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Review

Meditation and yoga for posttraumatic stress disorder: A meta-analytic review of randomized controlled trials

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HIGHLIGHTS

- Both patients and providers ask for more PTSD treatment options.
- Meditation and yoga allow for a variety of treatment options and address several domains of PTSD.
- Meditation and yoga-based approaches yielded small to medium effects on PTSD symptom reduction.
- Complementary interventions increase patient choice and offer a second-line treatment option.
- Efforts to move toward integrative approaches for PTSD warrant further study.

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ABSTRACT

Posttraumatic stress disorder (PTSD) is a chronic and debilitating disorder that affects the lives of 7–8% of adults in the U.S. Although several interventions demonstrate clinical effectiveness for treating PTSD, many patients continue to have residual symptoms and ask for a variety of treatment options. Complementary health approaches, such as meditation and yoga, hold promise for treating symptoms of PTSD. This meta-analysis evaluates the effect size (*ES*) of yoga and meditation on PTSD outcomes in adult patients. We also examined whether the intervention type, PTSD outcome measure, study population, sample size, or control condition moderated the effects of complementary approaches on PTSD outcomes. The studies included were 19 randomized control trials with data on 1173 participants. A random effects model yielded a statistically significant *ES* in the small to medium range ($ES = -0.39$, $p < 0.001$, 95% CI [−0.57, −0.22]). There were no appreciable differences between intervention types, study population, outcome measures, or control condition. There was, however, a marginally significant higher *ES* for sample size ≤ 30 ($ES = -0.78$, $k = 5$). These findings suggest that meditation and yoga are promising complementary approaches in the treatment of PTSD among adults and warrant further study.

1. Introduction

Several decades of research reveal chronic and debilitating biological, psychological, and social ramifications for individuals suffering from posttraumatic stress disorder (PTSD). The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., DSM-5; American Psychiatric Association, 2013) classifies the symptoms of PTSD within four symptom clusters of intrusion, persistent avoidance, negative alterations in cognitions and mood, and marked alterations in arousal. Both pharmacological and psychological interventions are used in the treatment of PTSD. The current evidence base for pharmacological treatment for PTSD is strongest for selective serotonin reuptake inhibitors (SSRIs), and are recommended as second-line treatment for patients that do not engage in or cannot access trauma-focused psychotherapies (Hoskins et al., 2015; Lee et al., 2016). Trauma-focused interventions based on cognitive models address trauma-related beliefs, memories, and emotions and include Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), and eye movement desensitization and reprocessing (EMDR) therapy. Non-trauma focused interventions are also used to treat PTSD, and include any psychological intervention that uses cognitive behavioral therapy (CBT), for example stress inoculation training (SIT). Evidence suggests that trauma-focused CBT (including CPT and PE), EMDR, and non-trauma-focused CBT are effective, though trauma-focused CBT and EMDR are considered more effective than non-

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trauma-focused CBT (Bisson, Roberts, Andrew, Cooper, & Lewis, 2013). Despite empirical support of effectiveness, these interventions have high rates of incompletion (up to 50%) and many patients, both veterans and civilians, continue to have residual symptoms (Bradley, Greene, Russ, Dutra, & Westen, 2005; Kearney & Simpson, 2015; Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008; Steenkamp, Litz, Hoge, & Marmar, 2015). Further, trauma-focused CBT approaches with exposure-based components incur greater dropout rates than non-trauma-focused therapies (Bisson et al., 2013). Some reasons for this difference include that non-trauma-focused CBT may be more appealing to a majority of patients and/or more emotionally tolerable. For this prevalent and devastating disorder, the poor completion rates and relatively poor remission rates of existing, standard PTSD interventions suggest that new, complementary and integrative interventions, whether adjunctive or stand-alone, are likely warranted. Further, both patients and providers have voiced desires for the availability of more PTSD treatment options (Lang et al., 2012).

Complementary health approaches hold promise for treating symptoms of PTSD. Complementary approaches are defined as non-mainstream practices typically used together with conventional medicine (National Center for Complementary and Integrative Health). Interest in complementary approaches among veterans and civilians is growing. Nearly 40% of adults in the U.S. use complementary health approaches and military personnel engage in these health practices at similar rates. A 2011 report by the Veterans Health Administration (VHA) indicated that 80% of VHA facilities offer meditation and stress management to patients (Strauss, 2011). An example of stress management commonly used to treat PTSD is stress inoculation training (SIT), a non-trauma-focused CBT approach to PTSD treatment that teaches skills for managing stress through relaxation and thought-stopping. Though it has been shown to be more effective than non-CBT interventions, like psychodynamic or present-centered therapies, it is not as effective as trauma-focused CBT (Bisson et al., 2013). Both yoga and meditation-based approaches are among the most popular complementary approaches for health promotion used by adults in the U.S. (Clarke, Black, Stussman, Barnes, & Nahin, 2015). Complementary approaches fit well with the interest in interventions that are not trauma-focused.

Increasingly, researchers are investigating the use of complementary approaches for treating PTSD. Complementary therapies used to treat PTSD include acupuncture, mindfulness-based stress reduction, meditation, yoga, deep-breathing exercises, guided imagery, hypnotherapy, progressive relaxation, and tai chi. Reviews of the literature on complementary approaches for the treatment of PTSD by Kim, Schneider, Kravitz, Mermier, and Burge (2013) and the VA's Health Service Research and Development (Strauss, 2011) found support for beneficial effect of such interventions on symptoms of PTSD; however, their findings were limited by the paucity of well-designed trials.

Here, we focus on a set of complementary health practices that have been used for the treatment of PTSD, namely meditation and yoga, with an explicit focus on randomized controlled trials. The National Center for Complementary and Integrative Health (NCCIH) classifies meditation and yoga as complementary mind and body health approaches. There are many forms of meditation, some of which teach practitioners to observe thoughts, feelings, and sensations in a non-judgmental manner. Mindfulness meditation, for example, teaches participants to orient their attention to the present with curiosity, openness, and acceptance. Experiencing the present moment non-judgmentally and openly may encourage practitioners to approach rather than avoid distressing thoughts and feelings, which may reduce cognitive distortions and avoidance (Gallegos, Cross, & Pigeon, 2015). Present-orientation also avoids excessive orientation toward the past or future, which may reduce worry and rumination. Another meditative practice, known as mantra-based meditation, cultivates focused attention by thinking or repeating a word or phrase. For either meditative practice, attentional control increases control of intrusive memories, allowing a patient to shift attention to coping strategies and problem solving (Lang et al., 2012). In this way, meditation practices have elements of exposure, cognitive change, attentional control, self-management, relaxation, and acceptance (Baer, 2003), all of which are pertinent to the symptoms of PTSD.

Yoga typically combines physical postures, breathing techniques, meditation, and relaxation. Yoga has been shown to reduce physiological arousal in PTSD patients and is believed to affect the pathology of PTSD by improving somatic regulation and body awareness, which are imperative to emotion regulation (van der Kolk et al., 2014). Learning to reflect rather than react to difficult physiological and emotional states has implications for the experience and expression of emotions in PTSD. Overall, these mind and body practices not only allow for a variety of options when choosing an approach to care, but address several domains of PTSD.

No study to date has provided a meta-analytic review of the literature on complementary mind and body approaches to the treatment of PTSD. The aim of this study was to evaluate the effect size (*ES*) of these complementary health approaches on PTSD outcomes in adult patients. We also examined whether the intervention type (mindfulness meditation, other meditation, and yoga), PTSD outcome measure (clinician administered and self-report), study population (veteran and non-veteran), sample size, or control condition (active and non-active) moderated the effects of complementary approaches on PTSD outcomes. Recommendations are provided for future research based on the review and analysis.

2. Method

2.1. Data sources and search strategy

MEDLINE (from 1946) and PsychINFO (from 1967) were searched through May 31, 2016. Clinicaltrials.gov was also searched to identify unpublished trials that met study eligibility criteria. Selection criteria for interventions were defined a priori and included: mind and body practices rather than natural products (e.g., herbs, vitamins, probiotics, etc.); outside of mainstream, or conventional, medicine; taught by a trained teacher; and encourage participants to take an active role. Boolean search logic and MeSH terms were used to create the following search terms: [(posttraumatic stress disorder or traumatic stress or psychological trauma) and (mind-body or meditation or mindfulness or mindfulness-based stress reduction or mindfulness-based cognitive therapy or transcendental or tai chi or qi gong or yoga or mantram or complementary health or alternative health)]. Data from unpublished trials, when identified, was obtained through direct communication from study investigators (Table 1).

2.2. Study selection and eligibility

All abstracts identified through the literature search were screened

Table 1
Study eligibility criteria.

Study characteristics	Inclusion criteria
Design	Randomized control trial 10 as minimal sample size
Population	Adults ≥ 18 with PTSD PTSD using clinician or self-report measure
Intervention	Mind-body, meditation, tai chi, qi gong, yoga, mindfulness, mindfulness-based stress reduction, mindfulness-based cognitive therapy, mantram
Comparator	Any control
Database	PubMed; Medline EBSCO; PsychINFO
Years	1946–2016