

## REVIEW ARTICLE

# Yoga in Lung Cancer Care: A Scoping Review of Randomized Clinical Trials and Outcomes

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### ABSTRACT

**Background:** Lung cancer, a leading cause of cancer-related morbidity and mortality worldwide, necessitates innovative therapeutic approaches to enhance patient outcomes. Yoga, an ancient practice with multifaceted benefits, has shown promise in cancer care but remains underexplored in lung cancer.

**Methods:** This scoping review focused on randomized trials from 2014 to 2023, examining yoga interventions in lung cancer care. We conducted a comprehensive literature search across PubMed, Cochrane, Embase, and CINAHL. The selection involved screening for relevance and detailed data extraction on study characteristics.

**Results:** The review identified three studies that met the inclusion criteria, highlighting notable benefits such as short-term pulmonary enhancements, significant physical and social function improvements for patients and caregivers, and perioperative benefits such as reduced dyspnea and anxiety.

**Conclusion:** Preliminary evidence suggests yoga could be a valuable adjunct therapy in lung cancer treatment. However, the heterogeneity in study designs and small sample sizes highlight the need for further, more rigorous research to establish standardized yoga protocols for lung cancer care.

## 1. INTRODUCTION

Lung cancer is a significant global health concern that results in high morbidity and mortality rates. According to the 2018 global cancer statistics, lung cancer accounts for 1.6% of total cancer cases and 18.4% of total cancer deaths worldwide.<sup>[1]</sup> In 2020, lung cancer was identified as the foremost cause of morbidity and mortality among all malignancies in men. Recent data from 2020 suggest that globally, there were 2,206,771 new cases and 1,796,144 deaths related to lung cancer, representing approximately 11.4% and 18.0% of all cancer cases, respectively.<sup>[2,3]</sup>

The specific mortality rates associated with lung cancer have exhibited varying trends over time. In nations such as the United States, the United Kingdom, and Denmark, where the tobacco epidemic began early, lung cancer mortality rates among men have been decreasing but at the same time, they have plateaued among women.<sup>[2]</sup> It is worth noting

that in recent years, the decline in lung cancer mortality rates have accelerated significantly, with an overall reduction in cancer mortality rates attributed to advances in the treatment and management of lung cancer.<sup>[4-6]</sup>

Yoga, an ancient tradition rooted in Indian culture for over 5000 years, is a comprehensive system that includes physical postures, breath control, meditative practices, and ethical principles designed to harmonize the body, mind, and spirit.<sup>[7]</sup> “Yoga” comes from the Sanskrit word “Yuj,” meaning the union or integration of individual consciousness with universal consciousness, highlighting its profound spiritual essence. This discipline has been revered for its physical and mental benefits, including promoting mental clarity, emotional resilience, and spiritual connectedness. The multifaceted nature of yoga, combining ethical guidelines with physical and meditative practices, offers a holistic approach to well-being, influencing neuro-psycho-physiological mechanisms and promoting overall health.<sup>[8-10]</sup> Over recent decades, the increasing adoption of yoga in Western cultures underscores its versatility and recognition as a valuable adjunct therapy for various health conditions, reflecting its enduring relevance and universal appeal across diverse cultural landscapes.<sup>[10-17]</sup>

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Extensive research has demonstrated the multifaceted benefits of yoga in cancer care, particularly for breast cancer patients. Studies and meta-analyses have shown significant improvements in psychological health, physical well-being, and quality of life (QOL).<sup>[18-22]</sup> These benefits extend to managing symptoms and side effects of cancer treatment.<sup>[23,24]</sup> The endorsement of yoga by oncological societies further validates its efficacy in symptom management, positioning yoga as a valuable complement to conventional cancer therapies.<sup>[25,26]</sup>

### 1.1. Objective

Given the prevalent evidence supporting yoga's benefits in breast cancer and the noticeable gap in literature for lung cancer, this review aims to specifically investigate the effects of yoga interventions in lung cancer patients. By focusing exclusively on randomized trials conducted within this demographic from 2014 to 2023, the review seeks to synthesize available evidence, assess the impact of yoga on physical, psychological, and QOL outcomes in lung cancer patients, and identify directions for future research in this underexplored area.

## 2. METHODS

Our methodology encompassed an extensive literature review across databases such as PubMed, Cochrane, Embase, and CINAHL, targeting studies on the impact of yoga in lung cancer patients. We focused exclusively on randomized trials published in English from 2014 to 2023, incorporating yoga interventions. Exclusions were made for conference proceedings and abstract-only studies. The selection process involved screening for relevance through titles, abstracts, and full texts, followed by detailed data extraction on study characteristics including sample size, design, interventions, controls, and outcomes.

## 3. RESULTS

The literature search identified three studies that fit the inclusion criteria. The studies employed a randomized controlled trial design to explore different aspects of yoga's impact, ranging from preoperative pulmonary function enhancement to the overall well-being of patients and their caregivers during treatment. Here, we discuss the summary and outcome analysis of the studies.

Barassi *et al.* explored the potential of yoga breathing (YB) exercises as a pre-operative intervention for lung cancer patients who were active smokers and candidates for pulmonary surgery.<sup>[27]</sup> The study involved 32 participants, randomly assigned to either a standard breathing exercise group or a YB group, with evaluations conducted at baseline and after a 7-day intervention period. The objective was to assess the impact of YB on pulmonary performance in a pre-surgical context. Utilizing a self-calibrating computerized spirometer and portable pulse oximetry, the researchers observed notable short-term enhancements in lung function among the YB group. These findings suggest that YB exercises could serve as an effective preoperative adjunct, potentially improving surgical outcomes by enhancing pulmonary capacity.

In their study Milbury *et al.* investigated the efficacy of a dyadic yoga (DY) program involving patients with stage I to III non-small cell lung or esophageal cancer undergoing thoracic radiotherapy (TRT) and their caregivers.<sup>[28]</sup> The randomized controlled trial, which included 26 dyads, aimed to assess the feasibility and preliminary effects of the yoga intervention on QOL and physical function. Participants were randomized to either the 15-session DY program or a waitlist control group, with assessments conducted prior to TRT, at the end of TRT, and 3 months later. The study met its predefined feasibility criteria, with

significant adherence and retention rates. Notably, patients in the DY group exhibited significant improvements in the 6-minute walk test and SF-36 measures of physical and social function compared to controls. Caregivers in the DY group also reported marginal improvements in vitality and role performance. These findings underscore the potential of DY as a supportive care strategy, enhancing both patient and caregiver well-being during TRT.

Lu *et al.* investigated the efficacy of YB exercises, both standalone and combined with a problem-solving model, in a randomized controlled trial involving 108 lung cancer patients undergoing surgical resection.<sup>[29]</sup> The study aimed to assess the impact of these interventions on perioperative outcomes such as dyspnea, exercise capacity, anxiety, depression, and the post-operative period of thoracic drainage tube indwelling. The findings revealed that participants in the combined intervention group experienced significantly greater improvements in dyspnea, exercise capacity, and anxiety compared to those receiving usual care. While YB exercises alone were effective in reducing dyspnea and anxiety, the addition of a problem-solving model further enhanced exercise capability and compliance. However, no significant differences were observed in depression levels or the duration of thoracic drainage tube indwelling across the groups. These results suggest that YB exercises, particularly when augmented by problem-solving strategies, offer a valuable pulmonary rehabilitation approach for enhancing perioperative outcomes in lung cancer patients' post-surgery.

## 4. DISCUSSION

The reviewed studies provide significant insights into the use of yoga as a therapeutic approach for lung cancer patients, especially during the preoperative and treatment phases. These studies, which used randomized controlled methodologies, demonstrate that yoga offers numerous benefits, such as improved pulmonary function, enhanced QOL, and better psychological well-being.

Barassi *et al.*'s study, which focused on YB exercises as a preoperative intervention, highlights the potential of such practices to enhance pulmonary performance.<sup>[27]</sup> This indicates that YB can improve lung capacity, contributing to better surgical outcomes. The study's findings suggest that YB exercises can provide short-term benefits, even within a week, making it a viable preoperative support for lung cancer patients.

The DY program evaluated by Milbury *et al.* further expands the scope of yoga's benefits, demonstrating significant improvements in patients' physical and social functions and caregivers' vitality and role performance.<sup>[28]</sup> The study shows that yoga positively impacts the individual and their support network, highlighting the importance of integrated care in cancer treatment.

Lu *et al.*'s investigation into YB exercises, both in isolation and with a problem-solving model, reveals significant enhancements in perioperative outcomes such as dyspnea, exercise capacity, and anxiety.<sup>[29]</sup> The added benefit of the problem-solving model suggests that cognitive-behavioral elements may amplify the efficacy of YB, offering a comprehensive approach to managing the multifaceted challenges faced by lung cancer patients undergoing surgery.

The utilization of Mindfulness-Based Interventions (MBIs), which encompasses practices such as meditation, yoga, and breathing exercises, has been studied for their potential usefulness in lung cancer care. A systematic review conducted by the McDonnell team

examined the effectiveness of MBIs in improving the QOL and managing the symptoms of lung cancer survivors and their partners, revealing promising outcomes.<sup>[30]</sup> This broader approach to MBIs aligns with the specific findings from our review, which focused on yoga, demonstrating that yoga, as a foundational component of MBIs, significantly enhances the well-being of those with lung cancer. The synergy between the targeted benefits of yoga and the holistic impact of MBIs highlights the potential of integrative therapies in cancer care.

Although these studies have evaluated the effectiveness of yoga interventions in patients with lung cancer, there is significant heterogeneity in the methods, patient populations, and outcome measures, making direct comparisons of results complex and standardized yoga protocols for lung cancer care challenging to formulate. The broad applicability of yoga interventions is evident from the diversity observed in the studies; however, these variations complicate the interpretation of results. Furthermore, these studies have several limitations, including small sample sizes, short intervention durations, and a need for long-term follow-up, which restricts the generalization of findings. To establish guidelines based on rigorous evidence for the inclusion of yoga in lung cancer treatment plans, it is recommended that future research focus on conducting larger, methodologically sound trials with standardized yoga interventions to validate the preliminary findings. Such research endeavors will help to bridge the existing knowledge gap and provide a more comprehensive understanding of the potential benefits of incorporating yoga into lung cancer treatment plans.

## 5. CONCLUSION

The preliminary trials conducted till now have exhibited promising outcomes for using yoga as a supplementary treatment for lung cancer patients. Yoga can enhance patients' physical, psychological, and QOL outcomes. Nevertheless, it is imperative to conduct further research to ascertain the optimal types, durations, and intensities of yoga interventions that could deliver maximum benefits to lung cancer patients at varying stages of their treatment and recovery trajectory.

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Nil.

## 8. ETHICAL APPROVALS

This study does not require ethical clearance as it is a review study.

## 9. CONFLICTS OF INTEREST

Nil.

## 10. DATA AVAILABILITY

This is an original manuscript, and all data are available for only review purposes from the principal investigators.

## 11. PUBLISHERS NOTE

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