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A LITERATURE REVIEW ON RESPIRATORY DISEASES

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ABSTRACT

Chronic respiratory diseases (CRDs) are diseases of the airways and other structures of the lung. Some of the most common are asthma, chronic obstructive pulmonary disease, occupational lung diseases, and pulmonary hypertension. CRDs affect hundreds of millions people and cause an immense health burden as leading cause of disability and mortality. Tackling respiratory diseases also poses enormous economic burden on national health care systems. Therefore, finding solutions to deal with the growing incidence of respiratory diseases requires a global approach integrating international efforts in health research and disease management in the area of respiratory diseases. Through its Framework Programmes for Research and Innovation, the European Union (EU) funds frontier research, basic and clinical research and innovative product development, and training and mobility of researchers.

Key Words: Respiratory diseases, Pneumonia, Tuberculosis, Asthma, Natural drug, Herbal drugs, Diagnosis, Symptoms, Causes.

1. INTRODUCTION

Respiratory diseases are pathological conditions affecting the organs and tissues that make gas exchange difficult in air-breathing animals. They include conditions of the respiratory tract including the trachea, bronchi, bronchioles, alveoli, pleurae, pleural cavity, the nerves and muscles of respiration. Respiratory diseases range from mild and self-limiting, such as the common cold, influenza, and pharyngitis to life-threatening diseases such as bacterial pneumonia, pulmonary embolism, tuberculosis, acute asthma, lung cancer. severe acute respiratory syndromes, such as COVID-19. Respiratory diseases can be classified in many different ways, including by the organ or tissue involved, by the type and pattern of associated signs and symptoms, or by the cause of the disease.

1.1 Major causes

Respiratory diseases can have many causes, including:

- Smoking
- Air pollution
- Infections
- Genetic factors
- Occupational chemicals

1.2 Symptoms

Respiratory diseases can have a variety of symptoms, including:

- Coughing
- Chest pain
- Wheezing
- Cyanosis
- Fatigue.

1.3 Chronic Respiratory Diseases

Asthma: A chronic condition characterized by airway inflammation and narrowing, leading to wheezing, coughing, and shortness of breath.

Chronic Obstructive Pulmonary Disease (COPD): A progressive lung disease that includes conditions like emphysema and chronic bronchitis, causing difficulty breathing. mucus buildup.

Lung Cancer: A malignant growth in the lungs, often caused by smoking.

Pulmonary Fibrosis: A condition where lung tissue becomes scarred, making it difficult to breathe.

Other Respiratory Diseases

Bronchiectasis: A condition where the airways become widened and damaged, leading to chronic infections.

Pulmonary Hypertension: A condition where the blood pressure in the pulmonary arteries is abnormally high.

Sleep Apnea: A disorder where breathing repeatedly stops and starts during sleep

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Pneumonia

Pneumonia is inflammation and fluid in your lungs caused by a bacterial, viral or fungal infection. It makes it difficult to breathe and can cause a fever and cough with yellow, green or bloody mucus. The flu, COVID-19 and pneumococcal disease are common causes of pneumonia. Treatment depends on the cause and severity of pneumonia.

Diagnosis

Pneumonia can be difficult to diagnose because it has similar symptoms to the flu or a cold. A doctor may perform a number of tests to diagnose pneumonia, including:

Chest X-ray

A common test that can show inflammation in the lungs.

Blood tests

A complete blood count (CBC) can show if the immune system is fighting an infection. A blood culture can determine if a bacterial infection has spread to the bloodstream.

Pulse oximetry

A small sensor is attached to the finger or ear to measure the amount of oxygen in the blood.

Arterial blood gas test

A more accurate test than pulse oximetry, this measures the amount of oxygen in a blood sample taken from an artery.

CT scan

A chest CT scan can show detailed images of the lungs and look for complications.

Pleural fluid culture

A small amount of fluid is removed from the pleural space, the space between the lungs and chest wall, to identify the bacteria causing the pneumonia.

Bronchoscopy

A flexible tube is used to examine the lungs' airways, and may be used to take tissue samples or fluid for testing.

Other tests that may be performed include: Influenza testing and Sputum Gram stain and culture.

1.4 Drugs used in Pneumonia

Anti biotics:

Antibiotics are classified by their chemical structure, and there are many different classes. Some common classes include:

Penicillins: Examples include amoxicillin, flucloxacillin, and phenoxymethylpenicillin

Cephalosporins: Examples include cefadroxil, cefalexin, and cefaclor

Tetracyclines: Examples include doxycycline, lymecycline, and tetracycline

Fluoroquinolones: Examples include levofloxacin, moxifloxacin, and ciprofloxacin

Aminoglycosides: Examples include amikacin, gentamicin, and tobramycin

Glycopeptides: An example is vancomycin

Cyclic lipopeptides: An example is daptomycin

Nitroimidazoles: An example is metronidazole

Antibiotics can be classified as either bactericidal or bacteriostatic:

Bactericidal: Kills bacteria

Bacteriostatic: Prevents bacterial growth and reproduction, but does not kill them

Antibiotics can also be classified as broad-spectrum or narrow-spectrum:

Broad-spectrum: Effective against a wide range of bacteria

Narrow-spectrum: Effective against specific families of bacteria

Antibiotics can be administered in different ways, including orally, topically, or by injection.

1.5 Herbal drugs used for Pneumonia

These herbs may help break up mucus and ease the pain and inflammation caused by pneumonia.

A 2019 study notes that fenugreek might help break down mucus. A tea made from ground fenugreek seeds may, therefore, ease a persistent cough.

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Natural antibiotic (herbal drugs) -

Garlic

Introduction:

In a study by Dickason et al, antibacterial effect of garlic prepared by agar technique was examined against some causes of pneumonia and it was confirmed that streptococcus pneumonia was completely removed through 8.7 mg r/ml of this solution, and clinical samples of Klebsiella pneumonia were inhibited by 38.24 mg r/ml [6]

Synonym: Ail, Ajo, Allium sativum, Camphor of the Poor, Dasan.

Biological source: Biological source. Allium sativum (garlic), a member of the Liliaceae family, is used as a nutritional supplement and cultivated worldwide.

Family: - Amaryllidaceae

Chemical Constituents of Garlic:-

S-propyl-cysteine-sulfoxide (PCSO), allicin and S-methyl cysteine-sulfoxide (MCSO) are the main odoriferous molecules of freshly milled garlic homogenates

Uses:-

- Regulates blood pressure and sugar
- Strengthens immune system
- Prevents heart disease
- Anti-inflammatory
- Prevents and treats cold
- Improves bone health
- Lowers cholesterol
- Antioxidants
- Anti-cancer

2. TUBERCULOSIS

Tuberculosis (TB)is an infectious disease usually caused by Mycobacterium tuberculosis (MTB) bacteria. Tuberculosis generally affects the lungs, but it can also affect other parts of the body. Most infections show no symptoms, in which case it is known as latent tuberculosis. Around 10% of latent infections progress to active disease that, if left untreated, kill about half of those affected.

Typical symptoms of active TB are chronic cough with blood-containing mucus, fever, night sweats, and weight loss. Infection of other organs can cause a wide range of Symptoms

1.2 TRNASFUSION:

Tuberculosis is spread from one person to the next through the air when people who have active TB in their lungs cough, spit, speak, or sneeze.

People with latent TB do not spread the disease. Active infection occurs more often in people with HIV/AIDS and in those who smoke. Diagnosis of active TB is based on chest X-rays, as well as microscopic examination and culture of bodily fluids. Diagnosis of latent TB relies on the tuberculin skin test (TST) or blood tests.

1.3 Cause:

The main cause of TB is Mycobacterium tuberculosis (MTB), a small, aerobic, nonmotile bacillus. The high lipid content of this pathogen accounts for many of its unique clinical characteristics.

1.4 Diagnosis

Active tuberculosis

Diagnosing active tuberculosis based only on signs and symptoms is difficult, as is diagnosing the disease in those who have a weakened immune system. A diagnosis of TB should, however, be considered in those with signs of lung disease or constitutional symptoms lasting longer than two weeks. A chest X-ray and multiple sputum cultures for acid-fast bacilli are typically part of the initial evaluation. Interferon-γ release assays (IGRA) and tuberculin skin tests are of little use in most of the developing world. IGRA have similar limitations in those with HIV.

A definitive diagnosis of TB is made by identifying M. tuberculosis in a clinical sample (e.g., sputum, pus, or a tissue biopsy). However, the difficult culture process for this slow-growing organism can take two to six weeks for blood or sputum culture. Thus, treatment is often begun before cultures are confirmed.

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Nucleic acid amplification tests and adenosine deaminase testing may allow rapid diagnosis of TB.[100] Blood tests to detect antibodies are not specific or sensitive, so they are not recommended.

Latent tuberculosis

The Mantoux tuberculin skin test is often used to screen people at high risk for TB. Those who have been previously immunized with the Bacille Calmette-Guerin vaccine may have a false- positive test result. The test may be falsely negative in those with sarcoidosis, Hodgkin's lymphoma, malnutrition, and most notably, active tuberculosis. Interferon gamma release assays, on a blood sample, are recommended in those who are positive to the Mantoux test.

These are not affected by immunization or most environmental mycobacteria, so they generate fewer false-positive results. However, they are affected by M. szulgai, M. marinum, and M. kansasii. IGRAs may increase sensitivity when used in addition to the skin test, but may be less sensitive than the skin test when used alone.

Fig : 1 Mantoux tuberculin skin test

Herbal drugs used for tuberculosis

Allium sativum, and Myrsine Africana were the most often mentioned anti-TB medicinal plants. Shrubs (35.7%) and trees (29.6%) were reported as dominant growth forms while plant roots (31.6%) and leaves (28.6%) were frequently used plant parts for the preparations of the treatment.

Moringa oleifera:

Introduction

Moringa oleifera is a fast-growing, drought-resistant tree of the family Moringaceae, native to the Indian subcontinent and used extensively in South and Southeast Asia. Common names include moringa, drumstick tree (from the long, slender, triangular seed-pods), horseradish tree (from the taste of the roots, which resembles horseradish), or malunggay (as known in maritime or archipelagic areas in Asia).

Synonym :-

Guilandina moringa L. Hyperanthera moringa (L.) Vahl

Moringa pterygosperma Gaertn. nom. illeg.

Biological source :

Geearushical asse-Moringa is a plant that is native to the sub-Himalayan areas of India, Pakistan, Bangladesh, and Afghanistan. It is also grown in the tropics. The leaves, bark, flowers, fruit, seeds, and root are used to make medicine.

Family : moringaceae

Chemical constituents:

Isothiocyanates such as 4-112-O-acetyl-a-L-rhamnosyloxy) benzyl Isothiocyanates (RBITC; a 2-acetylated glycoside of benzyl isothiocyanate) and a 4-acetylated variant (seeds) as well as a fully no acetylated 4-(alpha-L-Rhamnosylaxy) benzyl Isothiocyanates

Nitrate, Pterygosperma, Crypto-chlorogenic acid, Quercetin, Quercetin 3-0-BD- (600-0- malonyl)-glucoside, and the isomer Isoquercetin, Kaempferol and its 3- glucoside Astragalin and its rhamnoglucoside, Procyanidins, 4-O-caffeoylquinic acid, 5-0-caffeoylquinic acid, and glucosides thereof, Protease inhibitors (leaves and seeds) with activity against serine proteases (trypsin and chymotrypsin) and

Uses :-

Strengthens the immune system

Cleans the body from toxins and heavy metals

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Asthma

Asthma is a long-term inflammatory disease of the airways of the lungs. It is characterized by variable and recurring symptoms, reversible airflow obstruction, and easily triggered broncho spasms. Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath .These may occur a few times a day or a few times per week .Depending on the person, asthma symptoms may become worse at night or with exercise. Asthma is thought to be caused by a combination of genetic and environmental factors. Environmental factors include exposure to air pollution and allergens. Other potential triggers include medications such as aspirin and beta blockers. Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry lung function testing. Asthma is classified according to the frequency of symptoms of forced expiratory volume in one second (FEV1), and peak expiratory flow rate. It may also be classified as atopic or non-atopic, where atopy refers to a predisposition toward developing a type 1 hypersensitivity reaction

Diagnosis: Asthma is a clinical diagnosis that requires a combination of history, physical exam, and tests. There's no single test that can definitively diagnose asthma. Some tests that may be used to diagnose asthma include.

Spirometry

A lung function test that measures how much air you can breathe out and how fast. You blow into a device called a spirometer.

Peak expiratory flow (PEF) test

A lung function test that measures how fast you can breathe out using maximum effort. You can do this test with a handheld device or during spirometry.

Bronchodilator responsiveness test

A test that measures how much better you can breathe after inhaling a bronchodilator, a medicine that relaxes the muscles around your airways.

Feno test

A test that measures the level of nitric oxide in your breath, which can indicate inflammation in your lungs.

Blood tests

A doctor may check your blood for levels of eosinophils and immunoglobulin E (IgE), which can indicate severe asthma.

Allergy testing

A doctor may perform allergy testing using blood or skin tests.

Herbal drugs used for asthma

Some herbs and foods may alleviate asthma symptoms by reducing inflammation, combatting oxidative stress, and boosting the immune system. These include turmeric, ginseng, and garlic.

Herbal drugs

1. Turmeric

Turmeric is celebrated for its significant anti-inflammatory properties, largely attributed to its active compound, curcumin.

Synonym: Curcuma domestica; Curcuma aromatica.

Family: Zingiberaceae

Biological source: Turmeric is a product of Curcuma longa, a rhizomatous herbaceous perennial plant belonging to the ginger family Zingiberaceae, which is native to tropical South Asia. As many as 133 species of Curcuma have been identified worldwide

Uses of turmeric in asthma:

- Natural anti-inflammatory
- Anti-cancer Effect
- Powerful antioxidant
- Protects Heart disease
- Treat or Prevent Diabetes
- Prevent Alzheimer's Disease
- Treats Depression
- Improves skin health

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