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Yoga for Trauma and Related Mental Health Problems: A Meta-Review With Clinical and Service Recommendations

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Abstract

Health and human service providers have expressed growing interest in the benefits of yoga to help individuals cope with the effects of trauma, including anxiety, depression, and posttraumatic stress disorder (PTSD). Despite the growing popularity and strong appeal of yoga, providers must be mindful of the evidence regarding the efficacy of yoga in treating trauma effects as well as trauma-related mental health symptoms and illnesses. Therefore, our research team sought to answer two questions: (a) What is the evidence regarding yoga as a treatment for trauma effects, including anxiety, depression, and PTSD and (b) what are the clinical and service recommendations for using yoga with trauma-exposed individuals? Our initial scans identified a substantial body of research, including reviews. Rather than replicate earlier efforts, we undertook a systematic meta-review of 13 literature reviews, one of which included a meta-analysis. We determined the 13 reviews examined 185 distinct studies. Findings show that the evidence regarding yoga as an intervention for the effects of trauma as well as the mental health symptoms and illnesses often associated with trauma is encouraging but preliminary. Overall, the body of research is lacking in rigor as well as specificity regarding trauma. Review results also only allow for the recommendation of yoga as an ancillary treatment. Further, the reviews had considerable differences in their methods and limitations. Nonetheless, the results yielded findings concerning how clinicians and service providers can use yoga in their own practices, which is an important step for building an evidence base in this area.

Keywords

anxiety, depression, PTSD, trauma, trauma treatment, traumatic experiences, yoga, review

Health and human service providers who work with individuals who have had traumatic experiences (e.g., abuse and assault, human trafficking, military combat, natural disasters, and terrorism) have expressed growing interest in the potential benefits of yoga to help their clients and patients cope with the effects of trauma, including trauma-related mental illnesses such as anxiety, depression, and posttraumatic stress disorder (PTSD). This growing interest and enthusiasm is reflected in the increasing numbers of continuing education opportunities focused on using yoga to address trauma that are available to clinicians and service providers. Similarly, frequent articles in the popular press and news media on the benefits of yoga have fueled the growing popularity of yoga as an intervention. For example, the *New York Times* published an editorial addressing the use of mind–body interventions—including yoga—to help combat veterans with their traumatic experiences (Rosenberg, 2012).

Taken together, these trends suggest that advocates for violence survivors (e.g., domestic and sexual violence and human trafficking) and clinicians in service settings that provide interventions to individuals who have had traumatic experiences of other types (e.g., military combat, natural disasters, and terrorism) are adding yoga interventions to their treatment regimens. However, providers may be using yoga as a therapeutic treatment without guidance from the evidence base. Providers also lack clinical and service guidelines based on evidence to ensure that such yoga therapies are being used in beneficial ways. To help determine the state of the science on these topics, we sought to systematically locate and synthesize a broad literature related to yoga for individuals who are experiencing negative outcomes associated with traumatic experiences, including anxiety, depression, and/or PTSD.

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Defining Yoga, Trauma, and Trauma-Related Mental Illnesses

For this research, we chose to define both trauma and yoga broadly, so our review efforts could be as inclusive as possible and would be helpful with broad and varied audiences (i.e., advocates, clinicians, practitioners, policy makers, and researchers). Moreover, we aimed for this research to be useful to clinicians and service providers working in settings with trauma-exposed individuals who may appear with a range of presenting problems, sets of symptoms, and/or co-occurring disorders. Given how widely yoga appears to be used across various settings where trauma-exposed individuals are appearing for a range of psychological problems, we decided that a comprehensive research focus would most reflect what is currently occurring in many practice settings. Nonetheless, our efforts were guided by well-established definitions.

Yoga. The National Center for Complementary and Alternative Medicine (CAM; 2014; part of the National Institutes of Health) defines yoga as follows:

> A mind and body practice with origins in ancient Indian philosophy. The various styles of yoga typically combine physical postures, breathing techniques, and meditation or relaxation. There are numerous schools of yoga. Hatha yoga, the most commonly practiced in the United States and Europe, emphasizes postures *(asanas)* and breathing exercises *(pranayama)*. Some of the major styles of hatha yoga are Iyengar, Ashtanga, Vini, Kundalini, and Bikram yoga. (para. 1)

Asanas consist of careful stretches and specific physical postures (Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005) that are intended to increase flexibility and physical strength through bending and balancing (Pilkington, Kirkwood, Rampes, & Richardson, 2005). The meditation component of yoga involves mind–body practices that emphasize calmness and stillness of the mind (Kirkwood et al., 2005; Pilkington et al., 2005). *Pranayama* consists of various breath control exercises that function to increase relaxation and help in centering the mind from distractions (Kirkwood et al., 2005; Pilkington et al., 2005). The different forms of yoga put varying emphasis on these components. For example, Iyengar yoga integrates more asanas and structural alignment in the asanas, whereas Sudarshan Kriya Yoga (SKY) has a greater emphasis on pranayama (Uebelacker et al., 2010).

Trauma. This study used the definition of trauma set forth by the Substance Abuse and Mental Health Service Administration ([SAMHSA], 2014):

> Individual trauma results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or threatening and that has lasting adverse effects on the individual's functioning and physical, social, emotional, or spiritual well-being. (p. 7)

As SAMHSA (2014) developed this definition by convening an expert group of researchers, practitioners, trauma survivors, and policy makers, we chose this definition on which to base our work. This well-vetted definition allowed for broad exploration of yoga as a potential treatment for trauma as well as mental health symptoms and illnesses that may be the consequences of traumatic experiences, including anxiety, depression, and PTSD.

Trauma-related mental health symptoms and illnesses. Traumatic events include experiences, such as child abuse, intimate partner violence (IPV), human trafficking, immigration that results from crisis or conflict in a person's country of origin, military combat, natural disasters, and sexual violence. The negative mental health sequelae of traumatic events can manifest in a variety of ways, including general trauma symptoms as well as depressive, anxiety, and posttraumatic stress symptoms and disorders (Banyard, Williams, & Siegel, 2001; Campbell, 2002; Milliken, Auchterlonie, & Hoge, 2007; Steel et al., 2009). Research demonstrates associations between various types of traumatic experiences and the experience of depressive symptoms and disorders, including but not limited to the experience of childhood trauma (e.g., Banyard et al., 2001; Heim, Newport, Mletzko, Miller, & Nemeroff, 2008; Suliman et al., 2009), IPV (e.g., Campbell, 2002; Campbell & Lewandowski, 1997; Dienemann et al., 2000; McCauley et al., 1995), military combat (e.g., Blore, Sim, Forbes, Creamer, & Kelsall, 2015; Ginzburg, Ein-Dor, & Solomon, 2010), and natural disasters (e.g., Nolen-Hoeksema & Morrow, 1991; Tang, Liu, Liu, Xue, & Zhang, 2014). Moreover, numerous studies show an association between trauma exposure and the experience of anxiety symptoms and disorders, including but not limited to PTSD (e.g., Krupnick et al., 2004; Milliken et al., 2007; Steel et al., 2009; Suliman et al., 2009), and a high co-occurrence of depressive and anxiety symptoms/disorders in trauma-exposed individuals (e.g., Shalev et al., 1998; Stein & Kennedy, 2001).

Given that the experience of trauma has repeatedly been found to be associated with the experience of each of these constellations of mental health symptoms and disorders and their co-occurrence (SAMHSA, 2014), rather than focusing on a particular disorder, we conducted a broad literature search that encompassed these three sets of symptoms and illnesses (i.e., anxiety, depression, and PTSD) as well as trauma broadly. Thus, we use the phrase "trauma-related mental health symptoms and illnesses" to refer to depressive and anxiety symptoms and disorders and PTSD that are associated with experiencing trauma.

It is important to note that experiencing trauma does not always lead to symptoms of depression and/or anxiety, and depression and anxiety symptoms do not necessarily originate from experiencing trauma, unlike PTSD, which requires the presence of a traumatic event (American Psychiatric Association, 2013). However, given the aforementioned findings on associations between depression and anxiety and experiencing traumatic events, we chose to focus on yoga for the treatment of depression, anxiety, and PTSD in any population to provide a

more comprehensive view of the potential for yoga to be a useful treatment for trauma-related mental health symptoms and illnesses. Furthermore, we selected this broad focus because the findings concerned with yoga's helpfulness for depression and anxiety generally also hold implications for treating these disorders and/or set of symptoms among trauma-exposed individuals as well.

Why Yoga?

The therapeutic use of yoga represents one type of CAM (Strauss & Lang, 2012). CAM is a phrase used to describe treatments that are not typical practice in health care and medicine in Western countries. ''Complementary'' practices denote treatments used alongside typical Western medicinal approaches, while ''alternative'' techniques are used in place of typical Western medicinal practices (Strauss & Lang, 2012).

Enthusiasm for yoga as a potential treatment for trauma responses, as well as mental health symptoms and illnesses that may be the consequences of traumatic experiences, might be warranted. In considering the utility of yoga, researchers have noted that mindfulness or intentional thought—a key aspect of yoga—could be helpful in addressing the effects of trauma as well as the symptoms of anxiety, depression, and PTSD in particular (e.g., Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012; Uebelacker et al., 2010). Given yoga's emphasis on mindfulness, researchers have theorized that yoga alters cognitions by promoting adaptive thinking and helping individuals to decrease repetitive, negative thoughts and ruminations (Sharma & Haider, 2013; Uebelacker et al., 2010). In addition, yoga includes a focus on physical activity. Yogic physical postures, or asanas, are a key component of yoga practice, and researchers have argued that the physical postures can help address a range of mental health symptoms (Büssing et al., 2012; Uebelacker et al., 2010).

Researchers have also speculated that yoga can help address the symptoms and illnesses that may be trauma consequences by promoting beneficial physiological changes, specifically by altering neurotransmitter levels in positive ways (Cramer, Lauche, Langhorst, & Dobos, 2013; Sharma & Haider, 2013; Telles, Singh, & Balkrishna, 2012; Uebelacker et al., 2010) and regulating the physical stress response to promote well-being (Cramer et al., 2013; Sharma & Haider, 2013; Uebelacker et al., 2010). Recently, van der Kolk (2014) outlined the ways in which mindfulness and yoga have been found capable of ''rewiring'' the brains of trauma-exposed individuals by reactivating areas specifically devoted to processing trust, control, pleasure, and engagement that are often negatively affected by trauma. Further, yoga has been reported to have positive benefits in other ways, such as improving sleep (Uebelacker et al., 2010) and enhancing a sense of self-efficacy (Büssing et al., 2012).

Although yoga originated in Indian and Eastern cultures, the practice has become widespread and broadly accepted by Western populations over the past several decades (e.g., Barnes, Bloom, & Nahin, 2008; Saper, Eisenberg, Davis, Culpepper, & Phillips, 2004). In the United States, the National Health Interview Survey found that the use of yoga rose from an estimated 5.8% in 2002 to 10.1% in 2012 among adults practicing yoga as a CAM approach (Clarke, Black, Stussman, Barnes, & Nahin, 2015). Further, growing global acceptance has increased the number of individuals participating in yoga for recreation as well as its health benefits (Kirkwood et al., 2005; Mehta & Sharma, 2010; Pilkington et al., 2005). Yoga may also appeal to people who are struggling with mental health and psychological concerns because yoga can be seen as promoting health and well-being, rather than a treatment for disorders (Büssing et al., 2012; Uebelacker et al., 2010).

Yoga for the Effects of Trauma: What About the Evidence?

Although yoga has growing popular acceptability, providers should be thoughtful about using and/or recommending any untested intervention to any group, and especially with trauma-exposed individuals, as they are vulnerable to retraumatization (Doob, 1992; Vallejo & Amaro, 2009). With growing emphasis on evidence-based practices, clinicians and service providers are also increasingly called to attend to the scientific literature concerning the effectiveness and appropriateness of interventions (Drake et al., 2001; Torrey et al., 2001). The use of evidence-based practice (i.e., interventions found to be effective upon rigorous scientific testing for the treatment of specific mental health concerns with particular populations) helps to ensure that trauma-exposed individuals are provided with effective and ethical treatment options. For these reasons, it is worrisome that providers may be increasingly using yoga without a summary of the evidence to guide their practice.

To help address these critical knowledge gaps, our team sought to investigate the following research questions: (a) What is the evidence regarding yoga as a treatment for individuals who are experiencing negative outcomes associated with traumatic experiences, including anxiety, depression, and/or PTSD and (b) What are the existing clinical and service recommendations for the use of yoga with trauma-exposed individuals?

Our initial searches showed a considerable body of research was relevant to our study aims, including a number of reviews and meta-analyses concerned with yoga for treating trauma effects, anxiety, depression, and PTSD. Rather than replicate these prior reviews, we undertook a meta-review. Consistent with our first study question, our search efforts focused on identifying published review studies that addressed the use of yoga as a treatment for the effects of traumatic events and/or the treatment of mental health symptoms or illnesses often associated with trauma, specifically anxiety, depression, and PTSD. Further, we sought to identify studies concerned with yoga for the treatment of anxiety and depression for both individuals who have had traumatic experiences and those who have not to examine the extent to which trauma-exposed individuals have been the focus of such studies.

Concerning our second aim, we focused on gleaning from the literature any clinical and service recommendations for using yoga with trauma-exposed individuals to help develop evidence-based guidelines for providers who are considering or already using yoga as a therapeutic treatment in their practices. Also, as noted above, we focused broadly on how yoga might be best delivered in the treatment of depression and anxiety because such information holds implications for treating these disorders and/or sets of symptoms among trauma-exposed individuals. In particular, we scrutinized the literature to determine how to ensure yoga could be acceptable, feasible, and best delivered in health and human service settings.

Method

An extensive, systematic search for peer-reviewed scholarly research was conducted using multiple databases. Once we identified relevant articles, we conducted a backward search of the sources cited in each article as a means of identifying additional literature that might have been missed in our database searches. To ensure our search used the most rigorous method, our team consulted with a university reference librarian. Using the recommended format for search terms, we searched the following nine databases: Academic Onefile, Articles Plus, Cochrane Library, Google Scholar, JSTOR, Psychiatry Online, PsycINFO, PubMed, and Web of Science. Each search included the terms *review* and *meta-analysis* and *yoga*. To focus on trauma and symptoms of trauma, combinations of the terms *trauma, anxiety, PTSD* (with variations including *posttraumatic stress disorder*), and *depression* (with variations including *depress**, *depressive*) were used. Initial search efforts began in 2013. As our team worked on this review, we refreshed our search effort to capture newly published studies. We completed our search efforts in March 2014 and reviewed all potentially relevant articles with no exclusions with regard to publication dates.

Initial searches returned 69,622 articles. We eliminated duplicate articles and then reviewed each article's title and abstract to reduce these initial results. We scanned each article title and abstract for the words yoga, trauma, review, and meta-analysis. If yoga and review or meta-analysis were not in the title or abstract, the article was excluded. These exclusions reduced the pool of potential articles to 38. Two members of the research team then independently reviewed each article in depth to determine whether each article met inclusion criteria (detailed below). When uncertainty regarding an article occurred, team members jointly reviewed the article in depth again to reach consensus and make a determination regarding the article's inclusion.

Inclusion Criteria

The articles had to meet all of the following criteria to be included in the review. The study had to be a literature review or meta-analysis, including some discussion of the research methods used for the review or meta-analysis. The article had to address yoga as an intervention for trauma effects; a specific traumatic event; and/or anxiety, depression, or PTSD. Articles eligible for study inclusion could focus on yoga as the sole treatment or include yoga as a key treatment component administered as an adjunct to other interventions, such as psychotherapy or medication. We did not include studies using mindfulness and meditation without other components of yoga in the intervention. Database formats allowed our team to specify search limitations, including English language only, peer-reviewed, and scholarly articles.

Of the potential pool of 38 articles, 13 articles met the study criteria and were included in this meta-review. Although the 13 literature reviews fully met our criteria, some of the included articles had a broader scope of aims than our focus on yoga to address trauma effects or trauma-related mental health symptoms and illnesses. For example, some of the reviews examined a wide range of complementary or alternative medicine modalities and mind–body therapies such as biofeedback, guided imagery, hypnosis, relaxation, and qigong (D'Silva, Poscablo, Habousha, Kogan, & Kligler, 2012). Nonetheless, all 13 articles included in our meta-review gave at least some attention to examining the effectiveness of yoga for treating trauma effects generally and/or anxiety, depression, and/or PTSD with trauma-exposed individuals or other groups.

Data Collection and Analysis

To ensure consistency in our review of each article, the research team developed a data abstraction tool. We designed this tool to obtain detailed information to the extent that such information was presented in each article, including the design of the literature review, meta-analysis methods, yoga interventions used, types of participants, primary results, recommendations for future research, accessibility and feasibility of using yoga, and strengths and weaknesses of the review and/or meta-analysis. One member of our research team surveyed the 13 articles meeting inclusion criteria and then used the abstraction tool to systematically gather detailed information. Another member of the research team independently reviewed each abstraction along with the article form for content and accuracy.

Results

This meta-review included 13 literature reviews, including one with a meta-analysis. Table 1 presents details of each of the included review articles. All included reviews were published from 2005 to 2013, and they included studies published from 1973 to 2012. Overall, the 13 reviews presented a consensus that yoga is at least a somewhat beneficial treatment for anxiety, depression, PTSD symptoms, and the effects of trauma. In addition, the 13 articles were consistent in noting that the findings allowed the authors to recommend yoga only as an ancillary or complementary treatment. In other words, the current evidence does not reach the level of supporting yoga as a primary or sole treatment. Moreover, the included studies had

Table 1. Meta-Review Findings: Summary of Articles.

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
Cramer, Lauche, Langhorst, and Dobos (2013) Research Questions: Are various types of yoga effective and safe in reducing depression among individuals diagnosed with depressive disorders and individuals with higher levels of depression? Method: Systematic literature review and meta-analysis • Included 12 studies • Search terms: Various forms of "yoga" and various forms of "depression" • Dates: All through January 2013 • Inclusion criteria: Randomized-controlled trials (RCTs) only • Interventions: Yoga as primary component of intervention • Participants: Adults with depression, diagnosed with *DSM-IV* criteria, clinician, or depressive symptoms via self-report questionnaire	• Meditation-based yoga interventions were more effective than other types of yoga interventions • Yoga effectiveness was similar to interventions with (a) medication, (b) group therapy/support groups, and (c) massage • 7 Of 12 studies found yoga had significant short-term results in reducing anxiety • Yoga had minimal significant long-term effects on depression • Findings apply to majority of individuals with depression, with some limitation to men because samples primarily included women • Sample populations and yoga interventions varied widely across studies; lack of standard intervention and/or homogenous samples makes it impossible to draw conclusions and compare results across studies • Overall, the authors reported that the evidence supports short-term effects of yoga as method for reducing depressive symptoms; study results for yoga as treatment for depression are promising, but additional research is needed to establish long-term effectiveness	• No adverse effects were reported • Safety not established; authors recommend further research on safety of using yoga for depression treatment • Cost-effectiveness was not discussed	• First meta-analysis of yoga for depression treatment • Included elements of a rigorous research review: (a) two researchers conducted search, (b) data extraction form/standardized evaluation tool were used, (c) two researchers evaluated articles; disagreements were resolved via consensus or by consultation
D'Silva, Poscablo, Habousha, Kogan, and Kligler (2012) Research Questions: Are yoga and other mind–body modalities effective in reducing depression as a primary diagnosis or depression as comorbidity with other illnesses? Method: Systematic literature review • Included nine studies • Search terms: Various forms of depression, "complementary medicine," various terms associated with mind–body therapies, various terms	• Mixed results across studies: Six of nine studies reported positive findings of yoga treatment, and three of nine studies reported negative findings • Positive results were reported for depressive symptoms when yoga used with samples of (a) breast cancer patients, (b) college students, and (c) individuals with lower back pain • Negative results or no change reported when yoga was used with samples of (a) women with comorbid anxiety/	• Individuals using complementary alternative medicine (CAM) treatments often receive additional attention and care from practitioners that they do not receive when using more traditional medicine • Easier for CAM treatments to be tailored to each individual • CAM treatments are safe with minimal risk involved and easy to teach when using a trained professional • Recommendations were given to policy makers and practitioners to consider	• Broad search of 10 databases • Clear inclusion and exclusion criteria • Included elements of a rigorous research review: (a) librarians completed database search, (b) two researchers reviewed abstracts and selected studies, (c) the scale for Assessing Scientific Quality of Investigations was used, (d) four researchers extracted data from studies selected, and (e) disagreements were discussed until consensus reached

(continued)

Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
associated with study design (RCT's, cohort, comparative, case control, meta-analysis, and systematic review) • Inclusion criteria: Mind–body treatment used as an intervention for depressive symptoms or diagnosis, valid measurement, control comparison design, RCTs or quasi-RCTs, adult participants (i.e., $\geq$ 19 years), articles published in English • Exclusion criteria: design < 2 weeks, sample size < 30, excluded if article did not include at least one depression outcome measure	depressive disorders, (b) lymphoma patients, and (c) cancer survivors • In studies using a combination of treatments, positive results with (a) individuals with long-term depression (yoga with meditation and hypnosis), (b) female teachers (yoga with aerobic exercise and Feldenkreis), and (c) elderly (yoga and Ayurveda) • Authors noted that studies had methodological design limitations and a wide range of diversity among sample populations (age, gender, etc.) making it difficult to generalize results	the cost-effectiveness of these treatments when making treatment referrals to patients	
da Silva, Ravindran, and Ravindran (2009) Research Questions: Is yoga is an effective treatment option for mood and anxiety disorders? Method: Systematic literature review • Included 32 articles • Search terms: Variations of yoga with various mood and anxiety disorders, no limitations to types of studies searched • Dates: All prior to July 2008 • Included studies: Studies reviewed included variations of yoga interventions for numerous depressive and anxiety disorders including dysthymia, psychoneurosis, anxiety neurosis, generalized anxiety disorder (GAD), obsessive–compulsive disorder (OCD), performance anxiety and post-traumatic stress disorder (PTSD)	• Across studies, consistent positive results reported for yoga as treatment for depressive symptoms and anxiety disorders • Symptom improvement and benefits were reported for all types of yoga as both a monotherapy and as an adjunctive therapy with medications or psychotherapy • Review found yoga had stronger effects when used with depression than with anxiety • Authors noted limitations with studies reviewed, including poor methodology, small sample sizes, various outcome measures, short-term follow-up • Authors noted results are difficult to generalize because of multiple forms of yoga used • Overall, authors stated that the evidence available for anxiety disorders is weaker than available studies for depression	• Yoga offers advantages for anxiety and depressive disorders treatments: (a) noninvasive, (b) low risk, (c) no negative interactions with medications, (d) easy to access, (e) does not require administration by clinician or medical supervision, (f) provides physical exercise, and (g) is cost-effective • Yoga may be especially acceptable to individuals who are averse to taking medications or have had negative reactions to medication	• Level and strength of evidence of articles reviewed clearly defined and described through a standardized evidence rating tool • Multiple disorders analyzed and addressed • Clear results differentiating yoga as a sole therapy or as a complementary therapy • Certain elements of review rigor (e.g., data extraction process and multiple researchers) not reported
Forfylow (2011) Research Questions: Is yoga an effective complementary, clinical treatment for anxiety and depression, specifically when an adjunct with psychotherapy? Methods: Literature review	• Yoga decreases state, trait, performance, and PTSD anxiety; breath, meditation, and learning yoga all lower anxious feelings while postures lower physical stress	• CAM treatments, specifically yoga, are becoming more popular because of (a) minimal risks, (b) often more appealing and desirable than the side effects that come with many medicines, (c) few stigmas like those associated with	• Investigation of three yoga components- breath work, postures, and meditation- and strengths/effectiveness of each • Valuable recommendations for practitioners offered

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Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
• Included 22 articles • Search terms: Included yoga, anxiety, and depression • Dates: 2003–2010 • Studies included: CAM interventions for anxiety and depression with yoga being main treatment focus; also focused on the three components of yoga—breath work, postures, and meditation	• Yoga is found to lower depression of all types, as primary treatment or with medication or psychotherapy; postures improve mood and lower depression symptoms; meditation helps individuals with negative thoughts • Yoga causes change by regulating the autonomic nervous system, neurotransmitters, and hormone levels • Author noted four methodological limitations to the research: (a) there are few RCTs; (b) current research includes a wide range of yoga types and interventions, making it difficult to know which type of yoga is best for anxiety and depression; (c) results cannot be generalized because of variation in samples, specifically in regard to demographics, anxiety and depression diagnoses, motivation levels, and experience with yoga; and (d) current research gives limited information on the safety risks of using yoga for depression and anxiety • Overall, yoga may be an effective, clinical treatment for anxiety and depression; more research is needed	psychotherapy, (d) CAM treatments are typically more cost-effective than traditional interventions, (e) some participants have particularly enjoyed the meditative and spiritual aspect of yoga, and (f) yoga participants often report benefits such as stronger sense of well-being and physical and mental improvements	• Certain elements of review rigor (e.g., data extraction process, multiple researchers) not reported
Kirkwood, Rampes, Tuffrey, Richardson, and Pilkington (2005) Research Questions: Is yoga an effective treatment for anxiety? Methods: Systematic literature review • Included eight articles • Search terms: Variations of yoga and anxiety • Studies excluded/included: Clinical controlled trials; excluded uncontrolled trials, and dissertation abstracts • Participants: Formal diagnosis of an anxiety disorder, or other measures, or individuals experienced an event that could increase anxiety	• Reviewed studies showed results for yoga as an effective treatment for anxiety disorders, that is, OCD, anxiety neurosis, psychoneurosis, exam anxiety, and snake phobias • Authors determined limitations with the reviewed articles, including (a) poor recording of methodology, (b) six of the eight studies reviewed were randomized; however, there were issues with most; only one study used proper randomization, (c) issues with adequately blinding participants were present in most studies, (d) most studies had limitations with clinical	• Authors noted that yoga is becoming popular because (a) of its spread throughout the United States, (b) it is more appealing than other treatments, (c) it is nonpharmacological, (d) there is wide international acceptance, and (e) there are few risks • Clients/patients may be encouraged to use yoga by emphasizing yoga as a noncompetitive activity and with family support/encouragement • Issues with motivation exist in many studies, including low participation, high attrition, and high dropout rates; committing to a specific, long-term yoga	• Broad search of 10 databases • Clear and detailed search process and inclusion criteria for review process • Included elements of a rigorous research review: (a) two researchers were involved in the search process, (b) a data extraction form and standardized evaluation was created, (c) study quality was rated through recordings of the details of study methods, (d) multiple researchers conducted the evaluation process and disagreements were discussed until consensus was reached

(continued)

Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
• Interventions: Various types of yoga; did not include studies with meditation as sole treatment	significance, adequate data, use of appropriate scales, and baseline data • Due to issues with methodology and limited research available, results cannot be generalized to larger populations; further research is needed	program may be difficult for individuals with anxiety • Authors also noted that the reviewed studies reported limited information on risks and adverse effects of yoga	
Krisanaprakornkit, Sriraj, Piyavhatkul, and Laopaiboon (2009) Research Questions: Are various types of meditation therapy effective for anxiety and anxiety disorders? Methods: Systematic literature review • Included two articles • Search terms: Variations and types of meditation and specific anxiety disorders such as PTSD and OCD • Study types included: RCTs only • Participants: Individuals with a formal anxiety disorder diagnosis; may be with or without comorbid psychiatric disorder • Interventions: Specific types of meditation, including mindfulness; meditation must be a main intervention and be a formal, organized program to be included	• In the first study, improvements were found among all three treatment groups on anxiety scales as well as additional improvements: (a) in muscle relaxation, (b) at work, (c) in level of social functioning, and ,(d) with family relationships • In the second study, significant improvements were found in the Kundalini Yoga group compared to the other group for perceived stress and life purpose; no significant differences between groups on OCD rating scale • For both studies limitations were noted by authors: (a) both studies reviewed were classified as "moderate quality" in terms of their study design and strength due to issues with randomization, baseline data, blinding, and high dropout rates; (b) studies did not include discussion of the effects of samples also using medication as a complementary therapy; (c) research was scarce—only two studies reviewed met inclusion criteria; (d) only studies from the United Studies were included; and (e) small sample sizes used in both studies • Overall, the authors determined that results are positive but research is limited	• Both studies reported no negative effects • Both studies reported relatively high drop-out rates of 33%+ • Motivation and commitment are needed; may be difficult for individuals with depression or anxiety to follow through with yoga regime • Authors noted that consistent practice is important for effectiveness • Authors also noted that financial benefits could result with patients being able to do their own treatment from home without having to continually pay for therapy services	• Broad search of databases, grey literature, conference proceedings, books, and references; also, experts from spiritual institutions were consulted • Specific inclusion criteria was closely followed • Included elements of a rigorous research review: (a) two researchers conducted the initial screening and quality assessment of studies, (b) two researchers conducted data extraction from studies found independently through the use of a standardized data abstraction form, (c) when disagreements arose a third researcher was consulted
Li and Goldsmith (2012) Research Questions: Is yoga an effective nonpharmacological treatment in relieving stress and anxiety? Methods: Systematic literature review • Included 36 articles	• Primary outcomes measured among reviewed studies were (a) anxiety, (b) perceived stress, and (c) biochemical markers/physiological indicators of stress	• Adherence to yoga interventions in most studies was high • Cost-effectiveness of yoga was not discussed in this review; however the authors recommended that yoga's cost-effectiveness be included in future research	• Review focused on large number of rigorous—mostly RCTs—studies • Certain elements of review rigor lpar;e.g., data extraction process, multiple researchers) not reported

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Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
• Dates: September 1974–September 2010 • Search terms: yoga with "stress" and "anxiety" • Inclusion criteria: English only, RCTs and clinical trials only	• 28 of 36 studies found yoga produced significant improvements in anxiety, stress, or physiological reactions • Authors noted that studies included small sample sizes, limitations with outcome measures and control groups, and short intervention periods • Authors noted that heterogeneous samples make it difficult to generalize results; additionally, there were more females versus male participants in the included studies • Overall, authors noted results suggested yoga is a beneficial intervention, however, the reviewed studies' limitations should also be considered		
Longacre, Silver-Highfield, Lama, and Grodin (2012) Research Questions: Are various types of complementary and alternative forms of treatment (CAM; includes yoga) effective for survivors of torture or refugee trauma? Methods: Systematic literature review • 24 Articles included • Dates: Searched from inception of databases through November 2011 • Search terms: torture, refugee, asylum seeker; each paired with ayurveda, meditation, yoga, qigong, tai chi, aromatherapy, homeopathy, Reiki, pranayama, acupuncture, massage, and chiropractic, spirituality; Other disorders/issues searched: chronic pain, depression, PTSD, HIV, rape, and veterans • Inclusion criteria: peer-reviewed articles, surveys, case reports, clinical trials, and qualitative papers • Exclusion criteria: Non-English publications, book chapters, newspaper articles, conference proceedings, dissertations, any treatments not classified as CAM	• Specific findings for yoga: (physical/posture practice only): no published studies with refugees; one combining yoga with massage for Somali women showed benefits • Meditation as a sole treatment: effective findings with child survivors of the Tsunami on Northeast Sri Lanka, Tibetan refugee monks, child abuse survivors, veterans; also shown effective for depression and GAD in earlier studies • Overall, the authors noted that research is limited and inconclusive using CAM therapy with trauma and torture survivors • Authors also noted the following limitations in the research: (a) few studies were available specifically for trauma and torture survivors using CAM treatments	• Yoga is easy to use/practice; risks include (a) those with physical disabilities may not be able to use yoga, (b) specific postures creating problems for some torture survivors because of uncomfortable physical poses, and (c) yoga may not be culturally acceptable by all CAM clinics are easy to access (if more were available); they encourage cultural competence; • Yoga is cost-effective	• Wide range and long list of CAM treatments discussed • Clear description of strengths and risks in each intervention type • Evidence discussed in light of effectiveness for refugee and trauma survivors • Multiple databases searched for relevant studies • For the purposes of this research, limited discussion of yoga; no discussion of entirety of all three yoga components (meditation, breathing, postures combined); this study examined each component separately • Certain elements of review rigor (e.g., data extraction process, multiple researchers) not reported

(continued)

Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
Mehta and Sharma (2010) Research Questions: Is yoga an effective complementary and alternative treatment for depression? Methods: Literature review • 18 Studies included • Dates: 2005 to June 2010 • Search terms: Yoga for depression, alternative therapy for depression, and treating depression through yoga • Dates: Published between 2005 and 2010 • Inclusion criteria: English only, measure of depression or depressive symptoms as outcome, yoga used as intervention, RCTs or quasi-experimental design or pretest/posttest design used	• Positive effects and beneficial results of yoga were found in 17 of 18 studies reviewed for individuals with depression or depressive symptoms • The main populations used as samples in the studies were (a) cancer patients, (b) survivors of trauma, for example, battered women, (c) the elderly, (d) individuals with chronic back pain, and (e) individuals diagnosed with depression • The authors noted the following limitations to the individual studies reviewed: (a) majority of studies were conducted in Eastern countries where yoga may be more acceptable; few from the United States; (b) sample size was small in most studies and lacked diversity with age, gender, and ethnicity making it difficult to generalize results to larger populations; (c) samples included individuals from middle aged to older adults only; and (d) lack of research on yoga as a complementary intervention to other treatments was found	• Acceptability, feasibility, and cost-effectiveness were not directly discussed in the review	• Included elements of a rigorous research review, for example, multiple researchers involved in the search and collection process of articles to review • Certain elements of review rigor (e.g., data extraction process) not reported • Only four databases were searched
Pilkington, Kirkwood, Rampes, and Richardson (2005) Research Questions: Is yoga an effective treatment for depression? Methods: Literature review • 5 Studies reviewed • Dates: Included searches from inception of databases • Search terms: Yoga and related forms, "pranayama," "dhyana," "asanas;" "depress," depression and related forms, "affective," "mood" • Exclusions/inclusions: No limitations to language though search of English databases only; all clinical studies were searched but only RCTs selected	• Significant results were found with yoga in reducing depression or depressive symptoms in 4 5 of the studies • Authors noted the following limitations in the reviewed literature: (a) methodological procedures were not well documented; (b) randomization was not always fully described; (c) studies had limitations with baseline data collection, blinding, and high dropout rates; (d) wide variation in yoga types and interventions used; (e) wide range of types of depression/ severity of depression in these studies; (f) review only included studies with participants who were under the age of	• Most studies reviewed cited no negative effects reported with yoga, except for one with the mention of fatigue • Feasibility of using yoga may be difficult in the elderly or those with physical disabilities • Small risks include meditation which may cause psychological problems; other risks are possible but rare • Regarding whether depressed individuals are willing to do yoga, the research determined that there was inconclusive evidence to address this issue at this time • Yoga may be appealing to depressed individuals because of minimal negative	• Broad number of scholarly databases included in review search • Review search also included relevant yoga websites (i.e., International Association of Yoga Therapists, Yoga Biomedical Trust, and Yoga Research and Education Center) • Exclusion and inclusion criteria in review process were clearly outlined and detailed • Included elements of a rigorous research review: (a) a special form was used to select review studies, (b) included studies were evaluated using a specific abstraction tool, (c) two researchers independently conducted

(continued)

Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
• Participants: Those with depression/ depressive disorder • Intervention: Yoga/yoga-based exercises, excluding meditation only or complex interventions	50; (g) lack of discussion on the risks associated with using yoga • Overall, the review findings show that yoga has potential as a beneficial intervention for depression, but these results must be used with caution as there is limited research available and limitations in the studies	effects and often more attractive than medications that often have side effects	review process, with a third researcher reviewing discrepancies
Sharma and Haider (2013) Research Questions: Is yoga an effective treatment in reducing anxiety and anxiety disorders? Is yoga more effective when used as a sole, primary treatment, OR in adjunct with medication to reduce anxiety? Methods: Systematic literature review • 27 Studies included • Dates: January 2010–May 2012 • Search terms: "Yoga and anxiety intervention" and "yoga and anxiety program" • Inclusion criteria: English only; yoga must be a part of an intervention or the primary intervention; quantitative study designs only; and anxiety measured as an outcome, even if combined with other comorbidities	• 19 Of the 27 included studies found some form of significant decrease in state and/or trait anxiety with yoga • Only two studies found no significant change in anxiety when using yoga; one study found an increase in anxiety • Yoga interventions that included meditation were more effective than those that did not • Results were more robust in yoga interventions that lasted 2–3 months versus short-term interventions • Results were more robust in yoga interventions that were implemented by a trained instructor/classes versus when participants completed yoga interventions independently at home • Authors noted the following limitations among the reviewed articles: (a) many of the yoga intervention results came from individuals self-reporting which increases reporting error risks, (b) majority of studies examined anxiety as a comorbidity with other disorders or diseases, and (c) the wide range of anxiety disorders and comorbid disorders included in the reviewed studies made it difficult to compare results or draw generalizations to larger populations • Overall, the authors determined that the majority of reviewed studies found a decrease in anxiety—with most being statistically significant decreases—when using yoga as an intervention	• Yoga is a form of exercise that can be used by individuals who are not physically able to do other forms of aerobic exercise; thus, it is more feasible for elderly clients and individuals with physical disabilities • Yoga is more cost-effective than many other treatment options such as hospitalization, medication, or therapy; medication is also often associated with negative side effects, unlike yoga	• Review efforts were focused on studies with rigorous RCTs designs • Included a large amount of studies in the review • Certain elements of review rigor (e.g., data extraction process) not reported

(continued)

Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations

Telles, Singh, and Balkrishna (2012)
Research Questions: Is yoga an effective treatment for individuals who have experienced trauma and are now experiencing depression, anxiety, and PTSD as a result?
Methods: Systematic literature review
• 12 Studies included
• Inclusion criteria: Journals only; yoga or meditation as intervention had to be included in the study along with some type of trauma experienced by participants
	• Four types of trauma were discussed within each article found, along with various yoga interventions used in each
	  • **Survivors of natural disasters:** Studies reviewed found positive results overall; yoga lowered PTSD and anxiety symptoms, and sadness
	  • **Witnesses of combat/war:** Studies reviewed found overall positive results; yoga significant in decreasing PTSD symptoms and improvements with attention span and restlessness
	  • **Intimate partner violence:** Yoga showed promise in decreasing physical and mental stress responses
	  • **Incarcerated youth:** Yoga significantly reduced heart and breath rates
	• Mechanisms by which yoga actually decreases trauma symptoms: various physiological symptoms and measures were reviewed in studies using yoga and the possible mechanisms found were (a) lowering stress, (b) increasing positive affect, and (c) changing neurotransmitters
	• Authors noted the limitations in reviewed studies reviewed: (a) lack of control groups, (b) use of outcome measures that have not yet been proven reliable and valid, (c) short intervention periods, (d) lack of randomization, (e) samples including only individuals who were motivated or wanted to be a part of the study; and (f) risk of bias with self-reporting
	• Overall, the authors determined that (a) yoga is a positive treatment for mental health issues resulting from trauma; and that research is limited with no RCTs with survivors of trauma available
		• Acceptability, feasibility, and cost-effectiveness were not directly discussed in the review	• Clear focus on trauma with outcome measures measuring trauma symptoms such as PTSD and anxiety
			• Included children in sample populations
			• Authors investigated physical mechanisms by which yoga lowers trauma symptoms
			• Certain elements of review rigor (e.g., multiple researchers, data extraction process) not reported

(continued)

Table 1. (continued)

Authors, Aim, and Method	Findings	Acceptability, Feasibility and Cost-Effectiveness	Strengths and Limitations
Uebelacker et al. (2010) Research Questions: Is yoga an effective treatment for depression? Methods: Systematic literature review • 12 Articles included • Search terms: yoga and depression • Inclusion criteria: Study was clinical trial; one of the interventions in the study was primarily a yoga intervention • Participants: diagnosed with a depressive disorder or increased symptoms of depression	• Among the 12 included articles, 8 were controlled trials and 4 were open trials • Of the controlled trials that compared a yoga intervention to a control group with no or little treatment, four of the five showed evidence supporting yoga as an effective treatment • Among the open trials, three of the four used yoga as the primary treatment and found significant positive results while the fourth trial looked at yoga in adjunct with patients using antidepressants and found significant positive results • Authors noted the following limitations in reviewed studies: (a) methodological procedures were not well documented, (b) unable to generalize results because of limited research and differing methods, (c) wide variation in type and length of yoga interventions used—unknown as to which specific types are best, and (d) lack of control groups in some studies	• Authors note that current depression treatments are not acceptable or sufficient for many people: (a) low response rates and issues with relapse have been reported for both medicine and therapy; (b) many individuals have concerns about current treatments and yoga is more appealing because it promotes positive health rather than treatment; (c) many persons do not like to risk the side effects of medications; and (d) many do not like the cost, time, and stigma of counseling • Authors note that yoga (a) is flexible – can be done at home and classes are offered in many places at many times; (b) is easy to use as a complementary treatment, with medication or psychotherapy; (c) can easily be modified for groups with special needs/physical limitations; (d) has also been shown to lower weight gain and physical pain; (e) can be fun and enjoyable and give an individual a sense of accomplishment; (f) has minimal risks; and (g) is inexpensive • Nonetheless, authors also noted limitations to using yoga as an intervention: (a) yoga can be time consuming – multiple times weekly, and longer term intervention periods may be more effective; (b) individuals with physical disabilities or limitations may believe they cannot participate in yoga; (c) because yoga originated from Eastern thought and religion, some may have a negative view of using it in Western culture and religion	• Review methodology was detailed and clear • Multiple databases were searched for relevant studies • Authors offered recommendations for future research and practice in detail, including the need for a standardized manual and how clinicians should make yoga referrals • Certain elements of review rigor (e.g., multiple researchers, data extraction process) not reported

considerable differences in research methods, and the collective findings from these 13 reviews showed significant limitations in the rigor of the overall research. The reviews also yielded findings on how clinicians and service providers can best use yoga as an intervention in their own practices. These findings will be presented in detail later.

Review Methods and Results of Included Articles

Many of the review articles used a rigorous review process, including searching multiple databases, creating a systematic data extraction form, and having at least two researchers work independently to conduct the review and then compare results. Of the study sample, 12 of 13 reviews identified the databases searched and provided a detailed description of their respective search processes (Cramer et al., 2013; D'Silva et al., 2012; da Silva, Ravindran, & Ravindran, 2009; Kirkwood et al., 2005; Krisanaprakornkit, Sriraj, Piyavhatkul, & Laopaiboon, 2009; Li & Goldsmith, 2012; Longacre, Silver-Highfield, Lama, & Grodin, 2012; Mehta & Sharma, 2010; Pilkington et al., 2005; Sharma & Haider, 2013; Telles et al., 2012; Uebelacker et al., 2010). Six articles included multiple researchers in the search and review process (Cramer et al., 2013; D'Silva et al., 2012; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009; Mehta & Sharma, 2010; Pilkington et al., 2005).

The reviews generally followed the same protocol as used in this study to identify the relevant literature, including defining inclusion criteria and search terms to filter the results returned. However, the number of studies included in the review articles varied widely. One of the reviews included only two studies (Krisanaprakornkit et al., 2009), whereas others included as many as 12 or 18 studies (Cramer et al., 2013; Mehta & Sharma, 2010; Telles et al., 2012; Uebelacker et al., 2010). Two reviews stood out as exceptions, given the number of studies reviewed: Sharma and Haider (2013) reviewed 27 studies and Li and Goldsmith (2012) reviewed 36 studies. Reviews that had a narrowly defined focus and more rigorous inclusion criteria (e.g., limited to studies using randomized controlled designs; Krisanaprakornkit et al., 2009) tended to include a limited number of studies. In all, the 13 reviews analyzed 185 distinct articles that reported on a study examining the use of yoga in the treatment of anxiety, depression, PTSD, and/or the effects of trauma for trauma-exposed individuals or other groups.

Most of the reviews described a process in which researchers independently conducted data extraction, compared results, and consulted with other research team members to resolve discrepancies and reach final agreement on coding or categorization of the data. Five of the reviews reported using a standardized data extraction form created by the researchers to ensure consistency of the data extraction processes (Cramer et al., 2013; D'Silva et al., 2012; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009; Pilkington et al., 2005). One review used a "level of evidence" rating scale to ensure consistency in the researchers' evaluation of the included literature (da Silva et al., 2009).

Yoga for Treating the Effects of Trauma

Two of the reviewed studies focused specifically on yoga for treating the effects of trauma (Longacre et al., 2012; Telles et al., 2012). Longacre, Silver-Highfield, Lama, and Grodin (2012) sought information on the effectiveness of yoga for survivors of torture or traumatic refugee experiences, while Telles, Singh, and Balkrishna (2012) focused more broadly on studies of the effectiveness of yoga for trauma survivors dealing specifically with anxiety, depression, and/or PTSD. Individual study samples included survivors of various types of natural disasters (i.e., tsunami, hurricane, and flood), war, and terrorist bombings as well as witnesses of violence and youth who had been incarcerated. Longacre et al. (2012) did not locate any published studies on yoga specifically with refugees and located only one study that examined a combination of yoga with massage for Somali refugee women, which showed benefits for this sample of women (specific benefits of yoga were not outlined by review authors). Further, they found positive results in studies on meditation as a treatment for mental health concerns of child survivors of a tsunami, Tibetan refugee monks, child abuse survivors, and veterans, also discussing yoga to have been found effective in treating depression and generalized anxiety disorder (GAD) in earlier studies (Longacre et al., 2012). Overall, Longacre et al. (2012) discussed the promise that CAM interventions, including yoga and meditation, showed for refugees and survivors of torture while noting that evidence is very limited.

Telles et al. (2012) also found overall promising results in studies they reviewed. Notably, this review found yoga was associated with improvement in trauma-related mental health symptoms and illnesses for survivors of natural disasters (reduction in PTSD and anxiety symptoms and sadness), witnesses of combat and war (significant reduction in PTSD symptoms and improvement in attention span and restlessness), IPV (promise for decreasing physical and mental stress responses), and incarcerated youth (significant reduction in heart and breathing rates; Telles et al., 2012). The authors concluded that yoga is likely a beneficial treatment for trauma-related mental health symptoms and illnesses but that there is a dearth of rigorous research (e.g., research using randomized designs) focused on yoga for treating the effects of trauma (Telles et al., 2012).

Overall, five other studies we reviewed clearly included at least one study that assessed yoga as a treatment for trauma-exposed individuals (da Silva et al., 2009; Forfylow, 2011; Li & Goldsmith, 2012; Mehta & Sharma, 2010; Sharma & Haider, 2013), including the following groups: (a) veterans (da Silva et al., 2009; Sharma & Heider, 2013), (b) IPV survivors (da Silva et al., 2009; Forfylow, 2011; Mehta & Sharma, 2010), (c) tsunami survivors (da Silva et al., 2009), (d) incarcerated women (Sharma & Haider, 2013), and (e) flood survivors (Li & Goldsmith, 2012; Sharma & Haider, 2013). Further details on the findings of these five studies are reviewed in greater detail subsequently. The six other studies reviewed may have reviewed studies with samples of trauma-exposed individuals,

although we were not able to determine this from the review reports. As discussed earlier, these reviews were included because their findings concerned with yoga's helpfulness for depression and anxiety also hold implications for treating these disorders and/or set of symptoms among trauma-exposed individuals.

Depression, Anxiety, and PTSD

Depression. The majority of the reviews focused on using yoga to treat depressive symptoms or disorders. Overall, most of these reviews reported positive, beneficial results associated with using yoga as a treatment to reduce rates and/or levels of depressive symptoms (Cramer et al., 2013; D'Silva et al., 2012; da Silva et al., 2009; Forfylow, 2011; Longacre et al., 2012; Mehta & Sharma, 2010; Pilkington et al., 2005; Telles et al., 2012; Uebelacker et al., 2010). Moreover, multiple studies included results showing that yoga significantly reduced depressive symptoms (Cramer et al., 2013; D'Silva et al., 2012; Pilkington et al., 2005; Uebelacker et al., 2010). The breathing and meditation components of yoga were shown to appreciably reduce depression rates among individuals who had various depressive diagnoses (Forfylow, 2011). One review reported meditation-based yoga was more effective in reducing depressive symptoms than exercise-based yoga (Cramer et al., 2013). Another review found yoga therapy reduced heart and breath rates, decreased reports of negative emotions such as sadness, and was credited with improvements in attention span and restlessness (Telles et al., 2012). Another review reported that yoga was found to improve sleep quality, decrease negative thoughts and emotions, and improve participants' sense of meaning in life (Uebelacker et al., 2010).

In many of the studies, yoga was used as a primary treatment for depression, with beneficial results reported when yoga was used as a sole intervention without additional therapies (Cramer et al., 2013; da Silva et al., 2009; Mehta & Sharma, 2010; Pilkington et al., 2005; Telles et al., 2012; Uebelacker et al., 2010). Other studies used yoga as an adjunctive therapy to complement other treatments, including medication (antidepressants or antianxiety medicine; Cramer et al., 2013; D'Silva et al., 2012; da Silva et al., 2009; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009; Mehta & Sharma, 2010; Uebelacker et al., 2010), psychotherapy or psychoeducation (da Silva et al., 2009; Forfylow, 2011; Kirkwood et al., 2005), hypnosis (D'Silva et al., 2012), meditation (Cramer et al., 2013; Telles et al., 2012), ayurvedic medicine (D'Silva et al., 2012), trauma reduction exposure therapy (Telles et al., 2012), and aerobic exercise (Cramer et al., 2013; D'Silva et al., 2012). Effective results were found using yoga as an adjunct treatment with medication and psychotherapy as the most common complementary interventions.

Forfylow (2011) and Longacre et al. (2012) investigated differences among the three main components of yoga (i.e., breath work, physical postures, and meditation). Taken together, these two reviews determined that breath work was found to be beneficial for depression. Physical postures were found to be beneficial in reducing depressive symptoms and improving mood. Last, meditation significantly decreased frequency and severity of depressive symptoms, and thus, meditation was associated with increased rates of remission among those with depression. Meditation was shown to be an effective approach when used with several trauma-exposed populations, including tsunami survivors, refugees, child abuse survivors, and veterans.

A wide range of populations was included in the study samples, and positive results were found in all populations. Depression diagnoses varied as well as type of trauma experienced when samples included trauma-exposed individuals. Types of depression included in study samples were major depression (Cramer et al., 2013; da Silva et al., 2009), dysthymia (da Silva et al., 2009; Uebelacker et al., 2010), unipolar major depression (Forfylow, 2011), young adults or college students with mild depression (Cramer et al., 2013; D'Silva et al., 2012; Forfylow, 2011), chronic and mild depression (Forfylow, 2011), mild–moderate depression (Cramer et al., 2013; Forfylow, 2011; Pilkington et al., 2005; Uebelacker et al., 2010), severe depression (Cramer et al., 2013; Forfylow, 2011; Pilkington et al., 2005; Uebelacker et al., 2010), melancholic depression (Cramer et al., 2013; Pilkington et al., 2005; Uebelacker et al., 2010), major depressive disorder (Pilkington et al., 2005; Uebelacker et al., 2010), psychiatric patients with depression (Uebelacker et al., 2010), neurotic or reactive depression (Pilkington et al., 2005), prenatally depressed women (Cramer et al., 2013), and nonspecified depression (Cramer et al., 2013; Longacre et al., 2012; Mehta & Sharma, 2010).

Other sample populations were made up of individuals who experienced trauma and might be more likely to experience depression as a result. These populations included refugees and torture survivors, child abuse survivors, veterans (Longacre et al., 2012); survivors of natural disasters (e.g., the 2004 tsunami or Hurricane Katrina); survivors of war (specifically children and adolescents); children with high levels of exposure to violence (typically domestic violence); young girls in a community home with a history of legal offenses; and survivors of interpersonal violence (Telles et al., 2012).

Anxiety. Anxiety and a wide range of anxiety disorders were included in the reviewed studies. Although one review concluded that yoga was more beneficial for the treatment of depression than anxiety (da Silva et al., 2009), several other reviews reported yoga was a positive and effective treatment for anxiety (Cramer et al., 2013; Forfylow, 2011; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009; Li & Goldsmith, 2012; Longacre et al., 2012; Sharma & Haider, 2013; Telles et al., 2012;). Moreover, Forfylow (2011), Krisanaprakornkit, Sriraj, Piyavhatkul, and Laopaiboon (2009), Li and Goldsmith (2012), and Sharma and Haider (2013) found significant results when yoga was used as an intervention to reduce anxiety. Notably, Sharma and Haider's (2013) review found (a) yoga interventions of longer durations (2–3 months) were more effective in reducing anxiety than shorter term interventions,

(b) yoga interventions that included meditation were more effective than yoga interventions without a meditation component, and (c) yoga interventions that used a group format in a formal class structure conducted by a trained yoga instructor were more effective than interventions that participants carried out independently at home.

The sample populations used in most studies included individuals with specific anxiety disorders. Beneficial results were reported when yoga was used as the primary treatment with psychoneurosis, anxiety neurosis, GAD, and obsessive–compulsive disorder (OCD; da Silva et al., 2009). Moreover, two reviews reported statistically significant results for yoga as a primary treatment for OCD, psychoneurosis, and anxiety neurosis (Kirkwood et al., 2005; Krisanaprakornkit et al., 2009). Individuals with OCD reported yoga therapy led to reduced stress and improvements in life purpose, and individuals with anxiety neurosis reported yoga therapy led to improvements in mood, distress, muscle relaxation, social functioning, and family relationships (Krisanaprakornkit et al., 2009). In addition, positive results were found when using yoga as a complementary treatment to medication or psychotherapy for GAD and OCD (da Silva et al., 2009). Last, Li and Goldsmith (2012) found significant improvements in anxiety scale scores with several populations with unspecified anxiety disorders.

Telles et al. (2012), Li and Goldsmith (2012), and Sharma and Haider (2013) included studies with individuals who had experienced stressful or traumatic events, including natural disasters (e.g., floods, Hurricane Katrina, and the 2004 tsunami in Southeast Asia), incarceration, and military service. Yoga interventions used with these populations showed beneficial results in anxiety reduction. Two reviews included studies with a wide range of populations that generally report high stress levels. Li and Goldsmith (2012) included individuals with chronic illnesses (e.g., cancer and hypertension), firefighters, musicians, pregnant women, and medical students, whereas Sharma and Haider (2013) included individuals with eating disorders, fibromyalgia, schizophrenia, adult and child cancer patients, medical students, women with menstrual problems, and those with chronic pain or joint issues. Both reviews found significant, positive results in the majority of these populations when yoga was used as an intervention for anxiety.

Individual components of yoga were found to have variable effects on anxiety. Breath work was shown to reduce anxiety overall (Forfylow, 2011). While several reviews found that physical postures and meditation were beneficial for anxiety, two reviews showed these components significantly reduced anxiety (Forfylow, 2011; Longacre et al., 2012). GAD symptoms were lowered with the use of meditation for individuals who had experienced trauma events ranging from natural disasters to child abuse (Longacre et al., 2012). In addition, the meditation component of yoga was found to significantly lower anxiety neurosis (Krisanaprakornkit et al., 2009).

PTSD. Although PTSD received less attention in the reviews than depression or anxiety, the reviews found beneficial results when using yoga as a treatment for PTSD (da Silva et al., 2009; Forfylow, 2011; Longacre et al., 2012; Telles et al., 2012). Moreover, significant results were found in using yoga to reduce PTSD symptoms for trauma survivors of natural disasters and witnesses of combat and war (Telles et al., 2012).

Some reviews found each component of yoga had specific effects on PTSD. Breath work was shown to lower PTSD symptoms in general as well as PTSD-related anxiety (Forfylow, 2011; Longacre et al., 2012). Specifically, breath work was found to have strong treatment potential when used with survivors of violence, those with alcohol abuse disorders, and individuals in rehabilitation programs for prisoners (Longacre et al., 2012). Further, the physical postures component was shown to reduce PTSD symptom severity (Longacre et al., 2012). Last, meditation was shown as an effective intervention when used with children who survived the 2004 tsunami in Sri Lanka and a sample of Tibetan refugee monks and was shown to have statistically significant results in improving psychological health for child abuse survivors and military veterans (Longacre et al., 2012).

Yoga was used as both a primary and a complementary intervention to treat PTSD and was shown to be effective at either level of treatment (da Silva et al., 2009; Forfylow, 2011; Telles et al., 2012). Other treatments paired with yoga to treat PTSD included trauma reduction exposure technique (Telles et al., 2012), mindfulness meditation (Telles et al., 2012), medication (da Silva et al., 2009), and psychotherapy (da Silva et al., 2009).

Sample populations in the reviewed studies on PTSD included survivors of natural disasters, witnesses of combat and war, survivors of interpersonal violence, incarcerated youth (Telles et al., 2012), refugees and survivors of torture, child abuse survivors, and child survivors of natural disasters (Longacre et al., 2012). Positive results were found using yoga with all PTSD sample populations.

Acceptability, Feasibility, and Cost-Effectiveness

Several of the articles included in this meta-review noted that yoga has been shown to have minimal risks and few negative effects (Cramer et al., 2013; D'Silva et al., 2012; da Silva et al., 2009; Forfylow, 2011; Kirkwood et al., 2005; Li & Goldsmith, 2012; Pilkington et al., 2005; Uebelacker et al., 2010; Krisanaprakornkit et al., 2009). Nonetheless, the reviews also showed that certain populations should use yoga with caution, ensuring that accommodations have been made to the yoga regimen to safeguard against risk. The research reviewed here agreed that yoga interventions should be used cautiously with pregnant women (Uebelacker et al., 2010), individuals who have experienced severe trauma (Longacre et al., 2012), older adults and individuals with physical disabilities (Pilkington et al., 2005), and psychiatric patients (Krisanaprakornkit et al., 2009). Moreover, the reviewed literature showed that yoga is adaptable to accommodate individuals' personal limitations and desires for the practice. The reviews discussed ways in which yoga can be adapted to accommodate the needs of these populations through specific yoga styles such as

Viniyoga, which emphasizes customizing the yoga practice to the needs and limitations of each individual (Uebelacker et al., 2010).

Likewise, one article noted some of the physical postures used in specific yoga types could cause discomfort or flashbacks among trauma and torture survivors, especially survivors of physical or sexual abuse (Longacre et al., 2012). Some yoga poses expose sensitive parts of the body such as chest or groin areas, which might be uncomfortable for such survivors (Longacre et al., 2012). Likewise, meditation may trigger flashbacks for survivors who witnessed natural disasters or combat (Longacre et al., 2012). To address such concerns, Longacre et al. (2012) noted that certain forms of yoga (e.g., chair yoga) do not require complex postures and, thus, might be better suited for use with trauma survivors. In their review, Krisanaprakornkit et al. (2009) noted that meditation is risky for patients with psychosis, and yogic breathing could increase the likelihood of physiological problems for some.

Nearly all of the reviews included in this meta-review noted that yoga is becoming widely accepted as a treatment option for anxiety, depression, PTSD, and the effects of trauma (D'Silva et al., 2012; da Silva et al., 2009; Forfylow, 2011; Kirkwood et al., 2005; Li & Goldsmith, 2012; Pilkington et al., 2005; Sharma & Haider, 2013; Uebelacker et al., 2010). Yoga may be an appealing treatment approach for service users because many have expressed concern regarding potential side effects of medication and/or attributed their reluctance to engage in treatments due to the time, cost, and stigma of counseling and psychotherapy.

Further, several of the reviews described yoga as an affordable and cost-effective treatment option, especially compared to medication and psychotherapy (D'Silva et al., 2012; da Silva et al., 2009; Forfylow, 2011; Krisanaprakornkit et al., 2009; Longacre et al., 2012; Sharma & Haider, 2013; Uebelacker et al., 2010). Many reviews reported that yoga is easy to access and implement (D'Silva et al., 2012; da Silva et al., 2009; Krisanaprakornkit et al., 2009; Longacre et al., 2012; Mehta & Sharma, 2010; Sharma & Haider, 2013; Uebelacker et al., 2010). Most local gyms hold daily yoga classes, and many easy yoga exercises can be done in the privacy of a person's home whenever it is most convenient. Some yoga participants have described additional benefits to yoga practice such as losing weight, increasing their physical fitness level, and finding the practice enjoyable (da Silva et al., 2009; Forfylow, 2011; Uebelacker et al., 2010).

Quality of Research Included in the Review Articles

Despite the overall promise of yoga for treating depression, anxiety, and PTSD generally, as well as trauma-related mental health symptoms and illnesses reported across these 13 reviews, the review authors universally noted serious methodological issues and limitations across studies included in their research. Across the reviews, similar issues were noted, including a lack of randomization, poor quality in baseline data, lack of control groups, lack of consistent evaluation and outcome measurements, lack of long-term follow-up on the sustained effects of yoga, and poor documentation of methodological processes within the individual studies (Cramer et al., 2013; D'Silva et al., 2012; da Silva et al., 2009; Forfylow, 2011; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009; Li & Goldsmith, 2012; Mehta & Sharma, 2010; Pilkington et al., 2005; Sharma & Haider, 2013; Telles et al., 2012; Uebelacker et al., 2010). In addition, Cramer, Lauche, Langhorst, and Dobos (2013) noted that the majority of studies included in their review had not investigated adverse events, and most of the study samples were primarily female.

Two sets of authors noted that few of the randomized controlled trials (RCTs) included in their reviews used intent-to-treat analyses and/or attention-control comparison groups to enhance study rigor (Li & Goldsmith, 2012; Mehta & Sharma, 2010). Based on our systematic analysis of each of the 13 reviews, we determined that the research designs of only 113 (61.1%) of 185 studies were explicitly identified in the reviews. Of these 113, 56 (49.6% and about 30% of the 185 studies overall) were identified as RCTs, 53 (46.9%) as non-RCTs, and four (0.04%) as RCTs and non-RCTs by separate reviews (i.e., at least one review labeled a study as an RCT while at least one other review labeled it as something other than an RCT). Among the 13 reviews, six reported at least one effect size concerned with at least one of 20 of the individual studies. Thus, 20 (10.8%) of the 185 studies overall reported at least some information regarding the effects determined by their interventions.

Overall, reviews that synthesized studies on multiple types of yoga interventions discussed how the wide range of yoga used compromised their ability to make clear and certain statements about yoga's efficacy. For example, the studies included in these reviews examined interventions that used different types of yoga (e.g., Hatha yoga, Iyengar yoga, or SKY). Furthermore, the yoga interventions varied considerably in length, intensity, and format (e.g., classroom based and home based). Given the variety of yoga types and delivery strategies, the evidence about which yoga type(s) work best for treating the effects of trauma as well as anxiety, depression, and PTSD is uncertain.

All reviews raised another issue related to rigor, which stemmed from the wide range of mental health disorders and symptoms addressed in the studies. Among the reviewed studies, multiple types of mental health issues or trauma symptoms were addressed even in the context of one disorder or overall diagnostic category. For example, although Pilkington, Kirkwood, Rampes, and Richardson (2005) review focused on yoga as a treatment for depression, the samples in the included studies varied drastically by severity of depression, specificity of formal diagnosis, and symptom list. Given the variety of mental illnesses and symptoms investigated, the evidence about which yoga type(s) work best for which types of mental health concerns is uncertain.

Across all the reviews included in this research, the authors universally recommended that more research—particularly more rigorous research—is needed to strengthen the evidence regarding the value of yoga. However, despite such recommendations, several of the authors noted the substantial practical

challenges of conducting rigorous research on yoga as an intervention (D'Silva et al., 2012; Forfylow, 2011; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009). Specifically, these authors highlighted the challenge of evaluating a complex, holistic, spiritual practice using a scientific paradigm that requires consistency, simplification, structure, and standardization. As Kirkwood, Rampes, Tuffrey, Richardson, and Pilkington (2005) stated:

> . . . the exact causal mechanism is likely to be complex. Yoga may best be delivered as a complete intervention, and if different aspects are delivered separately, such a reductionist approach may result in a loss of efficacy or effectiveness. (p. 889)

In other words, the scientific requirements necessary to rigorously investigate yoga's effects might unintentionally dismantle its potential benefits.

Table 2. Summary of Critical Findings.

- Yoga shows promise as an acceptable, feasible, helpful, practical, and low-risk intervention for individuals who are struggling with negative outcomes frequently associated with traumatic experiences, including anxiety, depression, and/or post-traumatic stress disorder (PTSD).
- Yoga shows promise for enhancing and extending the benefits of other treatments for the effects of trauma, as well as anxiety, depression, and PTSD, such as psychotherapy and medication.
- Based on the current evidence, clinicians and service providers working with individuals who are experiencing negative outcomes associated with traumatic experiences, including anxiety, depression, and/or PTSD, should consider using yoga as an intervention but only in addition to other evidence-based and well-established treatments.

Discussion

Given the increasing popularity of yoga as an intervention for the effects of trauma, we sought to investigate the state of the evidence regarding yoga as an intervention for individuals who are experiencing negative outcomes associated with trauma, including anxiety, depression, and/or PTSD. Our goal in conducting this research was to inform clinical practice and service delivery in the various health and social services settings that serve trauma-exposed individuals. Accordingly, we aimed for this research to be useful to clinicians and service providers working in a variety of settings with trauma-exposed individuals who may appear with a range of presenting problems, sets of symptoms, and/or co-occurring disorders. Given this overall goal, this research was guided by broad definitions of trauma and yoga.

This rigorous meta-review showed that a considerable amount of empirical literature is available regarding yoga as a treatment for anxiety, depression, PTSD, and/or the effects of trauma. Our search efforts determined 12 systematic literature reviews and one literature review with a meta-analysis that, in combination, included 185 distinct articles published between 1973 and 2012, mainly published between 2000 and 2012. For the most part, these 13 reviews were rigorously conducted. Thus, a substantial body of literature exists that has important implications and valuable recommendations for using yoga as an intervention with individuals struggling with anxiety, depression, PTSD, and/or the effects of trauma.

In addition, the results of this meta-review show that yoga holds potential promise for helping improve anxiety, depression, PTSD, and/or the psychological consequences of trauma at least in the short term. The research findings show that yoga is an acceptable, feasible, practical, and low-risk intervention for individuals (Cramer et al., 2013; D'Silva et al., 2012; da Silva et al., 2009; Forfylow, 2011; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009; Li & Goldsmith, 2012; Pilkington et al., 2005; Uebelacker et al., 2010). Notably, only two reviews in our meta-review focused specifically on studies of yoga as an intervention for trauma-exposed individuals (Longacre et al., 2012; Telles et al., 2012), with an additional five reviews including at least one study on yoga for trauma-related mental health symptoms and illnesses (da Silva et al., 2009; Forfylow, 2011; Li & Goldsmith, 2012; Mehta & Sharma, 2010; Sharma & Haider, 2013). Given the broad goals and definitions guiding this research, the six other studies were included because their findings concerned with yoga's helpfulness for depression and anxiety also hold implications for treating these disorders and/or set of symptoms among trauma-exposed individuals. See Table 2 for a summary of all critical findings.

The results of this meta-review show that—at this time—yoga should be used only as an ancillary or complementary treatment. Based on the currently available evidence, clinicians and service providers might consider using yoga as an intervention for treating trauma effects but only in addition to other evidence-based and well-established treatments. Currently, the evidence base is insufficient to support recommending yoga as a primary or sole treatment for two reasons. First, our meta-review shows a considerable number of studies have investigated yoga only as an ancillary or complementary treatment for anxiety, depression, PTSD, and trauma effects. Second, this literature has few rigorous studies, poor quality baseline data, inconsistent evaluation and outcome measurements, lack of long-term follow-up to investigate the sustained effects of yoga, and poor documentation of methodological processes. Markedly, we were able to identify that only about a third of the 185 articles used randomization in their research designs. Among the studies employing such rigorous designs, only about 10% reported effect sizes for treatment differences. Further, there was sufficient heterogeneity in foci, design, and outcomes among the studies with randomized designs to preclude a meaningful summary of findings. For all these reasons, our meta-review shows the overall quality of the studies investigating yoga as an intervention—whether as a sole or adjunct treatment—have serious limitations in terms of scientific rigor.

This meta-review also shows that yoga has been investigated in a heterogeneous manner. On one hand, such diversity in the ways in which yoga has been investigated is expected because yoga is a diverse, multifaceted practice. On the other

hand, this heterogeneity means that there is little specific evidence to guide the delivery of yoga in terms of forms, length, and intensity, including with regard to the needs of specific populations. In addition, the current literature can provide little in the way of guidance on the active and important aspects of yoga as an intervention.

Nonetheless, the results of this review suggest that yoga might enhance and extend the benefit of other treatments, including psychotherapy and medication. Other researchers have speculated that the skills that trauma-exposed individuals learn in yoga might help these persons to actively and effectively engage in certain psychotherapies (Follette, Palm, & Pearson, 2006). Some of the authors of the reviewed research posit that for trauma-exposed individuals, yoga may be more acceptable relative to other treatments, such as medication or various forms of counseling or psychotherapy (da Silva et al., 2009; Forfylow, 2011; Li & Goldsmith, 2012; Sharma & Haider, 2013). Accordingly, for some trauma-exposed individuals, yoga may be an acceptable means of engaging with service providers and treatment initially. With such initial engagement, providers may then be able to introduce treatments with a more rigorous evidence base, such as psychotherapy. Given that the current evidence suggests that yoga may be a promising ancillary or complementary intervention and unlikely to cause harm, providers should be prepared to discuss yoga with their clients, if not recommend and/or implement yoga in their own service delivery practices.

Practice Recommendations

The results of this meta-review show that the meditative aspects of yoga seem to be especially helpful for depression and depressive symptoms (Forfylow, 2011). Thus, clinicians and service providers working with trauma-exposed individuals who are struggling with depression might find the meditative-based yoga practices helpful additions to trauma-exposed individuals' treatment or service plans. The review results also point to the following recommendations for using yoga as an intervention with anxiety symptoms. Providers should encourage their clients or patients to (a) participate in yoga for a significant period (e.g., at least 2–3 months), (b) include meditation as a component of their yoga practice, and (c) attend a formal class by a trained yoga instructor rather than do yoga at home independently on their own direction (Sharma & Haider, 2013). When considering the value of yoga as an intervention for individuals with PTSD, we encourage readers to be mindful that PTSD was investigated much less than depression or anxiety in the reviewed literature. Nonetheless, beneficial results were found in using yoga as a treatment for PTSD and its symptoms in the limited available research (da Silva et al., 2009; Forfylow, 2011; Longacre et al., 2012; Telles et al., 2012).

In light of this review's results, providers working with trauma-exposed individuals could beneficially integrate yoga into service and treatment plans by making referrals to appropriate yoga classes as well as by collaborating with yoga instructors to provide services (Forfylow, 2011; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009). This meta-review shows that providers should have at least some fundamental knowledge of yoga, its forms and types, its instructional methods, as well as connections to expert yoga teachers in their community (Forfylow, 2011; Kirkwood et al., 2005; Krisanaprakornkit et al., 2009). In particular, providers should be aware that credentialing for yoga teachers and organizations in the United States is varied, evolving, and differs from state to state. Before making referrals, providers should investigate the qualifications and methods of the yoga instructors and yoga therapists in their area (Forfylow, 2011). We also encourage readers to seek information about their own state's standards of yoga teacher and organization credentialing before referring trauma-exposed individuals to yoga classes, organizations, and teachers.

Beyond making referrals to or collaborating with yoga teachers and yoga therapists, some providers might wish to use yoga or components of yoga as part of their own practices with trauma-exposed individuals in addition to the advocacy, support services, psychotherapy, and medication services that they are already providing. Forfylow (2011) recommended that providers wishing to offer yoga along with their usual practices should first become credentialed as yoga teachers or therapists. We highlight this recommendation given the complexity of the practice of yoga. Before implementing yoga, it seems reasonable that providers who are already working with trauma-exposed individuals should have a firm understanding of and be well qualified to instruct yoga. Forfylow (2011) also noted the possibility of ethical conflicts and differences between yoga instructor approaches relative to the approaches required of other professional practices (e.g., advocates, counselors, health care providers, psychotherapists, and social workers). For example, the use of certain types of touch may be appropriate for a yoga teacher but inappropriate for a professional providing mental health care. To the best of our knowledge, little guidance is available regarding how such ethical and professional differences should be addressed or reconciled. Accordingly, readers who are interested in or who are already credentialed both as yoga teachers and as health and/or human service providers should be mindful of these unresolved and potentially challenging issues.

Although the result of this meta-review determined no contraindications for yoga, service providers should be aware of a few cautions determined by this research when recommending or implementing yoga. Specifically, yoga should be used cautiously by pregnant women (Uebelacker et al., 2010), individuals who have experienced severe trauma (Longacre et al., 2012), older adults, individuals with physical disabilities (Pilkington et al., 2005), and psychiatric patients (Krisanaprakornkit et al., 2009). We also underscore a recommendation determined from this research that individuals using yoga as a treatment should consult a physician prior to beginning practice and should be made aware of the rare but possible risks such as physical injury (Krisanaprakornkit et al., 2009; Longacre et al., 2012). Thus, when referring trauma-exposed individuals to yoga, providers should at least be knowledgeable enough about yoga to help match their clients and patients to the types

of yoga that will be most beneficial and adaptable to their needs and limitations (Forfylow, 2011; Kirkwood et al., 2005).

A few of the included reviews noted that for yoga to be helpful, an individual must have a firm commitment and high motivation. Such commitment may be difficult to obtain from individuals with anxiety, depression, and the effects of trauma because of the psychological distress they are experiencing. Thus, low motivation should be considered before creating a yoga treatment plan (Kirkwood et al., za; Krisanaprakornkit et al., 2009; Pilkington et al., 2005).

In addition, we encourage providers to keep in mind that yoga might not be appropriate and feasible for all trauma-exposed individuals. In their review, Li and Goldsmith (2012) made the point that learning something wholly new, such as yoga, has the potential to increase some individuals' anxiety and stress. Accordingly, providers should not press trauma-exposed individuals who are not interested in yoga or who are uncertain or worried about practicing yoga (Forfylow, 2011). Although the results of the review suggested that yoga is widely accessible and affordable, we note that in some communities in which trauma-exposed individuals may live (e.g., affected by disaster, impoverished, and rural), yoga may not be regularly available. Even if yoga is available in trauma-exposed individuals' communities, it may be expensive to access if individuals must pay out of pocket to attend studio-based classes. Thus, we encourage providers who recommend yoga to the individuals with whom they are working to look for accessible and no/low-cost yoga classes (i.e., many yoga studios offer at least one free class per week as a service to the community) as well as to consider accessible video and web-based yoga instruction options. See Table 3 for a summary of key practice implications.

Table 3. Summary of Implications for Practice and Research.

Practice	➢ Providers working with trauma-exposed individuals who have anxiety, depression, and/or post-traumatic stress disorder (PTSD) could beneficially integrate yoga into their clients' service and treatment plans by making referrals to appropriate yoga classes and collaborating with yoga instructors to provide services to their clients. ➢ When recommending yoga to trauma-exposed individuals, providers should have fundamental knowledge of yoga, its forms and types, its instructional methods, as well as connections to expert yoga teachers in their community. ➢ Providers wishing to offer yoga along with their usual practices should become credentialed as yoga teachers or therapists. ➢ Yoga should be used cautiously with pregnant women, individuals who have experienced severe trauma, older adults, individuals with physical disabilities, and psychiatric patients.
Research	➢ Clinicians and service providers need evidence regarding whether yoga improves the full range of mental health problems associated with trauma. Thus, we urge future research to examine the value of yoga for helping to improve trauma-exposed individuals' anxiety, depression, and PTSD symptoms, as well as their trauma-related affect, cognitions, and coping behaviors. ➢ Future research on yoga with trauma-exposed individuals should also: ■ Use randomized research designs that incorporate attention-control comparison conditions and intent-to-treat analyses, ■ Report effect sizes, ■ Use valid and reliable measurements of key outcomes, ■ Implement long-term follow-up data collection, ■ Clearly and systematically document all aspects of the study design, and ■ Document the yoga practices taught as well as the instructional delivery methods.

Research Recommendations

Given the literature's overall limitations, the potential for bias in the results is high (Kirkwood et al., 2005). Accordingly, to the greatest extent possible, future research on yoga with trauma-exposed individuals should use randomized research designs that incorporate attention-control comparison conditions and intent-to-treat analyses. Such future research should also (a) report effect sizes, (b) use valid and reliable measurements of key outcomes, (c) implement long-term follow-up data collection, as well as (d) clearly and systematically document all aspects of the study design.

To help address the knowledge gap regarding how best to offer yoga to trauma-exposed individuals, future research should document the yoga practices taught as well as the delivery methods. Researchers should document the specific stretches and physical postures (asanas), meditation practices, and the breath control exercises (pranayama) used in the practice as well as the emphasis placed on each of these three aspects of yoga. Likewise, researchers could valuably document the training and experience of their yoga instructors or therapists as well as the intensity, length, and format used for yoga delivery. In particular, we encourage researchers to investigate how class- and group-based yoga might mitigate the effects of trauma by helping individuals make social and community connections. We also encourage future researchers to investigate the extent to which yoga might enhance and extend the benefits of other trauma treatments, such as psychotherapy and medication (Follette et al., 2006).

Future studies should investigate changes in trauma-exposed individuals' mental health and well-being broadly. As discussed in the introduction, trauma can be associated with a variety of terrible events and negative mental health consequences. To account for such variety in the studies of yoga interventions for trauma effects, we defined trauma broadly in this research. Likely as a result of our broad definition, we determined 13 reviews that analyzed 185 studies with a diversity of findings relevant to our research questions. Although all 13 reviews held valuable implications for certain aspects of the

treatment of trauma effects and/or trauma-related mental health problems, relatively few of the articles focused on trauma effects specifically.

As can be seen in the SAMHSA's (2014) definition of trauma used to guide this study, the sequelae of traumatic experiences are diverse and varied. Given the heterogeneity of traumatic experiences and outcomes, researchers concerned with yoga may be challenged to investigate trauma in all its varied manifestations. We speculate that the dearth of studies concerned with trauma determined here (i.e., relative to anxiety and depression) may reflect the complexity of investigating trauma in the context of a single yoga intervention study. Nonetheless, given the growing interest in and enthusiasm for the potential benefits of yoga to help individuals with the effects of trauma, providers require evidence regarding whether yoga improves the full range of mental health problems associated with trauma. Thus, across studies of yoga, we urge researchers to examine the value of yoga for helping to improve trauma-exposed individuals' anxiety, depression, and PTSD symptoms as well as their trauma-related affect, cognitions, and coping behaviors.

Last, we highlight that several review authors included in this meta-review noted the complexities of conducting rigorous, randomized research on yoga. Although such research will be challenging, the challenges might not be insurmountable. Given the number of existing research studies focused on yoga, it certainly seems possible to test yoga rigorously (Lipton, 2008). Further, we echo Uebelacker and colleagues' (2010) recommendation for increasing collaborations between yoga teachers and researchers. By collaborating with yoga teachers in developing yoga interventions and study designs, researchers may be better able to retain the holistic aspects of yoga, while ensuring greater rigor in studies of yoga. Also, see Table 3 for a summary of key research implications.

Limitations

In conclusion, we encourage readers to note our study's limitations. We aimed for this research to be useful to clinicians and service providers working in a variety of settings with trauma-exposed individuals who may appear with a range of presenting problems, sets of symptoms, and/or co-occurring disorders. As a result, we chose broad definitions of trauma and yoga as well as broad study inclusion criteria. Due to this breadth, findings from this study cannot offer specific conclusions concerning particular types of yoga for particular groups of trauma-exposed individuals with particular diagnoses.

In addition, we might not have discovered and included all pertinent review articles in this research, and the reviews may not have located all articles pertinent to their own research questions. However, from the outset of this effort, we worked to address such limitations by using several systematic search strategies to locate as many relevant documents as possible. It is also possible that we may have missed or misunderstood information presented in the articles. Again, we worked to address this limitation by reviewing each of the 13 documents carefully with a standardized review form.

Moreover, the extent to which publication bias may be inherent in this literature overall is unknown. Thus, it is worth speculating that researchers might have conducted studies on yoga as an intervention for trauma-related problems that have had nonsignificant findings. Given that nonsignificant findings are less likely to be published, this meta-review might not present a full picture of all extant research conducted on yoga as an intervention for trauma effects and trauma-related mental health symptoms and illnesses.

Last, the most recent individual study in reviews we located was published in 2012 and most recent review in 2013. There may have been studies published since 2012 that may be pertinent to our research questions. However, this meta-review included 185 individual studies in 13 reviews that included studies published in recent years and likely provides a comprehensive overview of the bulk of published literature on this topic.

Conclusion

Despite these limitations, our research team worked to carry out this meta-review as rigorously as possible. We hope the clinical and service recommendations offered here will help guide health and human service providers who might be using or who are thinking about using yoga with trauma-exposed individuals in their practices. We also hope that these clinical and service recommendations will help inform future research and the development of a rigorous evidence base for this area. Currently, the existing literature allows only cautious optimism regarding potential benefits of yoga for treating the effects of trauma. Nonetheless, even if we do not yet have firm, rigorous evidence that yoga ameliorates the effects of trauma, yoga—in its various forms—may simply improve trauma-exposed individuals' quality of life and well-being.

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Rebecca J. Macy is the L. Richardson Preyer distinguished chair for Strengthening Families at the UNC at Chapel Hill School of Social Work. She teaches courses in social work practice, family violence, mental health, and statistics. She joined the UNC faculty in 2002, after receiving her doctoral degree in social welfare from the University of Washington in Seattle. In 1993, she received her MSW from Tulane University in New Orleans. She has social work practice experience in community mental health where she worked with violence survivors. Her research is concerned with multiple forms of violent victimization, including partner violence, sexual violence, and human trafficking. Her research activities focus on the health consequences of victimization, repeated victimizations across the life span, and the development of community-based preventions and interventions to promote violence survivors' resilience and well-being. She has published over 50 peer-reviewed articles, book chapters, and invited articles on these topics. She received the 2013 Office of the Provost Award for Engaged Research from the University of North Carolina at Chapel Hill and the 2010 Award for Community Service from the Orange County North Carolina Rape Crisis Center.

Elizabeth Jones is currently a program manager at the Center for Child and Family Health in Durham, NC, as a member of the North Carolina Child Treatment Program managing the Child Parent Psychotherapy Learning Collaborative. Elizabeth received her MSW from the University of North Carolina at Chapel Hill in 2014 concentrating in community management and policy practice where she gained social work experience working in the public schools and in a local domestic violence agency. While in the MSW program, Elizabeth served as a research assistant for a project focused on domestic violence homicide prevention programs.

Laurie M. Graham, MSW, received her bachelor's degree in sociology with a second concentration in psychology and her master's degree in social work from UNC-Chapel Hill. Upon receipt of her master's, she worked for the Orange County Rape Crisis Center in Chapel Hill for several years, most recently as the programs director. As a recipient of the Caroline H. and Thomas S. Royster Fellowship, Graham is pursuing her doctorate at the UNC-CH School of Social Work where she teaches a service-learning course for undergraduate students and focuses her research activities on sexual violence primary prevention, human trafficking, as well as intervention and prevention strategies for survivors of gender-based violence more broadly. She received the 2013 Peer Support Award from the North Carolina Coalition Against Sexual Assault for being the lead author on a manual concerning best practices in developing and coordinating support group programs for survivors of sexual violence.

Leslie Roach is a licensed massage and bodywork therapist as well as an experienced yoga teacher in the North Carolina Triangle area. She has completed both 200 hr (2009) and 500 hr (2013) yoga training courses, studying in depth asana, pranayama, mediation, and other facets of yoga. She has been studying yoga through various forms; traditional and formal training, teaching, self-study, and practice, since 2004. She received her North Carolina Massage and Bodywork therapy license in 2010 and has continued her education in many different areas of bodywork to enhance her understanding and "tool-box" of how to work with and through the body to help and treat "dis-ease" within the body. She completed her undergraduate degree from UNC-Chapel Hill with a double major in Exercise Sports Science and Psychology.