



## Review article

## A systematic review of yoga for major depressive disorder

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## ABSTRACT

**Background:** The purpose of this review was to investigate the efficacy and safety of yoga interventions in treating patients with major depressive disorder.

**Methods:** MEDLINE, Scopus, and the Cochrane Library were screened through December 2016. Randomized controlled trials (RCTs) comparing yoga to inactive or active comparators in patients with major depressive disorder were eligible. Primary outcomes included remission rates and severity of depression. Anxiety and adverse events were secondary outcomes. Risk of bias was assessed using the Cochrane tool.

**Results:** Seven RCTs with 240 participants were included. Risk of bias was unclear for most RCTs. Compared to aerobic exercise, no short- or medium-term group differences in depression severity was found. Higher short-term depression severity was found for yoga compared to electro-convulsive therapy; remission rates did not differ between groups. No short-term group differences occurred when yoga was compared to antidepressant medication. Conflicting evidence was found when yoga was compared to attention-control interventions, or when yoga as an add-on to antidepressant medication was compared to medication alone. Only two RCTs assessed adverse events and reported that no treatment-related adverse events were reported.

**Limitations:** Few RCTs with low sample size.

**Conclusions:** This review found some evidence for positive effects beyond placebo and comparable effects compared to evidence-based interventions. However, methodological problems and the unclear risk-benefit ratio preclude definitive recommendations for or against yoga as an adjunct treatment for major depressive disorder. Larger and adequately powered RCTs using non-inferiority designs are needed.

## 1. Background

Depression is one of the most prevalent psychiatric disorders as it affects 25% of women and 12% of men during their lifetime and increases the psychological strain for the affected person (Kessler et al., 2003; Moussavi et al., 2007; Rubio et al., 2011). Moreover, depression is characterized by a high comorbidity with several chronic conditions like addictions (Lai et al., 2015), neurodegenerative diseases (Herbert and Lucassen, 2016; Riccelli et al., 2016) or different psychiatric diseases (Azar et al., 2016; Chechko et al., 2016; Chen et al., 2016; Ronconi et al., 2015). Depression is projected as one of the leading causes of disability worldwide (Global Burden of Disease Study Collaborators, 2015).

The most commonly used treatments for depression are pharmacological (antidepressant) therapy, psychotherapy, or a combination of both. Both therapies have been previously shown to be effective for treating depression (Leichsenring et al., 2016). But recent reviews found high dropout rates, low remission rates, and high placebo

responses for these therapies (Mathew and Charney, 2009; Pigott et al., 2010; Rief et al., 2009; Turner et al., 2008); and complementary and alternative therapies can be a promising adjunct in the treatment of depression (Ravindran et al., 2016).

Yoga, a combination of movement, mindfulness and relaxation, is a traditional Indian philosophical and spiritual practice originated around 5000 years ago (Iyengar, 1966). Modern yoga forms based on Hatha yoga, which are commonly used in the western world, are mostly associated with physical postures (asanas), breathing techniques (pranayama), and meditation (dyana) (Yogi Hari, 2006). Yoga has become a popular means to promote physical and mental well-being (Cramer et al., 2016a; Cramer, 2015). The efficacy of yoga in improving comorbid mental symptoms could be shown for different health conditions such as pain (Chang et al., 2016; Kim, 2016), cancer (Sharma et al., 2016b), psychiatric diseases (Cramer et al., 2013b; Hofmann et al., 2016; Pascoe and Bauer, 2015) and other chronic diseases (Desveaux et al., 2015; Schumann et al., 2016). Specifically for depression, a recent review could show that yoga interventions can be

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an effective treatment option (Cramer et al., 2013c). However, this review included a variety of depressive disorders as well as individuals without a formal diagnosis of depression, rendering conclusions on yoga's efficacy in specific disorders difficult.

Due to the complex treatment situation, further information about effectiveness of yoga therapy in treating different levels of depression is needed. The purpose of this review is to investigate the efficacy and safety of yoga interventions in treating patients with major depressive disorder.

## 2. Methods

This review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009) as well as the recommendations of the Cochrane Collaboration (Higgins and Green, 2008).

### 2.1. Eligibility criteria

#### 2.1.1. Types of studies

Eligible study types included randomized controlled trials (RCTs), cluster-randomized trials and randomized cross-over studies. No language restrictions were applied.

#### 2.1.2. Types of participants

Studies that included participants with a DSM-IV or DSM-V diagnosis of major depressive disorder were eligible. It was post-hoc decided to also include studies in which the majority of participants ( $\geq 75\%$ ) were diagnosed with major depressive disorder and the remaining participants with other depressive disorders.

#### 2.1.3. Types of interventions

Studies were eligible if they compared yoga with no specific treatment, pharmacological or non-pharmacological interventions. No restrictions were made regarding yoga tradition, length, frequency, or duration of the program. Co-interventions were allowed as long as participants in all intervention groups received the same co-interventions. Head-to-head comparisons of different types of yoga without a non-yoga control group were excluded.

#### 2.1.4. Types of outcome measures

To be eligible, studies had to assess at least one of the main outcome measures:

1. Remission rates, i.e. the number of participants who obtained remission
2. Severity of depression measured by self-rating scales or by clinician-rated scales

Secondary outcome measures included:

1. Severity of anxiety measured by self-rating scales or by clinician-rated scales
2. Serious adverse events (including suicide and suicide attempts)
3. Non-serious adverse events

Adverse events resulting in 1) death, 2) life-threatening situations, 3) hospitalization, 4) disability or permanent damage, 5) congenital anomaly/birth defect, or 6) the need for medical or surgical intervention to prevent outcomes 1–5 were defined as serious. All other adverse events were regarded as non-serious (Food and Administration, 2016).

### 2.2. Search methods

Medline/PubMed, Scopus, and the Cochrane Central Register of Controlled Trials (Central) were searched from their inception through

December 06, 2016. The literature search was constructed around search terms for “yoga” and search terms for “major depressive disorders”. The complete search strategy for PubMed/Medline was (“Depression”[Mesh] OR “Depressive Disorder”[Mesh] OR depression[Title/Abstract] OR depressive[Title/Abstract]) AND (“Yoga”[Mesh] OR yoga[Title/Abstract] OR yogic[Title/Abstract]). The search strategy was adapted for each database as necessary.

In addition, our own extensive database (Cramer et al., 2014), reference lists of identified original articles or reviews and the tables of contents of the International Journal of Yoga Therapy, the Journal of Yoga & Physical Therapy, and the International Scientific Yoga Journal SENSE were searched manually.

Two review authors independently screened abstracts identified during literature search were screened and read potentially eligible articles in full to determine whether they met the eligibility criteria.

### 2.3. Data extraction and management

Two review authors independently extracted data on participants (e.g. diagnostic criteria, age, gender, race), interventions (e.g. yoga type, components, duration), control interventions (e.g. type, duration), outcomes (e.g. outcome measures, assessment time points), and results using an a priori developed data extraction form. Discrepancies were discussed with a third review author until consensus was reached.

### 2.4. Risk of bias in individual studies

Two review authors independently assessed risk of bias on the following domains: selection bias (random sequence generation, allocation concealment), performance bias (blinding of participants and personnel), detection bias (blinding of outcome assessment), attrition bias (incomplete outcome data), reporting bias (selective reporting), and other bias using the Cochrane risk of bias tool (Higgins and Green, 2008). All domains were scored as 1) low risk of bias, 2) unclear, or 3) high risk of bias. Discrepancies were discussed with a third review author until consensus was reached.

## 3. Results

### 3.1. Literature search

Nine hundred ninety-seven non-duplicate records were retrieved by literature search; 979 of which were excluded because they were not randomized, did not include participants with major depression and/or did not include yoga as an intervention. Eighteen full-texts were assessed for eligibility (Butler et al., 2008; Field et al., 2013a, 2013b, 2012; Gangadhar et al., 2013; Janakiramaiah et al., 2000; Kinser et al., 2013, 2014; Lavretsky et al., 2013; Naveen et al., 2013, 2016; Rohini et al., 2000; Sarubin et al., 2014; Schuver and Lewis, 2016; Sharma et al., 2016a, 2005; Thirthalli et al., 2013; Uebelacker et al., 2016); and 9 articles were excluded because they were either not randomized (Naveen et al., 2013, 2016; Thirthalli et al., 2013), no non-yoga control group was used (Rohini et al., 2000), the included participants were not diagnosed with a depressive disorder (Lavretsky et al., 2013), they were diagnosed with a depressive disorder but less than 75% with major depressive disorder (Butler et al., 2008), or it was unclear with what depressive disorder the participants were diagnosed (Field et al., 2013a, 2013b, 2012). One additional full-text was excluded because it was originally planned as an RCT but later changed to a non-randomized controlled study design and only a minority of participants actually were randomized (Gangadhar et al., 2013). Eight articles reporting seven RCTs on yoga for participants with major depressive disorder, encompassing 240 participants, were finally included in the analysis (Fig. 1) (Janakiramaiah et al., 2000; Kinser et al., 2013, 2014; Sarubin et al., 2014; Schuver and Lewis, 2016; Sharma et al., 2016a, 2005; Uebelacker et al., 2016).

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