

Evaluating the Efficacy of Kundalini Yoga for Mental Health and Well-being: A Systematic Review of Randomized Controlled Trials

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Abstract

Background: Mental health disorders such as stress, anxiety, depression, and PTSD pose significant challenges to public health. Traditional treatments, including pharmacotherapy and cognitive-behavioural therapy (CBT), are effective but have limitations. With its dynamic breathing techniques, meditation, and chanting, Kundalini Yoga has shown the potential to improve mental health outcomes.

Methods: A systematic review was conducted to evaluate the efficacy of Kundalini Yoga on mental health and well-being. Randomized controlled trials (RCTs) from January 2000 to December 2023 were identified through PubMed, Scopus, Web of Science, and Cochrane Library. The inclusion criteria focused on studies with individuals diagnosed with mental health disorders or assessed for mental well-being, comparing Kundalini Yoga to other interventions. The Cochrane Collaboration's Risk of Bias Tool and GRADE approach were utilized for quality assessment.

Results: Six RCTs met the inclusion criteria and were included in the review. The studies indicated that Kundalini Yoga significantly reduced symptoms of anxiety, depression, OCD and PTSD and improved overall well-being. Compared to control groups, Kundalini Yoga was generally more effective. However, CBT showed slightly better long-term outcomes in some studies. The risk of bias was moderate, with challenges in blinding and small sample sizes noted.

Conclusion: Kundalini Yoga is a promising intervention for improving mental health outcomes. It effectively reduces anxiety, depression, OCD and PTSD symptoms and enhances overall well-being. Future research should focus on larger sample sizes, long-term follow-up, and standardized protocols to further validate these findings.

Keywords: kundalini yoga; mental health; anxiety; depression, ptsd therapy, which will prevent secondary neurodegeneration in these patients.

Introduction

Mental health disorders such as stress, anxiety, depression, and PTSD are prevalent and pose significant challenges to public health [1-3]. Traditional treatment modalities, including pharmacotherapy and cognitive-behavioral therapy (CBT), are adequate but not without limitations. For instance, pharmacological treatments often come with side effects, and many patients do not respond adequately to these interventions. Moreover, access to CBT and other psychotherapies can be limited by availability, cost, and patient willingness to engage in these therapies.

Yoga has been extensively researched for its potential therapeutic benefits in various medical and psychological conditions [4]. Over the past decade, there has been a significant increase in the number of studies exploring

the efficacy of yoga, particularly in the mental health field [5]. This rise in research interest aligns with the global recognition of yoga's holistic benefits, underscored by the United Nations' declaration of the International Day of Yoga in 2015. This recognition has catalyzed a broader acceptance and integration of yoga into clinical practice, especially within psychiatric settings. As a complementary and alternative medicine (CAM) intervention, yoga offers a potentially accessible and cost-effective adjunctive treatment option [6].

Yoga in psychiatry has evolved from anecdotal evidence to a more structured, evidence-based approach. The integration of yoga into psychiatric practice has been driven by its demonstrated benefits in treating various psychiatric disorders, including depression, anxiety,

schizophrenia, obsessive-compulsive disorder (OCD), and post-traumatic stress disorder (PTSD) [7-10]. Studies have shown that yoga can be an effective adjunctive treatment, often enhancing the effects of conventional therapies.

Kundalini Yoga, a school of Yoga practice in particular, has gathered attention for its potential mental health benefits. This form of yoga comprises six main components: initiation with a mantra and pranayama (breathing exercises) or warm-up, kriya (a sequence of exercises), relaxation, meditation, and conclusion with a devotional song [11]. Kriyas, which may vary from uncomplicated sequences to vigorous exercises, aim to fortify the nervous and endocrine systems. Pranayama practices encompass breathing techniques, such as Breath of Fire and alternate nostril breathing. Meditations frequently involve movement, mantra, eye focus (drishti), mudra (hand position), and asana (body posture). A standard session typically spans 60-90 minutes, including a warm-up, kriya, relaxation, and meditation.

These systematic processes and practices aid in harmonizing the body's energy, reducing stress, and improving mental clarity. KY can be customized to individual requirements and accommodated to different levels of physical fitness and experience. KY is believed to regulate the autonomic nervous system through practices such as Pranayama, inducing relaxation and diminishing stress [12]. Meditation techniques such as Kirtan Kriya may influence cognitive decline and mental well-being [13].

As a complementary and alternative medicine (CAM) intervention, yoga offers a potentially accessible and cost-effective adjunctive treatment option [14]. Its benefits in mental health have been supported by various meta-analyses and systematic reviews, which have highlighted yoga's positive impact on symptoms of depression and anxiety and its role in enhancing overall well-being [15-18]. Despite the growing body of evidence supporting yoga's benefits, research in this area faces several methodological challenges [19]. Blinding, for instance, is problematic in yoga studies due to the nature of the intervention. Another significant challenge is finding an appropriate placebo or control condition that mimics yoga's physical and psychological engagement without providing therapeutic benefits. In addition, randomization can be complicated by participants' preconceived notions and preferences regarding yoga [20-22].

To address these challenges, high-quality randomized controlled trials (RCT) with rigorous methodologies are essential. Such studies should include appropriate control conditions, standardized intervention protocols, and objective outcome measures. The primary objective of this systematic review is to evaluate the impact of Kundalini Yoga on stress, anxiety, depression, and PTSD through the analysis of RCTs. By synthesizing the available evidence, this review aims to provide a comprehensive understanding of the effectiveness of Kundalini Yoga as a therapeutic intervention for these conditions. Additionally, the review seeks to identify gaps in the current research and suggest directions for future studies.

Previous research has demonstrated the potential benefits of yoga in psychiatric practice. Meta-analyses have shown that yoga can be effective in reducing symptoms of depression and anxiety, with some studies suggesting that yoga may be comparable to conventional treatments like CBT in certain contexts. However, the specific impact of Kundalini Yoga, with its unique combination of physical, respiratory, and meditative elements, has not been as thoroughly investigated. Current gaps in the literature include a lack of comprehensive reviews focusing exclusively on Kundalini Yoga and its effects on a range of mental health outcomes. Additionally, there is a need to explore the long-term benefits and potential mechanisms underlying the therapeutic effects of Kundalini Yoga. Addressing these gaps will contribute to a more nuanced understanding of how Kundalini Yoga can be integrated into mental health treatment protocols.

Methods

We searched various electronic databases in our systematic literature review, including PubMed, Scopus, Web of Science, and Cochrane Library. The search strategy encompassed keywords and Medical Subject Headings (MeSH) pertinent to Kundalini Yoga, mental health disorders, and mental well-being. The review specifically integrated randomized controlled trials (RCTs) that examined the impact of Kundalini Yoga on mental health disorders and general mental well-being.

Eligibility Criteria: This review adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for conducting and reporting systematic reviews [23]. We employed the PECO framework to specify our criteria.

Population: Individuals diagnosed with mental health disorders (e.g., stress, anxiety, depression, PTSD) or those undergoing assessment for mental well-being.

Intervention: Kundalini Yoga.

Comparator: Any comparative analysis encompassing conventional treatments, alternative yoga methodologies, psychotherapeutic interventions, or non-intervention approaches.

Outcomes: Evaluations of mental health (e.g., stress, anxiety, depression, OCD, PTSD) and overall mental well-being.

Inclusion and Exclusion Criteria: Only randomized controlled trials (RCTs) were considered, without restrictions on participants' demographic or geographic locations. The intervention had to be Kundalini Yoga, consistently administered across subjects. Publications in the English language from January 2000 to December 2023 were eligible for inclusion. Observational studies, case reports, and studies with unclear or incomplete data were excluded, along with those that failed to meet minimum quality thresholds determined by risk of bias assessment tools.

Two reviewers autonomously screened the titles and abstracts of identified studies in the study selection process. Based on the title and abstract review, studies that satisfied the inclusion criteria were acquired in full text. The same two reviewers independently evaluated the full-text articles to ascertain eligibility. Any inconsistencies were reconciled through discussions.

Data collection proces: Data were extracted from each included study using a standardized data extraction form. The extracted data encompassed study characteristics (authors, year of publication, country, study design), participant characteristics (sample size, age, gender, diagnosis), intervention details (type, duration, frequency of Kundalini Yoga practice), comparator details, outcome measures, results (including statistical significance and effect sizes), as well as funding sources and potential conflicts of interest. The data items of primary interest were measures of mental health disorders (stress, anxiety, depression, OCD, PTSD) and overall mental well-being. Secondary outcomes encompassed adherence to the intervention, adverse events, and quality of life.

The Cochrane Collaboration's Risk of Bias Tool was used to assess the risk of bias in the individual studies [24]. This tool evaluates several domains, including random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias. Each domain was categorized as "low risk," "high risk," or "uncertain risk" of bias. A narrative synthesis of the findings from the included studies was executed and structured around the type of mental health disorder and the outcomes assessed.

Results

The search process identified 1468 items from all the databases examined, as depicted in Figure 1. Before the screening phase, 149 duplicate records were eliminated, resulting in 1319 for the initial screening. Subsequently,

1294 records were excluded based on their titles and abstracts, leaving 25 reports. During the subsequent stage, additional papers were excluded based on predefined criteria that did not feature Kundalini yoga as the primary intervention [Figure 1]. A total of six randomized controlled trials (RCTs) were included in this systematic review, focusing on the effects of Kundalini Yoga on mental health disorders and overall well-being [25-30]. These studies evaluated a range of outcomes, including symptoms of stress, anxiety, depression, OCD, PTSD, and general mental well-being.

The studies by Hoge et al., Jacoby et al., and Simon et al. shared the same patient group but focused on different outcomes [25-27].

The included studies varied in sample size, duration of intervention, and specific mental health outcomes measured. The trials were conducted in different settings and involved diverse populations. The brief overview of the characteristics of each study summarising study design, population, outcomes, and key findings are detailed in Table 1.

Study	Population	Intervention	Comparator	Duration	Outcomes Measured	Key Findings
Jacoby et al. [26]	226 adults with GAD	KY	CBT, Stress Education	12 weeks	Sleep Quality, PSQI, ISI	All three treatment groups showed improvement in PQSI and ISI scores
Shannahoff-Khalsa et al. [30]	48 individuals with OCD	KY	Relaxation response	8 sessions	OCD symptoms, Anxiety, depression, wellbeing scores	KY significantly improved YBOCS scores and improved associated outcomes compared to controls
Hoge et al. [25]	226 adults with GAD	KY	CBT, Stress Education	12 weeks	Anxiety and depression symptoms	Both KY and CBT effective; CBT showed better long-term outcomes
Brandao et al. [28]	106 University students during COVID-19	Online KY	Autogenic Relaxation, passive control group	8 weeks	Self-compassion, emotion regulation, spiritual well-being	KY improved self-compassion, emotion regulation, and spiritual well-being compared to controls
Jindani and Turner [29]	80 individuals with PTSD	KY	Waitlist Control	8 sessions	PTSD symptoms, sleep quality, positive and negative affect, perceived stress, anxiety, stress, resilience	KY participants showed greater improvements in PTSD symptoms and associated outcomes compared to controls
Simon et al. [27]	226 adults with GAD (same group as Hoge et al. and Jacoby et al.)	KY	CBT, Stress Education	12 weeks	Anxiety, Depression, Mental well-being	Both KY and CBT were effective in reducing anxiety and depression symptoms; CBT showed better long-term effects

Table 1: Summary of Study Characteristics. Abbreviations: GAD (Generalised Anxiety Disorder), OCD (Obsessive Compulsive Disorder), PTSD (Post Traumatic Stress Disorder), CBT (Cognitive Behavioural Therapy), KY (Kundalini Yoga), PSQI (Pittsburgh Sleep Quality Index), ISI (Insomnia Severity Index), YBOCS (Yale-Brown Obsessive-Compulsive Scale)

The synthesis of results across the six studies indicates that Kundalini Yoga is generally effective in improving mental health outcomes, particularly in reducing symptoms of anxiety, depression, OCD, and PTSD and enhancing overall well-being. The following key findings were observed:

Anxiety and Depression: Kundalini Yoga was effective in reducing anxiety and depression symptoms in individuals with GAD and PTSD [25-27,29]. Comparative studies with CBT showed that while both interventions were effective, CBT generally had slightly better outcomes, especially in the long term.

PTSD: Kundalini Yoga significantly reduced PTSD symptoms and improved associated outcomes such as sleep quality, positive affect, perceived stress, and resilience [29]. The improvements were more significant compared to waitlist controls, indicating the potential of Kundalini Yoga as an adjunctive or alternative treatment for PTSD.

OCD: KY significantly reduced OCD symptoms, as measured by the Y-BOCS and DY-BOCS scales, suggesting that Kundalini Yoga can be an effective complementary therapy for OCD, particularly for patients unresponsive to traditional treatments [30]

General Mental Well-being: Studies involving university students during the COVID-19 pandemic showed that online Kundalini Yoga improved self-compassion, emotion regulation, and spiritual well-being [28].

General mental health and well-being measures indicated significant improvements in participants practising Kundalini Yoga.

Comparative Effectiveness: In most studies, Kundalini Yoga was more effective than stress education and relaxation response meditation. The comparative effectiveness with CBT showed that CBT had more robust and longer-lasting effects while both were beneficial.

Risk of Bias Assessment: The review encompassed studies of varied methodological quality, some indicating potential biases in blinding and sample size. However, the overall bias risk was deemed moderate, and the findings are considered reliable within the identified constraints [Table 2]. Systematic evaluation using the Cochrane Collaboration's Risk of Bias Tool assessed domains such as random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other potential sources of bias. At the same time, most studies showed a low risk of bias in random sequence generation and allocation concealment; blinding of participants and personnel across all studies exhibited a high risk of bias, a common challenge in yoga intervention research. Blinding of outcome assessment also presented a high risk, potentially influencing subjective measures of mental health outcomes. Despite these challenges, the studies maintained a low risk of bias in reporting and handling incomplete data. Although the methodological quality was generally robust, a cautious interpretation of the results is warranted due to the inherent difficulties in blinding yoga studies. These assessments highlight

the need for rigorously designed future studies with innovative blinding strategies to mitigate bias further.

Study	Random Sequence Generation	Allocation Concealment	Blinding of Participants and Personnel	Blinding of Outcome Assessment	Incomplete Outcome Data	Selective Reporting	Other Bias
Brandao et al. (2023)	Low Risk	Low Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
Hoge et al. (2023)	Low Risk	Low Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
Jacoby et al. (2023)	Low Risk	Low Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
Jindani and Turner (2015)	Low Risk	Low Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
Simon et al. (2023)	Low Risk	Low Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
Khalsa et al. (2023)	Low Risk	Low Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk

Table 2: RoB(Risk of Bias) table

GRADE Assessment: The GRADE approach was used to assess the quality of evidence for each outcome [Table 3]. The evidence was rated based on factors such as study limitations, consistency of results, directness of evidence, precision, and publication bias.

Outcome	Quality of Evidence	Justification
Anxiety Reduction	Moderate	Some inconsistency in results and potential for performance bias due to lack of blinding
Depression Reduction	Moderate	Similar to anxiety, with additional concerns about generalizability due to study populations
PTSD Symptom Reduction	Moderate to High	Consistent findings across studies, but potential biases related to blinding
OCD Score improvement	Moderate	Some risk of bias and limited precision due to small sample size, but high directness and significant improvements observed.
General Mental Well-being	High	Consistent and robust findings with minimal concerns about bias

Table 3: GRADE assessment table

Discussion

The findings derived from this systematic review indicate that Kundalini Yoga serves as an effective intervention in the enhancement of mental health outcomes, explicitly targeting anxiety, depression, PTSD, and overall well-being. These results are consistent with previous research that underscores the advantages of yoga-based interventions for mental health. Notably, the evaluations by Brinsley et al [31]. and Martínez-Calderon et al [32] offer valuable perspectives that complement our findings. Brinsley et al. conducted a systematic review and meta-analysis on the impact of yoga on depressive symptoms in individuals with mental disorders. In their analysis of 19 studies, they observed significant reductions in depressive symptoms through yoga interventions as compared to control conditions. The review emphasized the holistic approach of yoga, encompassing physical postures, breathing techniques, and meditation, as a contributing factor to its efficacy in mitigating depression. However, the authors cautioned on the varied intervention types and stressed the need for standardized protocols to facilitate comparability across studies.

In the study conducted by Martínez-Calderon et al., a systematic review incorporating meta-analysis and meta-regression was performed to assess the effects of mind-body exercises, including yoga, on anxiety and depression symptoms in adults diagnosed with anxiety or depressive disorders. The review encompassed 23 studies and concluded that yoga-based interventions demonstrated greater efficacy in alleviating anxiety symptoms in individuals with anxiety disorders and depressive symptoms in those with depressive disorders when compared to control conditions. Consequently, the findings advocate for the potential of yoga as an efficacious intervention for enhancing mental health. Notwithstanding, the review highlighted methodological limitations such as a high risk of bias, inconsistency, and heterogeneity among the included studies, corroborating our observations.

Our review honed explicitly in on Kundalini Yoga, a distinct yoga style characterized by dynamic breathing techniques, meditation, and chanting, which may offer distinct advantages relative to other forms of yoga. While encompassing various yoga styles, the studies by Brinsley et al. and Martínez-Calderon et al. contribute to elucidating the specific impact of Kundalini Yoga on mental health. The methodological limitations

identified in our review are consistent with those reported by Brinsley et al. and Martínez-Calderon et al. Common issues include Difficulty in blinding participants and personnel due to the nature of yoga interventions and Variability in intervention protocols, duration, and outcome measures across studies. Many studies had small sample sizes, which limited the generalizability of findings. In addition, there is a high risk of bias due to deviations from intended interventions and issues in the randomization process.

The evidence suggests that Kundalini Yoga can be a valuable adjunctive therapy in mental health treatment, offering benefits such as reduced anxiety and depression symptoms and improved overall well-being. It can be particularly beneficial for individuals who prefer non-pharmacological interventions or those seeking complementary therapies to enhance traditional treatments.

The review findings emphasize that KY can significantly benefit clinicians and patients in the mental health field. It is seen as a valuable supplementary approach in the treatment of mental health disorders, addressing both the psychological and physiological aspects. It offers an alternative to traditional treatments such as medication and Cognitive Behavioural Therapy (CBT). KY is adaptable and accessible to many individuals, including those who may find other forms of physical exercise challenging. Incorporating breathing techniques, meditation, and chanting can meet the needs of patients seeking non-pharmacological interventions. Clinicians can consider integrating Kundalini Yoga into existing treatment protocols for anxiety, depression, and PTSD to enhance the overall therapeutic regimen, potentially improving patient outcomes and reducing reliance on medication. KY also provides patients with self-regulation tools such as breathing exercises and meditation techniques, empowering them to manage their symptoms independently and fostering a sense of control and self-efficacy. As a cost-effective intervention, Kundalini Yoga can reduce healthcare costs associated with long-term medication and frequent therapy sessions. Its group-based nature also allows for efficient delivery in community and clinical settings.

Several limitations were identified in the included studies, such as potential biases related to blinding participants and outcome assessors, small sample sizes, and short intervention durations. These factors may influence the generalizability of the findings. Future research should

address these limitations by employing larger sample sizes, extended follow-up periods, and improved blinding techniques.

Conclusion

This systematic review provides robust evidence supporting the effectiveness of Kundalini Yoga in improving mental health outcomes. While CBT remains a superior treatment in some aspects, Kundalini Yoga offers a viable alternative or complementary approach, particularly for reducing symptoms of anxiety, depression, OCD and PTSD. Future research should continue to explore the long-term benefits and mechanisms of action of Kundalini Yoga in diverse populations and settings.

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Conflict of interests:

The authors declare no conflicts of interest.

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