

REVIEW ARTICLE **OPEN ACCESS**

Asthma A Chronic Respiratory Disease with Global Impact

Stefano Nigro^{1*}, Giorgi Billson¹

¹Department of Biomedical Sciences, Humanitas University, Italy

*Correspondence: Stefano Nigro, Department of Biomedical Sciences, Humanitas University, Italy, E-mail: Stefano@nigro.it

Citation: Nigro S, Giorgi B (2024) Asthma A Chronic Respiratory Disease with Global Impact. Int. J. Health Sci. Biomed. 1: 1-3. DOI: 10.5678/IJHSB.2024.420

Received Date: 2024-07-02, Accepted Date: 2024-07-23, Published Date: 2024-07-30

Keywords: Asthma; Chronic respiratory disease; Inflammation; Bronchodilators; Corticosteroids; Airway hyperresponsiveness

Abstract

Asthma is a chronic inflammatory disorder of the airways characterized by variable airflow obstruction, bronchial hyperresponsiveness, and respiratory symptoms such as wheezing, shortness of breath, chest tightness, and coughing. It affects individuals of all ages and contributes significantly to global morbidity and healthcare burden. While asthma is incurable, it can be effectively managed through pharmacological and non-pharmacological strategies. This article reviews the pathophysiology, risk factors, diagnosis, management, and preventive measures for asthma, emphasizing the importance of individualized treatment and public health efforts in reducing asthma-related complications.

Introduction

Asthma is a common chronic non-communicable disease that affects over 260 million people globally, according to the World Health Organization (WHO). It is a leading cause of hospitalization among children and contributes to millions of emergency room visits annually. Despite being a manageable condition, asthma can lead to life-threatening exacerbations and long-term disability when not properly controlled.

Asthma is marked by inflammation and narrowing of the airways, which results in episodic or persistent respiratory symptoms. These symptoms are often triggered by environmental exposures, allergens, respiratory infections, exercise, or stress [1]. Understanding the mechanisms of asthma and implementing appropriate management strategies are essential to improving patient outcomes and reducing the economic burden of the disease.

Pathophysiology of Asthma

The pathogenesis of asthma involves:

Airway inflammation: Persistent inflammation causes swelling and increased mucus production, narrowing the airways.

Bronchial hyperresponsiveness (BHR): The airways overreact to various stimuli, leading to bronchospasm.

Airflow obstruction: Reversible narrowing of the airways due to smooth muscle constriction, mucus plugging, and inflammation.

In some individuals, chronic inflammation can lead to airway remodeling, a process characterized by permanent structural changes in the lung tissue, contributing to fixed airflow limitation [2].

Risk Factors and Triggers

Genetic and Environmental Risk Factors
Family history of asthma or atopy
Allergic conditions such as eczema and allergic rhinitis
Air pollution, especially urban traffic-related pollution
Occupational exposures to irritants (e.g., chemicals, dust)

Low birth weight or premature birth

Common Triggers

Allergens: Pollen, mold, animal dander, dust mites

Citation: Nigro S, Giorgi B (2024) Asthma A Chronic Respiratory Disease with Global Impact. Int. J. Health Sci. Biomed. 1: 1-3. DOI: 10.5678/IJHSB.2024.420

Respiratory infections: Especially viral infections in children

Exercise-induced bronchoconstriction

Cold air or sudden weather changes[3]

Tobacco smoke (firsthand or secondhand)

Strong odors and air pollutants

Clinical Features

Asthma symptoms are variable and may worsen at night or early morning. Key symptoms include:

Wheezing

Shortness of breath

Chest tightness

Coughing, especially at night or after exercise

The frequency and intensity of these symptoms vary depending on the severity of the condition and the presence of triggers.

Diagnosis of Asthma

Clinical Assessment

Diagnosis is based on history and physical examination[4]. Key features include recurrent episodes of wheezing, cough, and shortness of breath, especially if associated with known triggers.

Pulmonary Function Testing

Spirometry: Measures FEV₁ and FVC. A reversible reduction in FEV₁ after bronchodilator use is diagnostic.

Peak Expiratory Flow (PEF) monitoring helps assess variability in airflow obstruction.

Bronchoprovocation testing with methacholine or histamine may be used in unclear cases.

Allergy Testing

Skin prick tests or serum-specific IgE testing may help identify environmental allergens.

Classification of Asthma Severity

Asthma severity is categorized based on symptom frequency, nighttime awakenings, interference with activity, and lung function.

Severity	Symptoms	Lung Function
Mild Intermittent	<2 days/week	Normal between exacerbations
Mild Persistent	>2 days/week but not daily	FEV ₁ ≥ 80% predicted
Moderate Persistent	Daily symptoms	FEV ₁ 60–80% predicted
Severe Persistent	Continual symptoms, frequent at night	FEV ₁ < 60% predicted

Table 1: Asthma Severity Classification and Corresponding Lung Function

Management of Asthma

Asthma is managed with a stepwise approach based on symptom control and severity.

Pharmacological Treatment

Controller Medications (Long-term)

Inhaled Corticosteroids (ICS): First-line treatment for persistent asthma.

Long-acting Beta-2 Agonists (LABAs): Used in combination with ICS.

Leukotriene Receptor Antagonists (LTRAs): Oral alternative or add-on therapy.

Biologic agents: Such as omalizumab (anti-IgE), mepolizumab (anti-IL-5), for severe asthma.

Reliever Medications (Short-term)

Short-acting Beta-2 Agonists (SABAs): For acute symptom relief.

Anticholinergics: Sometimes used in emergency settings.

Non-Pharmacological Strategies

- Trigger avoidance
- Allergen control
- Smoking cessation
- Patient education and self-management plans
- Regular follow-up and review of inhaler technique

Citation: Nigro S, Giorgi B (2024) Asthma A Chronic Respiratory Disease with Global Impact. Int. J. Health Sci. Biomed. 1: 1-3. DOI: 10.5678/IJHSB.2024.420

Asthma in Special Populations

Children

Diagnosis may be challenging due to overlapping symptoms with viral bronchiolitis.

ICS are safe and effective for long-term control[5].

Prevention and Public Health Approaches

Public awareness campaigns[6] on air quality and smoking risks
Vaccination against influenza and pneumococcus

Indoor air quality improvement through ventilation and allergen reduction

Access to essential asthma medications, especially in low-income settings

School-based asthma management programs

Conclusion

Asthma is a chronic respiratory disease with significant personal and societal impact. While it cannot be cured, asthma can be well-controlled with appropriate medical therapy, education, and environmental control. Early diagnosis,

individualized treatment plans, and regular follow-up are essential for maintaining lung health and preventing severe complications. As environmental and lifestyle factors continue to evolve, integrated public health strategies and improved access to care are crucial for reducing the global burden of asthma.

References

1. Global Initiative for Asthma (GINA) (2024) Global Strategy for Asthma Management and Prevention.
2. World Health Organization (2023) Asthma Fact Sheet.
3. National Heart, Lung, and Blood Institute (NHLBI) (2020) Guidelines for the Diagnosis and Management of Asthma (EPR-3).
4. Reddel HK, Bacharier LB, Bateman ED (2021) Global Initiative for Asthma (GINA) 2021: Executive summary and recommendations. *European Respiratory Journal* 57: 2003089.
5. Martinez FD (2019) Early-life origins of chronic obstructive pulmonary disease. *New England Journal of Medicine* 381: 1345–1355.
6. Boulet LP, Boulay MÈ, Lavoie KL (2017) Asthma and obesity. *Clinical and Experimental Allergy* 47: 498–499.

Citation: Nigro S, Giorgi B (2024) Asthma A Chronic Respiratory Disease with Global Impact. *Int. J. Health Sci. Biomed.* 1: 1-3.
DOI: 10.5678/IJHSB.2024.420
