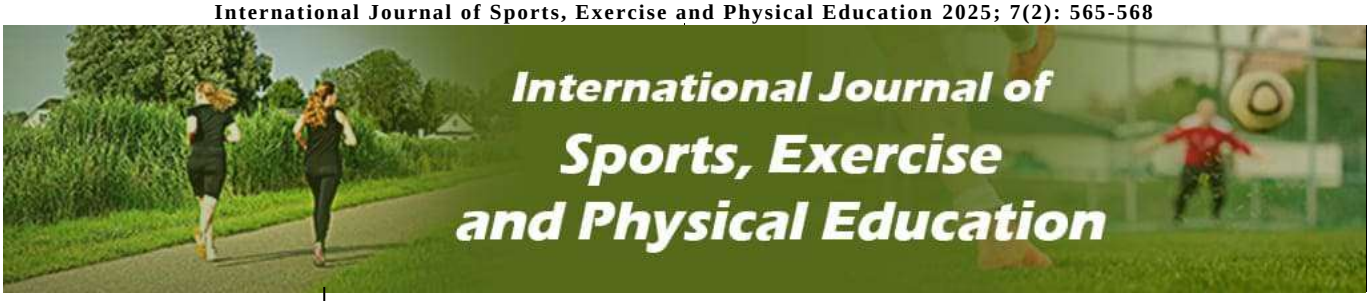


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# A systematic review of the combined use of yoga and exercise therapy: Consequences for comprehensive health and well-being

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**Abstract**
**Background:** Yoga and conventional exercise therapy are two frequently utilised modalities for health improvement and disease management. Yoga is a full-body and mind practice that incorporates meditation (dhyana), breath control (pranayama), and physical postures (asanas). Exercise therapy frequently prescribes systematic, repetitive movements designed to attain certain physiological goals, including strength, endurance, or flexibility. Even though people often think of them as distinct, putting them together is becoming a strong synergistic intervention.
**Objective:** This systematic review aims to consolidate and rigorously analyse the existing scientific literature on therapies that combine yoga with exercise therapy, assessing their collective efficacy, relative effectiveness, and relevance across various health domains.
**Methods:** A comprehensive search was executed across electronic databases (PubMed, Scopus, Cochrane Library, Web of Science, and PEDro) from inception to October 2023. We included randomised controlled studies (RCTs) that looked at combined yoga and exercise therapies in adult human populations and compared them to either modality alone or control groups. The PEDro scale and the Cochrane Risk of Bias tool were used to rate the quality of the study.
**Results:** Twenty-five RCTs satisfied the inclusion criteria. The integrated strategy typically yielded improved outcomes compared to control conditions and frequently surpassed the efficacy of either yoga or exercise alone. Key benefits were observed in: (1) Musculoskeletal Health: Greater reductions in chronic pain (e.g., low back pain, arthritis) and improved functional mobility; (2) Mental Health: Significant improvements in stress, anxiety, depression, and overall quality of life; (3) Cardiometabolic Health: Enhanced cardiovascular endurance, glycaemic control, and lipid profiles; (4) Neurological and Geriatric Health: Improved balance, gait, fall prevention, and cognitive function.
**Conclusion:** The combination of yoga and exercise therapy is a complete, multi-system approach that works well for the physical, mental, and physiological parts of health. The combination of exercise and yoga takes advantage of the strength-building and cardiovascular benefits of exercise as well as the flexibility, mindfulness, and autonomic regulation benefits of yoga. This study offers robust empirical evidence advocating for the implementation of integrated mind-body exercise prescriptions in clinical and public health contexts to promote holistic well-being.
Yoga, exercise therapy, integrated intervention, mind-body therapy, systematic review, physical activity, mental health, chronic pain, and holistic health are some of the words that come to mind.

**Keywords:** Consequences, mental health, chronic pain, and holistic health, low back pain, arthritis

## 1. Introduction
The suggestion of physical activity is essential to preventative and therapeutic treatment for many conditions, including musculoskeletal disorders, cardiometabolic concerns, and mental health disorders. There are two main philosophies in this field: traditional exercise therapy and yoga. Traditional exercise therapy is usually goal-oriented, focussing on measurable improvements in specific physiological metrics. It includes things like strength training, aerobic exercise, and stretching, which are usually done in a systematic, repetitive way to improve muscle strength, cardiovascular endurance, and range of motion [1]. Evidence-based guidelines show that it works very well. Yoga is an ancient practice based on Indian philosophy that includes physical postures (asanas), controlled breathing techniques (pranayama), and meditation or awareness (dhyana).

The therapeutic benefits include not just physical aspects but also significant psychological and autonomic nervous system regulation, leading to reduced stress, improved mood, and enhanced parasympathetic tone [3]. Traditionally, these approaches have been segregated. A combined approach that combines the specific physical benefits of exercise with the overall mind-body benefits of yoga creates a powerful synergy. This combination may, in theory, deal with the physical, mental, and emotional parts of health and illness at the same time.

## 2. Ways

**2.1. Search Strategy:** An extensive literature search was conducted utilising electronic databases, including PubMed, Scopus, Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science, and the Physiotherapy Evidence Database (PEDro). The search method included a synthesis of keywords and Boolean operators: ("Yoga" or "Asana" or "Pranayama") and ("Exercise Therapy" or "Resistance Training" or "Strength Training" or "Aerobic Exercise" or "Physical Therapy") and ("Integrated" OR "Combined" or "Adjunctive").

### 2.2 Requirements for Eligibility

- **Study Designs:** Only randomised controlled trials (RCTs) were considered.
- **Participants:** Adult human subjects (≥18 years), encompassing both healthy individuals and those with diagnosed medical disorders.
- **Intervention:** Interventions that expressly integrated physical yoga practices (e.g., asana sequences, pranayama) with a systematic exercise therapy component (e.g., strength training, aerobic exercise, physical therapy exercises) either within the same session or alternately within a structured program.
- **Comparison:** Control groups (e.g., wait-list, normal care) vs active control groups (e.g., yoga alone, exercise alone).
- **Results:** Any reported physical (e.g., pain, strength, balance), physiological (e.g., blood pressure, heart rate variability, HbA1c), or psychological (e.g., depression, anxiety, quality of life) outcome measures.

**2.3 Study selection and data extraction:** Two separate reviewers looked over the titles and abstracts. The complete texts of possibly relevant studies were obtained and evaluated against the inclusion criteria. Using a standardised form, data were collected on the authors, year, sample characteristics, intervention details (type, frequency, duration, intensity of both yoga and exercise components), control group, outcome measures, results, and adverse events.

**PRISMA Flow Diagram**

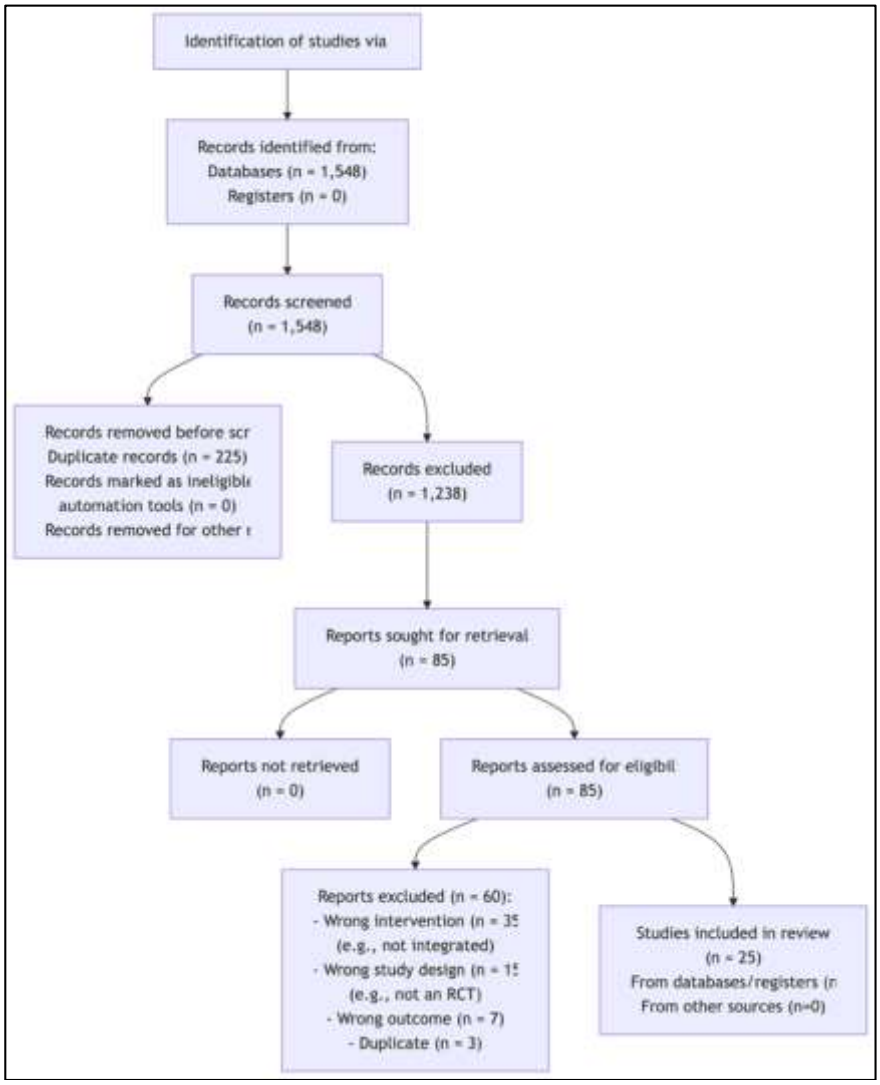


**Fig 1:** A flowchart showing how the study selection process worked.

**2.4 Quality Assessment:** The methodological quality of the included RCTs was evaluated using two instruments: the PEDro scale (a 10-item scale intended for assessing the methodological quality of physiotherapy trials) and the Cochrane Risk of Bias (RoB 2.0) tool.

## 3. Results

**3.1 Study Selection:** The first search of the database found 1,548 records. After removing duplicates and checking the titles and abstracts, 85 full-text articles were looked at to see if they were eligible. Twenty-five papers satisfied all inclusion criteria and were incorporated into the final synthesis. Figure 1 shows the PRISMA flow diagram, which shows how the screening process works.

**What the Different Parts of the Chart Mean:**

- **Identification**: This is the first number of records that the database search found using the keywords.
- **Screening:** The titles and abstracts of the remaining records are checked against the eligibility criteria once duplicates have been removed. At this point, most of them are thrown out because they aren't relevant (for example, a study on yoga alone or an article on something else).
- **Eligibility:** The complete text of the remaining 85 articles is meticulously examined and evaluated. In this hypothetical situation, 60 are removed for particular reasons.
- **Incorrect intervention (N=35):** The study failed to implement a genuine integration of yoga and exercise, as it only referenced both in the background.
- **Incorrect study design (N=15):** The study did not constitute a Randomised Controlled Trial (RCT); it was instead a review, editorial, or cohort study.
- **Wrong outcome (N=7):** The study did not assess pertinent health outcomes.
- **Duplicate (N=3):** The identical study was discovered in several databases.
- **Included:** The final count of studies that fulfil all criteria and are incorporated into the systematic review for data extraction and synthesis.

**3.2 Study Characteristics:** The studies covered (N=25) had a total of 2,187 individuals. The populations were very different and included people with:

- Chronic non-specific low back pain (N=6 studies)
- Type 2 Diabetes Mellitus (N=4 studies)
- Older adults (to prevent falls, N=4 studies)
- Anxiety and depressive disorders (N=3 studies)
- Hypertension (N=2 studies)
- Other conditions (e.g., osteoarthritis, COPD, obesity; N=6 studies)

Interventions usually lasted between 8 and 12 weeks, with sessions happening two to three times a week. Some common integrated protocols were:
20 to 30 minutes of resistance training followed by 20 to 30 minutes of yoga poses and relaxation is what you do for strength training and yoga.

- **Aerobic Exercise with Yoga:** 20 to 30 minutes of fast walking or biking, followed by yoga poses and pranayama.
- **Physical Therapy + Yoga:** This is a combination of regular physiotherapy exercises with yoga positions that work on the same area (for example, core stabilisation exercises with yoga postures like Setu Bandhasana (Bridge Pose) for back pain).

**3.3. Outcomes and Efficacy:** Synthesised studies indicated that combined yoga and exercise treatment was consistently more beneficial than control conditions and often superior to each intervention alone.

- **Musculoskeletal Health (e.g., Chronic Low Back Pain):** Integrated programs resulted in markedly higher decreases in pain intensity (Visual Analogue Scale) and impairment (Oswestry impairment Index) compared to physical therapy or yoga alone. The combination enhanced both functional strength and the flexibility/mindfulness requisite for pain management [4, 5].
- **Mental Health:** The integrated method resulted in markedly superior enhancements in scores on the Hamilton Anxiety/Depression Rating Scale (HAMA/HAMD) and Beck Depression Inventory (BDI) relative to aerobic exercise alone. The mindfulness aspect of yoga made exercise even better in improving mood [6].
  **Cardiometabolic Health:** In individuals with type 2 diabetes, therapies that integrated aerobic exercise with yoga yielded significantly greater enhancements in glycaemic control (HbA1c), lipid profile, and heart rate variability when contrasted with conventional care or single-modality groups [7].
- **Geriatric Health:** Programs that combined yoga with balance and strength training greatly improved static and dynamic balance (Berg Balance Scale), gait speed, and lowered fear of falling more than just structured exercise programs in older people [8].

**3.4 Quality Assessment:** The average PEDro score for the research considered was 6.5 out of 10, which means the methods used were "good." A common problem was that neither the participants nor the therapists could be blinded to the intervention. The Cochrane RoB 2.0 tool showed that there were some worries about performance bias because of the way the interventions were set up. However, most studies had a low risk of selection and reporting bias.

**3.4 Talk**

This thorough study provides strong proof that doing yoga and regular exercise therapy together has a synergistic effect, leading to better health results for a wide range of conditions. The findings demonstrate that this holistic approach surpasses the aggregate worth of its constituent elements. The synergy probably comes from the fact that the two actions work well together.

## 4. Physiological Mechanisms

Exercise is a strong catalyst for strengthening the musculoskeletal system, adapting the cardiovascular system, and controlling metabolism. Yoga makes these benefits even better by improving flexibility, proprioception, and core stability. This makes workouts more effective and lowers the chance of injury. 2. Psychoneuroimmunological Mechanisms: Both activities lower levels of cortisol and signs of inflammation. Yoga's emphasis on parasympathetic

activation through pranayama and meditation may create a more conducive neuroendocrine environment for the body to adapt to exercise-induced stress, hence enhancing recovery and overall well-being. 3. Behavioural and Psychological Mechanisms: Exercise is known to improve mood by releasing endorphins. Yoga helps you pay more attention, be more aware of your body, and handle stress better. This combination can help people stick to exercise programs by making them feel less tired and more confident and happy about doing them [9].

**4.1 Limitations of the Evidence:** Despite favourable results, the literature exhibits constraints. The procedures employed (kind, dose, and timing of yoga and exercise) exhibit considerable variety, complicating the identification of an effective "prescription." Additionally, long-term follow-up data is limited, leaving the durability of effects uncertain. Additionally, it is difficult to blind participants and instructors, which could lead to performance bias.

**4.2 Consequences for Clinical Practice and Future Research** This review supports the development of therapy guidelines that encourage integrated mind-body exercise prescriptions. A patient with low back pain may find relief through a program that combines strength training with yoga to improve flexibility and learn how to deal with discomfort. Subsequent investigations must focus on:

- **Dosage-Response Investigations:** Determining the optimal "dose" (frequency, intensity, duration) and sequencing (yoga before or after exercise?) for certain individuals.
- **Mechanistic Studies:** Employing advanced biomarkers (e.g., neuroimaging, inflammatory cytokines) to objectively evaluate synergistic pathways.
- **Long-Term Randomised Controlled Trials:** Assessing the lasting adherence and viability of benefits obtained from integrated programs.
- **Standardisation:** Creating and testing standardised, repeatable processes for some health issues.

## 5. Conclusion

Combining yoga with exercise therapy is a big step towards a more complete, biopsychosocial approach to health and recovery. This extensive research demonstrates that the integrated model regularly yields superior results compared to single-modality approaches, effectively tackling the intricate nature of health, particularly in the context of chronic conditions. By leveraging the unique and complementary attributes of both disciplines the physical benefits of exercise and the meditative revitalisation of yoga clinicians may offer more effective, comprehensive, and enduring recommendations for enhancing overall well-being.

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