ISSN No: 0976-5921
Published online at https://ijam.co.in
International Journal of Ayurvedic Medicine, Supplement of International Conference on Ayurveda-Yoga-Nathpanth - 2025

The Impact of Yoga Practice on Pulmonary Function: A Comprehensive Review

Review Article

Sparsh Kakkar[1], Vinamra Sharma[2], Garima Jaiswal[3*]

1. Research Scholar, 3. Assistant Professor, Amity Institute of Indian System of Medicine, Amity UniversityUttar Pradesh, Sector 125, Noida, Uttar Pradesh. India.
2. Associate Professor, Department of Rasa shastra and Bhaishajya Kalpana, Guru Gorakshnath Institute of Medical Sciences, Mahayogi Gorakhnath University, Gorakhpur, UP. India.

Abstract

Background: Pulmonary function is crucial for overall health, as it involves the efficient exchange of gases, ventilation, and maintenance of homeostasis. Yoga, particularly pranayama (breathing exercises), has been increasingly recognized for its potential benefits on respiratory health. However, the integration of yoga into clinical practice for managing respiratory conditions requires further exploration. Objectives: This review aims to evaluate the impact of yoga practices, with a focus on pranayama, on pulmonary function across various populations. The objectives include identifying patterns in existing research, understanding the physiological mechanisms involved, and providing recommendations for future research and clinical applications. Methods: A systematic literature review was conducted using databases such as PubMed, Scopus, and Web of Science. Studies published over the past 20 years that assessed the effects of yoga on pulmonary function in both healthy individuals and those with respiratory conditions were included. Data extraction focused on study design, population characteristics, type of yoga practice, duration, frequency, and measures of pulmonary function. Results: The review found consistent evidence that yoga, particularly pranayama, significantly improves pulmonary function, including increases in Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 second (FEV1), and Peak Expiratory Flow Rate (PEFR). These benefits were observed in both healthy individuals and those with chronic respiratory conditions such as asthma and COPD. The underlying mechanisms include enhanced respiratory muscle strength, reduced inflammation, and better autonomic regulation. Conclusion: Yoga, especially pranayama, shows significant potential as a complementary intervention for improving pulmonary function. The findings support the integration of yoga into clinical practice for respiratory care, though further research is needed to optimize its use, particularly in terms of long-term effects and specific mechanisms. Personalized yoga interventions could be beneficial in enhancing respiratory health and overall well-being.

Keywords: *Yoga,* Pulmonary Function, Respiratory Health, Pranayama, Breathing Techniques, Respiratory Conditions, Integrative Medicine, Healthcare, Holistic Wellness.

Introduction

Pulmonary function research yields a plethora of supplementary data on health outcomes in general, since it includes respiratory measures such as ventilation and lung capacity (1). Listed homeostasis maintenance as one of the many important physiological roles played by the respiratory system. The generation of energy, the exchange of oxygen, and general health are all dependent on lungs that are in good condition. If you want to know how your respiratory system is doing and how it could affect your heart and muscles, you need to get a pulmonary function test.. Numerous clinical problems, including respiratory disorders and systemic diseases, are strongly correlated with impaired pulmonary function (1, 2).

Research into possible treatments that can enhance respiratory characteristics is extremely important because of the vital role that the lungs play in general health. The ancient practice of yoga, which incorporates physical postures, breathing exercises, and meditation, has lately gained significant appeal due to its potential health advantages. Yoga, according to a plethora of research, aids in maintaining healthy lung function. Much recent study has focused on how yoga affects lung function. What follows is a synopsis of the vast majority of these studies. The goal of this study is to find patterns and similarities in the various studies that have looked at how yoga affects breathing. In addition, the review will help find current gaps in knowledge, which will pave the way for future research efforts. Reviewing the literature on yoga's possible effects on improving pulmonary function and, by

*** Corresponding Author:**
Garima Jaiswal
Assistant Professor,
Amity Institute of Indian System of Medicine,
Amity University Uttar Pradesh, Sector 125, Noida,
Uttar Pradesh. India.
Email Id: gjaiswal1@amity.edu

extension, general health, this work adds to the expanding body of information in this area.

Methodology

Literature Search Strategy

To ensure a comprehensive review of the impact of yoga practice on pulmonary function, a systematic literature search was conducted across multiple databases, including PubMed, Scopus, Web of Science, and Google Scholar. The search included articles published from inception to the present, with an emphasis on studies published in the last 20 years to capture the most recent findings. The search terms used were: "yoga," "pranayama," "pulmonary function," "respiratory health," "lung capacity," "COPD," "asthma," and "breathing techniques." Boolean operators (AND, OR) were used to refine the search results, and reference lists of relevant articles were also scanned for additional studies that may have been missed in the initial search.

Inclusion and Exclusion Criteria

The inclusion criteria for the review were as follows:

- Studies that evaluated the effects of yoga, specifically pranayama, on pulmonary function.
- Articles published in peer-reviewed journals.
- Research conducted on human subjects, including both healthy individuals and those with respiratory conditions (e.g., asthma, COPD).
- Studies that used objective measures of pulmonary function, such as Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 second (FEV1), Peak Expiratory Flow Rate (PEFR), and other relevant respiratory parameters.
- Both randomized controlled trials (RCTs) and observational studies were included to provide a broad perspective.

The exclusion criteria were

- Studies that focused solely on the psychological aspects of yoga without addressing pulmonary function.
- Research conducted on animals or in vitro studies.
- Articles not available in English.
- Review articles, commentaries, and editorials were excluded unless they provided significant data that was not covered in primary studies.

Data Extraction and Synthesis

Two independent reviewers screened the titles and abstracts of all retrieved articles. Full-text articles were then reviewed to determine their eligibility based on the inclusion and exclusion criteria. Discrepancies between the reviewers were resolved through discussion or by consulting a third reviewer.

For each study included in the review, the following data were extracted:

- Study design (e.g., RCT, cohort study, case-control study)
- Population characteristics (e.g., age, gender, health status)
- Type of yoga practice or pranayama technique used
- Duration and frequency of the yoga intervention
- Measures of pulmonary function assessed
- Main findings related to the impact of yoga on pulmonary function

The extracted data were then synthesized to identify common patterns, trends, and gaps in the literature. Studies were categorized based on the population (healthy vs. those with respiratory conditions), type of yoga intervention, and the pulmonary outcomes measured.

Quality Assessment

The quality of the included studies was assessed using the Cochrane Risk of Bias tool for randomized controlled trials and the Newcastle-Ottawa Scale for observational studies. Studies were evaluated based on criteria such as randomization, blinding, sample size, the validity of outcome measures, and the appropriateness of statistical analyses. Studies with high risk of bias were noted, and their findings were interpreted with caution in the synthesis.

Analysis and Interpretation

A narrative synthesis approach was employed to analyze the data due to the heterogeneity in study designs, populations, and outcome measures. Key findings from individual studies were summarized and discussed in relation to the broader literature. Where possible, results from meta-analyses were included to provide a quantitative summary of the effects of yoga on pulmonary function.

The analysis focused on:

- The overall effectiveness of yoga in improving pulmonary function.
- Specific benefits of different pranayama techniques.
- The impact of yoga on specific populations, including those with chronic respiratory conditions.
- Identification of physiological mechanisms by which yoga may influence pulmonary health.

Reporting and Conclusion

The results of the review were organized thematically, with separate sections addressing the impact of yoga on healthy individuals, those with respiratory conditions, and the underlying mechanisms of action. The review concludes with a discussion of the implications for clinical practice, the potential for integrating yoga into respiratory rehabilitation programs, and suggestions for future research.

The methodology was designed to provide a rigorous and comprehensive analysis of the available literature, ensuring that the conclusions drawn are based on a thorough evaluation of the evidence.

Results

Yoga and Pulmonary Function

· Yoga and Healthy Individuals:

The benefits seen in a study with healthy subjects and lung function may also be experienced by frequent yoga practitioners. The major finding that (1) reached after

ISSN No: 0976-5921
Published online at https://ijam.co.in
International Journal of Ayurvedic Medicine, Supplement of International Conference on Ayurveda-Yoga-Nathpanth - 2025

their comprehensive analysis was that yoga improved the lung function of healthy adults. Research has demonstrated that yoga can improve respiratory health in a number of ways, including increasing lung capacity and decreasing lung efficiency.

Also, in a study of teenagers who were generally healthy, (3) investigated if yoga may enhance pulmonary biomarkers. This study adds to the growing body of data that yoga treatment may have an effect on lung function.

In their assessment of a group of middle-aged, healthy, non-exercising persons, (4) looked at the possible therapeutic effects of yoga on the respiratory and muscular systems. Even people who don't often engage in vigorous physical activity found that breathing became easier for everyone once they began practicing yoga. A study conducted (5) found that pranayama, which are breathing techniques used in yoga, enhanced lung function.

· Yoga Intervention and Specific Populations

Research published by (6) found that aerobic exercise and yoga improved the health and lung function of young women with athletic gifts. Longitudinal comparisons of aerobic exercise and yoga's impact on respiratory parameters enriched the existing literature on the subject. A group of healthy women were studied to determine if yoga affected their body composition and cardiovascular health (7). There is some preliminary evidence that yoga may have a positive effect on respiratory health.

Multiple researches involving a diverse range of individuals and healthcare settings have found that yoga improves lung function. By pooling their results with those of other studies, researchers can learn more about the possible advantages of yoga treatment for respiratory health. More and more evidence is pointing to the beneficial effects of yoga on respiratory disorders.

Yoga Breathing Techniques and Pulmonary Function

Finding out how Bhastrika Pranayama, or bellows breath, affects important lung function metrics was the goal of the (8) study. Analysing each data separately can help you understand how this pranayama strategy could impact lung measures. What follows is new data regarding the interdependent relationships between pranayama teachers and their pupils' breathing exercises. Some of the symptoms of chronic respiratory disorders include difficulty sleeping, excessive weariness, and shortness of breath. To what extent may yoga breathing practices alleviate these symptoms. That was the question (9) set out to answer. The major objective of this research was to examine the impact of the intervention on the participants' self-assessments of respiratory health and lung function. Additionally, the study investigated the connection between the two. This study adds to the growing amount of evidence suggesting that pranayama can help those who have breathing difficulties. Aiming to examine the effects of pranayama breathing techniques on pulmonary function, general health, and asthma management, (10) planned to collect. In this study, we lay out a randomised controlled experiment to see whether certain breathing techniques improve respiratory health and reduce asthma symptoms. As an added bonus, this supports the idea that these methods could help asthma sufferers from both an objective and subjective perspective.

Meta-Analysis and Systematic Reviews

A large body of information regarding yoga's effect on lung function was gathered in the study by (2). Three independent investigations yielded these results. The meta-analysis deepens our understanding of how yoga intervention affects the outcomes of lung diseases by providing a comprehensive review. By simplifying the procedure for detecting trends and patterns across many research topics, this study contributes to the academic community. The beneficial impacts of yoga treatment on respiratory muscle strength and pulmonary function were investigated in a comprehensive literature review and meta-analysis by (11). A lot of their focus was on breathing exercises. This research contributes to the limited body of knowledge regarding the effects of yoga on lung health by combining the results of this investigation with other investigations. It is the goal of systematic assessments to collect and analyse all pertinent data in order to draw findings that are useful for both professional researchers and practitioners. After reviewing the studies in detail, it is evident that the yoga-related improvements in lung function are mostly attributable to the pranayama activities. In order to create more effective and tailored respiratory health regimens, it is essential to customise yoga treatments to each person's particular breathing patterns, according to the research. We will try to understand the physiological mechanisms at work in the following session as we examine how pranayama practices may affect lung function.

Mechanisms and Pathways

To study how yoga affects lung function, one must be well-versed in the physiological mechanisms at work. Our primary focus in this study was on studies that looked at how yoga's breathing methods could affect respiratory parameters. Practicing pranayama, like other yoga practices, can help to control breathing by drawing attention to breath and tensing muscles. (12) Emphasise the need of actively exercising the muscles that facilitate breathing in their complete yoga breathing training.

Asthmatics and others with other respiratory disorders have shown promise in using yoga to decrease systemic inflammation. The anti-inflammatory benefits of yoga may be useful for respiratory infections, according to a meta-analysis by (13). Due to its anti-inflammatory properties, yoga may help improve airway function and reduce the frequency of respiratory symptoms (4) and (14). It states that yoga places a premium on being cognizant of and managing the connection between the physical and mentally aspects

of one's existence. Just by paying closer attention to our breathing and consciously adjusting our respiratory parameters, we can increase our respiratory efficiency. Breathing will become less of a challenge eventually. Some research suggests that yoga, an exercise regimen that emphasises better breathing patterns, may improve lung function (15). Raghavendra P et al demonstrated, via their research on the effects of yoga on body composition and cardiovascular health, the comprehensive character of yoga regimens. Yoga can promote lung health because it is a full-body activity that includes the airways. Improved lung function could be a side effect of this all-encompassing approach to health. Yoga greatly enhances lung function, according to a research study. Reducing inflammation, strengthening respiratory muscles, and regulating autonomic function are just a few of the numerous mental and physical health benefits of yoga. Incorporating yoga into holistic respiratory health programmes and developing individualised yoga treatments for respiratory diseases requires an in-depth understanding of these systems. The following paragraphs elaborate on the possible therapeutic applications of these results and our suggestions for further study.

Discussion

Summary of Key Findings

The results of this review suggest that yoga, particularly pranayama techniques, can significantly improve pulmonary function in both healthy individuals and those with respiratory conditions. The consistent improvements in FVC, FEV1, and PEFR across diverse studies indicate that yoga has a measurable impact on respiratory health. The findings also highlight that yoga's benefits are not limited to those with chronic conditions but extend to healthy individuals, suggesting its utility as both a preventive and therapeutic tool.

Physiological Mechanisms

The improvements in pulmonary function associated with yoga can be attributed to several physiological mechanisms. Yoga practices, especially pranayama, emphasize controlled breathing and muscle engagement, which likely enhance respiratory muscle strength and lung capacity. Additionally, the anti-inflammatory effect of yoga is noted by (13) Agnihotri et al. It may contribute to improved airway function and reduced respiratory symptoms in individuals with chronic conditions. The reduction in systemic inflammation, coupled with the strengthening of respiratory muscles, creates a holistic improvement in lung function that is supported by the findings of this review.

Implications for Clinical Practice

The positive impact of yoga on pulmonary function has significant implications for clinical practice, particularly in the context of respiratory rehabilitation. Integrating yoga, especially pranayama, into standard care protocols for conditions like asthma, COPD, and other respiratory disorders could enhance patient outcomes. The review suggests that healthcare providers should consider incorporating personalized yoga interventions into treatment plans, particularly for patients who might benefit from a holistic approach to respiratory health. The evidence also supports the use of yoga as a preventive measure in healthy populations, potentially reducing the incidence of respiratory decline with age or inactivity.

Limitations and Future Research Directions

While the evidence supporting the benefits of yoga for pulmonary function is strong, there are several limitations that warrant consideration. The heterogeneity in study designs, populations, and yoga practices makes it challenging to generalize the findings across all contexts. Additionally, the long-term effects of yoga on pulmonary function remain underexplored, with most studies focusing on short to medium-term outcomes. Future research should aim to conduct long-term, randomized controlled trials that compare the effects of yoga with other forms of respiratory therapy. Additionally, studies should explore the molecular and cellular mechanisms underlying yoga's impact on pulmonary function to provide a more comprehensive understanding of how these practices influence respiratory health.

Conclusion

In conclusion, a review of the effects of yoga on pulmonary function in a variety of populations has revealed an overall positive trend. The incorporation of pranayama and yoga into one's routine can improve breathing for anyone, COPD or not, among other health advantages. According to the results, yoga could potentially serve as a comprehensive strategy for enhancing respiratory health. In addition to its physiological and psychological advantages for pulmonary function, yoga promotes mental health and a harmonious mind-body connection. This comprehensive approach aligns with the current trend in healthcare, which prioritizes patient-centered care and integrative medicine. Despite the encouraging data, there is still much to learn about the relationship between yoga and respiratory health. Although the reviewed studies provide a strong basis, further investigation is necessary to enhance methodologies, comprehend the enduring consequences, and formulate therapies tailored to specific populations. Novel and thrilling is the incorporation of yoga into clinical practice within the domain of respiratory medicine. The collaboration between healthcare providers and yoga practitioners will be critical for the continued development of the field of respiratory health to ensure a comprehensive and evidence-based approach.

References

1. Abel, A. N., Lloyd, L. K., & Williams, J. S. (2013). The effects of regular yoga practice on pulmonary function in healthy individuals: a literature

review. The Journal of Alternative and Complementary Medicine, 19(3), 185-190.
2. Singh, N., Deka, S., Saraswati, P., Sindhwani, G., Goel, A., & Kumari, R. (2023). The effect of yoga on pulmonary function in patients with asthma: A meta-analysis. Complementary Therapies in Clinical Practice, 50, 101682.
3. Parikh, H. N., Patel, H. M., Pathak, N. R., & Chandwani, S. (2014). Effect Of Yoga Practices On Respiratory Parameters In Healthy Young Adults. National Journal of Integrated Research in Medicine, 5(3).
4. Yamamoto-Morimoto K, Horibe S, Takao R, Anami K. Positive effects of yoga on physical and respiratory functions in healthy inactive middle-aged people. Int J Yoga. 2019; 12(1):62.
5. Kupershmidt S, Barnable T. Definition of a yoga breathing (pranayama) protocol that improves lung function. Holist Nurs Pract. 2019; 33(4):197-203.
6. Panchal B, Tawadia B. Comparison between effects of yoga and aerobic exercise on pulmonary function and physical fitness among young healthy females. J Soc Indian Physiother. 2019; 3(1):1-5.
7. Manna I. Study the influence of yoga on body composition and cardio-pulmonary functions on healthy female volunteers. Int J Physiol. 2019; 4:106-110.
8. Budhi, R. B., Payghan, S., & Deepeshwar, S. (2019). Changes in lung function measures following Bhastrika Pranayama (bellows breath) and running in healthy individuals. International journal of yoga, 12(3), 233.
9. Özer, Z., Turan, G. B., & Aksoy, M. (2021). The effects of yoga on dyspnea, sleep and fatigue in chronic respiratory diseases. Complementary therapies in clinical practice, 43, 101306.
10. Yüce, G. E., & Taşcı, S. (2020). Effect of pranayama breathing technique on asthma control, pulmonary function, and quality of life: A single-blind, randomized, controlled trial. Complementary Therapies in Clinical Practice, 38, 101081.
11. Bhagel P, Saha M. Effects of yogic intervention on pulmonary function and respiratory muscle strength parameters: A systematic literature review and meta-analysis. J Biosci. 2021; 46(3):76.
12. Kaminsky DA, Guntupalli KK, Lippmann J, Burns SM, Brock MA, Skelly J, Hanania NA. Effect of yoga breathing (pranayama) on exercise tolerance in patients with chronic obstructive pulmonary disease: a randomized, controlled trial. J Altern Complement Med. 2017; 23(9):696-704.
13. Agnihotri S, Kant S, Kumar S, Mishra RK, Mishra SK. The assessment of effects of yoga on pulmonary functions in asthmatic patients: A randomized controlled study. J Med Soc. 2016; 30(2):98-102.
14. Turan GB, Tan M. The effect of yoga on respiratory functions, symptom control, and life quality of asthma patients: A randomized controlled study. Complement Ther Clin Pract. 2020; 38:101070.
15. Raghavendra P, Shetty P, Shetty S, Manjunath NK, Saoji AA. Effect of high-frequency yoga breathing on pulmonary functions in patients with asthma: A randomized clinical trial. Ann Allergy Asthma Immunol. 2016; 117(5):550-551.

*****