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An Overview Over Asthma: Chronic Inflammatory Chronic Diseases

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ABSTRACT:

Our current understanding of the path physiology of asthma and the availability of potent, effective therapies mean that asthma can be well controlled. However, to achieve this goal, optimal therapy must be prescribed and the patient must be taught how and when to use it. Pharmacists, as part of the health care team, help improve the pharmacologic management of asthma by teaching patients about their medications, how to use them, and the importance of using them as prescribed [1]. Alerting physicians to suspected problems, such as under using anti-inflammatory therapy or overusing inhaled bronchodilators, will provide an opportunity for the physician to consider changes in a patient's management plan when appropriate. Acting in these educational and information-sharing roles, pharmacists contribute to improving the control of asthma and enabling patients to live full, active, and productive lives[1].

Keywords: Asthma, Epidemology, Bronchiodialtors, Hyperactivity.

Introduction:

Bronchial asthma is characterized by hyperresponsiveness of tracheobronchial smooth muscle to a variety of stimuli, resulting in narrowing of air tubes, often accompanied be increased mucosal secretion, mucosal edema and mucus plugging. Asthma is a chronic, episodic disease of the airways, and it is best viewed as a syndrome. In 1997, the National Heart, Lung, and Blood Institute (NHLBI) included the following features as integral to the definition of asthma-recurrent episodes of respiratory symptoms,variable airflow obstruction that is often reversible, either spontaneously or with treatment; presence of airway hyper reactivity, and,importantly chronic airway inflammation in which many cells and cellular elements play a role, in particular mast cells, eosinophils, T lymphocytes, macrophages, neutrophils, and epithelial cells[1]. All of these features need not be present in any given asthmatic patient. Although the absolute "minimum criteria" to establish a diagnosis of asthma is not known or widely agreed upon, the presence of airway hyper reactivity is a common finding in patients with current symptoms and active asthma[1].

W H O DEFINITION:

Asthma is a chronic disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. Symptoms may occur several times in a day or week in affected individuals, and for some people become worse during physical activity or at night. During an asthma attack, the lining of the bronchial tubes swell, causing the airways to narrow and reducing the flow of air into and out of the lungs. Recurrent asthma symptoms frequently cause sleeplessness, daytime fatigue, reduced activity levels and school and work absenteeism. Asthma has a relatively low fatality rate compared to other chronic diseases [1].

EPIDEMOLOGY:

As of 2011, ~235 million people worldwide were affected by asthma, and approximately 250,000 people die per year from the disease.Low and middle income countries make up more than 80% of the mortality. Rates vary between countries with prevalences between 1 and 18%.It is more common in developed than developing countries. Within developed countries it is more common among those who are economically disadvantaged while in contrast in developing countries it is more common amongst the affluent.

• Asthma is currently a worldwide problem, with increasing prevalence in both children and adults. Total prevalence is estimated to be 7.2% of the world's population (6% in adults, 10% in children)[2].

• An hospital based study on 20,000 children under the age of 18 years from 1979,1984,1989,1994 and 1999 in the city of Bangalore showed a prevalence of 9%, 10.5%, 18.5%, 24.5% and 29.5% respectively. The increased prevalence correlated well with demographic changes of the city. Further to the hospital study, a school survey in 12 schools on 6550 children in the age group of 6 to 15 years was undertaken for prevalence of asthma and children were categorized into three groups depending upon the geographical situation of the school in relation to vehicular traffic and the socioeconomic group

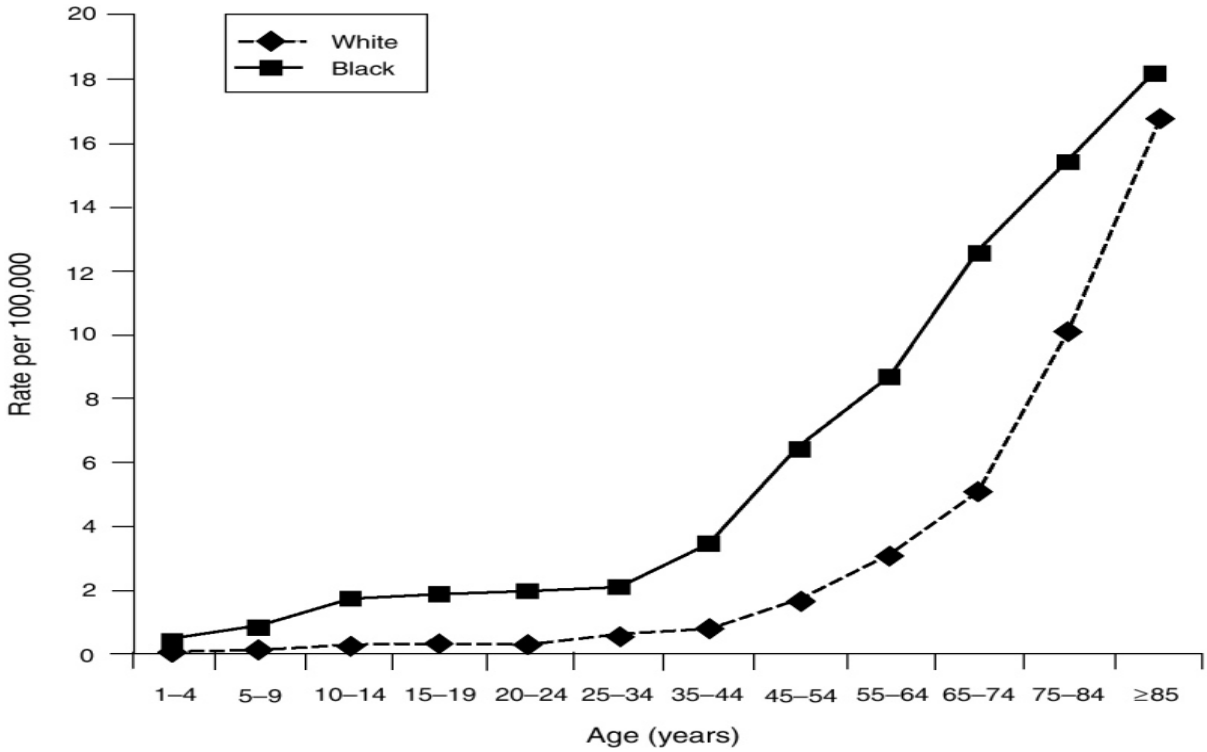
of children. Group I-Children from schools of heavy traffic area showed prevalence of 19.34%, Group II-Children from heavy traffic region and low socioeconomic population had 31.14% and Group III-Children from low traffic area school had 11.15% respectively. (P: I & II; II & III <0.001). A continuation of study in rural areas showed 5.7% in children of 6-15 years. The persistent asthma also showed an increase from 20% to 27.5% and persistent severe asthma 4% to 6.5% between 1994-99[2].

• Asthma is found in all countries but it is more prevalent in industrialized countries than in low-income countries. A recent survey estimates that in New Zealand, 25% of children from 13 to 14 years of age have asthma symptoms, 16% in the USA, 13% in Europe and Latin America and 10% in African cities.

• The total number of people with asthma, however, is already higher in the developing world than in the industrialized countries. There are approximately 3 million asthmatics in Japan and in France, compared to an estimated more than 15 million in India and over 30 million in Africa. Rates of asthma have increased significantly between the 1960s and 2008 with it being recognized as a major public health problem since the 1970s.[2] Some 9% of US children had asthma in 2001, compared with just 3.6% in 1980. The World Health Organization (WHO) reports that some 10% of the Swiss population have asthma as of 2007, compared with 2% some 25–30 years ago.[2] In the United States the age-adjusted prevalence of asthma increased from 7.3 to 8.2 percent during the years 2001 through 2009.

MORTALITY:

Asthma mortality data are readily available from the U.S. Vital Statistics System. The U.S. asthma mortality rate of 2.13 deaths per 100,000 population in 1996 is low compared to as many as 7 to 9 deaths per 100,000 population in other parts of the world—the highest rates being noted in New Zealand, West Germany, and Norway (Sears, 1991)[2]. Although the number of deaths from asthma is not large, an understanding of their causes is important since asthma mortality is considered preventable. Asthma mortality primarily affects adults, with approximately 67% occurring at or after 45 years of age. Males tend to have higher asthma death rates than females until about age 25, after which females have the higher rates for the rest of the life span[2]. African Americans have consistently higher asthma death rates than whites. The difference is greatest in the younger group—approximately 10 times higher in 1- to 4-year-olds—and decreases with age until the ratio is only 1.2 times greater at age 85 and over. Little difference in asthma mortality rates is seen when the United States is divided into four census regions (U.S. Vital Statistics, 1995, 1996). However, numerous studies conducted in urban areas have much higher asthma mortality in areas characterized by high levels of poverty and minority populations (Carr et al., 1992; Lang and Polansky, 1994). Asthma mortality has been increasing in the United States since the late 1970s, although in the past several years the increase appears to have slowed down. No group has been spared this increase[2].



Asthma significantly disrupts lives.

- 87% of parents and 84% of adult patients report that asthma has had a negative impact on their or their child's lives.

•23% of adult patients and 36% of parents of asthmatics missed work during the past year because of their asthma (ALA survey).

Asthma is not under control.

•83% of parents and 75% of adult patients reported unscheduled visits to the physician during 1998 because of asthma attacks [2].

Asthmatics adapt their lifestyle to accommodate their asthma. And they do not lead a "normal" life.

•61% of all asthma patients and 73% of children report that they limit sports participation or exercise, find it difficult to sleep through the night, and make unplanned trips to the physician or ED. Families, with members who have asthma, adapt to accommodate asthma and lack a "normal" family life.

•70% of parents and patients agree that the whole family is affected by one member's asthma, and nearly 50% say asthma limits the range of activities the family can do together[2]. Many asthmatics do not know the difference between the controller medications that keeps symptoms from occurring and the reliever medication that can alleviate an attack

•73% of adult patients and 79% or parents of asthmatics actually named a reliever medication when asked to name a controller medication.

In children:

•Asthma is the most common chronic illness and is the highest ranking chronic condition causing hospitalization [3]

ETIOLOGY:

The complete causes of asthma are unknown. Heredity does seem to play a role, as do allergens and environmental factors. According to the latest Expert Panel Report (EPR) in 1997 from the National Heart, Lung, and Blood Institute's National Asthma Education and Prevention Program, "Atopy, the genetic predisposition for the development of an IgE-mediated response to common aeroallergens, is the strongest identifiable predisposing factor for developing asthma[3]. There are two categories of asthma: allergic or extrinsic and idiosyncratic or intrinsic. Allergic asthma is a result of an antigen\antibody reaction on mast cells in the respiratory tract. This reaction causes the release of inflammatory mediators from mast cells, which elicit the clinical response associated with an asthma attack. Idiosyncratic asthma is a result of neurological imbalances in the autonomic nervous system (ANS) in which the alpha and beta-adrenergic as well as the cholinergic sites of the ANS are not properly coordinated. Onset of asthma between the ages of 5 to 15 years usually indicates asthma with an allergic basis[3]. Studies suggest a genetic basis for airway hyper responsiveness, including linkage to chromosomes 5q and 11q. However, asthma clearly does not result from a single genetic abnormality, but is rather a complex multigenic disease with a strong environmental contribution. For example, allergic potential to inhalant allergens (dust mites, mold spores, cat dander, etc) more commonly is found in asthmatic children as well as asthmatic adults whose asthma began in childhood, compared with adult-onset asthmatics[5].

PATHOPHYSIOLOGY:

Airway inflammation is the primary problem in asthma. An initial event in asthma appears to be the release of inflammatory mediators (e.g., histamine, tryptase, leukotrienes and prostaglandins) triggered by exposure to allergens, irritants, cold air or exercise. The mediators are released from bronchial mast cells, alveolar macrophages, T lymphocytes and epithelial cells. Some mediators directly cause acute bronchoconstriction, termed the "early-phase asthmatic response." The inflammatory mediators also direct the activation of eosinophils and neutrophils, and their migration to the airways, where they cause injury. This so-called "late-phase asthmatic response" results in epithelial damage, airway edema, mucus hyper secretion and hyper responsiveness of bronchial smooth muscle . Varying airflow obstruction leads to recurrent episodes of wheezing, breathlessness, chest tightness and cough[3].

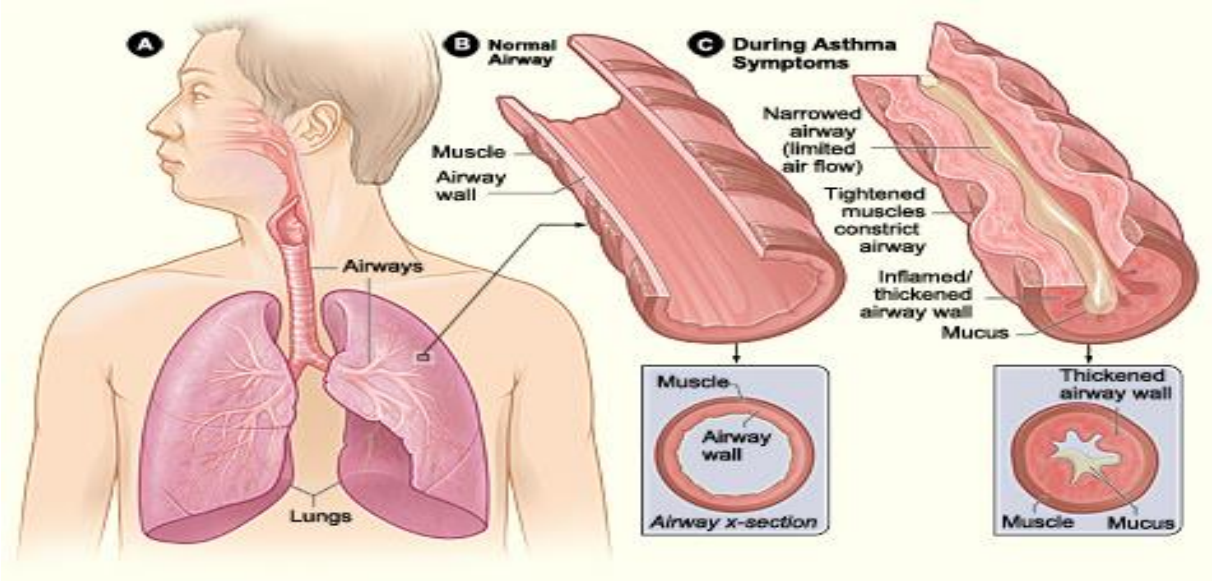
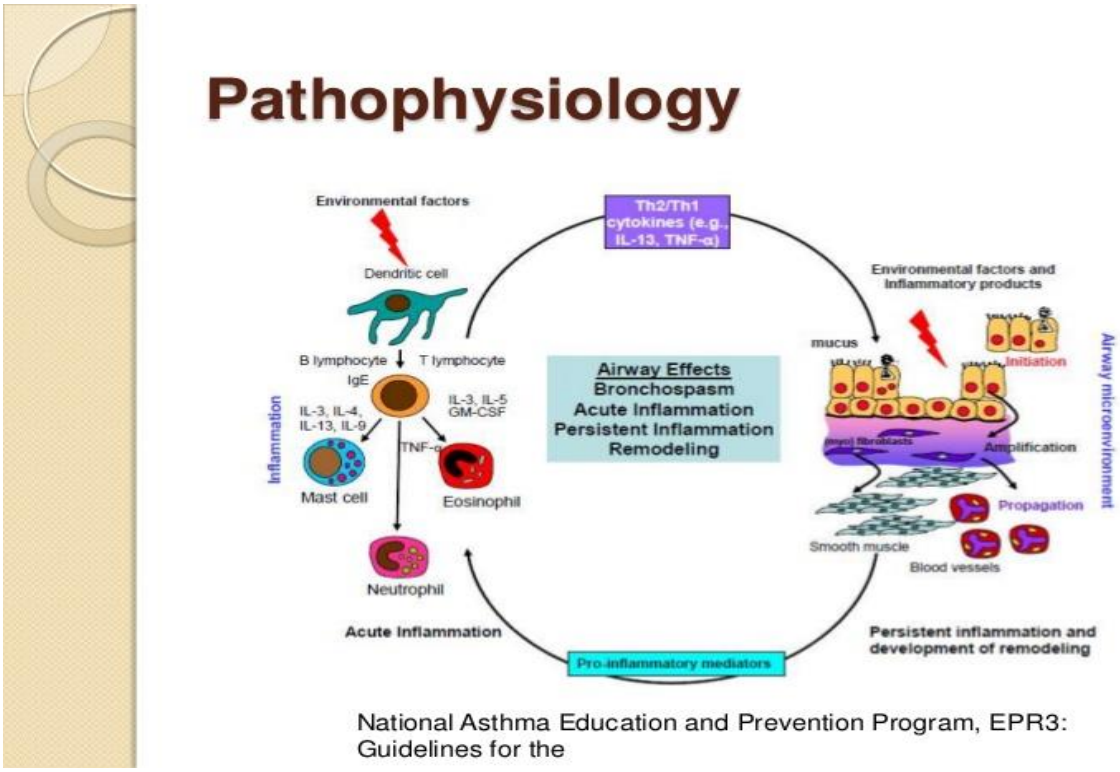


Figure No 2: Path physiology of asthma. According to the current view, several inflammatory cells interact in a complex manner and release multiple inflammatory mediators that act on various target cells in the airways to produce the characteristic path physiology of asthma.



CLASSIFICATION:

The National Asthma Education and Prevention Program has classified asthma as:

- Intermittent.
- Mild persistent.
- Moderate persistent.
- Severe persistent.

These classifications are based on severity, which is determined by symptoms and lung function tests. You should be assigned to the most severe category in which any feature occurs.

- Classification is based on symptoms before treatment.
- Classification may change over time.
- A person in any category can have severe asthma attacks.
- Asthma in children younger than age 4 can be hard to diagnose. And its symptoms may be different from asthma in older children or adults[3].

Intermittent asthma

Asthma is considered intermittent if without treatment **any** of the following are true:

- Symptoms (difficulty breathing, wheezing, chest tightness, and coughing):
    - Occur on fewer than 2 days a week.
    - Do not interfere with normal activities.
- Nighttimes symptoms occur on fewer than 2 days a month.
- Lung function tests (spirometry and peak expiratory flow [PEF]) are normal when the person is not having an asthma attack. The results of these tests are 80% or more of the expected value and vary little (PEF varies less than 20%) from morning to afternoon[3]

Mild persistent asthma

Asthma is considered mild persistent if without treatment **any** of the following are true:

- Symptoms occur on more than 2 days a week but do not occur every day.
- Attacks interfere with daily activities.
- Nighttime symptoms occur 3 to 4 times a month.
- Lung function tests are normal when the person is not having an asthma attack. The results of these tests are 80% or more of the expected value and may vary a small amount (PEF varies 20% to 30%) from morning to afternoon[3].

Moderate persistent asthma

Asthma is considered moderate persistent if without treatment **any** of the following are true:

- Symptoms occur daily. Inhaled short-acting asthma medication is used every day.
- Symptoms interfere with daily activities.
- Nighttimes symptoms occur more than 1 time a week, but do not happen every day.
- Lung function tests are abnormal (more than 60% to less than 80% of the expected value), and PEF varies more than 30% from morning to afternoon[3].

Severe persistent asthma

Asthma is considered severe persistent if without treatment **any** of the following are true:

- Symptoms:
  - Occur throughout each day.
  - Severely limit daily physical activities.
- Nighttimes symptoms occur often, sometimes every night.
- Lung function tests are abnormal (60% or less of expected value), and PEF varies more than 30% from morning to afternoon.

Another type of classification commonly seen is :

1. Chronic asthma

2. Acute severe asthma

3. Allergic asthma

4. Exercise induced asthma

5. Nocturnal asthma

DIAGNOSIS:

A diagnosis of asthma usually is based on the patient's symptoms, medical history, a physical examination, and laboratory tests that measure pulmonary (lung) function. Doctors typically look for signs that the patient's airflow is obstructed and that the obstruction is at least partially reversible. Factors that trigger symptoms may be evident, such as exercise, cold air, and exposure to an allergen; however, the precipitating factors may not be clearly identified [4]. Evidence of reversible airway obstruction is often detected in the physical examination or by physiologic testing. Physiologic testing generally is recommended to confirm the diagnosis. During an asthma attack, wheezing can be heard by listening to the chest with a stethoscope. The airway obstruction is considered reversible if the wheezing disappears in response to treatment, or when the suspected triggering factor is removed or resolved.

- Spirometry
- Peak Expiratory flow
- Bronchial Provocation

Other Tests [4]

SYMPTOMS:

People with asthma have symptoms when the airways are narrowed (bronchospasm), swollen (inflamed), or filled with mucus [4]. Common symptoms of asthma include:

- Coughing, especially at night

- Wheezing
- Shortness of breath
- Chest tightness, pain, or pressure

The symptoms might also vary from one asthma episode to the next, being mild during one asthma episode and severe during another. Some people with asthma might have extended symptom-free periods, interrupted by periodic asthma episodes, while others have some symptoms every day. In addition, some people with asthma might only have symptoms during exercise, or when they are exposed to allergens or viral respiratory tract infections[4].

Mild asthma episodes are generally more common. Usually, the airways open up within a few minutes to a few hours. Severe episodes are less common, but last longer and require immediate medical help. It is important to recognize and treat even mild symptoms to help you prevent severe episodes and keep asthma in better control. Early warning signs are changes that happen just before or at the very beginning of an asthma episode. These changes start before the well-known symptoms of asthma and are the earliest signs that a person's asthma is worsening.[4] In general, these signs are not severe enough to stop a person from going about his or her daily activities. By recognizing these signs, one can stop an asthma episode or prevent one from getting worse. Early warning signs include:

- Frequent cough, especially at night
- Losing your breath easily or shortness of breath
- Feeling very tired or weak when exercising
- Wheezing or coughing after exercise
- Feeling tired, easily upset, grouchy, or moody
- Decreases or changes in a peak expiratory flow
- Signs of a cold, upper respiratory infection, or allergies (sneezing, runny nose, cough, congestion, sore throat, and headache)
- Trouble sleeping [4]

Symptoms of worsening asthma

If early warning signs and symptoms are not recognized and treated, the asthma episode can progress and symptoms might worsen. As symptoms worsen, one might have more difficulty performing daily activities and sleeping. Symptoms of worsening asthma include:

- A cough that won't go away (day and night)
- Wheezing
- Tightness in the chest
- Shortness of breath
- Poor response to medicines (bronchodilators)

Late, severe symptoms: When asthma symptoms become severe, the patient will be unable to perform regular activities. If one has late, severe symptoms, follow the "Red Zone" or emergency instructions in the Asthma Action Plan immediately. These symptoms occur in life-threatening asthma episodes and the patient needs medical help right away. Late, severe symptoms include:

- Severe wheezing (both when breathing in and out)
- Coughing that won't stop
- Very rapid breathing
- Inability to catch your breath
- Chest pain or pressure
- Tightened neck and chest muscles (retractions)
- Difficulty talking
- Inability to perform a peak expiratory flow
- Feelings of anxiety or panic
- Pale, sweaty face
- Blue lips or fingernails [4]

COMPLICATIONS:

Those with asthma are at increased risk of developing problems associated with acid reflux, including the development of gastroesophogeal reflux disease. Avoiding acid reflux can be aided by avoiding food or drink for several hours prior to bedtime and sleeping with the head slightly elevated.Badly controlled asthma can have an adverse effect on your quality of life. The condition can result in:

- fatigue
- underperformance or absence from work
- psychological problems including stress, anxiety and depression. In rare cases, asthma can lead to a number of serious respiratory complications, including:
- pneumonia (infection of the lungs)
- a collapse of part or all of the lung
- respiratory failure, where the levels of oxygen in the blood become dangerously low, or the levels of carbon dioxide become dangerously high
- status asthmaticus (severe asthma attacks that do not respond to treatment). All of these complications can be life-threatening and will need medical treatment[4].

MANAGEMENT OF ASTHMA:

Although asthma cannot be cured, appropriate management can control the disease and enable people to enjoy good quality of life.

Short-term medications are used to relieve symptoms. People with persistent symptoms must take long-term medication daily to control the underlying inflammation and prevent symptoms and exacerbations. Medication is not the only way to control asthma. It is also important to avoid asthma triggers - stimuli that irritate and inflame the airways. With medical support, each asthma patient must learn what triggers he or she should avoid.

Although asthma does not kill on the scale of chronic obstructive pulmonary disease (COPD) or other chronic diseases, failure to use appropriate medications or to adhere to treatment can lead to death[4].

Non pharmacological approach –

There is increasing interest in factors, which, if avoided, might facilitate the management of Asthma, reducing the requirement for pharmacotherapy; and which may have the potential to modify fundamental causes of asthma. However, evidence has been difficult to obtain for many approaches and more studies are required.

This section distinguishes:

 PRIMARY PROPHYLAXIS: interventions made before there is any evidence of disease.

 SECONDARY PROPHYLAXIS: interventions made after the onset of disease to reduce its impact.The distinction is made, as factors that induce the disease in the first place are not necessarily the same as those that incites a pre-existing problem[4].

PHARMACOTHERAPY-

For completeness, this section on the primary prevention of asthma should mentionpharmacological trials of treatments designed to prevent onset of the disease. Children givenketotifen (206 infants, in two trials) showed significantly less asthma at one and three-yearfollow-up compared with those receiving placebo. In the third study, using cetirizine.Months' treatment had no effect in the intention to treat population but significantly reducedasthma in children with atopic dermatitis sensitised to either grass pollen or house dust mite.Cetirizine had additional benefits for atopic dermatitis alone and reduced the frequency ofUrticaria[4].

SECONDARY PROPHYLAXIS

ALLERGEN AVOIDANCE:

Allergen avoidance measures may be helpful in reducing the severity of existing disease. Increasing allergen exposure in sensitised individuals is associated with an increase in asthma symptoms,bronchial reactivity and deterioration in lung function.

ENVIRONMENTAL FACTORS:

SMOKING:

The association between passive smoking and respiratory health has been extensively reviewed. There is a direct causal relationship between parental smoking and lower respiratory illness in children up to three years of age. Infants whose mothers smoke are four times more likely to develop wheezing illnesses in the first year of life[4]

Corticosteroids

Corticosteroids increase the number of β_2-adrenergic receptors and improve receptor responsiveness to β_2-adrenergic stimulation, thereby ***reducing mucus production and hypersecretion, reducing BHR, and reducing airway edema and exudation***. Inhaled corticosteroids are the preferred long-term control therapy for persistent asthma in all patients because of their potency and consistent effectiveness; they are also the only therapy shown to reduce the risk of death from asthma. Most patients with moderate disease can be controlled with twice-daily dosing; some products have once-daily dosing indications. Patients with more severe disease require multiple daily dosing. Because the inflammatory response of asthma inhibits steroid receptor binding, patients should be started on higher and more frequent doses and then tapered down once control has been achieved. The response to inhaled corticosteroids is delayed; symptoms improve in most patients within the first 1 to 2 weeks and reach maximum improvement in 4 to 8 weeks. Maximum improvement in FEV_1 and PEF rates may require 3 to 6 weeks.

Systemic toxicity of inhaled corticosteroids is minimal with low to moderate inhaled doses, but the risk of systemic effects increases with high doses. Local adverse effects include dose-dependent oropharyngeal candidiasis and dysphonia, which can be reduced by the use of a spacer device. The ability of spacer devices to enhance lung delivery is inconsistent and should not be relied on.

Systemic corticosteroids are indicated in all patients with acute severe asthma not responding completely to initial inhaled β_2- agonist administration (every 20 minutes for three to four doses). Prednisone, 1 to 2 mg/kg/day (up to 40 to 60 mg/day), is administered orally in two divided doses for 3 to 10 days. Because short-term (1 to 2 weeks), high-dose systemic steroids do not produce serious toxicities, the ideal method is to use a short burst and then maintain the patient on appropriate long-term control therapy with inhaled corticosteroids.

In patients who require chronic systemic corticosteroids for asthma control, the lowest possible dose should be used. Toxicities may be decreased by alternate-day therapy or high-dose inhaled corticosteroids.

Methylxanthines

Ø ***Theophylline*** appears to produce bronchodilation by inhibiting phosphodiesterases, which may also result in antiinflammatory and other nonbronchodilator activity through decreased mast cell mediator release, decreased eosinophil basic protein release, decreased T-lymphocyte proliferation, decreased T-cell cytokine release, and decreased plasma exudation.

Ø Methylxanthines are ineffective by aerosol and must be taken systemically (orally or IV). Sustained-release theophylline is the preferred oral preparation, whereas its complex with ethylenediamine (aminophylline) is the preferred parenteral product due to increased solubility. IV theophylline is also available.

Ø Theophylline is eliminated primarily by metabolism via hepatic cytochrome P450 mixed-function oxidase microsomal enzymes (primarily CYP1A2 and CYP3A4) with 10% or less excreted unchanged in the kidney. The hepatic cytochrome P450 enzymes are susceptible to induction and inhibition by various environmental factors and drugs. Clinically significant reductions in clearance can result from cotherapy with cimetidine, erythromycin, clarithromycin, allopurinol, propranolol, ciprofloxacin, interferon, ticlopidine, zileuton, and other drugs. Some substances that enhance clearance include rifampin, carbamazepine, phenobarbital, phenytoin, charcoal-broiled meat, and cigarette smoking.

Ø Because of large interpatient variability in theophylline clearance, routine monitoring of serum theophylline concentrations is essential for safe and effective use. A steady-state range of 5 to 15 mcg/mL is effective and safe for most patients.

Ø Sustained-release oral preparations are favored for outpatient therapy, but each product has different release characteristics and some products are susceptible to altered absorption from food or gastric pH changes. Preparations unaffected by food that can be administered a minimum of every 12 hours in most patients are preferable.

Ø Adverse effects include nausea, vomiting, tachycardia, jitteriness, and difficulty sleeping; more severe toxicities include cardiac tachyarrhythmias and seizures.

Ø Sustained-release theophylline is less effective than inhaled corticosteroids and no more effective than oral sustained-release β2-agonists, cromolyn, or leukotriene antagonists

Ø The addition of theophylline to optimal inhaled corticosteroids is similar to doubling the dose of the inhaled corticosteroid and is less effective overall than the long-acting β2-agonists as adjunctive therapy[4].

AIM OF MANAGEMENT

The aim of asthma management are to: Avoid causative and trigger factors

- Abolish symptoms and achieve a normal lifestyle
- Restore normal (or best possible) lung function

- Reduce the risk of severe attacks
- Optimize treatment and minimize side-effects of drugs

These aims are promoted by early recognition of asthma and treatment of airway inflammation with inhaled. corticosteroids. The severity of asthma is assessed and treatment initiated on the principle of "hit early, hit hard" to gain rapid control.[4]

ROLE OF PHARMACIST IN ASTHMA MANAGEMENT;

Whether they work in community pharmacies, hospitals, or clinics, pharmacists are in a pivotal position to contribute to the overall management of asthma. Every year, pharmacists fill more than7 million prescriptions for asthma medications, which remain the principal treatment for the disease. Pharmacists have many other opportunities to assisting he management of asthma.[4]. Pharmacists can educate patients by providing information on the types and purposes of asthma medications and by demonstrating how to use inhaled medications and peak flow meters. They can reinforce and clarify the instructions contained in a patient's individual asthma management plan. In addition, pharmacists can refer patients who use over-the-counter medications to physicians for medical care Pharmacists can be valuable source of important information for other members of the health care team. They can monitor medication use and refill intervals and use this information to alert prescribers and help identify patients with poorly controlled asthma. Pharmacists also can share information about asthma medications and the National Asthma Education and Prevention Program guidelines on the diagnosis and management of asthma with members of the health care team.

Action Plan for Pharmacists

1. Educate patients about asthma medications.
2. Instruct patients about the proper techniques for inhaling medications.
3. Monitor medication use and refill intervals to help Identify patients with poorly controlled asthma.
4. Encourage patients purchasing OTC asthma inhalers or tablets to seek medical care.
5. Help patients use peak flow meters appropriately.
6. Help patients discharged from the hospital understand their asthma management plan.[4]

1. Educate patients about the role of each medication:

Pharmacists can help patients understand that, with appropriate therapy, most patients can lead normal, productive, and physically active lives. Pharmacist's can educate patients about the two broad categories of asthma medications: Medications used to prevent and/or decrease the frequency of symptoms. Preventive medication should be taken on a regular basis even when the patient is free of symptoms. This type of long-term medication includes inhaled anti-inflammatory agents such ascorticosteroids, cromolyn, and nedocromil,which are preferred therapy. It may include extended-release formulations of theophylline. Also included as long-term medication are extended-release oral and long-acting inhaledbeta2-agonists, which are added to inhaled corticosteroidswhen the recommended doses of inhaled corticosteroids are not sufficient to control chronic symptoms, especially nighttime symptoms. Preventive long-term medication also may include, for severe asthma, alternate day oralcorticosteroid therapy. In addition, the use of a short- or long-acting inhaled beta2-agonists or cromolyn beforeexercise to prevent exercise-induced bronchospasm falls into the "prevention" category. Medications taken to relieve asthma symptoms. Medications in this category are designed to relieve symptoms and generally are prescribed to be taken only as needed (PRN). This therapy includes primarily short-acting inhaled beta2-agonists (albuterol, bitolterol, pirbuterol,or terbutaline). In addition, a short course of oralcorticosteroids for patients who are not fully responsive to inhaled bronchodilators may be used to treat acute exacerbations of asthma. An effective asthma management plan should ensure that the patient is given written and verbal instructions that describe when and how a medication should be taken, how much to take, how to evaluate the response to therapy, when to seek medical care, and what to do when the desired effect isn't achieved or side effects are encountered. Pharmacists can reinforce these instructions by reminding patients, for example, to contact their physician when acute symptoms are not relieved by using their short-acting beta2-agonists inhaler as directed or when their peak expiratory flow rate (PEFR) drops below a predetermined value.

Signs of Poorly Controlled Asthma

Any one of the following criteria may indicate the need for medication adjustment, improved medication administration technique, or patient education concerning asthma and its management:

- Adverse effects from medications.
- Waking up at night from symptoms of asthma more than twice a month.
- Increased use of inhaled, short-acting beta2-agonists

(E.g., more than three to four times in 1 day).[4]

- Long-term overuse of inhaled, short-acting beta2-agonists (e.g., refilling the prescription more often than one canister/month or more than one canister/2 months of a short-acting agent when it is used in addition to a long-acting agent).
- Overuse or misuse of inhaled long-acting beta2-agonists.
- No adherence to anti-inflammatory medications (e.g., refilling the prescription less than half as often as would be required if the directions on the prescription were followed).
- Failure to achieve quick and sustained response (i.e., beginning within 10 to 20 minutes and lasting longer than 3 to 4 hours) to short-acting beta2-agonists during an acute asthma episode (as measured by a decrease in symptoms or an increase in peak expiratory flow rate).
- Poor tolerance to physical activity (i.e., the patient experiences symptoms of exercise-induced asthma).
- Missing school or work because of asthma symptoms.
- An emergency department visit or hospitalization for asthma.[5]

2. Instruct patients about the proper techniques for inhaling medications:

Inhaled medications are preferred over oral therapies. However, a major limitation in their effectiveness is the patient's ability to use the device appropriately. Studies suggest that members of the health care team (e.g., physicians, nurses, and pharmacists) may not adequately instruct patients on how to use a metered-dose inhaler (MDI). Improper MDI technique can be one cause of a poor response to therapy. Pharmacists can play an important role on the health care team by teaching patients with asthma about proper medication technique. Other devices, such as dry powder inhalers, breath-actuated inhalers, and nebulize, are also available, and they require different techniques for administration. A placebo inhaler, which can be obtained from pharmaceutical manufacturers, and instructional videos, may be useful in demonstrating proper technique.

3. Monitor medication use and refill intervals to help identify patients with poorly Controlled asthma:

During symptomatic periods, selective short-acting inhaledbeta2-agonists may be sufficient to relieve asthma symptoms. When asthma is stable, it is preferable to use these agents on an as-needed basis. Overuse and over reliance on short-acting inhaled beta2-agonists can be signs that asthma is poorly controlled. During an exacerbation, patients may increase the dose and/or frequency of use, which may lead toa delay in seeking appropriate medical care.

Pharmacists may find indications of chronic overuse of medical history and the frequency of refills. Overuse can be defined as using more than one canister per month of short- or long-acting beta2-agonists or more than one canister of a short-acting beta2-agonists in 2 months when used in conjunction with a long-acting agent. Pharmacists should also monitor for overuse of a long-acting beta2-agonists (e.g., salmeterol). In general, these agents should not be used more than twice a day and are not appropriate to relieve acute symptoms. If overuse is noted, pharmacists should alert the physician, who can assess the need for reevaluation of the patient and consider whether the patient needs to initiate or intensifyAnti-inflammatory therapy. Before contacting the physician, pharmacists should have the patient demonstrate his or herMDI technique. Poor technique may be one of the causes of Overuse of an MDI. The physician will find this information useful in making a decision on how to respond to the situation. Physicians also may want to evaluate recent trends in peak flow meter readings.[5]. Physicians will consider several factors when deciding whether to initiate or increase anti-inflammatory therapy. In general, a short course of oral corticosteroids may be indicated if the excessive use of an MDI is short term; due to an acute, severe episode; or the result of an isolated exacerbation caused by a common cold or other upper respiratory tract infections. The initiation or dose increase of an inhaled anti-inflammatory agent (corticosteroids, cromolyn, or nedocromil) as long-term therapy may be indicated if the patient relies on short-acting inhaled beta2-agonists daily to relieve symptoms, has frequent fluctuations in the peak expiratory flow rate, or has other signs of poorly controlled asthma. Patients on preventive therapy for asthma also should be monitored for signs of no adherence to anti-inflammatory therapy. In some cases, patients do not adhere toanti-inflammatory therapy because they do not understand the purpose of or perceive any immediate benefit from this Therapy. Some patients may be discouraged about following their prescribed regimen because they fear adverse reactions longer than indicated by the directions for use on the Prescription may indicate no adherence. For example, if an inhaled anti-inflammatory agent contains 100 puffs and the directions are to take 2 puffs twice a day, a patient refilling the prescription once every 60 days is underusingthe medication. In this example, the canister should be depleted in 25 days (100 puffs divided by 4 puffs per day =25 days).[5]

4. Encourage patients purchasing OTC asthma inhalers or tablets to seek medical care:

Asthma is one of the very few potentially fatal diseases for which OTC products are available for self-treatment. Use of OTC inhalers may lead to a delay in seeking appropriate medical care. Pharmacists should refer anyone using an OTC product for respiratory symptoms to a physician for diagnosis, regular monitoring, and proper treatment. The physician can then determine the need for other therapies, such as an inhaled anti-inflammatory agent to prevent.Over-the-counter inhalers contain epinephrine, which is anon selective, weak, and extremely short-actingbronchodilator. Thus, if physicians determine that the PRNuse of an inhaled bronchodilator is indicated, they can that will provide greater efficacy and a longer duration of Combination of ephedrine and theophylline. Generally, bronchodilators are less effective and cause more side effects when administered by the oral route; and combinations of theophyl line and ephedrine have the potential to cause synergistic toxicity.

5. Help patients use peak flow meters appropriately:

It is recommended that clinicians consider peak expiratory flow rate monitoring for patients over 5 years of age with moderate or severe asthma. Regular home monitoring may detect decreased lung function and signs of an impending asthma episode before it become more severe. The PEFR is the greatest flow velocity that can be obtained during a forced expiration starting with fully inflated lungs. It provides a simple, quantitative, and reproducible measure of airway obstruction with a relatively inexpensive device that is available without a prescription.[5] Measuring PEFR in a patient with asthma is analogous to measuring blood pressure with sphygmomanometer or blood glucose to guide insulin dosage. The PEFR is used by the Physician to assess the severity of asthma as a basis for adding medication, monitoring response to chronic therapy, and detecting deterioration in lung function before symptoms develop. The physician may consider more aggressive therapy if the patient's highest value is less than 80 percent of predicted value and/or daily variability is more than 20.

6. Help patients discharged from the hospital after an asthma exacerbation understand their asthma management plan:

Every patient being discharged from the hospital for the treatment of acute asthma should receive and understand an individualized asthma management plan. An asthma management plan should include specific written instructions for patients and families. Hospital pharmacists can discuss such a plan with a patient before discharge, reinforcing and clarifying instructions that have been designed to prevent subsequent hospitalizations or emergency department visits. Pharmacists also can review the patient's inhaler and peak flow meter technique and provide instruction, if needed. [6]

CONCLUSION:

Asthma is a complicated disease with a multitude of clinical presentations. The exact defect in asthma has not been defined, and it may be that asthma is a common presentation of heterogenous group of diseases. Asthma is defined and characterized by excessive reactivity of the bronchial tree to a wide variety of noxious stimuli. The reaction is characterized by bronchospasm, excessive mucus production, and inflammation. The central role of inflammation in inducing and maintaining BHR is now becoming widely appreciated and studied. The goal of asthma therapy is to normalize, ass much as possible, the patient's life and prevent chronic irreversible lung changes. Drugs are the mainstay of asthma therapy. The goal of drug therapy is to use the minimum amount possible to completely control the disease. In chronic asthma, therapy should be aimed at both bronchospasm and inflammation in order to produce the best results. Patients should be followed and nonitored diligently for toxicities. Although death from asthma is an uncommon event, the most common cause of death is underassessment of the severity of obstruction either by the patient or by the clinician; the next common cause is undertreatment. A corner stone of any therapy is education and the realization that most asthma deaths are avoidable.[6]

REFERENCES:

1. Lugogo, N., Que, L.G., Fertel, D., Kraft, M., 2010. Asthma. In: Mason, R.J., Broaddus, V.C., Martin, T.R., (Ed.) Murray & Nadel's Textbook of Respiratory Medicine. Saunders Elsevier, Philadelphia. 5th Edn. pp. 258-267.

2. Brozek, J.L., Bousquet, J., Baena-Cagnani, C.E., Bonini, S., Canonica, G.W., Casale, T.B., 2010. Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines: 2010 revision. J. Allergy Clin. Immunol. 126(3), 466-76.

3. National Asthma Education and Prevention Program Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. Rockville, MD. National Heart, Lung, and Blood Institute, US Dept of Health and Human Services, 2007. NIH publication 08-4051.

4. Wechsler, M.E., 2009. Managing asthma in primary care: putting new guideline recommendations into context. Mayo Clin. Proc. 84, 707-717.

5. Fanta, C.H., 2009. Asthma. N. Engl. J. Med. 360, 1002-1014.

6. www.asthma.com/learn/index.html