., Movalli, M., & Maffei, C. (2018). The clinical efficacy of mindfulness-based treatments for alcohol and drugs use disorders: A meta-analytic review of randomized and nonrandomized controlled trials. *European Addiction Research*, *24*(3), 137–162. https://doi.org/10.1159/000490762

Chopko, B. A., & Schwartz, R. C. (2013). The relation between mindfulness and posttraumatic stress symptoms among police officers. *Journal of Loss and Trauma*, *18*(1), 1–9. https://doi.org/10.1080/15325024.2012.674442

Christopher, M. S., Goerling, R. J., Rogers, B. S., Hunsinger, M., Baron, G., Bergman, A. L., & Zava, D. T. (2016). A pilot study evaluating the effectiveness of a mindfulness-based intervention on cortisol awakening response and health outcomes among law enforcement officers. *Journal of Police and Criminal Psychology*, *31*(1), 15–28. https://doi.org/10.1007/s11896-015-9161-x

Clark, C. J., Lewis-Dmello, A., Anders, D., Parsons, A., Nguyen-Feng, V., Henn, L., & Emerson, D. (2014). Trauma-sensitive yoga as an adjunct mental health treatment in group therapy for survivors of domestic violence. *Complementary Therapies in Clinical Practice*, *20*(3), 152–158. https://doi.org/10.1016/j.ctcp.2014.04.003

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*, *4*(1), 20706. https://doi.org/10.3402/ejpt.v4i0.20706

Cloitre, M., Stolbach, B. C., Herman, J. L., van der Kolk, B., Pynoos, R., Wang, J., & Petkova, E. (2009). A developmental approach to complex PTSD: Childhood and adult cumulative trauma as predictors of symptom complexity. *Journal of Traumatic Stress*, *22*(5), 399–408. https://doi.org/10.1002/jts.20444

Cole, M. A., Muir, J. J., Gans, J. J., Shin, L. M., D'Esposito, M., Harel, B. T., & Schembri, A. (2015). Simultaneous treatment of neurocognitive and psychiatric symptoms in veterans with post-traumatic stress disorder and history of mild traumatic brain injury: A pilot study of mindfulness-based stress reduction. *Military Medicine*, *180*(9), 956–963. https://doi.org/10.7205/milmed-d-14-00581

Craig, A. D. (2003). Interoception: The sense of the physiological condition of the body. *Current Opinion in Neurobiology*, *13*(4), 500–505. https://doi.org/10.1016/s0959-4388(03)00090-4

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. 2006. *Developing and evaluating complex interventions*. Medical Research Council, United Kingdom. Retrieved from www.mrc.ac.uk/complexinterventionsguidance.

Cramer, H., Anheyer, D., Saha, F. J., & Dobos, G. (2018). Yoga for posttraumatic stress disorder - a systematic review and meta-analysis. *BMC Psychiatry*, *18*(1), 72. https://doi.org/10.1186/s12888-018-1650-x

Cushing, R. E., Braun, K. L., Alden, C. I. S. W., & Katz, A. R. (2018). Military-tailored yoga for veterans with post-traumatic stress disorder. *Military Medicine*. doi: 10.1093/milmed/usx071

D'Andrea, W., & Pole, N. (2012). A naturalistic study of the relation of psychotherapy process to changes in symptoms, information processing, and physiological activity in complex trauma. *Psychological Trauma: Theory, Research, Practice, and Policy*, *4*(4), 438–446. https://doi.org/10.1037/a0025067

Danielly, Y., & Silverthorne, C. (2017). Psychological benefits of yoga for female inmates. *International Journal of Yoga Therapy, 27*(1), 9–14. doi: 10.17761/1531-2054-27.1.9

Davis, D. M., & Hayes, J. A. (2011). What are the benefits of mindfulness? A practice review of psychotherapy-related research. *Psychotherapy*, *48*(2), 198–208. https://doi.org/10.1037/a0022062

de Kloet, C. S., Vermetten, E., Geuze, E., Kavelaars, A., Heijnen, C. J., & Westenberg, H. G. (2006). Assessment of HPA-axis function in posttraumatic stress disorder: Pharmacological and non-pharmacological challenge tests, a review. *Journal of Psychiatric Research*, *40*(6), 550–567. https://doi.org/10.1016/j.jpsychires.2005.08.002

Department of Health. (2019, 17 April). *Private health insurance reforms: Changing coverage for some natural therapies*. Canberra, Australia: Department of Health. http://www.health.gov.au/internet/main/publishing.nsf/Content/private-health-insurance-reforms-fact-sheet-removing-coverage-for-some-natural-therapies

Ferszt, G. G., Miller, R. J., Hickey, J. E., Maull, F., & Crisp, K. (2015). The impact of a mindfulness based program on perceived stress, anxiety, depression and sleep of incarcerated women. *International Journal of Environmental Research and Public Health*, *12*(9), 11594–11607. https://doi.org/10.3390/ijerph120911594

Frye, L. A., & Spates, C. R. (2012). Prolonged exposure, mindfulness, and emotion regulation for the treatment of PTSD. *Clinical Case Studies*, *11*(3), 184–200. https://doi.org/10.1177/1534650112446850

Gallegos, A. M., Crean, H. F., Pigeon, W. R., & Heffner, K. L. (2017). Meditation and yoga for posttraumatic stress disorder: A meta-analytic review of randomized controlled trials. *Clinical Psychology Review*, *58*, 115–124. https://doi.org/10.1016/j.cpr.2017.10.004

Gallegos, A. M., Lytle, M. C., Moynihan, J. A., & Talbot, N. L. (2015). Mindfulness-based stress reduction to enhance psychological functioning and improve inflammatory biomarkers in trauma-exposed women: A pilot study. *Psychological Trauma: Theory, Research, Practice, and Policy*, *7*(6), 525–532. https://doi.org/10.1037/tra0000053

Garland, E. L., Gaylord, S. A., Boettiger, C. A., & Howard, M. O. (2010). Mindfulness training modifies cognitive, affective, and physiological mechanisms implicated in alcohol dependence: Results of a randomized controlled pilot trial. *Journal of Psychoactive Drugs*, *42*(2), 177–192. https://doi.org/10.1080/02791072.2010.10400690

Garland, E. L., Roberts-Lewis, A., Tronnier, C. D., Graves, R., & Kelley, K. (2016). Mindfulness-oriented recovery enhancement versus CBT for co-occurring substance dependence, traumatic stress, and psychiatric disorders: Proximal outcomes from a pragmatic randomized trial. *Behaviour Research and Therapy*, *77*, 7–16. https://doi.org/10.1016/j.brat.2015.11.012

Ghahari, S., Khademolreza, N., Poya, F. S., Ghasemnejad, S., Gheitarani, B., & Pirmoradi, M. R. (2017). Effectiveness of mindfulness techniques in decreasing anxiety and depression in women victims of spouse abuse. *Asian Journal of Pharmaceutical Research and Health Care*, *9*(1), 28–33. https://doi.org/10.18311/ajprhc/2017/7644

Goldsmith, R. E., Gerhart, J. I., Chesney, S. A., Burns, J. W., Kleinman, B., & Hood, M. M. (2014). Mindfulness-based stress reduction for posttraumatic stress symptoms: Building acceptance and decreasing shame. *Journal of Evidence-Based Complementary and Alternative Medicine*, *19*(4), 227–234. https://doi.org/10.1177/2156587214533703

Goldstein, L. A., Mehling, W. E., Metzler, T. J., Cohen, B. E., Barnes, D. E., Choucroun, G. J., Silve, A., Talbot, L. S., Maguen, S., Hlavin, J. A., Chesney, M. A., & Neylan, T. C. (2018).

Veterans group exercise: A randomized pilot trial of an integrative exercise program for veterans with posttraumatic stress. *Journal of Affective Disorders*, *227*, 345–352. https://doi.org/10.1016/j.jad.2017.11.002

Grasser, L. R., & Javanbakht, A. (2019). Treatments of posttraumatic stress disorder in civilian populations. *Current Psychiatry Reports*, *21*(2), 11. https://doi.org/10.1007/s11920-019-0994-3

Hall, A., Copsey, B., Richmond, H., Thompson, J., Ferreira, M., Latimer, J., & Maher, C. G. (2017). Effectiveness of tai chi for chronic musculoskeletal pain conditions: Updated systematic review and meta-analysis. *Physical Therapy*, *97*(2), 227–238. https://doi.org/10.2522/ptj.20160246

Harding, K., Simpson, T., & Kearney, D. J. (2018). Reduced symptoms of post-traumatic stress disorder and irritable bowel syndrome following mindfulness-based stress reduction among veterans. *Journal of Alternative and Complementary Medicine*, *24*(12), 1159–1165. https://doi.org/10.1089/acm.2018.0135

Harner, H., Hanlon, A. L., & Garfinkel, M. (2010). Effect of Iyengar yoga on mental health of incarcerated women: A feasibility study. *Nursing Research*, *59*(6), 389–399. doi: 10.1097/NNR.0b013e3181f2e6ff

Herman, J. L. (1997). *Trauma and recovery* (Rev. ed.). BasicBooks.

Higgins, J. P. T., & Green, S. (2008). *Cochrane handbook for systematic reviews of interventions*. Wiley-Blackwell.

Hilton, L., Maher, A. R., Colaiaco, B., Apaydin, E., Sorbero, M. E., Booth, M., Shanman, R. M., & Hempel, S. (2017). Meditation for posttraumatic stress: Systematic review and meta-analysis. *Psychological Trauma: Theory, Research, Practice and Policy*, *9*(4), 453–460. https://doi.org/10.1037/tra0000180

Hopwood, T. L., & Schutte, N. S. (2017). A meta-analytic investigation of the impact of mindfulness-based interventions on post traumatic stress. *Clinical Psychology Review*, *57*, 12–20. https://doi.org/10.1016/j.cpr.2017.08.002

Jasbi, M., Sadeghi Bahmani, D., Karami, G., Omidbeygi, M., Peyravi, M., Panahi, A., Mirzaee, J., Holsboer-Trachsler, E., & Brand, S. (2018). Influence of adjuvant mindfulness-based cognitive therapy (MBCT) on symptoms of post-traumatic stress disorder (PTSD) in veterans - results from a randomized control study. *Cognitive Behaviour Therapy*, *47*(5), 431–446. https://doi.org/10.1080/16506073.2018.1445773

Jindani, F., Turner, N., & Khalsa, S. B. (2015). A yoga intervention for posttraumatic stress: A preliminary randomized control trial. *Evid Based Complement Alternat Med*. doi: 10.1155/2015/351746

Johnston, J. M., Minami, T., Greenwald, D., Li, C., Reinhardt, K., & Khalsa, S. B. S. (2015). Yoga for military service personnel with PTSD: A single arm study. *Psychological Trauma: Theory, Research, Practice, and Policy*, *7*(6), 555–562. http://dx.doi.org/10.1037/tra0000051

Kabat-Zinn, J. (2005). *Full catastrophe living : Using the wisdom of your body and mind to face stress, pain, and illness* (15th Anniversary Edition ed.). Delta Trade Paperbacks.

Kabat-Zinn, J., Massion, A. O., Kristeller, J., Peterson, L. G., Fletcher, K. E., Pbert, L., Lenderking, W. R., & Santorelli, S. F. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry*, *149*(7), 936–943. https://doi.org/10.1176/ajp.149.7.936

Kearney, D. J., McDermott, K., Malte, C., Martinez, M., & Simpson, T. L. (2012). Association of participation in a mindfulness program with measures of PTSD, depression and quality of life in a veteran sample. *Journal of Clinical Psychology*, *68*(1), 101–116. https://doi.org/10.1002/jclp.20853

Kearney, D. J., McDermott, K., Malte, C., Martinez, M., & Simpson, T. L. (2013). Effects of participation in a mindfulness program for veterans with posttraumatic stress disorder:

A randomized controlled pilot study. *Journal of Clinical Psychology*, *69*(1), 14–27. https://doi.org/10.1002/jclp.21911

Kearney, D. J., Simpson, T. L., Malte, C. A., Felleman, B., Martinez, M. E., & Hunt, S. C. (2016). Mindfulness-based stress reduction in addition to usual care is associated with improvements in pain, fatigue, and cognitive failures among veterans with gulf war illness. *The American Journal of Medicine*, *129*(2), 204–214. https://doi.org/10.1016/j.amjmed.2015.09.015

Kelly, A., & Garland, E. L. (2016). Trauma-informed mindfulness-based stress reduction for female survivors of interpersonal violence: Results from a stage I RCT. *Journal of Clinical Psychology*, *72*(4), 311–328. https://doi.org/10.1002/jclp.22273

Kerekes, N., Fielding, C., & Apelqvist, S. (2017). Yoga in correctional settings: A randomized controlled study. *Front Psychiatry*, *8*, 204. doi: 10.3389/fpsyt.2017.00204

Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Benjet, C., Bromet, E. J., Cardoso, G., Degenhardt, L., de Girolamo, G., Dinolova, R. V., Ferry, F., Florescu, S., Gureje, O., Haro, J. M., Huang, Y., Karam, E. G., Kawakami, N., Lee, S., Lepine, J. P., Levinson, D., Navarro-Mateu, F., … Koenen, K. C. (2017). Trauma and PTSD in the WHO world mental health surveys. *European Journal of Psychotraumatology*, *8*(sup5), 1353383. https://doi.org/10.1080/20008198.2017.1353383

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month dsm-iv disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 617–627. https://doi.org/10.1001/archpsyc.62.6.617

Kim, S. H., Schneider, S. M., Bevans, M., Kravitz, L., Mermier, C., Qualls, C., & Burge, M. R. (2013). PTSD symptom reduction with mindfulness-based stretching and deep breathing exercise: Randomized controlled clinical trial of efficacy. *Journal of Clinical Endocrinology and Metabolism*, *98*(7), 2984–2992. https://doi.org/10.1210/jc.2012-3742

Kim, S. H., Schneider, S. M., Kravitz, L., Mermier, C., & Burge, M. R. (2013). Mind-body practices for posttraumatic stress disorder. *Journal of Investigative Medicine*, *61*(5), 827–834. https://doi.org/10.231/JIM.0b013e3182906862

Kimbrough, E., Magyari, T., Langenberg, P., Chesney, M., & Berman, B. (2010). Mindfulness intervention for child abuse survivors. *Journal of Clinical Psychology*, *66*(1), 17–33. https://doi.org/10.1002/jclp.20624

King, A., Block, S., Sripada, R., Rauch, S., Giardino, N., Favorite, T., Angstadt, M., Kessler, D., Welsh, R., & Liberzon, I. (2016). Altered default mode network (DMN) resting state functional connectivity following a mindfulness-based exposure therapy for posttraumatic stress disorder (PTSD) in combat veterans of Afghanistan and Iraq. *Depression and Anxiety*, *33*(4), 289–299. doi: 10.1002/da.22481

King, A. P., Erickson, T. M., Giardino, N. D., Favorite, T., Rauch, S. A., Robinson, E., Kulkarni, M., & Liberzon, I. (2013). A pilot study of group mindfulness-based cognitive therapy (MBCT) for combat veterans with posttraumatic stress disorder (PTSD). *Depression and Anxiety*, *30*(7), 638–645. https://doi.org/10.1002/da.22104

Kline, A. C., Cooper, A. A., Rytwinksi, N. K., & Feeny, N. C. (2018). Long-term efficacy of psychotherapy for posttraumatic stress disorder: A meta-analysis of randomized controlled trials. *Clinical Psychology Review*, *59*, 30–40. https://doi.org/10.1016/j.cpr.2017.10.009

Liu, X., Clark, J., Siskind, D., Williams, G. M., Byrne, G., Yang, J. L., & Doi, S. A. (2015). A systematic review and meta-analysis of the effects of Qigong and Tai Chi for depressive symptoms. *Complementary Therapies in Medicine*, *23*(4), 516–534. https://doi.org/10.1016/j.ctim.2015.05.001

Ludwig, L., Pasman, J. A., Nicholson, T., Aybek, S., David, A. S., Tuck, S., Kanaan, R. A., Roelofs, K., Carson, A., & Stone, J. (2018). Stressful life events and maltreatment in conversion (functional neurological) disorder: Systematic review and meta-analysis of

case-control studies. *The Lancet Psychiatry*, *5*(4), 307–320. https://doi.org/10.1016/s2215-0366(18)30051-8

Macy, R. J., Jones, E., Graham, L. M., & Roach, L. (2015). Yoga for trauma and related mental health problems: A meta-review with clinical and service recommendations. *Trauma, Violence, & Abuse,* 1–23. https://doi.org/10.1177/1524838015620834

Maddock, A., Hevey, D., & Eidenmueller, K. (2017). Mindfulness training as a clinical intervention with homeless adults: A pilot study. *International Journal of Mental Health and Addiction*, *15*(3), 529–544. https://doi.org/10.1007/s11469-016-9718-7

Mahoney, A., Karatzias, T., & Hutton, P. (2019). A systematic review and meta-analysis of group treatments for adults with symptoms associated with complex post-traumatic stress disorder. *Journal of Affective Disorders*, *243*, 305–321. https://doi.org/10.1016/j.jad.2018.09.059

Manning-Jones, S., de Terte, I., & Stephens, C. (2017). The relationship between vicarious posttraumatic growth and secondary traumatic stress among health professionals. *Journal of Loss and Trauma*, *22*(3), 256–270. https://doi.org/10.1080/15325024.2017.1284516

Marzabadi, E. A., & Zadeh, S. M. H. (2014). The effectiveness of mindfulness training in improving the quality of life of the war victims with Post Traumatic Stress Disorder (PTSD). *Iranian Journal of Psychiatry*, *9*(4), 228–236. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4361826/

Michalopoulou, E., Tzamalouka, G., Chrousos, G., & Darviri, C. (2015). Stress management and intimate partner violence: A randomized controlled trial. *Journal of Family Violence*, *30*(6), 795–802. https://doi.org/10.1007/s10896-015-9740-8

Mitchell, K. S., Dick, A. M., Dimartino, D. M., Smith, B. N., Niles, B., Koenen, K. C., & Street, A. (2014). A pilot study of a randomized controlled trial of yoga as an Intervention for PTSD symptoms in women. *Journal of Traumatic Stress*, *27*(2), 121–128. https://doi.org/10.1002/jts.21903

Molendijk, M. L., Hoek, H. W., Brewerton, T. D., & Elzinga, B. M. (2017). Childhood maltreatment and eating disorder pathology: A systematic review and dose-response meta-analysis. *Psychological Medicine*, *47*(8), 1–15. https://doi.org/10.1017/S0033291716003561

Muller-Engelmann, M., Wunsch, S., Volk, M., & Steil, R. (2017). Mindfulness-Based Stress Reduction (MBSR) as a standalone intervention for posttraumatic stress disorder after mixed traumatic events: A mixed-methods feasibility study. *Frontiers in Psychology*, *8*, 1407. https://doi.org/10.3389/fpsyg.2017.01407

Niles, B. L., Mori, D. L., Polizzi, C., Pless Kaiser, A., Weinstein, E. S., Gershkovich, M., & Wang, C. (2018). A systematic review of randomized trials of mind-body interventions for PTSD. *Journal of Clinical Psychology*, *74*(9), 1485–1508. https://doi.org/10.1002/jclp.22634

O'Connor, M., Piet, J., & Hougaard, E. (2014). The effects of mindfulness-based cognitive therapy on depressive symptoms in elderly bereaved people with loss-related distress: A controlled pilot study. *Mindfulness*, *5*(4), 400–409. https://doi.org/10.1007/s12671-013-0194-x

Omidi, A., Mohammadi, A., Zargar, F., & Akbari, H. (2013). Efficacy of mindfulness-based stress reduction on mood states of veterans with post-traumatic stress disorder. *Archives of Trauma Research*, *1*(4), 151–154. https://doi.org/10.5812/atr.8226

Palmer, D., Holt, C., Wissink, T., & Stevens, M. (2014). A wellness curricular intervention for family medicine residents to reduce depression and burnout. *Journal of Alternative & Complementary Medicine*, *20*(5), A148–149. https://doi.org/10.1089/acm.2014.5399.abstract

Patwardhan, A. R., & Lloyd, L. W. (2017). Decline in the use of medicalized yoga between 2002 and 2012 while the overall yoga use increased in the United States: A conundrum. *Journal of Evidence Based Complementary & Alternative Medicine*, *22*(4), 567–572. https://doi.org/10.1177/2156587216689183

Pietrzak, R. H., Goldstein, R. B., Southwick, S. M., & Grant, B. F. (2011). Prevalence and axis I comorbidity of full and partial posttraumatic stress disorder in the United States: Results from wave 2 of the national epidemiologic survey on alcohol and related conditions. *Journal of Anxiety Disorders*, *25*(3), 456–465. https://doi.org/10.1016/j.janxdis.2010.11.010

Polusny, M. A., Erbes, C. R., Thuras, P., Moran, A., Lamberty, G., Collins, R. C., Rodman, J. L., & Lim, K. O. (2015). Mindfulness-based stress reduction for posttraumatic stress disorder among veterans. *Journal American Medical Association*, *314*(5), 456–465. https://doi.org/10.1001/jama.2015.8361

Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology*, *74*(2), 116–143. https://doi.org/10.1016/j.biopsycho.2006.06.009

Possemato, K., Bergen-Cico, D., Treatman, S., Allen, C., Wade, M., & Pigeon, W. (2016). A randomized clinical trial of primary care brief mindfulness training for veterans with PTSD. *Journal of Clinical Psychology*, *72*(3), 179–193. https://doi.org/10.1002/jclp.22241

Price, C. J., & Hooven, C. (2018). Interoceptive awareness skills for emotion regulation: Theory and approach of mindful awareness in body-oriented therapy (MABT). *Frontiers in Psychology*, *9*, 798. https://doi.org/10.3389/fpsyg.2018.00798

Price, C. J., Thompson, E. A., Crowell, S. E., Pike, K., Cheng, S. C., Parent, S., & Hooven, C. (2018). Immediate effects of interoceptive awareness training through Mindful Awareness in Body-oriented Therapy (MABT) for women in substance use disorder treatment. *Substance Abuse*, *40*(1), 1–14. https://doi.org/10.1080/08897077.2018.1488335

Price, M., Spinazzola, J., Musicaro, R., Turner, J., Suvak, M., Emerson, D., & van der Kolk, B. (2017). Effectiveness of an extended yoga treatment for women with chronic posttraumatic stress disorder. *The Journal of Alternative and Complementary Medicine*. doi: 10.1089/acm.2015.0266

Przekop, P., Przekop, A., Haviland, M. G., & Oda, K. (2018). Comprehensive treatment for patients with chronic pain in a 12-step based substance use disorder program. *Journal of Bodywork and Movement Therapies*, *22*(3), 685–692. https://doi.org/10.1016/j.jbmt.2017.08.009

Quinones, N., Maquet, Y. G., Diana Maria Agudelo, V., & Lopez, M. A. (2015). Efficacy of a Satyananda yoga intervention for reintegrating adults diagnosed with posttraumatic stress disorder. *International Journal of Yoga Therapy*, *25*(1), 89–99. https://doi.org/10.17761/1531-2054-25.1.89

Reb, A. M., Saum, N. S., Murphy, D. A., Breckenridge-Sproat, S. T., Su, X., & Bormann, J. E. (2017). Qigong in injured military service members. *Journal of Holistic Nursing*, *35*(1), 10–24. https://doi.org/10.1177/0898010116638159

Reinhardt, K. M., Noggle Taylor, J. J., Johnston, J., Zameer, A., Cheema, S., & Khalsa, S. B. S. (2017). Kripalu yoga for military veterans with PTSD: A randomized trial. *Journal of Clinical Psychology*, *74*(1). https://doi.org/10.1002/jclp.22483

Samuelson, M., Carmody, J., Kabat-Zinn, J., & Bratt, M. A. (2007). Mindfulness-based stress reduction in massachusetts correctional facilities. *The Prison Journal*, *87*(2), 254–268. https://doi.org/10.1177/0032885507303753

Serpa, J. G., Taylor, S. L., & Tillisch, K. (2014). Mindfulness-based stress reduction (MBSR) reduces anxiety, depression, and suicidal ideation in veterans. *Medical Care*, *52*, S19–S24. https://doi.org/10.1097/MLR.0000000000000202

Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., & Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *British Medical Journal*, *349* (jan02 1), g7647. https://doi.org/10.1136/bmj.g7647

Shiyko, M. P., Hallinan, S., & Naito, T. (2017). Effects of mindfulness training on posttraumatic growth: A systematic review and meta-analysis. *Mindfulness*, *8*(4), 848–858. https://doi.org/10.1007/s12671-017-0684-3

Song, S. Y., Koo, D. H., Jung, S. Y., Kang, W., & Kim, E. Y. (2017). The significance of the trial outcome was associated with publication rate and time to publication. *Journal of Clinical Epidemiology*, *33*(3), 78–84. https://doi.org/10.1016/j.jclinepi.2017.02.009

Spidel, A., Lecomte, T., Kealy, D., & Daigneault, I. (2017). Acceptance and commitment therapy for psychosis and trauma: Improvement in psychiatric symptoms, emotion regulation, and treatment compliance following a brief group intervention. *Psychol Psychother, 91* (2), 248–261. https://doi.org/10.1111/papt.12159

Staples, J. K., Hamilton, M. F., & Uddo, M. (2013). A yoga program for the symptoms of post-traumatic stress disorder in veterans. *Military Medicine*, *178*(8), 854–860. doi: 10.7205/MILMED-D-12-00536

Stein, D. J., McLaughlin, K. A., Koenen, K. C., Atwoli, L., Friedman, M. J., Hill, E. D., Maercker, A., Petukhova, M., Shahly, V., van Ommeren, M., Alonso, J., Borges, G., de Girolamo, G., de Jonge, P., Demyttenaere, K., Florescu, S., Karam, E. G., Kawakami, N., Matschinger, H., Okoliyski, M., … Kessler, R. C. (2014). DSM-5 and ICD-11 definitions of posttraumatic stress disorder: Investigating "narrow" and "broad" approaches. *Depression and Anxiety*, *31*(6), 494–505. https://doi.org/10.1002/da.22279

Sterne, J. A., Sutton, A. J., Ioannidis, J. P., Terrin, N., Jones, D. R., Lau, J., Carpenter, J., Rucker, G., Harbord, R. M., Schmid, C. H., Tetzlaff, J., Deeks, J. J., Peters, J., Macaskill, P., Schwarzer, G., Duval, S., Altman, D. G., Moher, D., & Higgins, J. P. (2011). Recommendations for examining and interpreting funnel plot asymmetry in meta-analyses of randomised controlled trials. *British Medical Journal*, *343*(jul22 1), d4002. https://doi.org/10.1136/bmj.d4002

Taylor, J., McLean, L., Korner, A., & Glozier, N. (2018). Direct and indirect psychological impacts of shark-bite events. *Australian and New Zealand Journal of Psychiatry, 53*(1), 27–36. https://doi.org/10.1177/0004867418808899

Telles, S, Naveen, K. V, & Dash, M. (2007). Yoga reduces symptoms of distress in tsunami survivors in the andaman islands. *Evidence-based Complementary and Alternative Medicine*, *4*(4), 503-509. doi: 10.1093/ecam/nem069

Telles, S., Singh, N., Joshi, M., & Balkrishna, A. (2010). Post traumatic stress symptoms and heart rate variability in Bihar flood survivors following yoga: A randomized controlled study. *BMC Psychiatry*, *10*(18), 1–10. https://doi.org/10.1186/1471-244X-10-18

Thieleman, K., Cacciatore, J., & Hill, P. W. (2014). Traumatic bereavement and Mindfulness: A preliminary study of mental health outcomes using the ATTEND model. *Clinical Social Work Journal*, *42*(3), 260–268. https://doi.org/10.1007/s10615-014-0491-4

Thordardottir, K., Gudmundsdottir, R., Zoëga, H., Valdimarsdottir, U. A., & Gudmundsdottir, B. (2014). Effects of yoga practice on stress-related symptoms in the aftermath of an earthquake: A community-based controlled trial. *Complementary Therapies in Medicine*, *22*(2), 226–234. doi: 10.1016/j.ctim.2014.01.008

Tsai, P. F., Kitch, S., Chang, J. Y., James, G. A., Dubbert, P., Roca, J. V., & Powers, C. H. (2018). Tai Chi for posttraumatic stress disorder and chronic musculoskeletal pain: A pilot study. *Journal of Holistic Nursing*, *36*(2), 147–158. https://doi.org/10.1177/0898010117697617

Van der Kolk, B. A. (2014). *The body keeps the score: Mind, brain and body in the transformation of trauma*. Allen Lane, Penguin Books.

Waelde, L. C., Hechanova, M. R. M., Ramos, P. A. P., Macia, K. S., & Moschetto, J. M. (2018). Mindfulness and mantra training for disaster mental health workers in the Philippines. *Mindfulness*, *9*(4), 1181–1190. https://doi.org/10.1007/s12671-017-0855-2

Wahbeh, H., Goodrich, E., Goy, E., & Oken, B. S. (2016). Mechanistic pathways of mindfulness meditation in combat veterans with posttraumatic stress disorder. *Journal of Clinical Psychology*, *72*(4), 365–383. https://doi.org/10.1002/jclp.22255

Wilson, D. R., Vidal, B., Wilson, W. A., & Salyer, S. L. (2012). Overcoming sequelae of childhood sexual abuse with stress management. *Journal of Psychiatric & Mental Health Nursing*, *19*(7), 587–593. https://doi.org/10.1111/j.1365-2850.2011.01813.x

Witt, K., Milner, A., Spittal, M. J., Hetrick, S., Robinson, J., Pirkis, J., & Carter, G. (2019). Population attributable risk of factors associated with the repetition of self-harm behaviour in young people presenting to clinical services: A systematic review and meta-analysis. *European Child and Adolescent Psychiatry*, *28*(1), 5–18. https://doi.org/10.1007/s00787-018-1111-6

Yehuda, R. (2006). Advances in understanding neuroendocrine alterations in PTSD and their therapeutic implications. *Annals New York Academy of Sciences*, *1071*(1), 137–166. https://doi.org/10.1196/annals.1364.012

Zalta, A. K., Held, P., Smith, D. L., Klassen, B. J., Lofgreen, A. M., Normand, P. S., Brennan, M. B., Rydberg, T. S., Boley, R. A., Pollack, M. H., & Karnik, N. S. (2018). Evaluating patterns and predictors of symptom change during a three-week intensive outpatient treatment for veterans with PTSD. *BMC Psychiatry*, *18*(1), 242. https://doi.org/10.1186/s12888-018-1816-6