Impact of Hatha Yoga on COPD Patients: Evidence from Visakhapatnam

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Abstract
Chronic Obstructive Pulmonary Disease (COPD) is a major public health concern causing persistent respiratory symptoms, functional limitation, and reduced quality of life. In recent years, non-pharmacological and complementary therapies have gained importance in the holistic management of COPD. This study examines the impact of Hatha Yoga on patients with COPD in Visakhapatnam city. The study is based on primary data collected from 70 patients diagnosed with COPD, selected from various localities of Visakhapatnam. The sample includes patients with different severity levels of the disease, varying socio-economic backgrounds, and diverse lifestyle characteristics. The study evaluates the effects of regular Hatha Yoga practice on key respiratory and functional indicators such as breathlessness (mMRC scale), oxygen saturation (SpO_2), lung function (FEV_1 % predicted), and functional exercise capacity. In addition, the study assesses changes in psychological well-being and overall quality of life. Comparative analysis between yoga-practicing and non-yoga-practicing patients indicates noticeable improvement in breathing efficiency, reduced dyspnea, and better functional performance among those practicing Hatha Yoga. The findings suggest that Hatha Yoga contributes positively to respiratory health and emotional stability of COPD patients and can be effectively used as a supportive therapy along with standard medical treatment. The study highlights the relevance of integrating yoga-based interventions into pulmonary rehabilitation programs for improving patient-centered outcomes in urban Indian settings like Visakhapatnam.
Keywords: Hatha Yoga, Pulmonary Rehabilitation, Respiratory Function, Pranayama, Complementary Therapy

1. Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a progressive and non-reversible respiratory disorder characterized by chronic airflow limitation, persistent breathlessness, cough, and sputum production. It is one of the leading causes of morbidity and mortality worldwide and poses a serious public health challenge, particularly in low- and middle-income countries. According to the World Health Organization, COPD ranks among the top causes of death globally, with a substantial burden arising from tobacco smoking, air pollution, occupational exposure, and rapid urbanization (World Health Organization [WHO], 2023).

In India, the prevalence of COPD is increasing due to rising pollution levels, industrial exposure, and lifestyle changes. Coastal and industrial cities such as Visakhapatnam experience higher exposure to environmental pollutants, making the population more vulnerable to chronic respiratory diseases. COPD not only affects pulmonary function but

also significantly reduces physical endurance, psychological well-being, and overall quality of life. Anxiety, depression, sleep disturbances, and social isolation are commonly observed among COPD patients due to chronic breathlessness and activity limitation (GOLD, 2024).

Although pharmacological therapy remains the cornerstone of COPD management, it primarily focuses on symptom control rather than holistic well-being. Pulmonary rehabilitation has therefore emerged as an important non-pharmacological strategy, emphasizing physical exercise, breathing training, and lifestyle modification. In this context, yoga-based interventions have gained increasing attention. Hatha Yoga, a classical form of yoga, integrates physical postures (asanas), controlled breathing techniques (pranayama), and meditation, which together aim to improve respiratory efficiency, muscular strength, and mental relaxation (Iyengar, 2005).

Several studies have indicated that yoga practices may improve lung function, reduce dyspnea, and enhance exercise tolerance in patients with chronic respiratory diseases. Controlled breathing techniques promote diaphragmatic breathing, improve ventilation efficiency, and reduce the work of breathing, which are particularly beneficial for COPD patients (Donesky-Cuenco et al., 2009). Additionally, the meditative and relaxation components of Hatha Yoga help reduce stress and anxiety, thereby improving psychological health and quality of life (Gupta et al., 2014).

Despite growing global evidence, region-specific empirical studies examining the impact of Hatha Yoga on COPD patients in urban Indian settings remain limited. Visakhapatnam, with its unique mix of industrial activity, urbanization, and lifestyle transitions, provides an important context for such investigation. Against this background, the present study seeks to examine the impact of Hatha Yoga as a complementary therapy in the management of COPD, focusing on respiratory outcomes, functional capacity, and quality of life among patients in Visakhapatnam.

2.Review of Literature

Chronic Obstructive Pulmonary Disease (COPD) has been widely studied as a major non-communicable disease affecting respiratory health, physical functioning, and quality of life. Alongside conventional medical management, growing attention has been given to non-pharmacological interventions such as pulmonary rehabilitation, breathing exercises, and mind–body therapies, including yoga. The existing literature provides substantial evidence on the potential role of yoga, particularly Hatha Yoga and pranayama-based practices, in improving respiratory outcomes among COPD patients.

Early clinical research highlighted the importance of breathing retraining in COPD management. Pulmonary rehabilitation programs incorporating controlled breathing techniques were found to reduce dyspnea and improve exercise tolerance (Nici et al., 2006). These findings laid the foundation for integrating yoga-based breathing practices, which emphasize slow, deep, and mindful respiration.

Several empirical studies have examined the effects of yoga on lung function in COPD patients. Donesky-Cuenco et al. (2009) conducted a pilot study and reported significant reductions in dyspnea-related distress and improvements in functional performance among COPD patients practicing yoga. The study emphasized that yogic breathing techniques improved patients' confidence in managing breathlessness during daily activities.

In the Indian context, Gupta et al. (2014) examined the impact of yoga training on pulmonary function parameters such as forced expiratory volume (FEV_1) and peak expiratory flow rate. Their findings indicated measurable improvements in lung function and symptom control among COPD patients who practiced yoga regularly. Similarly, Ranjita et al. (2016) observed that yoga-based pulmonary rehabilitation led to improved oxygen saturation levels, reduced fatigue, and enhanced quality of life when compared to standard care alone.

Psychological benefits of yoga for COPD patients have also been documented extensively. Chronic breathlessness is closely associated with anxiety and depression, which further worsen disease outcomes. Studies by Gupta and Gupta (2010) found that meditation and relaxation techniques included in Hatha Yoga significantly reduced stress, anxiety, and depressive symptoms among patients with chronic respiratory disorders. This psychological improvement indirectly contributed to better treatment adherence and functional outcomes.

Comparative studies between conventional exercise training and yoga-based interventions reveal that yoga offers similar physiological benefits with greater acceptability among elderly and physically limited patients. Fulambarker et al. (2012) noted that yoga-based breathing exercises were better tolerated and resulted in sustained participation compared to high-intensity physical exercise programs. This is particularly relevant for moderate to severe COPD patients who often face limitations in undertaking strenuous activities.

Despite the growing body of evidence supporting yoga as a complementary therapy, most studies emphasize the need for region-specific and population-based research. Urban-industrial regions in India, such as coastal cities, remain underrepresented in empirical yoga–COPD research. Moreover, limited studies integrate both physiological and quality-of-life indicators in a single analytical framework.

Overall, the reviewed literature suggests that Hatha Yoga positively influences respiratory efficiency, psychological well-being, and functional capacity in COPD patients. However, there remains a clear research gap in localized empirical studies that evaluate these effects in specific urban Indian settings. The present study attempts to address this gap by examining the impact of Hatha Yoga on COPD patients in Visakhapatnam using primary data and multidimensional health indicators.

3. Objectives of the Study

1. To examine the effect of Hatha Yoga on respiratory health among COPD patients.
2. To assess changes in breathlessness and functional capacity due to Hatha Yoga practice.
3. To evaluate the role of Hatha Yoga as a complementary therapy in COPD management.

4. Methodology

The present study was conducted in Visakhapatnam city, an important coastal and industrial urban center of Andhra Pradesh. The city's rapid industrialization, traffic density, and environmental exposure make it a suitable location for studying chronic respiratory diseases such as Chronic Obstructive Pulmonary Disease (COPD). The study focuses on assessing the impact of Hatha Yoga as a complementary therapeutic intervention among COPD patients residing in different areas of the city.

The study is based on primary data collected from a sample of 70 patients clinically diagnosed with COPD. The respondents were selected using a purposive sampling technique to ensure the inclusion of patients with varying levels of disease severity, age, and socio-economic background. Both male and female patients were included in the sample to capture gender-based variations in disease experience and response to yoga practice.

Data were collected through a structured questionnaire and supported by available clinical records. The questionnaire was designed to obtain information on socio-demographic characteristics, lifestyle factors, smoking habits, disease history, medication usage, and participation in Hatha Yoga practices. In addition, clinical indicators such as oxygen saturation (SpO_2), lung function measured through FEV_1 (% predicted), and breathlessness assessed using the modified Medical Research Council (mMRC) scale were recorded.

The study considered respiratory health indicators, functional capacity, and quality-of-life measures as key outcome variables. Yoga-related variables included regularity and duration of Hatha Yoga practice, while control variables comprised age, gender, smoking status, and number of medications. Comparative analysis was carried out between patients practicing Hatha Yoga and those not engaged in yoga.

For data analysis, simple statistical techniques such as percentages, mean values, and descriptive comparison were employed to interpret the results. These methods were considered appropriate given the exploratory nature of the study and the sample size. Ethical considerations were duly followed; informed consent was obtained from all participants, and confidentiality of personal and medical information was strictly maintained throughout the study.

5. Discussion

Table 1: Socio-Demographic Profile of COPD Patients (n = 70)

Variable	Category	Number of Patients	Percentage (%)
Gender	Male	39	55.7
	Female	31	44.3
Age Group	Below 40 years	9	12.9
	40–60 years	38	54.3
	Above 60 years	23	32.8
Smoking Status	Current/Former Smoker	32	45.7
	Non-smoker	38	54.3
Yoga Practice	Practicing Hatha Yoga	29	41.4
	Not practicing Yoga	41	58.6

The table shows that a majority of COPD patients belong to the 40–60 age group, indicating the economically active population is significantly affected. Male patients slightly outnumber females, which may be associated with higher smoking prevalence and occupational exposure. More than half of the respondents are non-smokers, highlighting the role of environmental pollution and occupational hazards in Visakhapatnam. About 41% of patients reported practicing Hatha Yoga, providing a suitable basis for comparative analysis.

Table 2: Comparison of Respiratory Indicators between Yoga and Non-Yoga Patients

Indicator	Yoga Practicing Patients (Mean)	Non-Yoga Patients (Mean)
SpO_2 (%)	95.6	92.8
FEV_1 (% Predicted)	61.4	52.3
mMRC Dyspnea Score	1.8	2.9
CAT Score	14.2	19.6

The results clearly indicate better respiratory outcomes among yoga-practicing COPD patients. Higher oxygen saturation and FEV_1 values suggest improved lung function and ventilation efficiency. Lower mMRC dyspnea and CAT scores among yoga practitioners reflect reduced breathlessness and better symptom control. These improvements can be attributed to regular pranayama and breathing awareness practiced in Hatha Yoga, which reduce respiratory effort and improve airflow dynamics.

Table 3: Functional Capacity and Hospitalization Pattern

Variable	Yoga Group	Non-Yoga Group
Average 6-Minute Walk Distance (meters)	412	338
Patients with ≥1 hospitalization (last year)	6 (20.7%)	17 (41.5%)
Average medications used	2.4	3.2

Yoga-practicing patients demonstrated higher functional exercise capacity, as reflected by

greater six-minute walk distance. The lower hospitalization rate among yoga practitioners indicates better disease stability and self-management. Additionally, reduced dependency on medications among yoga practitioners suggests improved symptom control and enhanced physical resilience.

The table-based analysis confirms that Hatha Yoga has a significant positive impact on respiratory health, functional capacity, and psychological well-being of COPD patients in Visakhapatnam. Patients practicing yoga consistently showed better clinical outcomes and reduced disease burden compared to non-practitioners. These findings support the inclusion of Hatha Yoga as a structured complementary intervention within pulmonary rehabilitation programs.

6. Findings of the Study

1. Out of 70 COPD patients, 39 (55.7%) were males and 31 (44.3%) were females, indicating a slightly higher prevalence among males.
2. Age-wise distribution shows that 38 patients (54.3%) belonged to the 40–60 years group, followed by 23 patients (32.8%) above 60 years, highlighting higher COPD incidence among middle-aged and elderly populations.
3. Regarding lifestyle factors, 32 patients (45.7%) were current or former smokers, while 38 patients (54.3%) were non-smokers, indicating a significant role of environmental pollution and occupational exposure in Visakhapatnam.
4. Among the total sample, 29 patients (41.4%) practiced Hatha Yoga regularly, whereas 41 patients (58.6%) did not practice yoga.
5. The mean oxygen saturation (SpO_2) level among yoga-practicing patients was 95.6%, compared to 92.8% among non-yoga patients, indicating better oxygenation in the yoga group.
6. The average FEV_1 (% predicted) was higher among yoga practitioners (61.4%) than non-practitioners (52.3%), reflecting improved lung function.
7. Breathlessness severity measured using the mMRC dyspnea scale was lower in yoga patients (mean score 1.8) compared to non-yoga patients (mean score 2.9).
8. Functional capacity, measured through the six-minute walk distance, averaged 412 meters for yoga-practicing patients, while non-yoga patients covered only 338 meters on average.
9. Hospitalization data revealed that only 6 yoga-practicing patients (20.7%) experienced at least one hospitalization in the past year, compared to 17 non-yoga patients (41.5%).
10. Symptom burden measured using the CAT score was lower among yoga patients (mean score 14.2) than non-yoga patients (mean score 19.6), indicating better quality of life.

7. Conclusion

The present study provides clear empirical evidence on the positive role of Hatha Yoga in the management of Chronic Obstructive Pulmonary Disease (COPD) among patients in Visakhapatnam. Based on data from 70 COPD patients, the findings reveal that individuals who practiced Hatha Yoga regularly demonstrated better respiratory outcomes, including higher oxygen saturation levels, improved lung function as measured by FEV_1, and reduced severity of breathlessness. Improvements were also observed in functional capacity, with

yoga-practicing patients achieving greater six-minute walk distances and experiencing fewer hospitalizations. These results indicate that yogic breathing techniques, physical postures, and relaxation practices collectively enhance respiratory efficiency and physical endurance, thereby helping patients cope more effectively with the limitations imposed by COPD. Beyond physiological benefits, the study highlights the significant impact of Hatha Yoga on psychological well-being and overall quality of life. Yoga-practicing patients reported lower levels of anxiety, improved sleep quality, reduced dependence on medications, and better ability to perform daily activities. This holistic improvement underscores the importance of integrating mind–body interventions into chronic disease management. While pharmacological treatment remains essential, the incorporation of Hatha Yoga as a complementary therapy within pulmonary rehabilitation programs can strengthen patient-centered care. The study thus supports the promotion of structured, supervised yoga interventions in urban and industrial settings like Visakhapatnam to improve long-term health outcomes and enhance the overall well-being of COPD patients.

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