Review article

The Efficacy of Yoga Interventions in Managing Bronchial Asthma: A Research Paper Review

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ABSTRACT
Background: Bronchial asthma is a prevalent chronic respiratory condition affecting a significant portion of the global population, particularly children and adults. The standard treatment approach often involves medications like inhaled corticosteroids, but their prolonged use can pose challenges. In recent years, complementary and alternative therapies such as yoga have gained attention for their potential in asthma management.
Objective: This literature review explores the efficacy of yoga interventions in managing bronchial asthma.
Method:A comprehensive search was conducted using databases like PubMed, Google Scholar, web of scienceand PubMed Central, focusing on keywords related to yoga and asthma management. Initially identifying 44 relevant articles, subsequent filtering and inclusion criteria led to the selection of 13 articles for detailed review.
Result: The selected studies included various yoga interventions targeted at asthma management, incorporating clinical trials and other rigorous methodologies. The outcomes measured included asthma control, medication reduction, frequency of attacks, and pulmonary function parameters such as peak expiratory flow rate (PEFR).Findings from this review suggest that yoga interventions show promise in improving asthma outcomes, reducing reliance on medication, and enhancing quality of life.
Keywords: *Bronchial asthma,Yoga interventions**,** Asthma management**,** Complementary and alternative therapies**,** Peak expiratory flow rate (PEFR)**,** Quality of life.*
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INTRODUCTION

It has been estimated that 5% of adults and 7% to 10% of children worldwide suffer from asthma, and this condition is contributing to an increasing number of cases and mortality rates.[1] Asthma is a deeply entrenched chronic lung disease that affects our respiratory system by causing difficulty in breathing due to constriction of the smooth muscles surrounding the airways, leading to coughing and wheezing.[2] Patients suffering from mild to moderate asthma are increasingly relying on continuous use of inhaled corticosteroids to manage their condition.[3] Inactivity or reduced physical activity has now become a critical issue and a predominant psychological problem in modern times. Consequently, mental health-related problems have also become common. Diseases that originate from psychological causes leading to physical distress include bronchial asthma among others.[4]

Chronic inflammation or swelling of the airways is a major characteristic of bronchial asthma, resulting in a population mostly affected by eosinophils, mast cells, and activated T helper lymphocytes. These cells directly affect the airways by narrowing them and initiating bronchoconstriction, mucus secretion, and structural changes.[5]

Yoga is a type of impactful and cost-effective treatment that can be used as complementary and alternative therapy for diseases like asthma. Yoga has been observed to have a positive impact in reducing medication dosage, decreasing the frequency of asthma attacks, and improving the peak expiratory flow rate (PEFR).As a result, using yoga for medical purposes has proven to be a valuable medical effect in the treatment of asthma. This includes yoga

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postures (asanas), breathing exercises (pranayama), relaxation techniques, and meditation.[6]

Yoga is a specific and accessible form of exercise that helps promote physical health and mental peace.[7] Yoga is a method that originated in ancient times in India, encompassing religious, moral, physical, and mental practices. It is a kind of spiritual process that functions in a person's life like nectar, involving self-control, social behaviour, pure actions, yoga postures, breathing exercises (pranayama), and knowledge—all of which contribute to the development of a well-rounded personality and aid in the treatment of various diseases.[6]

Yoga is considered beneficial for many ailments such as cardiovascular disease, metabolic diseases, mental health issues, heart disease, and lung diseases, based on scientific studies.[8] It plays a significant role in treating these major illnesses, which include various conditions like bronchial asthma, blood cholesterol, weight loss, blood pressure control, asthmatic conditions, sadness, anxiety, mood swings, and controlling blood sugar levels.[9]Yoga incorporates physical, cognitive, and emotional elements, making it more successful compared to non-pharmaceutical treatments, as indicated by previous studies. Yoga has been found to be safe and beneficial for both the mind and body interventions.[10]

It can be clearly seen that several studies have been conducted in the past demonstrating the positive impact of yoga on bronchial asthma. Some notable studies include Nagendra and Nagarathna (1985), which showed the effect of yoga on upper bronchial asthma[11], Seethalakshmi et al. (1991) who examined yoga chair breathing for acute episodes of bronchial asthma[12], Vedanth (1998) who studied different yogic techniques in university students for asthma treatment[13], and a randomized controlled trial (RCT) by Vempati et al. (2009) examining the effectiveness of a holistic yoga lifestyle modification program in controlling and managing bronchial asthma.[14] Bidwell et al. (2012) also focused on improving the quality of life and asthma management in women through yoga.[15]

All these written studies or research clearly demonstrate that yoga has a positive impact on the management and control of bronchial asthma. Yoga actively contributes to enhancing the quality of life and assists in reducing medication reliance. It is possible to achieve early control over bronchial asthma by incorporating yoga therapy alongside medication.[16]

While focusing on yoga practice, it controls the sympathetic nervous system and treats various lung diseases, as well as other types of illnesses, positively through deep breathing.[9] During an asthma attack, yoga's impact works on the sudden and surprising pressure on the smooth muscles.[17]

METHODOLOGY: -

Research Question: - This literature review aims to assess the effectiveness of various yoga interventions in the management of bronchial asthma.The objective is to provide a comprehensive analysis of existing evidence regarding the efficacy of yoga as a complementary therapy for bronchial asthma management.

Search Strategy: -A comprehensive literature search was done for the effectiveness of yoga on bronchial asthma. This review has not been registered yet because its purpose is educational, and no formal yoga protocol has been prepared within it.

This review primarily addresses the following questions:

- What types of yoga interventions have been used for managing asthma?
- Is yoga alone sufficient to treat asthma, or should medication also be administered alongside?
- What kinds of asthma questionnaires were used, and what outcomes were derived from them?
- What positive impact did yoga have on PEFR (Peak Expiratory Flow Rate) after intervention?
- Is there available data to determine the effectiveness of yoga in treating asthma?

In this literature review, the primary method involved searching for and studying various papers that utilized yoga interventions, including clinical studies, literature review, yoga interventions, and clinical trials.

The following Inclusion criteria were used in this study:

- Only papers that mention asthma will be included in this study.
- Review articles, systematic review articles, critical reviews, and meta-analyses focusing on the role of yoga in the management of bronchial asthma.
- Papers that discuss the use of yoga for asthma or other lung function-related diseases such as COPD will be included in this review.
- Papers that used ACQ (Asthma Control Questionnaire) or AQLQ (Asthma Quality of Life Questionnaire) will be considered.
- Papers that measured forced expiratory volume in 1 second, peak expiratory flow rate, airway resistance, or Asthma Quality of Life Questionnaire score will be included in this review.
- Studies published in peer-reviewed journals.
- Articles in English language.
- Publications from the last 5 years

The following Exclusion criteria were used in this study:

- Studies that do not include asthmatics.
- Papers that lack clinical trial components.
- Studies where yoga was not used as a treatment.

- Studies where yoga intervention was not employed specifically for treating asthma or related lung diseases, such as asthma attacks or lung conditions.

Based on these inclusion and exclusion criteria, selected studies are being identified for this review. It is also worth noting that yoga not only treats lung diseases but has also proven to be beneficial in managing various physical and mental ailments, including heart disease, anxiety, diabetes, hypertension, depression, COPD, obesity, and more.[18]

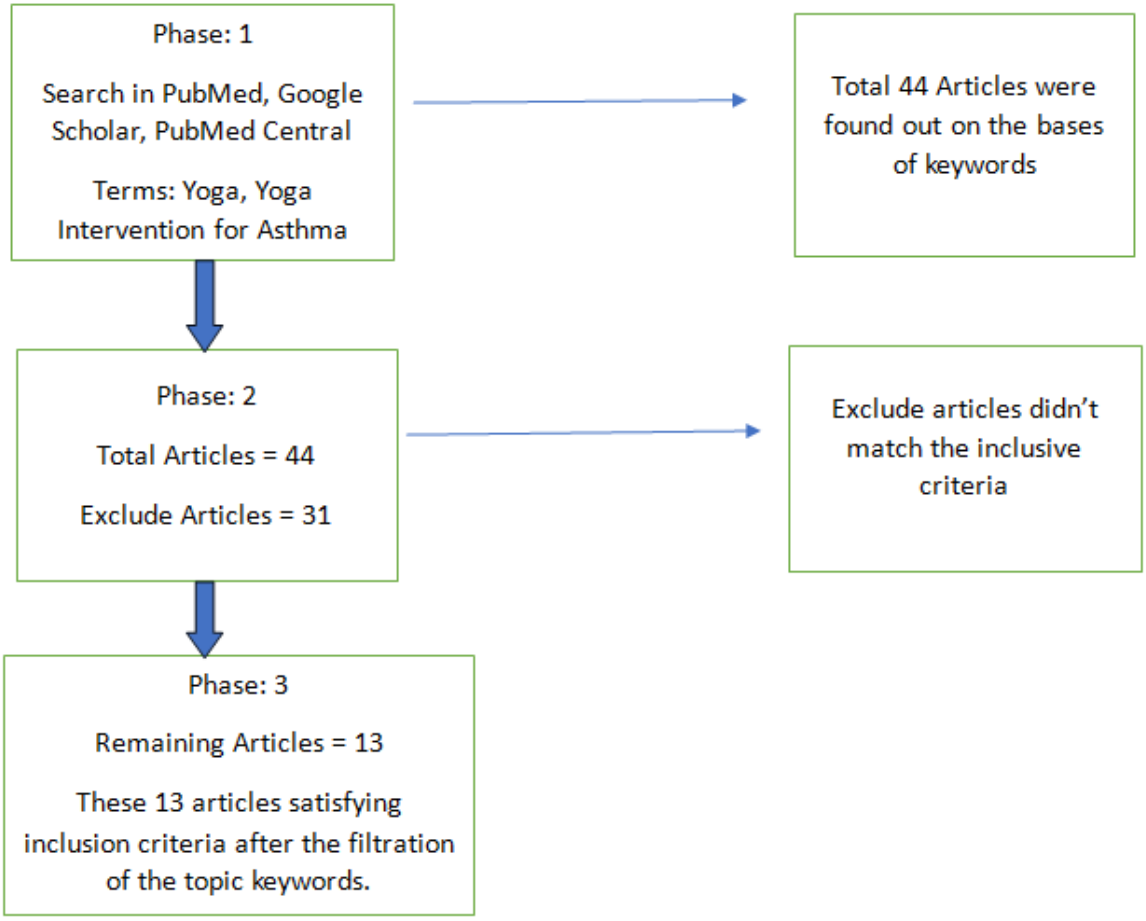
The total number of articles selected for this study is based on three phases of thorough consideration and study, applying both inclusion and exclusion criteria.

Phase 1: Initially, papers were searched using search engines like PubMed, Google Scholar, and PubMed Central, focusing on main terms or keywords related to yoga and asthma management, such as "yoga," "yoga for asthma management," "yoga intervention for asthma management," "asthma management through yoga," "yoga for lung disease," etc. Subsequently, a total of 44 articles/papers were retrieved, which were somewhat related to the main keywords.

Phase 2: After filtering the records, we conducted a secondary search using specific subtopics, resulting in 23 articles. Out of these 23 articles, some did not align with our population, study design, intervention, and other criteria (including language for review publication). Ultimately, we were left with 13 articles that met our inclusion criteria for the study review, which prompted our decision to proceed with the review.

Phase 3: - Now we had remaining 33 articles, these remaining articles were satisfying the inclusion criteria after the filtration of the topic keywords.

Table 1 illustrates the methods used in this article's phases.



In asthma attacks, a reduction was observed in medication treatment as well as an increase in Quality of Life, Pulmonary function, and autonomic function in the experimental group which practiced yoga.[19] We have 6 studies that demonstrate the benefits of yoga in asthma, and their brief descriptions are shown in the table below.

Table 2 summary of Interventions Exploring Yoga as Therapy for Asthma.

year	authors	No. of patients	Mode of intervention	Intervention Time\Dosage	Findings
2023	M.J SangeethaLaxmi, Alex Hankey	10 Patients	Abdominal Breathing, vakshasthalashaktivikasavyayama, kapalbhatiBhastrika Pranayama, guided relaxation	20- 30 min daily	Improvement in pulmonary function & Quality of life, reduce anxiety and depression, seven tests of pulmonary function revealed improvement in yoga group as compared to control group (P<0.002) [12]
2021	RashmiRajan Das, JhumaSankar, SushilkumarKabra	Total =30 patients	Ujjai, AnulomViloma, Alternative Nostril breathing, Extended Exhalations, yoga chair breathing, belly breathing, kapalbhati	45 min daily 6 days in week for 3 months	Significient improvement in vital capacity (VC), Forced Vital Capacity (FVC) and Peak Expiratory Flow Rate (PEFR) as compared to control group QOC score, FEV1, FEV1/FVC, is improved.[6]
2020	Gulyetererdogenyuce&sultonTase	Total 50 patients Intervention =25, control =25	Warm-up, Kapalbhati, ujjayi, anulomvilloma, Relaxation and rest.	20 min once daily for 1 month	The result of the study indicate that the pranayama group exhibited significantly higher score in ACT (asthma control test) overall AQCQ (Asthma Quality of Life Questionnaire) score, and its subscale score compared to the relaxation group (P< 0.05). however, there was no significant difference observed between the group concerning PFT (Pulmonary Function Test) parameters and Peak expiratory flow value (P>0.05)[20]

year	authors	No. of patients	Intervention Time\Dosage	Mode of intervention	Findings
2021	Sarah A. Hiles,	Total 24 patients, Experiment group = 15 Control group = 9	3 months 75 min for group class	Asana, pranayama and Meditation	Improvement in SGRQ Experimental group ACQ-5 compared to the control group. [21]
2023	PreamkumarBadwaik, Vinod Ade	Total 120 patients Experiment group = 60 Control group = 60	6 months	Anulomvilom pranayama +Tab. KantakariGhanvati 500 mg BD &AnulomVilom pranayama + Tab. KantakarikaGhanvati 500 mg	Anulom -viloma pranayama and nadisodhana pranayama have been found to have positive effects on retaining oxygen in the lungs. Both pranayama techniques did in increasing oxygen saturation levels, consequently enhancing lung vitality. [22]
2023	Karpagam Kumar, Ramasamay S, Dr. R. Vijayaraghvan, Madhan Krishnan	Total = 120 patients, 3 group Buteyko group= 40 Pranayama group = 40	3 months	Nadishodana, kapalbhati, bhastrica, Buteyko breathing technique	The statistical analysis revealed significant results P(<0.001) for forced Vital Capacity (FVC), Forced Expiratory Volume in one second (FEV1) and the ratio of FEV1 to FVC within both experimental group 1 (Buteyko group) and experimental group 2nd (pranayama group). conversely, the control group did not exhibit and statical significance (P>0.05) in these parameters. [23]

In most studies where yoga was found beneficial for controlling asthma, common yoga asanas, pranayama, etc., were used in the yoga intervention. These practices were simple to perform and helpful in alleviating the obstructed airflow in the trachea due to bronchial constriction associated with asthma, reducing diaphragmatic movement, and aiding proper lung function.[24] Additionally, yoga protocols were also suggested for treating psychological problems like anxiety and depression.[25] Breathing exercises (pranayama) were predominantly emphasized in studies aimed at improving asthma. The main five breathing exercises commonly used in different study protocols are as follows:

1. **Rhythmic Abdominal Breathing: -**This is a basic breathing exercise, which is beneficial for those who often breathe incorrectly and have shallow breathing habits. It is a deep, slow abdominal muscle engaging activity that involves both contraction and expansion of the lungs. Practicing it for just 5 minutes can be effective.[6]
2. **VakshasthalaShaktivikasaVyayama: -**This is an age-old and familiar process which was taught by Maharishi Kartikeya, but it became popular through ShriDhirendraBrahmachari.[12]

Instructions: Stand straight with both feet close together, hands by the sides of the body, and palms turned inward.

Procedure 1: - To begin this exercise, while inhaling through the nose, raise the hands upwards and towards the back, forming a half circle. Participants should be instructed to bend back as much as possible, and for as long as possible, while holding their breath, and slowly return to the normal position with hands down, exhaling slowly and attentively."

Procedure 2: - The exercise will commence with inhaling through the nose and leaning backward from the waist. Simultaneously, the hands will be drawn towards the back, and concurrently, the chest will expand. Participants will maintain this posture until they can easily hold their breath, then gradually return to the standard position while exhaling. This exercise will be performed for 5 minutes.

3. Kapalbhati: - Sit in Sukhasana or Vajrasana, and in this, there is a process of actively exhaling breath. After doing 60 strokes in 1 minute, there will be a rest of 5 to 10 minutes.[26]

4. Bhastrika Pranayama: - Sit in Sukhasana or Vajrasana and forcefully inhale and exhale breath through the nose, while rhythmically moving the abdomen in and out, mirroring the inhalation and exhalation pattern of the nose. This practice will be performed consecutively, 25 times through the right nostril, 25 times through the left nostril, and 25 times through both nostrils. This exercise should be practiced for approximately 10 minutes.[17]

5. Guided Relaxation: - Lie down in Shavasana, and instruct participants to relax each part of their body. They will take deep breaths from head to abdomen, visualizing themselves deeply relaxed, comfortably without any obstruction, for 5 minutes. After this, they will be instructed to slightly move their fingers and toes, and then asked to open their eyes.[16]

Results: During the data extraction process, obtained the necessary information required for analysis from 13 articles meeting the eligibility criteria. Significant benefits were observed in pulmonary function, quality of life, as well as reductions in anxiety and depression through yoga. For example, clinically significant improvement was observed in AQLQ in the yoga group compared to the control group.

Table 2 summarizes the 6 most impactful studies demonstrating the positive impact of yoga, exercises, and pranayama on bronchial asthma. These six summarized studies were published between the years 2020 to 2024. Table 2 includes the Year of Publication, Authors' Names, Number of Patients, Mode of Intervention, Investigation Time/Dosage, and Findings.

DISCUSSION: -

In the discussion, we aimed to ascertain the efficacy of yoga in managing bronchial asthma and to assess its positive effects on asthma control, reducing asthma attacks, peak expiratory flow rate, ACQ, and AQLQ. Furthermore, this study aimed to evaluate yoga's potential as a treatment option for individuals with mild to moderate asthma by examining studies published between 2018 and 2024. Despite limited research on incorporating yoga into asthma interventions, we sought to determine its relevance in this context. Our research question focused on assessing the effectiveness of various yoga interventions in managing bronchial asthma. We discovered through the studies related to our research question that yoga interventions yield significant clinical benefits for asthma and pulmonary function. The summaries of different studies provided in Table 2 demonstrate this finding. The studies encompassed participants of all age groups, suggesting the effectiveness of yoga interventions for asthma across various age demographics. Ultimately, this review underscores the substantial efficacy of yoga in addressing asthma, pulmonary function, and overall lung health.

CONCLUSION –

This analysis of 13 research found that yoga therapies significantly enhance pulmonary function, quality of life, and psychological well-being in people with bronchial asthma. Yoga groups had clinically significant improvements in AQLQ scores as compared to controls. Recent researches (2020-2024) provide additional evidence supporting yoga's effectiveness as a supplemental therapy. Overall, yoga looks to be a safe and helpful addition to normal asthma treatment, while further large-scale trials are needed. However, further research is warranted to establish specific protocols and optimal integration of yoga into asthma management strategies.

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