

# Free asthma research paper example

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Asthma is a complex multifactorial disease that affects millions of people worldwide and can occur across any age or ethnicity. In children, boys are slightly more affected than girls, but in adults, women are more affected than men (Fanta 1002). Asthma affects about 300 million people and accounts for around 250, 000 deaths each year worldwide (Lv et al. 105; Ober and Yao 11). Asthma can be atopic or non-atopic. Atopic asthma usually starts in childhood or adolescence and is hypothesized to be influenced by genetic predisposition. Non-atopic asthma usually occurs in adults and can result from bacterial or viral infections (Barnes 85; Kaufman 49).

## **Symptoms and Diagnosis**

The symptoms of asthma typically include recurrent episodes of respiratory distress marked by wheezing, cough, breathlessness and chest tightness. It can be triggered by a number of factors such as stress, allergens (e. g. dust, pollen, milk, nuts, eggs, etc.), viral infection, exercise, and certain drugs (e. g. NSAIDs). Environmental factors such as smoke or fumes, air pollutants and

climatic variation (e. g. extreme heat during the day followed by a considerably cold night or rains) can also trigger asthma (Ober and Yao 12; Fanta 1002; Kaufman 49; Royal College of Physicians 27). Asthma patients can exhibit varying severity of clinical symptoms and often have varied triggers.

Diagnosis of asthma can be difficult, because of the variability of asthma in patients and the fact that the pathogenesis of asthma is still largely unknown. There is no ‘ gold standard’ test or reliable biomarkers to diagnose asthma or to distinguish it from other diseases, making it difficult to confirm or refute the diagnosis. Asthma is usually diagnosed based on one or more typical features, such as respiratory symptoms, variable airflow obstruction (as evidenced by lung function tests), and the patient’s response to asthma medication (Royal College of Physicians 27; Ober and Yao 12).

## **Pathophysiology**

Asthma is a chronic inflammatory disease, which indicates that the immune system is primarily involved. Normally, when the body is attacked by a pathogen, it raises an inflammatory response to alert the immune system of the infection. On the other hand, an allergy is increased sensitivity to a substance that may not induce a similar response in a non-allergic person. Asthma, which is usually accompanied by various allergies, can be seen as an “ extreme allergy,” an overreaction of the body (particularly the airways) to various triggers. It is characterized by a certain pattern of inflammation that is largely driven by mechanisms dependent on the immunoglobulin IgE. This inflammatory process is often very complex, involving many inflammatory cells, inflammatory mediators and multiple inflammatory

effects such as bronchoconstriction, plasma exudation or leakage (edema), mucus hypersecretion (leading to the formation of mucus plugs) and sensory nerve activation (Barnes 103; Fanta 1002).

During an asthma attack, bronchoconstriction (or narrowing of the airways: trachea, bronchi, or bronchioles) occurs as a result of an immune response to a trigger. The smooth muscles of the airway wall is oedematous (filled with fluid exuded from airway vessels) and is infiltrated with inflammatory cells (predominantly eosinophils and lymphocytes, as well as mast cells). The airway epithelium may have excessive collagen deposits beneath the basement membrane. It may also be damaged and shed into the airway lumen, which may be further occluded or blocked by a mucus plug composed of plasma proteins exuded from airway vessels and mucus glycoproteins secreted from surface epithelial cells. The smooth muscles of the airways also abnormally constrict, in bronchospasms, leading to further narrowing of the airways (Barnes Fanta 1002; Kaufman 49-50). Asthma attacks can result to general hypoxia and can be fatal when not immediately given due medical attention.

Acute inflammation resulting in an asthma attack is often regarded as an exacerbation of the chronic inflammation of the lower respiratory tract. The mechanisms involved in the persistence of inflammation (or chronic inflammation state) in asthma are, at present, still poorly understood. It is generally hypothesized that the severity of asthma is correlated with the increased sensitivity of the airways due to chronic inflammation (Barnes Fanta 1002; Kaufman 49-50). This increased sensitivity, or airway hyper-responsiveness (AHR), leads the body to react to anything that otherwise

would not induce such an extreme response in a normal, healthy person. For example, a cloud of dust tracked by a vehicle on a dust road will induce coughing in a healthy person to clear the airways, but it may trigger an asthma attack in an asthmatic person. Furthermore, AHR may be a result of epithelial shedding, which leads to: (1) loss of barrier (thereby allowing penetration of allergens or triggering a response by a non-allergen), (2) loss of enzymes that break down inflammatory mediators (residual inflammatory agents are implicated in chronic inflammation) and (3) exposure of sensory nerves, which may lead to reflex effects on the airway.

## **Treatment**

There is no known cure for asthma, so treatment is often palliative, such as when counteracting bronchoconstriction during an asthma attack, or preventive, to reduce the chance of attacks. Traditionally, pharmacological treatment of asthma was categorized according to the drug's predominant effect: either by relaxing the airway smooth muscle (bronchodilators) or by suppression of airway inflammation (anti-inflammatory drugs). Newer medications, such as leukotriene modifiers, and drug combinations, such as inhaled corticosteroids combined with long-acting  $\beta$ -adrenergic agonists, have dual effects. Nowadays, asthma medications can be classified as quick relief (or short-acting) or long-term (or long-acting) (Kaufman 53-55; Chu and Drazden 1202-1205; Fanta 1002).

## **Prognosis**

In summary, asthma is a very manageable disease, but symptom severity varies greatly from one person to another. Full remission is possible but it

may also reoccur in adulthood. Proper treatment management is necessary to prevent irreparable damage by asthma or the prescribed medications.

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