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THE IMPACT OF REGULAR PHYSICAL ACTIVITY ON REDUCING EXACERBATION FREQUENCY, ENHANCING DISEASE CONTROL, AND IMPROVING QUALITY OF LIFE IN PATIENTS WITH BRONCHIAL ASTHMA

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ABSTRACT

Introduction: Bronchial asthma is a chronic inflammatory airway disease with variable obstruction and hyperresponsiveness. Symptoms such as wheezing, dyspnea, chest tightness, and coughing fluctuate over time. Globally, asthma affects over 235 million people and represents a major health and economic burden. While physical exertion was once discouraged due to exercise-induced bronchoconstriction (EIB), current guidelines, including GINA, recommend regular physical activity as part of management.
Objective: To evaluate whether physical activity benefits asthma patients of varying severity by improving control, reducing exacerbations, and enhancing quality of life.
Methods: A narrative literature review was performed using PubMed. Inclusion criteria: English-language full texts from 2013–2025, limited to reviews and RCTs. Eighteen relevant articles were analyzed.
Results: Exercise improves asthma control (e.g., 23% ACQ improvement in REACT) and quality of life (AQLQ). It reduces exacerbations and reliever use (53% vs. 20% exacerbation-free in one study). Aerobic training enhances FEV1 and FVC, while Inspiratory Muscle Training increases PImax. No consistent effect on airway inflammation was observed. Recommended modalities include aerobic, resistance, and flexibility training individualized via the FITT principle. Aquatic exercise may lower EIB risk due to humid air. EIB is managed by warm-up routines, pre-exercise SABAs, ICS for control, and optional ICS-LABA or LTRA. Benefits are pronounced in obese and moderate/severe asthma, especially with weight loss. Monitoring air quality and symptoms during activity is essential.
Conclusion: Regular physical activity is safe, cost-effective, and improves asthma outcomes when tailored and combined with appropriate EIB management.

KEYWORDS

Asthma, Exercise-Induced Asthma, Physical Activity, Bronchoconstriction, Asthma Exacerbations

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1. Introduction

Asthma is one of the most prevalent chronic diseases in contemporary society [1]. It is a complex, heterogeneous inflammatory disease of the airways [1, 2]. The cardinal features of asthma include variable airflow obstruction and bronchial hyperresponsiveness, underpinned by chronic airway inflammation [1, 7, 15]. Symptoms such as wheezing, dyspnea, chest tightness, and coughing vary in timing and intensity [1, 4, 6, 7, 14, 15]. This underlying chronic inflammation is believed to contribute significantly to airway hyperresponsiveness, airflow limitation, respiratory symptoms, and disease chronicity.

Asthma constitutes a substantial global health concern, estimated to affect 235 to 250 million individuals worldwide [1, 15]. Data from various studies indicate a global prevalence of asthma in adults of approximately 4.3% of the population [1, 15]. In the USA, the general population prevalence of asthma is around 7.7%, with higher rates observed in adult women (9.1%) compared to adult men (6.2%) [1, 4]. An increase in asthma prevalence has been noted in industrialized nations, although recent statistics may suggest a stabilization of this trend [1, 16]. Given the high prevalence of asthma and its associated healthcare costs, there is an urgent need to identify low-cost, non-pharmacological treatment strategies that can supplement traditional methods [1, 3, 6, 7, 14].

Historically, individuals with asthma were often advised to avoid physical exertion, as aerobic activity could provoke asthma-related symptoms [1, 2, 15]. This phenomenon, known as exercise-induced bronchoconstriction (EIB) or exercise-induced asthma, is characterized by airway narrowing that can occur after intense physical effort [2, 4, 12]. Nevertheless, a growing body of evidence suggests that regular physical activity can either replace or complement pharmacological asthma treatment [1, 2, 5]. Current international asthma

management guidelines, such as those from the Global Initiative for Asthma (GINA), encourage clinicians to promote regular physical activity in patients due to its generally recognized health benefits [1, 2, 5].

Recent studies and meta-analyses confirm that aerobic training improves asthma control and lung function in adults [1, 2, 5, 7, 13, 15]. Physical activity is associated with numerous benefits for individuals with asthma, including improved disease control, quality of life, and overall health status [2, 5, 7, 13]. Moderate physical exertion has been found to lead to clinically and statistically significant improvements in asthma-related quality of life (AQLQ) and asthma control (ACQ) [13]. Furthermore, studies have demonstrated that exercise training can significantly reduce the number of asthma exacerbations [5, 9, 15]. For instance, in one study, a higher percentage of participants in the intervention group (69%) achieved a clinically significant improvement in ACQ, and the percentage of patients without exacerbations during the observation period was higher in the intervention group (53% vs. 20%) [5, 15]. This suggests that increased physical activity should be recommended as part of routine asthma management, particularly for patients with obesity and difficult-to-control asthma [1, 9, 13].

2. Aim

The aim of this work is to assess whether, in accordance with the latest scientific recommendations, regular physical activity is indicated for patients with bronchial asthma at various stages of severity and whether it contributes to reducing the frequency of disease exacerbations, improving overall asthma control, and enhancing quality of life. Recent research and guidelines indicate the beneficial effects of exercise on these aspects.

3. Methods

This paper presents a narrative literature review conducted to assess the influence of regular physical activity on the decreasing frequency of bronchial asthma exacerbations, improvement in overall asthma control, and patients' quality of life. The authors utilized the PubMed database, employing the search terms "asthma," "exercise-induced asthma," "physical activity," "bronchoconstriction" and "asthma exacerbations," which yielded a preliminary result of fifty articles. Inclusion criteria applied were publication years 2013-2025, English language text, full-text availability, and specific article types including reviews and randomized controlled trials, thereby reducing the number of eligible articles to eighteen. A personal review of these articles was subsequently performed by the authors, and content deemed inconsistent with the study's scope or exhibiting thematic redundancy was excluded.

4. Results

1. **Physical activity is recommended and beneficial for individuals with bronchial asthma:** The latest recommendations, including those from the Global Initiative for Asthma (GINA), emphasize that physical activity constitutes an important component of comprehensive asthma management, complementing pharmacotherapy[2, 7]. Systematic reviews and meta-analyses confirm that aerobic training improves asthma control and lung function in adults [1, 2, 12].
2. **Reduced frequency of exacerbations:** Studies have demonstrated that regular exercise training can significantly decrease the number of asthma exacerbations [5, 15]. In one study, a higher percentage of participants in the intervention group (53%) did not experience exacerbations during the observation period, compared to 20% in the control group [5]. Furthermore, regular exercise reduced the necessity for reliever medications [2, 15].
3. **Improved asthma control and quality of life:** Physical activity improves asthma control (measured, for instance, by the Asthma Control Test - ACT and Asthma Control Questionnaire - ACQ) and enhances asthma-related quality of life (AQLQ) [1, 2, 5, 7, 9]. Moderate-intensity training led to clinically and statistically significant improvements in these indicators [2, 13]. In the REACT study, a 24-week exercise program improved asthma control by 23% and reduced dyspnea by 30.1% [15].
4. **Impact on lung function and respiratory muscle strength:**

- **Improved lung function:** Systematic reviews indicate an improvement in lung function (e.g., FEV1 - forced expiratory volume in one second, FVC - forced vital capacity) following aerobic training [1, 2, 3, 4].
- **Respiratory Muscle Training (RMT):** Inspiratory Muscle Training (IMT) significantly increases maximal inspiratory pressure (PImax) in adults with asthma [3,14]. This can serve as a supplementary therapy, enhancing respiratory muscle function and endurance, thereby potentially facilitating the management of daily ventilatory demands [2, 14].

- **No effect on airway inflammation:** Despite its beneficial effect on asthma control, aerobic training does not have a clinically significant impact on markers of airway inflammation (such as FeNO or sputum eosinophils) [1, 2].

5. **Varying intensities and types of activity:**

- Moderate and vigorous aerobic activity are associated with improved clinical asthma outcomes [13]. Both moderate and vigorous physical activity can be recommended as complementary therapy [13].
- High-intensity interval training (HIIT) has been shown to be safe, feasible, and well-tolerated in adults with asthma, irrespective of disease control, airway inflammation, or hyperresponsiveness [2]. It may reduce the perception of dyspnea and fatigue [2].
- Resistance and flexibility training are also recommended (at least twice weekly) to maintain strength and mobility, particularly in the context of muscle weakness and bone density loss risk in patients receiving corticosteroids [2].
- Aquatic exercises/swimming are beneficial because the warm, humid environment may limit the drying stimulus that can trigger exercise-induced bronchoconstriction (EIB) [2, 6].

6. **Exercise-induced asthma (EIB):**

- Although intense exercise can provoke EIB [17], regular physical activity is still recommended. EIB is characterized by airway narrowing after exercise, manifesting as coughing, wheezing, and dyspnea [17].
- EIB management involves warm-up [2] and preventive pharmacotherapy, such as short-acting beta-2-agonists before exercise, as well as regular use of inhaled corticosteroids (ICS) in the long term [2,18].
- **Preventive pharmacotherapy:** Medications such as short-acting beta-2-agonists (SABA, e.g., salbutamol, terbutaline) are the first line of defense against an anticipated EIB attack, taken 15-20 minutes before planned activity [18]. Regular use of inhaled corticosteroids (ICS) is crucial for long-term control, especially when SABA is needed more than twice a week [17]. There are also combination preparations of ICS with LABA (long-acting beta-2-agonists) and leukotriene receptor antagonists (LTRA), such as montelukast, which can prevent EIB [17].
- **Warm-up:** 5-10 minutes of light to moderate physical activity before the main training session can help prevent EIB [2]. The inclusion of high-intensity intervals in the warm-up may promote a refractory period, reducing the risk of EIB [2].

7. **Importance of activity for various patient populations:**

- **Moderate to severe asthma:** Physical interventions (aerobic and/or resistance) increase daily step counts and time spent on moderate to vigorous physical activity, positively impacting asthma control and quality of life [5].
- **Asthma with obesity:** Patients with obesity and difficult-to-control asthma often exhibit lower levels of physical activity [9]. Combining exercise with a weight reduction program can be particularly effective in improving asthma control, quality of life, and lung function, and fat mass reduction has been associated with improved AQLQ and decreased sputum IL-6 concentration [2, 5, 13].

8. **Monitoring and adaptation:** Irrespective of the severity of bronchial asthma, it is important to monitor the environment (air quality, weather, pollen) and adjust activity accordingly (e.g., indoor exercise in case of poor air quality). Patients should always have reliever medications readily available and discontinue exertion if symptoms persist or become problematic.

5. Limitation

Directions for future research: Despite promising results, higher quality, large-scale randomized controlled trials (RCTs) with longer durations are still needed [5, 7]. It is important to establish the optimal dose (frequency, intensity, duration, and type) of physical activity depending on the asthma stage and patient age [7]. Furthermore, the immunomodulatory and anti-inflammatory mechanisms underlying the beneficial effects of exercise require further investigation [2].

6. Conclusions

Bronchial asthma is a chronic, heterogeneous inflammatory disease of the airways, characterized by symptoms such as wheezing, dyspnea, chest tightness, and coughing, which fluctuate in time and intensity, along with variable airflow limitation. It affects hundreds of millions of people worldwide, posing a significant health and economic burden. Despite advancements in pharmacotherapy, insufficient asthma control continues to result in a substantial number of medical visits and hospitalizations, and diminishes quality of life.

Consequently, preventing exacerbations is crucial for improving treatment outcomes and patient quality of life, and excessive use of short-acting beta-2 agonists (SABA) is associated with more severe exacerbations.

Current scientific evidence unequivocally indicates that regular physical activity, including moderate and vigorous intensity aerobic training, inspiratory muscle training (IMT), and other forms of exercise, is an effective and safe non-pharmacological intervention in the comprehensive management of bronchial asthma. Its integration into the treatment plan contributes to:

- Significant improvement in asthma control (measured by tests such as ACT and ACQ). For example, in the REACT study, exercise intervention improved asthma control by 23%.
- Increased asthma-related quality of life (AQLQ).
- Improvement in lung function, including forced expiratory volume in one second (FEV1), forced vital capacity (FVC), and maximal inspiratory pressure (PImax).
- Potential reduction in the frequency of exacerbations and, importantly, a decrease in the use of reliever medications (beta-2 agonists), indicating better disease control.
- Positive impact on co-morbidities such as obesity, anxiety, and depression, which often accompany asthma, particularly in moderate and severe forms.

A key aspect is that physical activity does not require significant financial outlay and need not be extreme or exhaustive. Various forms of activity are recommended, which can be tailored to individual patient preferences and capabilities. These include:

- Aerobic exercises of moderate (e.g., brisk walking, swimming, jogging) or vigorous (e.g., running, spinning, high-intensity interval training - HIIT) intensity. Studies have demonstrated that both moderate and vigorous activity are beneficial.
- Respiratory muscle training.
- Resistance training and flexibility exercises (including yoga, Pilates) are also recommended at least twice a week to maintain strength and mobility, particularly in patients receiving corticosteroids.
- Aquatic exercises/swimming are particularly beneficial as the warm and humid environment can minimize the risk of exercise-induced bronchoconstriction (EIB).

Although intense exercise can provoke exercise-induced asthma (EIB), appropriate warm-up (including high-intensity intervals) and preventive pharmacotherapy (e.g., short-acting beta-2-agonists prior to exercise, regular inhaled corticosteroids) allow for safe participation in physical activity.

In summary, physical activity is an inexpensive, scalable, and effective complementary therapy in the management of bronchial asthma. Its regular integration into daily life, in forms and intensities adapted to individual needs, can significantly improve disease control, reduce the burden of exacerbations, and enhance the overall quality of life for patients with asthma.

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All authors contributed to the article.
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Methodology: Mikulec P, Stopyra M
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