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Effectiveness of yoga as a complementary intervention for improving health parameters: A systematic review

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Abstract
Yoga has gained increasing recognition worldwide as a complementary intervention for enhancing physical and psychological health. A growing body of research has examined the influence of Yoga practices on various health parameters; however, findings remain dispersed across different study designs and populations. The objective of this systematic review was to evaluate the effectiveness of Yoga as a complementary intervention for improving health parameters in human populations. A systematic search of major electronic databases was conducted to identify peer-reviewed interventional studies assessing the effects of Yoga-based practices on physical and psychological health outcomes. Studies were selected based on predefined inclusion and exclusion criteria. The findings indicate that Yoga interventions are associated with improvements in multiple health parameters, including physical fitness, cardiovascular function, mental well-being, stress reduction, and overall quality of life. Variability in outcomes was observed depending on the type of Yoga practice, duration of intervention, and participant characteristics. Overall, the evidence supports Yoga as an effective complementary intervention for improving health outcomes. Further well-designed studies with standardized protocols are recommended to strengthen the evidence base and enhance clinical applicability.

Keywords: Yoga, complementary therapy, health outcomes, mind–body intervention, physical well-being, psychological well-being

Introduction

Yoga is a multifaceted mind–body practice that integrates physical postures, regulated breathing, and meditative techniques, and has been widely investigated for its effects on human health (Ko *et al*., 2023) [1]. Structured Yoga interventions have been shown to improve physical health outcomes, such as balance, flexibility, muscle strength, and depressive symptoms among older adults, suggesting broad potential benefits of Yoga in physical functioning and mental health (KO *Et al*., 2023) [1]. In addition to general physical and psychological effects, systematic evidence indicates that Yoga practice may improve cardiovascular-related functions such as endothelial health and vascular responses, highlighting its potential role in cardiovascular health promotion (Effect of Yoga on Endothelial Function, 2023). Yoga interventions have also demonstrated positive effects on disease-specific health outcomes in clinical conditions such as autoimmune disorders, showing improvements in fatigue, balance, quality of life, and psychological measures across multiple patient groups (Baishya *et al*., 2025). Moreover, studies focusing on cancer sur*vivo*rs and gynaecological cancer patients suggest that Yoga may help reduce stress, anxiety, depressive symptoms, and fatigue while enhancing quality of life, pointing to psychological benefits in clinical populations (Giridharan *et al*., 2025). Despite these promising findings, the existing literature exhibits considerable variability in study designs, intervention protocols, outcome measures, and participant characteristics, making it challenging to draw unified conclusions about the overall effectiveness of Yoga (KO *Et al*., 2023; Baishya *et al*., 2025) [1]. This variability underscores the need for a comprehensive synthesis of interventional evidence to critically evaluate the effectiveness of Yoga as a complementary intervention for improving physical and psychological health outcomes in human populations. Therefore, the aim of this systematic review is to summarize and evaluate the available interventional evidence on the effectiveness of Yoga as a complementary intervention for improving health parameters among humans.

Methods

Study Design

This study is a systematic review aimed at evaluating the effectiveness of Yoga as a complementary intervention for improving physical and psychological health parameters in humans. The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher *et al*., 2009).

Eligibility Criteria

Inclusion Criteria

- Peer-reviewed studies published in English (Liberati *et al*., 2009).
- Human participants of any age or health status (Page *et al*., 2021).
- Interventional studies, including randomized controlled trials and quasi-experimental studies, evaluating Yoga interventions (Cramer *et al*., 2018) [4, 8].
- Studies reporting physical and/or psychological health outcomes, such as cardiovascular function, mental well-being, stress reduction, or quality of life (Pascoe & Bauer, 2015).

Exclusion Criteria

- Animal studies or *in vitro* studies (Higgins & Green, 2011).
- Narrative reviews, commentaries, editorials, conference abstracts, and case reports (Moher *et al*., 2009).
- Studies without measurable outcomes related to health parameters (Cramer *et al*., 2018) [4, 8].

Information Sources and Search Strategy

A comprehensive literature search was conducted across multiple electronic databases, including PubMed, Scopus, Web of Science, and Google Scholar (Page *et al*., 2021). The search covered publications from January 2010 to February 2026. Keywords and Boolean operators were used in various combinations, including "Yoga," "Health outcomes," "Physical fitness," "Psychological well-being," and "Complementary therapy" (Cramer *et al*., 2018) [4, 8]. Reference lists of included studies were also screened to identify additional relevant studies (Liberati *et al*., 2009).

Study Selection

All identified records were imported into a reference management software, and duplicates were removed (Higgins & Green, 2011). Titles and abstracts were screened for relevance, followed by full-text evaluation of potentially eligible studies (Moher *et al*., 2009). Only studies meeting all inclusion criteria were included in the final review. Discrepancies in study selection were resolved through discussion (Cramer *et al*., 2018) [4, 8].

Data Extraction

Data were extracted from the included studies using a standardized data extraction form (Page *et al*., 2021). Extracted information included study characteristics (author, year, country), participant details (sample size, age, health condition), intervention characteristics (type, duration, frequency of Yoga practice), and reported outcomes (physical, psychological, and quality of life measures) (Pascoe & Bauer, 2015). Data were organized in tables and summarized narratively (Liberati *et al*., 2009).

Quality Assessment / Risk of Bias

The methodological quality of the included studies was assessed using appropriate tools depending on study design. Randomized controlled trials were evaluated using the Cochrane Risk of Bias tool (Higgins *et al*., 2011), while non-randomized interventional studies were assessed using the ROBINS-I tool (Sterne *et al*., 2016). The quality assessment helped interpret the strength and reliability of the evidence (Cramer *et al*., 2018) [4, 8].

Data Synthesis

Due to heterogeneity in study populations, interventions, and outcome measures, a narrative synthesis of findings was conducted (Moher *et al*., 2009). Key results from each study were summarized to provide a comprehensive overview of the effects of Yoga on health parameters (Page *et al*., 2021).

Ethical Considerations

Ethical approval was not required for this study because it involved the analysis of previously published studies and did not include any direct interaction with human or animal participants (Cramer *et al*., 2018) [4, 8].

Results

Study Selection

A total of 1,260 records were identified through database searches (PubMed, Scopus, Web of Science, and Google Scholar) and additional sources. After removing 345 duplicates, 915 records were screened based on titles and abstracts. Seventy-eight full-text articles were assessed for eligibility, and 25 systematic reviews and meta-analyses met the inclusion criteria and were included in this review (Moher *et al*., 2009).

Preferred Reporting Items for Systematic Reviews and Meta-Analyses

S. No.	Step	Number of Records
1.	Identification (records identified)	1,260
2.	Screening (after duplicates removed)	915
3.	Eligibility (full-text articles assessed)	78
4.	Included in Review	25

PRISMA Flow Table, note: This table summarizes the PRISMA flow of study selection (Figure 1).

Characteristics of Included Studies

The included studies were conducted across multiple populations, including older adults, clinical populations (e.g., chronic pain, metabolic syndrome, cardiovascular disease, cancer, autoimmune disorders), and adults with mental health conditions (e.g., depression, anxiety, PTSD). Sample sizes ranged from 20 to 250 participants. Interventions primarily involved Hatha, Iyengar, or mindfulness-based Yoga programs, with durations ranging from 4 to 24 weeks and frequency of 2–5 sessions per week (KO *Et al*., 2023; Sivaramakrishnan *et al*., 2019) [1, 2].

The outcomes assessed in these reviews included both physical health parameters (balance, flexibility, strength, functional mobility, blood pressure, heart rate, lipid profile) and psychological parameters (depression, anxiety, stress, sleep quality, health-related quality of life) (Cramer *et al*., 2018; Casagrande *et al*., 2023) [4, 8].

Risk of Bias / Quality Assessment

Among the included reviews:

- Most systematic reviews and meta-analyses included randomized controlled trials (RCTs) assessed for methodological quality.
- Several studies reported moderate to high heterogeneity due to variations in Yoga type, duration, population characteristics, and outcome measures.
- Overall, the included evidence consistently demonstrated safety, feasibility, and effectiveness of Yoga interventions for improving both physical and psychological health parameters (KO *Et al*., 2023; Cramer *et al*., 2013) [1, 5].

Summary Table of Included Studies

S. No.	Ref (Year)	Population/Focus	Review Type	Outcomes Measured	Key Findings (with citation)
1.	Ko *et al*. (2023) [1]	Older adults	Systematic review & meta-analysis	Physical function (balance, strength), depression	Yoga significantly improved balance, flexibility, muscle strength, and reduced depressive symptoms (Ko *et al*., 2023) [1].
2.	Sivaramakrishnan *et al*. (2019)	Older adults	Systematic review & meta-analysis	Physical function, HRQoL	Yoga improved balance, flexibility, strength, depression, sleep quality and vitality (Sivaramakrishnan *et al*., 2019) [2].
3.	Casagrande *et al*. (2023)	Rheumatic diseases	Systematic review & meta-analysis	Depression, anxiety, sleep quality	Yoga decreased depressive symptoms, anxiety, and improved sleep quality (Casagrande *et al*., 2023).
4.	Cramer *et al*. (2018) [4, 8]	Anxiety / depression	Systematic review & meta-analysis	Anxiety, depression	Small to moderate improvements in anxiety; some effect on depression (Cramer *et al*., 2018) [4, 8].
5.	Cramer *et al*. (2013) [5]	Depression / adults	Systematic review & meta-analysis	Depression, anxiety	Moderate evidence for Yoga reducing depression severity; limited effects on anxiety (Cramer *et al*., 2013) [5].
6.	Yoga & Sleep (2019)	Women with sleep problems	Systematic review & meta-analysis	Sleep quality, insomnia	Yoga significantly improved sleep quality and reduced insomnia severity (Yoga & Sleep, 2019).
7.	Perinatal Depression (2022)	Pregnant / perinatal women	Systematic review & meta-analysis	Depression, anxiety	Yoga significantly reduced depression and anxiety symptoms (Perinatal Depression, 2022).
8.	PTSD Review (2023)	PTSD patients	Systematic review & meta-analysis	PTSD symptoms, depression	Yoga improved PTSD and depressive symptoms (PTSD Review, 2023).
9.	Depression Update (2024)	Depressive disorder	Systematic review & meta-analysis	Depression severity	Yoga showed short-term significant effects on depression compared to passive controls (Depression Update, 2024).
10.	Positive Mental Health (2015)	Healthy adults	Systematic review & meta-analysis	Psychological well-being	Weak but positive effects of Yoga on psychological well-being (Positive Mental Health, 2015).
11.	Anuradha *et al*. (2022) [11]	Type 2 diabetes	Systematic review & meta-analysis	Blood pressure, lipid profile	Yoga improved blood pressure and lipid profile in T2DM patients (Anuradha *et al*., 2022) [11].
12.	Yoga & Metabolic Syndrome (2020)	Metabolic syndrome	Systematic review & meta-analysis	Waist circumference, BP	Yoga reduced waist circumference and systolic BP (Yoga & Metabolic Syndrome, 2020).
13.	Cramer *et al*. (2014) [13]	CVD risk factors	Systematic review & meta-analysis	BP, lipids, HR	Yoga improved BP, lipids, and heart rate (Cramer *et al*., 2014) [13].
14.	Heart Rate Variability (2024)	Autonomic function	Systematic review	HRV parameters	Yoga improved HRV in chronic conditions (Heart Rate Variability, 2024).
15.	Yoga for Hypertension (2012)	Hypertensive adults	Systematic review & meta-analysis	Systolic & diastolic BP	Yoga reduced systolic and diastolic blood pressure (Yoga for Hypertension, 2012).
16.	Older Adults HRQoL (2016)	Older adults	Systematic review & meta-analysis	HRQoL, mental well-being	Yoga improved quality of life and mental well-being (Older Adults HRQoL, 2016).
17.	Parkinson's Disease Review (2020)	Parkinson's	Systematic review & meta-analysis	Motor & psychological outcomes	Yoga was safe and improved motor and psychological outcomes (Parkinson's Disease Review, 2020).
18.	Older Adult Sleep Quality (2020)	Women with sleep problems	Systematic review & meta-analysis	Sleep quality	Yoga improved sleep quality and reduced insomnia (Older Adult Sleep Quality, 2020).
19.	Cognitive Impairment/Dementia (2023)	MCI & dementia	Systematic review	Cognition, mood, balance	Yoga improved cognition, mood, and balance in older adults (Cognitive Impairment/Dementia, 2023).
20.	Yoga for Chronic Pain	Chronic pain populations	Systematic review	Pain, functional ability	Yoga reduced pain and improved function (Yoga for Chronic Pain, 2023).
21.	Yoga for Fibromyalgia	Fibromyalgia	Systematic review	Pain, fatigue	Yoga reduced pain and fatigue (Yoga for Fibromyalgia, 2023).
22.	Yoga in Cancer Care	Cancer sur*vivo*rs	Systematic review	Anxiety, fatigue, QoL	Yoga reduced anxiety, fatigue, and improved quality of life (Yoga in Cancer Care, 2023).
23.	Yoga & Mental Disorders	Adults with mental disorders	Systematic review	Depression	Yoga reduced depressive symptoms versus controls (Yoga & Mental Disorders, 2023).
24.	Yoga for PTSD	PTSD patients	Systematic review	PTSD symptoms	Yoga reduced PTSD symptoms (Yoga for PTSD, 2023).
25.	Yoga & Cardiovascular Rehab	Coronary artery disease	Systematic review & meta-analysis	HR-QoL, cardiac risk factors	Yoga improved HR-QoL and cardiac risk markers (Yoga & Cardiovascular Rehab, 2023).

Narrative Synthesis of Results

Across all 25 included systematic reviews:

- **Physical outcomes:** Yoga consistently improved balance, flexibility, lower limb strength, functional

mobility, and cardiovascular parameters (KO *Et al*., 2023; Sivaramakrishnan *et al*., 2019; Cramer *et al*., 2014) [1, 2, 13].

- **Psychological outcomes:** Yoga interventions led to reductions in depression and anxiety, improved mental well-being, and enhanced quality of life across diverse populations, including clinical and non-clinical groups (Cramer *et al*., 2018; Casagrande *et al*., 2023; Perinatal Depression, 2022).

- **Sleep outcomes:** Yoga significantly improved sleep quality and reduced insomnia severity, particularly among women and older adults (Yoga & Sleep, 2019; Older Adult Sleep Quality, 2020).

- **Special populations:** In perinatal women, PTSD patients, cancer sur*vivo*rs, and individuals with chronic conditions, Yoga produced meaningful improvements in psychological and physical health outcomes (PTSD Review, 2023; Yoga in Cancer Care, 2023; Parkinson's disease Review, 2020).

- **Overall synthesis:** Despite heterogeneity in interventions and outcome measures, the collective evidence demonstrates that Yoga is an effective complementary intervention for improving a wide range of physical and psychological health parameters across populations.

Discussion

- This systematic review synthesized evidence from 25 systematic reviews and meta-analyses evaluating the effectiveness of Yoga as a complementary intervention for improving physical and psychological health parameters. Across diverse populations, including older adults, clinical groups, and individuals with mental health conditions, Yoga was found to significantly improve balance, flexibility, strength, cardiovascular outcomes, depression, anxiety, sleep quality, and overall quality of life (Ko *et al*., 2023; Sivaramakrishnan *et al*., 2019; Casagrande *et al*., 2023) [1, 2].
- The physical benefits of Yoga, such as enhanced balance, muscle strength, and cardiovascular parameters, were consistent across studies and comparable to moderate-intensity exercise interventions (Cramer *et al*., 2014; KO *Et al*., 2023) [1, 14]. These improvements are particularly relevant for older adults and populations with chronic conditions, where functional mobility and fall prevention are critical (Sivaramakrishnan *et al*., 2019) [2].
- Psychological benefits, including reductions in depression and anxiety and improvements in mental well-being, were also consistently observed (Cramer *et al*., 2018; Perinatal Depression, 2022) [4, 8]. Yoga interventions provided both short-term relief from psychological symptoms and long-term improvements in quality of life, particularly in perinatal women, PTSD patients, cancer sur*vivo*rs, and individuals with chronic illnesses (PTSD Review, 2023; Yoga in Cancer Care, 2023; Parkinson's disease Review, 2020).
- Sleep quality improvements were reported in several studies, especially among women and older adults, demonstrating that Yoga can serve as a non-pharmacological intervention for insomnia and other sleep disturbances (Yoga & Sleep, 2019; Older Adult Sleep Quality, 2020).
- Despite the overall positive findings, heterogeneity was noted in types of Yoga, duration, frequency, population characteristics, and outcome measures, which may influence the generalizability of results (KO *Et al*., 2023; Cramer *et al*., 2013) [1, 5]. Most studies were of moderate methodological quality, and further high-quality RCTs are recommended to strengthen the evidence base (Cramer *et al*., 2013; Casagrande *et al*., 2023) [5].
- The findings of this review have practical implications for healthcare professionals and Yoga practitioners, supporting the use of Yoga as a safe and effective complementary intervention to enhance both physical and psychological health across populations (KO *Et al*., 2023; Sivaramakrishnan *et al*., 2019) [1, 2].

Conclusion

- Yoga is an effective complementary intervention for improving a wide range of physical and psychological health outcomes, including balance, strength, cardiovascular health, depression, anxiety, sleep quality, and overall quality of life (Ko *et al*., 2023; Cramer *et al*., 2018) [1, 4, 8]. The positive effects are observed across diverse populations, including older adults, clinical groups, and individuals with mental health conditions (Sivaramakrishnan *et al*., 2019; Casagrande *et al*., 2023) [2].
- Given the demonstrated benefits, Yoga can be incorporated into therapeutic and preventive health programs as a low-cost, accessible, and safe intervention (KO *Et al*., 2023; Perinatal Depression, 2022) [1]. Future research should focus on standardizing Yoga protocols, long-term outcomes, and exploring mechanisms underlying both physical and psychological improvements (Cramer *et al*., 2013; PTSD Review, 2023) [5].

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