



## Reframing respiratory health through yogic practices: An integrative approach

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### Abstract

Respiratory health is foundational to overall well-being, yet it is increasingly compromised by environmental pollutants, lifestyle stressors, and chronic respiratory conditions such as asthma and chronic obstructive pulmonary disease (COPD). Modern medical interventions, while effective, often focus on symptomatic relief rather than holistic prevention and rehabilitation. This paper explores an integrative approach to respiratory health through the lens of yogic practices, including asanas (postures), pranayama (breathing techniques), and meditation. The paper analyzes how yogic practices enhance lung function, improve autonomic balance, reduce systemic inflammation, and support psychological resilience, drawing evidence from clinical and physiological studies. This paper reviews recent research demonstrating the efficacy of yoga in reducing airway resistance, increasing vital capacity, and improving quality of life in individuals with respiratory disorders. By synthesizing traditional yogic wisdom with contemporary scientific understanding, this study proposes a reframed, preventive, and complementary model for promoting respiratory health. The findings advocate for the incorporation of structured yogic modules into public health programs and clinical protocols, especially in respiratory rehabilitation and preventive care.

**Keywords:** Respiratory Health, Yogic practices, Asana, Pranayama, Meditation, lung function, inflammatory markers, Environmental stressors

### Introduction

#### Background

Respiratory health refers to the optimal functioning of the respiratory system, allowing us to breathe effortlessly and efficiently. It's more than just the absence of disease" it's about having strong respiratory components like nose, throat, lungs, airway, accessory muscles that can support an active life and overall well-being. This intricate system serves as the primary gateway for oxygen intake and carbon dioxide removal. This continuous exchange of gasses, known as respiration, is essential for sustaining life and ensuring the proper functioning of every cell of the body.

Maintaining good respiratory health is paramount to overall well-being. When our respiratory system functions optimally, we breathe effortlessly, our bodies receive a constant supply of oxygen, and we are able to engage in a wide range of activities without experiencing any discomfort. When we breathe well, we have more energy, sleep better, and are less likely to develop other health problems. It allows one to enjoy physical activity, engage in hobbies, and live life to the fullest without being limited by breathing problems.

Factors like air quality (Pollutants), infections (Pneumonia, Influenza, Tuberculosis etc), allergens (Pollen, Dust mites, Mold, Pet Dander etc), irritants and occupational hazards (Chemical Fumes, asbestos, silica etc.) can affect the respiratory health (Padilla *et al.*, 2010) [19]. These factors are major concerns to respiratory health especially in metropolitan cities due to bad air quality and excessive industrial activities (Nidhi & Jayaraman, 2007) [16]. When respiratory health is compromised it can lead to symptoms like shortness of breath, wheezing, rapid breathing, coughing, fatigue, chest tightness, increased mucus

production and frequent respiratory infections (Waugh *et al.*, 2001) [23].

Compromised respiratory health can significantly impact our quality of life. Reduced lung function can limit endurance and make physical activities, even simple ones like walking or climbing stairs, more challenging (Juniper, 1998) [11]. This can lead to a more sedentary lifestyle. Everyday chores, such as cleaning or cooking, may become exhausting or overwhelming. This can affect independence and self-sufficiency. Conditions like asthma or sleep apnea can disrupt sleep patterns, leading to fatigue, poor concentration, and decreased overall quality of life.

#### Need for Reframing

Respiratory illnesses, ranging from the common cold to chronic conditions like asthma and chronic obstructive pulmonary disease, can hinder breathing, limit physical activity, and increase susceptibility to other health problems. It is, therefore, crucial to explore and implement effective strategies to optimize respiratory health and mitigate the impact of respiratory ailments.

To resolve this problem in modern medicine i.e., allopathy has made remarkable strides in the management of respiratory diseases, significantly improving both diagnosis and treatment options. But it can focus on symptom suppression, using medications like bronchodilators, corticosteroids, or antibiotics to manage acute episodes of disease (Lenfant & Taggart, 1999) [13]. While these interventions are crucial for controlling immediate symptoms, they often fail to address the underlying causes of chronic respiratory dysfunction or promote long-term resilience of the respiratory system. Also, the traditional treatment comes with potential side effects like long term

use of medications leads to weight gain, tremors, increased heart rate, palpitations, anxiety, nausea, headache, dizziness and over reliance on medications (Leung *et al.*, 2017) <sup>[14]</sup>.

Hence an alternative approach is requisite with a broader perspective to subside the potential risks of modern medicine as well as to improve the convalescence period and the quality of life of the individual. It involves individual responsibility for lifestyle choices, advocating for healthier environments, and potentially exploring complementary approaches alongside conventional care.

### Yoga: An Integrative Solution

One such complementary approach that has gained attention for its potential benefits to respiratory health is the ancient art of yoga which offers a holistic approach to well-being that encompasses physical, mental, and spiritual aspects (Madan *et al.*, 2022). Yoga, with its emphasis on breath control (pranayama), physical postures (asanas), and meditation, has been increasingly recognized for its potential to boost respiratory health and mitigate the impact of respiratory disorders (Agnihotri *et al.*, 2008) <sup>[2]</sup>. Its holistic design offers simultaneous benefits to the respiratory, psychological, and physiological systems (Gard *et al.*, 2014), making it a powerful tool in the pursuit of overall well-being, particularly in the domain of respiratory health (Agnihotri *et al.*, 2008) <sup>[1]</sup>.

The goal of this article is to synthesize the existing scientific evidence on how yogic practices, including physical postures, breath control, and meditation, can improve respiratory health and effectively manage a variety of respiratory conditions, thereby providing a comprehensive understanding of this holistic approach to respiratory well-being.

### Conceptual Framework

#### Respiratory Health

Respiratory health refers to the optimal functioning of the organs and systems involved in breathing—primarily the lungs, airways, respiratory muscles, and the nervous system that regulates them. It encompasses both physical capability (e.g., adequate lung capacity, clear airways) and functional adaptability (e.g., the ability to breathe efficiently under different conditions, such as stress or exercise).

#### Dimensions of Respiratory Health

Factors which affects the respiratory health are categorized as

- Physiological- Lung capacity and Elasticity, Respiratory muscle strength, Regulation of Nervous system, Airway resistance and patency.
- Psychological - Stress, Anxiety, Depression, Fear.
- Environmental - Air Quality, Climate and altitude and Exposure to pathogens.
- Lifestyle - Smoking, Physical activity, Posture and mobility, Nutrition.
- Demographic - Age, Gender, Ethnicity
- Socioeconomic - Income, Education, Healthcare access

### Multidimensional mechanism of yoga

#### a. Physiological regulation

Yoga, an ancient Indian practice, encompasses physical postures (asanas), breathing techniques (pranayama), and meditation. These practices are known to improve the

physiology of the respiratory system. It includes following physiological changes -

#### Improvement in Lung Compliance

Various studies have found that chest opening asanas and deep breathing pranayama enhances the respiratory musculature, enabling the chest and lungs to expand and deflate to their utmost capacity, hence maximising muscular engagement. It further strengthens respiratory muscles, improves chest expansion which can contribute to better respiratory function (Joshi *et al.*, 1992) <sup>[10]</sup>.

#### Improvement in Pulmonary Functions

The study conducted on 100 subjects of age group 20-40yrs, practicing yoga (asana, pranayama and meditation) found that pulmonary functions were improved after practicing yoga for 60 min/day for 6 months. The yoga group shows significant improvement in Vital capacity, forced expiratory lung volume, Peak expiratory flow rate (PEFR) and Breath Holding Time (BHT) which indicates the overall development of Pulmonary functions (Vedala *et al.*, 2014) <sup>[22]</sup>.

#### Anti-Inflammatory and Immune Modulating Effect

The study postulated that regular practice of yoga reduces chronic inflammation and enhances immune surveillance by modulating cytokine profiles (e.g., IL-6, TNF- $\alpha$ ). Thus potentially influencing the immune system to fight with the infections or reducing/preventing the auto-immune reactions within the body (KIECOLT-GLASER *et al.*, 2010) <sup>[12]</sup>.

#### Improves oxygen saturation

Yoga can positively influence oxygen saturation levels in the body, particularly through its focus on breathing techniques (pranayama), relaxation, and physical postures (asanas). Oxygen saturation is the percentage of oxygen bound haemoglobin (oxygen bound haemoglobin) in the blood which indicates how well the oxygen is delivered to the bodily tissues. Practices like deep diaphragmatic breathing, alternate nostril breathing (nadi shodhana), and ujjayi breathing increase the amount of air reaching the lungs which enhances alveolar gas exchange, potentially improving oxygen saturation (SpO<sub>2</sub>) levels, especially in individuals with shallow or inefficient breathing (Catela *et al.*, 2024) <sup>[6]</sup>.

#### b. Psychological Modulation

Yoga offers a holistic approach to respiratory health by addressing the psychological factors that influence breathing and lung function. It includes the following psychological changes -

#### Reduction in Anxiety and Depression

There is a natural tendency of change in breathing pattern when the body goes into any psychological disequilibrium. Mind and breathing patterns are correlated. Yogic practices such as Pranayama and Meditation have shown to alleviate anxiety and depression, which further brings the breathing into equilibrium. A randomized controlled trial demonstrated that yogic breathing (Pranayama) and relaxation (Meditation) significantly improved anxiety and depression scores in young adults with bronchial asthma over a 90-day period (Sangeethalaxmi & Hankey, 2023) <sup>[21]</sup>.

### Improvement in Emotional Regulation

Yoga supports self regulation which means the ability to manage one's thoughts, emotions, and behaviours in all situations whether they are favourable or unfavourable. Bhagwad gita (2.48) states that "To remain in equanimity is yoga". Individuals who practice yoga daily have shown to manage their emotions mindfully. Pranayama regulates the activity of brain areas associated with emotional processing, specifically the amygdala, anterior cingulate, anterior insula, and prefrontal cortex (Novaes *et al.*, 2020) [17].

### Enhanced Sleep Quality and Reduced Fatigue

Mental fatigue and sleep quality are inter-related to each other. One affects the other. Continuous and ceaseless thoughts lead to mental and physical exhaustion. Regular yogic practices such as Pranayama and Meditation focuses the mind on breath instead of unwanted thoughts which calms the mind, reduces stress, brings mental clarity, improves relaxation and promotes restful sleep (Özer *et al.*, 2021) [18].

### c. Environmental Adaptability

Environmental adaptability of yoga refers to the way yoga modifies the human body's and mind's capacity to cope with and thrive under various environmental stressors such as climate, air quality, varying temperatures, altitude etc.

### Adaptation to Environmental Stressors

Environmental stressors like Air Quality, Allergens, Higher Altitude and extreme cold also produce stress in the individual and influence the homeostasis. Yogic practices have emerged as a powerful tool for enhancing respiratory resilience and maintaining overall health. Yogic practices like Pranayama (breathing techniques) like Nadi shodhana, Sheetal, Sheekari, Bhastrika and Kapalhati helps the body to adapt to altitudes, extreme temperatures by promoting oxygen utilisation and CO<sub>2</sub> tolerance. Regular practice of yoga develops resistance to allergens by modulating inflammatory markers and enhancement of mucosal immunity (Mishra *et al.*, 2024) [15].

### d. Lifestyle Adaptation

Yoga is not a therapy. It's a way of living which includes living in moderation, following some rules and adopting a healthy lifestyle. It -

### Encourages a Healthy Lifestyle

Yoga promotes a healthy lifestyle such as sobriety (Non-smoking) (Behr & Nowak, 2002) [4], sattvic diet in moderation (Das *et al.*, 2023) [8] (Wypych *et al.*, 2017) [24], regular exercise (asana) (JOSHI *et al.*, 1992) [9] and proper sleep (Beltrán *et al.*, 2025) [5], all these factors support the healthy respiratory system.

### Improves Posture and Mobility

Poor body posture can significantly impact breathing patterns. Slouching (hunch back) and forward head position can restrict chest expansion and diaphragm movement, leading to shallow, faster breathing (Baydur *et al.*, 1987) [3]. Yogic practices like Asana improves the body posture which allows optimal diaphragm function and efficient breathing. Insufficient body mobility reduces the muscle mass and its flexibility which limits the functions of diaphragm and intercostal muscles. Pranayama (Yogic

breathing) enhances muscle movement. leading to improved range of motion by consciously engaging in diaphragmatic breathing, individuals can increase the movement of the diaphragm and rib cage (Catela *et al.*, 2024) [7].

### Enhance Sleep Quality

Sleep plays a critical role in maintaining overall health. Both the quantity and quality of sleep are essential for optimal health and performance. Disruptions in sleep can adversely affect respiratory systems, leading to or exacerbating conditions such as asthma, chronic obstructive pulmonary disease (COPD), and sleep-disordered breathing. Integrating yogic practices like pranayama and meditation reduces stress, promotes relaxation and enhances sleep quality (Phillips *et al.*, 1989) [20].

### e. Socioeconomic Accessibility

#### Universal Accessible and Low-Cost

Yoga is affordable and adaptable to different populations, regardless of age, gender, or socioeconomic background. This makes it an inclusive intervention for improving respiratory health at both individual and community levels.

### Conclusion

Yoga provides a multifactorial therapeutic intervention that supports respiratory health by Enhancing physiological function, regulating psychological states, improving adaptation to environmental and lifestyle-related stressors and Empowering individuals across all demographic groups By addressing the root causes and holistic experience of breathing, yoga moves beyond symptom control to offer a sustainable model for respiratory well-being.

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