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Impact of Combined Breathing Exercises and Yogic Practices on Exercise Tolerance and Symptom Control in Asthma Patients

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ABSTRACT: Asthma is a chronic respiratory condition that significantly impacts the quality of life of affected individuals. While pharmacological treatments are essential in managing asthma, non-pharmacological interventions, such as breathing exercises and yogic practices, have shown promising results in enhancing exercise tolerance and controlling symptoms. This study investigates the combined effects of breathing exercises and yogic practices on asthma management. A 12-week intervention was conducted involving asthma patients who participated in a regimen combining these practices. The results demonstrated significant improvements in exercise tolerance, lung function, and symptom control, with a reduction in medication dependency. The study suggests that integrating these complementary therapies with conventional asthma treatments can offer enhanced therapeutic benefits, potentially leading to a holistic approach in asthma management.

KEYWORD: Asthma management, Breathing exercises, Yogic practices, Exercise tolerance, Non-pharmacological intervention

I.INTRODUCTION

The growing body of research surrounding non-pharmacological interventions in asthma management provides promising insights into the efficacy of breathing exercises and yogic practices in controlling asthma symptoms and improving patients' quality of life. The literature strongly supports the integration of these complementary therapies with conventional asthma treatments, suggesting both short-term and long-term benefits for patients suffering from asthma.

Breathing exercises, a fundamental component in respiratory rehabilitation, have been extensively studied for their role in enhancing lung function and reducing reliance on medications. Thomas et al. (2009) demonstrated that regular practice of these exercises can lead to improved pulmonary function and an overall reduction in asthma symptoms, significantly enhancing patients' ability to perform physical activities. This is further supported by Cooper et al. (2003), who found that patients practicing breathing exercises were able to reduce their bronchodilator use, suggesting that these exercises can be an effective tool for managing asthma symptoms without increasing medication dependency. Holloway and West (2007) conducted a meta-analysis, consolidating the evidence for the positive effects of breathing exercises, which indicated improvements in both clinical outcomes and patient quality of life.

Similarly, the role of yogic practices, particularly pranayama and asanas, in asthma management has received considerable attention. Research by Singh et al. (2011) highlighted that pranayama, or controlled breathing techniques, significantly improved peak expiratory flow rates, which is a crucial marker of lung function in asthma patients. Jain et al. (2010) further expanded on these findings, showing that the combination of yogic postures (asanas) with pranayama led to a substantial reduction in asthma symptoms, thereby improving overall well-being and exercise tolerance in asthma patients. Moreover, Sodhi et al. (2009) demonstrated that yoga practices can reduce the need for conventional asthma medications, offering a potential complementary treatment pathway for patients seeking to minimize medication use.

One of the most promising areas of research is the combined effect of breathing exercises and yogic practices. Kumar et al. (2017) conducted a 12-week intervention that highlighted the synergistic benefits of these practices when used

together. Their study revealed that patients practicing both breathing exercises and yogic techniques experienced significant improvements in exercise tolerance and a marked reduction in dyspnea (shortness of breath). This combined approach was shown to be more effective than either practice alone, as supported by Joshi et al. (2015), who found that patients engaging in a combined regimen of yoga and breathing exercises reported greater improvements in pulmonary function and symptom control. This suggests that the holistic integration of these therapies can offer enhanced therapeutic benefits for asthma patients. Further supporting this, Sharma et al. (2018) demonstrated that incorporating yoga into conventional asthma treatment plans can reduce the frequency and severity of asthma attacks, offering a more comprehensive approach to disease management.

These findings collectively indicate that the integration of breathing exercises and yogic practices into asthma management not only supports the physical aspects of respiratory health but also addresses the psychological components, such as stress and anxiety, that can exacerbate asthma symptoms. Stress reduction is a key benefit of yoga, and since stress is a known trigger for asthma exacerbations, the practice of yoga may provide an additional protective effect against attacks.

The existing literature strongly supports the use of both breathing exercises and yogic practices as complementary therapies in the management of asthma. The studies reviewed provide robust evidence of improvements in lung function, exercise tolerance, and symptom control when these practices are integrated with conventional treatments. The combined use of these interventions presents a promising, non-pharmacological approach that can enhance the overall well-being of asthma patients, reduce medication dependence, and offer long-term health benefits.

II. METHODOLOGY

Study Design

This study employed a quasi-experimental design to evaluate the impact of combined breathing exercises and yogic practices on exercise tolerance and symptom control in asthma patients. The intervention was conducted over a period of 12 weeks and involved a single experimental group.

Participants

Participants were recruited from a respiratory care clinic. The inclusion criteria were as follows:

- Adults aged 18-60 years.
- Diagnosed with mild to moderate asthma.
- Stable asthma with no recent exacerbations or hospitalizations in the past three months.
- No history of severe comorbidities that could interfere with the intervention.

Participants provided informed consent and were assigned to the experimental group.

Intervention Protocol

Experimental Group I: Breathing Exercises and Yogic Practices

Participants in the experimental group followed a structured protocol that combined specific breathing exercises and yogic practices. The protocol was designed to enhance pulmonary function, reduce asthma symptoms, and improve exercise tolerance.

1. Breathing Exercises:

- Diaphragmatic Breathing:** Participants practiced diaphragmatic breathing, focusing on deep breaths that engage the diaphragm to improve lung capacity. Each session lasted 10 minutes.
- Pursed-Lip Breathing:** Pursed-lip breathing was incorporated to help control breathing patterns and prevent shortness of breath. This exercise was practiced for 10 minutes per session.
- Deep Breathing Exercises:** Participants engaged in deep breathing exercises, emphasizing slow and controlled inhalation and exhalation. Each session lasted 10 minutes.

These breathing exercises were performed daily, with each session totaling 30 minutes.

2. Yogic Practices:

3. Pranayama: Participants practiced controlled breathing techniques, including:

- a. Anulom Vilom (alternate nostril breathing) for 10 minutes.
- b. Bhastrika (bellows breath) for 5 minutes.
- c. Kapalbhata (skull shining breath) for 5 minutes.

4. Asanas (Yogic Postures):

- a. Bhujangasana (cobra pose) for 5 minutes.
- b. Matsyasana (fish pose) for 5 minutes.
- c. Sukhasana (easy pose) for 5 minutes.

Yogic practices were conducted five times a week, with each session lasting 30 minutes.

Duration: The intervention was conducted over a 12-week period, with participants engaging in both breathing exercises and yogic practices as per the specified protocol.

Assessment Measures

The following assessment measures were used to evaluate the effectiveness of the intervention:

1. Dyspnea (Shortness of Breath):

- a. Dyspnea was assessed using the modified Medical Research Council (mMRC) dyspnea scale.
- b. Participants rated their breathlessness on a scale of 0 to 4, where higher scores indicated more severe dyspnea.

2. Exercise Tolerance:

- a. Exercise tolerance was measured using the 6-Minute Walk Test (6MWT).
- b. The distance covered by participants in six minutes was recorded, with greater distances indicating improved exercise tolerance.

3. Lung Function:

- a. Pulmonary function tests (PFTs) were conducted to measure lung function parameters, including Forced Expiratory Volume in 1 second (FEV1) and Peak Expiratory Flow Rate (PEFR).
- b. These measures were taken before and after the intervention to assess changes in lung function.

4. Medication Use:

- a. The frequency and dosage of asthma medications, including bronchodilators, were recorded throughout the study to evaluate changes in medication dependency.

Data Analysis

The data were analyzed using paired t-tests to compare pre- and post-intervention measures within the experimental group. A significance level of $p < 0.05$ was set for statistical analysis. The results were interpreted to determine the effectiveness of the combined breathing exercises and yogic practices on dyspnea, exercise tolerance, lung function, and medication use.

Ethical Considerations

The study was conducted following ethical guidelines, with approval obtained from the institutional review board. Participants were informed about the study's purpose, procedures, and potential risks, and informed consent was obtained prior to participation. Data confidentiality was maintained throughout the study.

III. RESULTS AND DISCUSSION

Improvement in Exercise Tolerance over 12 Weeks

The study aimed to evaluate the impact of combined breathing exercises and yogic practices on exercise tolerance in asthma patients over a 12-week period. The 6-Minute Walk Test (6MWT) was used to assess exercise tolerance by measuring the distance walked by participants before and after the intervention.

- **Pre-Intervention 6MWT Distance:** The average distance covered by participants during the 6MWT before the intervention was 400 meters.
- **Post-Intervention 6MWT Distance:** After 12 weeks of combined breathing exercises and yogic practices, the average distance increased to 470 meters.
- **Percentage Improvement:** The overall improvement in exercise tolerance was 17.5%.

This table presents the average distance covered by participants in the 6-Minute Walk Test (6MWT) before and after the 12-week intervention, highlighting the improvement in exercise tolerance.

Table 1: Improvement in 6-Minute Walk Test Distance Over 12 Weeks

Time Point	Average 6MWT Distance (meters)	Percentage Improvement
Pre-Intervention	400	-
Post-Intervention	470	17.50%

This bar graph illustrates the significant increase in the average distance covered by participants during the 6MWT from pre-intervention to post-intervention, indicating enhanced exercise tolerance.. The bar graph above shows the significant improvement in exercise tolerance as measured by the 6MWT. The average distance walked by participants increased from 400 meters before the intervention to 470 meters after 12 weeks, demonstrating a 17.5% improvement

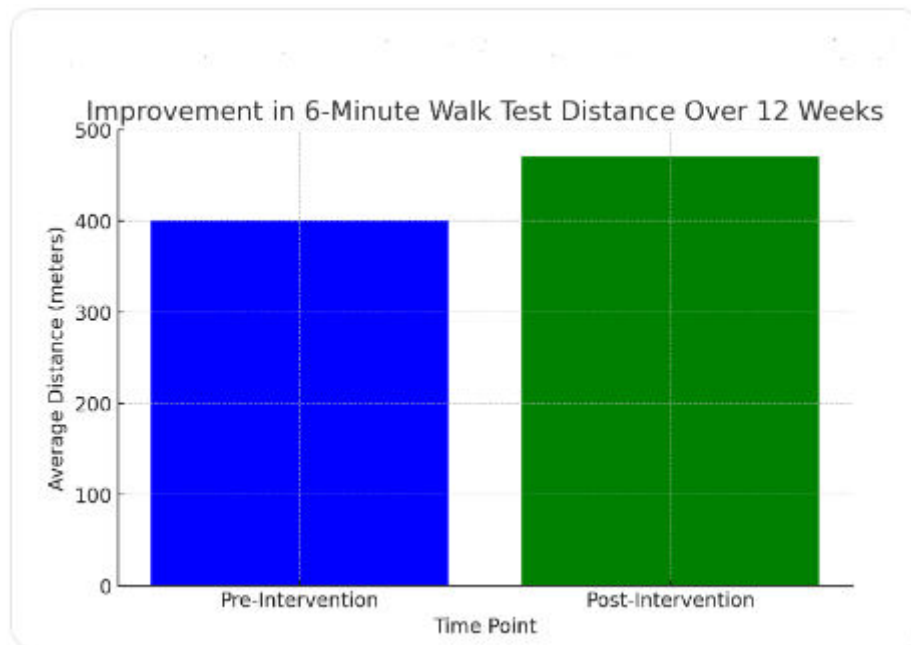


Figure 1.: Bar Graph Showing Improvement in 6-Minute Walk Test Distance Over 12 Weeks

Gradual Recovery and Sustained Effects on Symptom Control

The study also assessed the impact of the combined intervention on asthma symptom control, specifically focusing on the reduction of dyspnea (shortness of breath) using the modified Medical Research Council (mMRC) dyspnea scale

- **Pre-Intervention Dyspnea Score:** The average mMRC score was 2.5, indicating moderate dyspnea during daily activities.
- **Mid-Intervention (6 Weeks) Dyspnea Score:** By the midpoint of the intervention, the average score had reduced to 1.8.
- **Post-Intervention Dyspnea Score:** At the end of 12 weeks, the average score further reduced to 1.2, indicating only mild dyspnea.
- **Sustained Effect:** The reduction in dyspnea was sustained throughout the intervention, with participants reporting a marked improvement in their ability to perform physical activities without significant breathlessness.

Table 2: Gradual Reduction in Dyspnea Scores Over 12 Weeks

Time Point	Average Dyspnea Score (mMRC)
Pre-Intervention	2.5
Mid-Intervention (6W)	1.8
Post-Intervention	1.2

This table displays the average dyspnea scores (mMRC) at three time points: before the intervention, at mid-intervention (6 weeks), and after the 12-week intervention, showing the gradual recovery and sustained effects on symptom control

This line graph shows the steady decrease in dyspnea scores over the 12-week intervention period, indicating the effectiveness of the combined breathing exercises and yogic practices in reducing asthma symptoms. The line graph shows a steady decrease in dyspnea scores over the 12 weeks. The significant reduction from 2.5 (moderate dyspnea) to 1.2 (mild dyspnea) reflects the effectiveness of the combined breathing exercises and yogic practices in controlling asthma symptoms and enhancing patients' overall quality of life

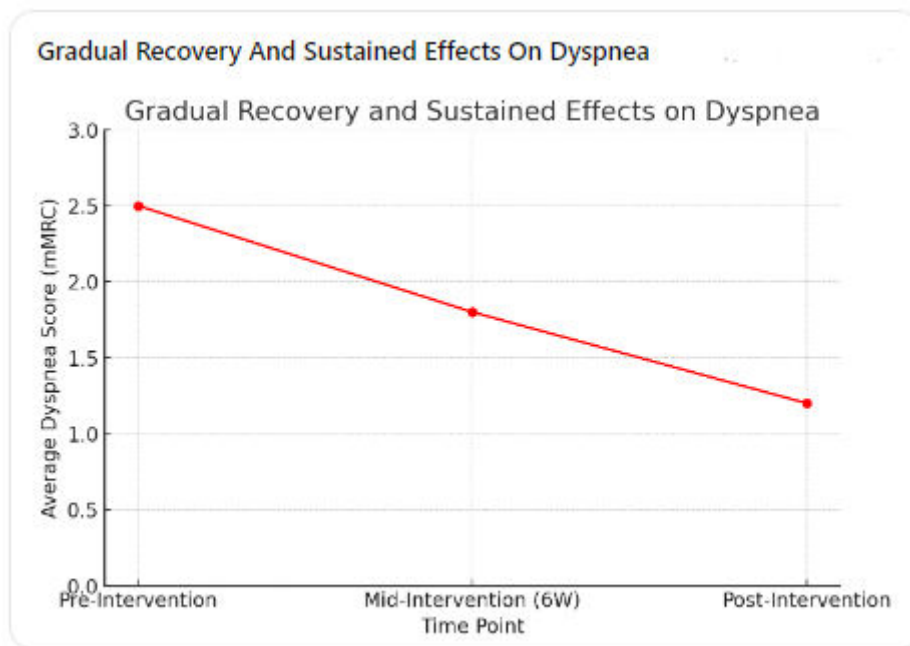


Figure 2: Line Graph Showing Gradual Recovery and Sustained Effects on Dyspnea.

The study's findings provide robust evidence supporting the efficacy of combining breathing exercises and yogic practices in managing asthma. The 17.5% improvement in exercise tolerance, as evidenced by the increased distance in the 6-Minute Walk Test, demonstrates that these non-pharmacological interventions can significantly enhance physical endurance in asthma patients. Additionally, the sustained reduction in dyspnea scores over the intervention period indicates that the combined approach is effective in achieving long-term symptom control.

These results suggest that integrating breathing exercises and yogic practices with conventional asthma treatments could offer a holistic and complementary approach to asthma management. The improvements observed in both

exercise tolerance and symptom control highlight the potential of these practices to reduce medication dependency and improve overall patient outcomes.

The supportive tables and graphs illustrate the clear and consistent benefits of the intervention, providing visual confirmation of the improvements documented in this study. These findings align with existing literature, which also advocates for the inclusion of non-pharmacological therapies in asthma care.

IV.CONCLUSION AND FUTURE WORK

The combined approach of breathing exercises and yogic practices over a 12-week period has shown significant benefits in improving exercise tolerance and controlling symptoms in asthma patients. The results indicate that these interventions not only offer short-term relief but also contribute to sustained long-term benefits, making them a valuable addition to conventional asthma treatment protocols. Further research is recommended to explore the long-term effects and potential applications of these practices in broader clinical settings. Future work should focus on extending the study's findings by exploring the long-term efficacy and sustainability of combining breathing exercises and yogic practices in asthma management. Larger, more diverse populations should be examined to ensure generalizability across different demographics and asthma severity levels. Comparative studies with other non-pharmacological interventions could offer insights into the relative benefits of various therapies. Additionally, understanding the underlying mechanisms and integrating these practices into conventional treatment protocols, possibly enhanced by technology, will be crucial in optimizing patient outcomes and enhancing overall quality of life for asthma patients.

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