Complementary Therapies in Medicine 46 (2019) 153–157

Contents lists available at ScienceDirect

Complementary Therapies in Medicine

journal homepage: www.elsevier.com/locate/ctim

Yoga for the treatment of depression: Five questions to move the evidence-base forward

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ARTICLE INFO

Keywords:
Yoga
Depression
Clinical care integration

ABSTRACT

Yoga-based practices, derived from ancient Eastern mind-body practices, have grown in popularity in the West over the past several decades. Increasing evidence supports the antidepressant effects of yoga-based interventions (YBIs). However, despite yoga's promise as a potential treatment for depression, the literature to date is marked by substantial methodological limitations, which remain a barrier to the integration of YBIs into conventional clinical care. We highlight five key areas of study that need further investigation to fill crucial gaps in the literature-base to advance yoga research and yoga's potential as an effective evidence-based treatment for depression.

1. Introduction

Depression is the leading cause of disability worldwide, according to the World Health Organization and affects more than 300 million people per year globally.[1] Depression is a chronic and recurring disorder associated with a host of negative outcomes and significant morbidity.[2] A number of evidence-based treatments exist for depression, most commonly a combination of psychotherapy and pharmacological treatments.[3] However, current treatments remain unsatisfactory, as a significant proportion of individuals who receive treatment for depression do not achieve full remission and continue to experience persistent depressive symptoms and/or recurrent episodes over time.[3–5] Only approximately one-third of depressed clients respond (defined as greater than a 50% reduction in depressive symptoms) to their initial trial of an antidepressant medication,[6] and remission rates (i.e., a reduction of symptoms to pre-morbid levels of functioning) for Cognitive Behavioral Therapy (CBT), the standard-of-care psychological intervention for depression, are no better than those of antidepressants.[7]

These findings speak to a need for new approaches for treating depression. In recent years, there has been growing interest in evaluating the efficacy of mind-body practices to treat a range of psychiatric disorders and symptoms.[3] The general population has also demonstrated increased use of these interventions, with 34% of adults in 2012 in the United States (US) reporting using alternative and complementary health approaches.[8] Yoga has been growing in popularity in the US over the past decade, with a 2016 lifetime use prevalence rate of 13.2%.[8,9] Similar trends of increasing yoga use have been reported

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https://doi.org/10.1016/j.ctim.2019.08.012
Received 26 March 2019; Received in revised form 4 July 2019; Accepted 14 August 2019
Available online 16 August 2019
0965-2299/

around the world.[10,11]

The origins of yoga-based practices are rooted in ancient Eastern cultures, as forms of spiritual and healing practices commonly associated with eight limbs: (1) yamas (moral restraints), (2) niymas (observances), (3) asanas (postures), (4) pranayama (mindful breathing), (5) pratyahara (turning inward), (6) dharana (concentration), (7) dhyana (meditation), and (8) samadhi (union of the self with object of meditation).[12] In the West, yoga-based interventions (YBIs) often focus on a combination of three core elements: meditation, breathing, and postures.[13] Modern Hatha yoga – a style that places a strong emphasis on physical postures – is the most popular form of yoga practice in the US, and the most cited in studies using YBIs to improve mental or physical health.[3,14] In a large survey of 30,044 yoga users in the US, a majority of individuals reported turning to YBIs for general wellness, as well as to address and treat various mental and physical health conditions.[9,15,16]

Increasing evidence supports the antidepressant effects of YBIs. A number of meta-analyses and systematic reviews have reported that YBIs show promise for reducing symptoms of depression across a wide range of populations.[3,17] YBIs have been shown to be equally as effective as antidepressant medications and exercise in treating major depressive disorder (MDD),[3,14,18] and have been associated with both decreases in depressive symptom severity and improved treatment remission rates.[17] The yoga literature is comprised of studies examining the effectiveness of YBIs among clinical samples of individuals with major depressive disorder (MDD), as well as samples of individuals with depressive symptoms; evidence supports the effectiveness of YBIs for both populations.[3,18] Of note, studies involving individuals with depressive symptoms but not a diagnosis of MDD does not necessarily reflect the inclusion of less severe clinical populations, but might only reflect the absence of a diagnostic evaluation as part of the research process. Despite the heterogeneity in the inclusion/exclusion criteria in studies of YBIs among depressed individuals, in practice, clinicians often do not differentiate between these populations when conceptualizing and implementing treatment programs. For this manuscript, we will use the word “depression” to include studies of individuals who meet criteria for MDD and those who present with elevated symptoms of depression, in order to fully capture the heterogeneity of the literature base.

Whereas a majority of findings regarding YBIs’ antidepressant effects are promising, recent meta-analyses report inconsistent findings. These inconsistencies might be accounted for by the substantial methodological limitations of many published studies to date, including limitations of study design, data reporting, and descriptions of the interventions.[19] In fact, the relatively low-quality of many existing research studies remains a significant barrier to the establishment of yoga practice as an approved treatment for depression and the integration of YBIs into clinical care.[19] Some key questions need to be answered in order to move yoga research forward and to potentially recommend the increased use of YBIs as a complementary or integrative healthcare strategy for depression.

We highlight five key questions needed to further address crucial gaps in the literature to address methodological limitations of published studies to date. These questions are designed to help guide researchers towards designing high-quality efficacy studies to advance our understanding of if and how YBIs can be integrated into clinical care for depression. The five unanswered questions are: 1) Are certain types of YBIs more effective than others for the treatment of depression? 2) What dose of YBIs is needed to achieve an antidepressant effect? 3) Are YBIs safe for depressed populations? 4) How do YBIs interact with established depression treatments? 5) What are some barriers that clients may face in accessing YBIs?

2. Questions to move yoga research forward

2.1. Question 1: are certain types of YBIs more effective than others for the treatment of depression?

There are many different styles of modern hatha yoga that are incorporated into YBIs, and different styles place differential emphasis on the three most common components of YBIs: breathing, meditation, and postures. This variability in yoga styles is reflected in the yoga literature, which is marked by significant heterogeneity in the types of yoga interventions studied.[18,19] Even within a particular style, yoga practices can differ based on the particular teacher and the composition of the class. Additionally, the majority of reports on YBIs do not provide much information about the interventions themselves or the emphasis placed on different components of the practice.[20,22] Some researchers have attempted to develop standardized yoga protocols to facilitate the comparison of findings across studies.[23,24] However, these interventions may not reflect how yoga is taught outside of research settings, in that most community classes do not adhere to strict standardized protocols. Thus, the generalizability of findings from highly standardized interventions may not reflect the way yoga is naturalistically practiced in community settings. Such variability, combined with the multidimensional nature of YBIs, makes it difficult to compare findings across studies and also limits our ability to determine what styles of yoga practice, and what specific components of yoga practice, may be particularly effective in the treatment of depression. Efficacy studies designed to determine the effects of YBIs in controlled settings should be followed by effectiveness studies to evaluate the interventions’ performance in the real world.[25]

While some preliminary evidence suggests that different yoga styles are equally effective in reducing symptom burden across a range of psychiatric and physical disorders, few studies directly compare the efficacy of different styles of yoga and different yoga components (i.e., mindfulness, breath, and postures) in reducing symptoms of depression.[26] Individual preferences must be considered when recommending certain styles of yoga to clients. Evidence from the exercise literature suggests that individual preferences for certain types of exercise is associated with actual exercise use,[27] and the same could be true with yoga practice. While it might not be desirable to standardize the delivery of YBIs in the community, researchers should strive to increase transparency about YBIs in the reporting of research. Studies may also compare yoga components or styles and evaluate whether preferences play a role in continued practice and/or antidepressant effects. One advancement to address the heterogeneity of yoga interventions and facilitate more detailed reporting on YBIs in the literature is the development of the Essential Properties of Yoga Questionnaire (EYPQ).[28] The EYPQ-2 (27 questions) and EYPQ-4 (59 questions) provide researchers with tools to describe and quantify the various components of different YBIs, thus facilitating the comparison of findings across studies and guiding the descriptions of YBIs in the literature.

2.2. Question 2: what dose of YBIs is needed to achieve an antidepressant effect?

A frequent question that might arise in both the research and clinical realms is the frequency of practice needed to achieve antidepressant effects. Clients will likely want to know the minimum amount of practice time (i.e., session duration and frequency) needed to obtain symptomatic improvement, as well the duration needed to achieve remission. Unfortunately, there is scant data on the “dosing” effect of yoga practice among depressed populations (i.e., with a diagnosis of MDD and/or elevated depressive symptoms), and ever fewer data on “dosing” effects across different styles of practice. Only one study to date directly addressed the issue of “dosing” by examining the effectiveness of two different doses of an Iyengar yoga and coherent breathing intervention on depressive symptoms in adults with MDD.[24]

In this study, 32 participants were randomized to two groups, a "high dose" group that participated in three yoga classes a week with additional homework or a "low dose group" that participated in two classes a week with homework.[24] There were no significant differences between the two "dosing" groups in the number of participants who responded to the intervention (i.e., > 50% decrease in depressive symptoms) or who achieved remission (i.e., scores of < 14 on the BDI-II) at the end of the study.[24] However, the high dose group had significantly more subjects with remission in depressive symptoms when defined as a BDI-II score of ≤10. Overall, both "doses" of yoga practice had significant antidepressant effects, with the twice-weekly yoga sessions representing a lower time demand. These findings need to be replicated and may have limited generalizability due to the small sample size and lack of a non-treatment control-group. Other studies indirectly address the question of dosing and suggest that even once weekly yoga classes with homework is associated with measurable effects on depressive symptoms.[29] Surveys of experienced yoga instructors recommend more frequent practice to achieve antidepressant effects, with the goal of thirty-to-forty minutes a day, five days a week, for a total of six weeks, although these dosing recommendations have not been scientifically evaluated.[30] Additional "doses" of yoga practice should be examined to better understand how much yoga practice is "optimal" for clients with depressive disorders, as well as explore the efficacy of "in class" versus "at home" practice.

In addition to the relative dearth of "dosing" studies, this question is further complicated by the variability in the duration and frequency of YBIs across efficacy studies. Some studies focus on the acute effects of YBIs immediately following practice, while others focus on short-term effects (several weeks) and/or long-term effects (several months) of practice, all of which include variations in the frequency of practice (i.e., multiple times a day, multiple times a week, different durations of sessions, with and without home practice, etc.). Additionally, there is significant variability in the severity of depressive symptoms (i.e., study inclusion/exclusion criteria) and methodology used to diagnose depression or evaluate symptoms among yoga studies, which in turn might influence the amount of yoga practice needed to observe symptom improvement and/or remission.[21] The variability in practice frequency and depression severity makes it difficult to compare "dosing effects" of yoga practice across studies and draw meaningful conclusions about what frequency of practice is best suited for the treatment of depression.

2.3. Question 3: are YBIs safe for depressed populations?

For clinicians and medical providers to comfortably recommend YBIs to their clients, reliable safety data are needed. The lack of reported safety data is one of the largest limitations in the YBI literature to date.[31] More specifically, only about one third of YBIs sufficiently report yoga-related adverse events (AEs) to allow for quantifiable analysis.[32] Additionally, many YBI studies are conducted with younger and fitter participants who may be better able to withstand the rigors of practice, both in terms of the adherence to regular practice and the challenges associated with more vigorous practice, thus limiting the generalizability of safety findings to less "healthy" populations.[21] Providers need further data on potential "side effects" and/or AEs associated with different components of YBIs and contraindications of the various components of practice in different populations. This is especially important given the recent increase in reports of yoga-related injuries in lay press articles.[32,33] Data on AEs would facilitate discussion of risks and benefits between providers and clients and may decrease unrealistic expectations and allow for appropriate cautions to be put into place.

Reviews of available safety data report inconsistent findings. In a systematic review of randomized-controlled trials (RCTs) of YBIs, the overall frequency of AEs was relatively low (2.2%), and yoga practice was not associated with more AEs compared to other exercise-based interventions.[32] However, a review of epidemiological observational studies reported high rates of yoga-related AEs, with a lifetime prevalence of yoga-related injuries ranging from 21.3% to 61.8%.[31] The large range may be due to the different time periods assessed: some studies assess for lifetime prevalence of AEs and others asses for AEs over the course of a study period. Regardless of the time frame assessed, yoga-related AEs tended to be mild, transient, and musculoskeletal in nature.[31] Of note, the predominance of posture-related AEs reported in the YBI literature is likely a reflection of the emphasis that modern hatha yoga practices place on physical postures. Younger populations reported more frequent AEs (likely due to more intense practice), while elderly populations experienced more SAEs, which the authors explain is likely due to a decreased ability to handle physical strain and longer recovery times following AEs.[31,34] These findings speak to the need to evaluate the safety of yoga practice across diverse populations, with a focus on age, mobility, overall physical health, and mental health. The majority of reviews that examine the safety of YBIs do not do so explicitly among depressed populations and do not examine AEs that might be specific to individuals with depressive disorders, such as worsening symptoms of depression or suicidality.

Only one study to date examines the safety of yoga practice among individuals with MDD, with a focus on the effects of yoga use on suicidal ideation (SI) without intent (subjects who had suicidal ideation with intent were excluded from the study).[35] This study reported that Iyengar yoga and coherent breathing practice were associated with the resolution of SI in 8 out of 9 participants throughout the 12-week study. Additionally, no SAEs were reported over the course of the study and non-serious AEs were primarily musculoskeletal, which is consistent with prior reviews.[31] Of note, only one participant reported an AE that was not uniquely associated with physical postures (i.e., increased negative thoughts); all other AEs were posture-related (e.g., musculoskeletal injuries, headache, dizziness). As such, additional research on AEs associated with other components of YBIs, namely breathing and meditation, in depressed populations specifically is warranted. While the available data suggest that YBIs have an acceptable risk profile, there is a need for consistent reporting of AEs associated with YBIs. The need to clearly characterize the safety of yoga practice for various age groups warrants additional research before clinicians will be able to integrate YBIs into routine care.

2.4. Question 4: how do YBIs interact with established depression treatments?

Currently, YBIs lack the evidence base to be prescribed as a monotherapy to treat depressive disorders. Rather, unless new evidence emerges to support YBIs as a monotherapy for depression, YBIs will likely assume a complementary or augmentative role in the treatment of depression. As such, it is crucial to examine how YBIs interact with already established treatments for depression – namely, psychotherapy and/or pharmacological treatments. The addition of yoga practice as an augmentative therapy to established interventions might be beneficial among individuals who do not respond or only partially respond to existing treatments or who are poor candidates for polypharmacy, due to proneness to medication-related side effects or medical comorbidity. Most research on the efficacy of yoga practice as an augmentative intervention explores the use of yoga as an add-on practice to pharmacological treatment among adults who are still symptomatic when treated with antidepressant medications alone. However, this literature regarding the use of YBIs as an adjunctive intervention to antidepressant treatment has produced inconsistent findings.[3] A recent RCT by Sharma and colleagues (2017) reported that the combination of SKY yoga (a breathing-based yoga practice) and antidepressant medications resulted in greater improvements in depressive symptoms compared to medication-only treatment among adults with treatment resistant depression,[36] supporting the use of YBIs as an augmentation to antidepressant medication. Another recent RCT by Uebelacker and

colleagues (2017) compared the effect of augmenting antidepressant treatment in those with persistent depression (i.e., on an adequate dose of antidepressant medication and still meeting study inclusion criteria) with at least once per week (up to twice per week) hatha yoga classes that included a combination of yogic breathing practices, postures, and brief meditation versus an active control intervention.[29] While no differences were observed between groups at the end of the 10-week intervention period, individuals in the yoga group showed lower severity of depressive symptoms and a greater number of treatment responders at 3 and 6-months follow-up, suggesting that the effects of yoga practice might accumulate over time.[29] In contrast, another study reported no differences in depressive symptom reduction when weekly hatha yoga practice was added to either an antidepressant or antipsychotic medication among adults with MDD.[37]

Only one study to date examined the efficacy of adding a YBI to psychotherapy for the treatment of depression. A yoga-enhanced CBT intervention was effective for improving symptoms of anxiety and depression, though the lack of a control group limited the authors' ability to isolate the unique contributions of the yoga practice on symptom improvement.[38] Overall, it appears that the addition of yoga to traditional treatments for depression has not been shown to be harmful and might be beneficial. Heated forms of yoga, however, may require more careful attention to determine the risk of AEs specifically related to exercising in a heated environment, such as dehydration. Additional research is needed to better elucidate how YBIs can best be combined with existing interventions to maximize treatment effects. This information would allow treaters to better conceptualize treatment plans to include YBIs for clients who might already be receiving standard depression treatments, as well as provide empirical evidence to support augmenting already existing treatments with YBIs.

With regard to the use of YBIs as a monotherapy for the treatment of depression, additional research on both the efficacy and safety of YBIs is needed before clinicians can safely make recommendations. It is important to note that no evidence to date supports the efficacy and safety of yoga practices in lieu of existing treatments shown to be effective for depression. Future research on the use of YBIs as a monotherapy for depression should consider the implications of comparing group-delivered (e.g., yoga classes) and/or individually-delivered (e.g., at-home practice, homework) YBIs, in order to determine their efficacy relative to control conditions and already-established treatments for depression. Of note, in class practices provide the additional benefit of social engagement and as such, the use of control conditions that do not consider interpersonal dynamics and interaction with research staff are a less than optimal.

2.5. Question 5: what are some barriers that clients may face in accessing YBIs?

Arguably one of the greatest barriers to integrating yoga practice into clinical care is the issue of access. If clients are not able to establish a regular yoga practice, they may not be able to obtain the antidepressant effects associated with yoga use. A national survey of US yoga users reported that the majority of yoga practitioners are white, female, young, and at least college educated.[15] These statistics highlight that the benefits of YBIs are not equally distributed among the US population. The limited demographic of yoga users is reflected in the yoga research and makes up the majority of participants in YBI trials to date,[3] with some notable exceptions for lower back pain but not depression. The homogeneity of the samples significantly limits our ability to generalize these findings to larger, more diverse populations. Additionally, in the literature to date, some of the most commonly cited barriers to frequent yoga practice include time, cost, and yoga studio location.[16] Efforts to reduce barriers to access by conducting YBIs at community health centers in underserved neighborhoods have shown that time remains a significant barrier to practice.[39] One potential solution to this access issue and the burden of cost associated with YBIs would be insurance coverage. More evidence-based studies are needed to document the clinical effectiveness of YBIs before insurance companies will provide reimbursement. Additionally, it is important to consider the implications of insurance companies covering YBIs, including: who will be able to provide yoga "services," what training/certification on the part of instructors will be required to receive reimbursements from insurance companies, whether or not "prescriptions" for YBIs will be required, and who will provide them. Additionally, home-based YBIs might offer another promising solution to overcoming some of the barriers to accessing in-person YBIs. Online delivery of YBIs could help with dissemination to larger audiences and provide instruction and guidance to individuals interested in developing a home practice. One study examined the feasibility and acceptability of an online yoga class for individuals with mood disorders (i.e., bipolar disorder, major depressive disorder, cyclothymia, or schizoaffective disorder).[40] Following a single online hatha yoga class, participants rated the course highly and reported significant decreases in negative affect.[40] Future efforts to encourage and facilitate home-based YBIs might offer a promising solution to increasing access to yoga interventions.

Two other significant and interrelated barriers to regular yoga practice among depressed populations in particular are motivation and compliance.[21,41] Depressed individuals might find it especially difficult to attend and complete yoga classes and sustain the consistent practice needed to achieve and maintain antidepressant effects.[42] More data are needed on patterns and predictors of attrition in yoga interventions to better understand how best to maximize adherence and motivation among depressed populations, among whom these barriers remain symptoms of the disorder. Taken together, these findings suggest the need to increase the accessibility of yoga practices to a wider range of populations, to reduce attrition rates from yoga studies, and to include more diverse samples in research studies moving forward.

3. Conclusion

In the past two decades, research on the therapeutic effects of YBIs has grown rapidly, with mounting evidence suggesting that YBIs are promising for individuals with depressive symptoms and MDD. However, demonstrating the efficacy of YBIs for reducing depressive symptoms will not be sufficient to fully integrate yoga practice into standard clinical care. Additional research is needed to address the methodological limitations of published YBI studies to date and to allow providers to "prescribe" yoga practice to their clients in a safe and personalized manner. In particular, the mental health professions need more reliable data on what types of yoga interventions to recommend, the desired "dose" of different YBIs to prescribe, the potential "side effects" associated with YBIs and ways to mitigate them, and what barriers might prevent clients from attending regular YBI sessions. Additionally, providers will need to consider the role of YBIs in treatment plans, and how YBIs can best be combined with existing treatments for depression to maximize outcomes and minimize side effects. Future research should also examine YBIs' potential as stand-alone treatments for depression, as well as investigate which individuals might benefit most from integrating yoga practice into their treatment plan.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

Maya Nauphal, MA: None.

David Mischoulon, MD, PhD: Dr. Mischoulon has received research support from Nordic Naturals. He has provided unpaid consulting for

Pharmavite LLC and Gnosis USA, Inc. He has received honoraria for speaking from the Massachusetts General Hospital Psychiatry Academy, Blackmores, Harvard Blog, and PeerPoint Medical Education Institute, LLC. He has received royalties from Lippincott Williams & Wilkins for published book "Natural Medications for Psychiatric Disorders: Considering the Alternatives.

Lisa Uebelacker, PhD: Dr. Uebelacker's spouse is employed by Abbvie Pharmaceuticals.

Chris Streeter, MD: None.

Maren Nyer, PhD: None.

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