
UNIT 2 COMMON CONDITIONS-2 – RESPIRATORY SYSTEM

Structure

- 2.0 Introduction
- 2.1 Objectives
- 2.2 Overview of Respiratory System
- 2.3 Primary Care for Acute Upper Respiratory System Infections
 - 2.3.1 Catarrh (Rhinitis)
 - 2.3.2 Common Cold (Viral Rhinitis),
 - 2.3.3 Sinusitis
 - 2.3.4 Pharyngitis
 - 2.3.5 Laryngitis
 - 2.3.6 Tonsillitis
- 2.4 Primary Care for Acute Lower Respiratory System Infections (LRTIs)
 - 2.4.1 Bronchitis
 - 2.4.2 Pneumonia
 - 2.4.3 Bronchial Asthma
- 2.5 Screening, Referral and Follow up of Patients
 - 2.5.1 Haemoptysis
 - 2.5.2 Acute Chest Pain
 - 2.5.3 Screening of Patient with Acute Chest Pain
- 2.6 Let Us Sum Up
- 2.7 Model Answers
- 2.8 Key Words
- 2.9 References

2.0 INTRODUCTION

In previous Unit you have already learnt about assessment, identification and referral of patients with conditions related to gastro intestinal system. In this unit we shall focus on assessment, identification and referral of patients with acute respiratory infections and conditions. The early assessment of various acute respiratory illnesses is very important for taking a prompt action and correctly deciding an appropriate management at your level before referral. In this unit, you will learn conditions related to respiratory system i.e. Acute Upper Respiratory System Infections and Acute Lower Respiratory System Infections.

2.1 OBJECTIVES

After completing this unit, you should be able to:

- assess and identify signs and symptoms of patients with Acute Upper Respiratory System Infections;
- assess and identify signs and symptoms of patients with Acute Lower Respiratory System Infections;

- explain the steps of primary care for patients with Acute Upper and Lower Respiratory System Infections; and
- identify and assess the patients with Hemoptysis and Acute Chest pain in patients above 35 years of age for early referral and follow up.

2.2 OVERVIEW OF RESPIRATORY SYSTEM

The respiratory system is composed of the upper and lower respiratory tracts, both are responsible for ventilation. The upper respiratory tract is known as the upper airway warms and filters inspired air so that the lower respiratory tract (lungs) can accomplish gas exchange. The upper respiratory tract structures consist of the nose, sinuses and nasal passages, pharynx, tonsils and adenoids, larynx and trachea. The lower respiratory tract structures consist of the lungs which contain the bronchial and alveolar structures needed for gaseous exchange (Fig. 2.1). The disorders of respiratory system are common and are encountered by health professionals in every setting from community to the intensive care unit. To assess the respiratory system the nurse must be skilled at differentiating between normal and abnormal findings.

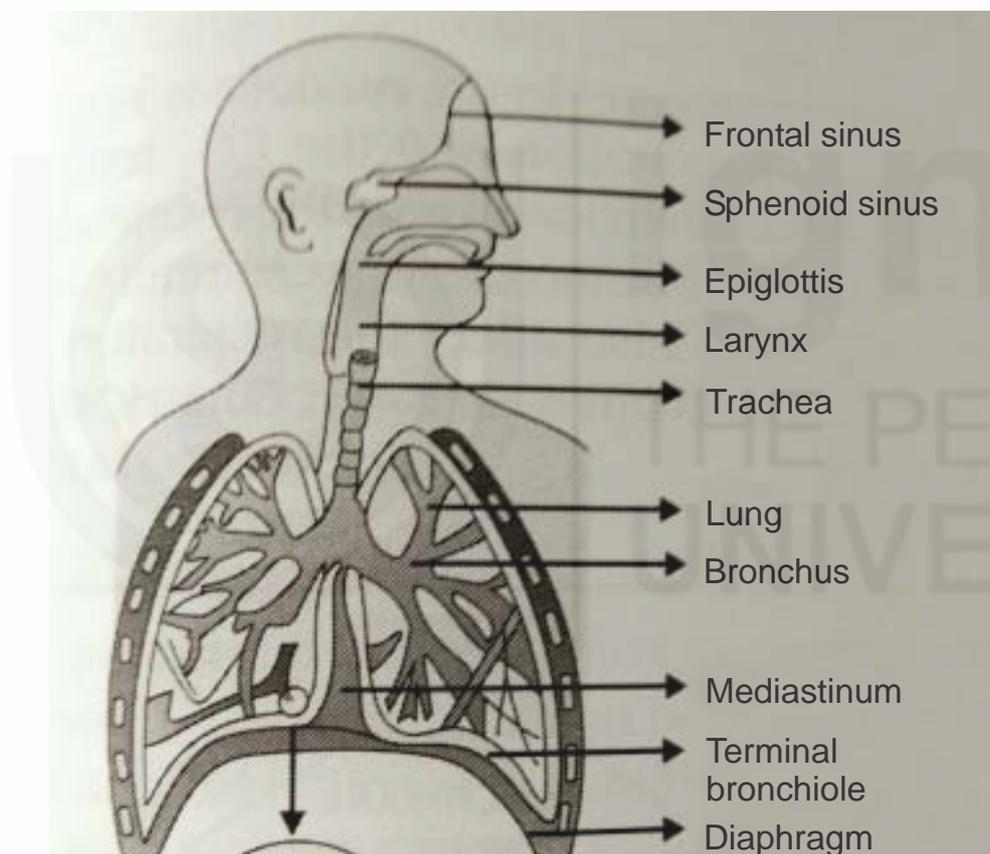


Fig. 2.1: Anatomy of Respiratory System

2.3 PRIMARY CARE FOR ACUTE UPPER RESPIRATORY SYSTEM INFECTIONS

The Upper Respiratory tract Infection is the most common cause of illness and affects most people on different occasions. Acute respiratory infections are those in which symptoms last for several days. Their effects are limited to mild and temporary discomfort to the patient which can be treated at the basic level by a competent and skilful health care giver. But occasionally these problems can

become complicated and need referral. The Upper Respiratory tract Infections (URIs) are viral or bacterial infections which can occur in any of the components of upper respiratory tract, like trachea, larynx, pharynx, sinuses etc. About 90% of URIs stem from a viral infection of the upper respiratory passages and subsequent mucous membrane inflammation. Some of the common acute upper respiratory infections which need prompt care are: catarrh (rhinitis), common cold (viral rhinitis), sinusitis, pharyngitis, laryngitis and tonsillitis.

Assessment: Let us now learn the assessment for the patient with upper respiratory infections as given below:

For assessing the patient with upper respiratory infections such as: catarrh, common cold, sinusitis, pharyngitis, laryngitis and tonsillitis, it is important for the community health nurse practitioner to check for the following possible signs and symptoms given in (Box 2.1) below:

Box 2.1: Common Signs and Symptoms of Upper Respiratory Infections

- Running nose
- Nasal congestion
- Sneezing
- Postnasal drip
- Cough
- Sore throat
- Headache
- Difficulty in breathing
- Fever
- Fatigue
- In addition to above signs and symptoms, the patient has other symptoms associated with specific condition/ disease.

Primary care:

As the upper respiratory tract infections are mostly contagious, they spread from one person to another by coming in contact with respiratory droplets from sneezing, coughing etc. Thus exposure to objects like doors, sink faucets, table surfaces with viruses can lead very frequently to acute infections like rhinitis and common cold. Besides, infections like sinusitis, pharyngitis, laryngitis and tonsillitis can be caused by bacterial infections as well. Most of the upper respiratory infections occur during winter season. Individuals with low immunity are more prone to these problems. Therefore community health nurse practitioner plays a significant role in educating these patients to practice following primary remedial measures before referring to the general practitioner.

Primary Remedial Measures for Acute Upper Respiratory Tract Infection

a) Non-pharmacological measures:

- Taking ginger tea several times in a day is one of the most effective natural remedies for upper respiratory infection for being antibacterial and excellent cough expectorant in nature. Prepare the tea by boiling one or two teaspoons of freshly ground ginger in water for about ten minutes. Add some honey in it to make this more effective.

- Gargling with lukewarm salt water several times in a day can help relieve throat discomfort. It also helps to dislodge any phlegm that is hanging out and expels it out easily.
- Steam inhalation therapy (plain or added with menthol crystals or eucalyptus oil) during morning and evening is beneficial in loosening the trapped mucous and soothing the sore throat.
- Take 1 tablespoon of honey 1–3 times daily to control coughing by soothing the irritated mucous membrane. Take immediately before bed if cough is disrupting the sleep. Honey also has antibacterial properties due to its enzymes.
- Drinking a combination of garlic and lemon juice mixed in water daily is one of the therapeutic natural remedies for upper respiratory infection due to their antibacterial and antioxidant properties.
- Drinking warm milk mixed with half a teaspoon of turmeric powder twice a day is effective due to its antibacterial and antiviral properties.
- Sniffing few drops of eucalyptus oil placed on a clean cloth will reduce nasal congestion.
- Taking a combination of lemon juice extracted from one lemon and a teaspoon of honey in a glass of lukewarm water is a highly beneficial for fighting cold, cough and the flu naturally due to their antibacterial and antiviral properties. Follow this therapy for a few days by taking this mixture about one or two times in a day.
- Consuming a combination of onion juice and honey is useful in providing relief by soothing the throat during throat infection. Combination of carrot juice can also help in controlling the infection.
- Take adequate rest.
- Avoid physical and mental stress.
- Maintain proper hygiene to avoid the infection from spreading such as: covering mouth and nose during coughing and sneezing, wiping running nose with separate handkerchief and proper hand washing.

b) Dietary measures:

- When dealing with upper respiratory infection, it is recommended to take a diet rich in vitamin C and zinc. Vitamin C, in particular, helps strengthen the immune system and hence helps fight infection.
- Take chicken soup. Having antiviral action chicken soup really does act to knock out a cold or the flu and hasten healing.
- Take low fat dairy products, sprouts and vegetables high in protein with garlic, onion, carrot, lemon and ginger. Use spices like cardamom, black pepper, turmeric and clove.
- Avoid refined carbohydrates and flesh foods as well, atleast until you get rid of the infection.
- Drink plenty of water to replace fluid loss.
- Drink hot herbal teas added with honey which has antibacterial property.

c) Stop

Taking alcoholic, caffeinated beverages and smoking as it can make the condition worse causing irritation in the bronchial tubes. In addition, it also affects the immune system adversely.

Referral:

If the patients with upper respiratory tract infections do not respond to non-pharmacological measures / elementary treatment and show the recurrence of sign and symptoms or become very sick, such patients are then referred to a hospital for further diagnostic investigation and appropriate treatment.

2.3.1 Catarrh (Allergic Rhinitis)

Catarrh is a vasomotor rhinitis or allergic rhinitis caused by the body’s natural reaction to an infection or irritation / allergen which causes the mucous membranes to swell and produce mucous. The common triggers for catarrh are cigarette smoke, air pollution, perfume, alcohol, spicy food, changes in the weather and stress.

Assessment:

Assessment includes identifying the problems of the patient by history taking and physical examination. Upon assessment, patient with catarrh will have the following possible signs and symptoms given in Box 2.2.

Box 2.2: Assessment of patient with catarrh for possible signs and symptoms

- A blocked or ‘stuffy’ nose
- A running nose or mucous that runs down the back of throat· Sore throat
- An irritating cough
- Headache
- Loss of smell or taste
- Pain in the face
- Generalised fatigue
- Body aches
- An occasionally mild hearing loss
- Or a crackling sensation in the middle ear

Primary care:

- Most cases require no specific treatment. But if it does not clear up on its own, then patient is advised to take following treatment:
 - Antihistamine drugs (levocitrizine 1 tablet 1 to 3 times a day) which help to relieve a blocked nose by reducing swelling of the blood vessels in the nose but this should not be used for more than a few days.
 - Tablet paracetamol stat if there is headache, fever or body ache.
 - Steam inhalation therapy: This involves inhaling steam from a bowl of hot but not boiling water which helps in softening and loosening any mucous form nasal cavities.

- Ask the patient to :
 - Gargle with hot water and salt, this will help in relieving the throat congestion and irritation.
 - Avoid common triggers such as cigarette smoke, dust, perfume, alcohol, caffeinated beverages, spicy food, cold breeze and congested environment.
 - Take adequate rest.
 - Follow dietary measures as mentioned above in Box 2.2.

Referral:

- If catarrh persists over a week then refer the patient to the hospital to rule out other conditions such as nasal polyps or allergy.
- Small nasal polyps are treated by shrinking them with steroid nasal sprays, but larger polyps may need to be removed with surgery.

2.3.2 Common Cold (Viral Rhinitis)

It is a common condition which often makes a patient to seek the medical advice at the sub-centre. It is caused by a virus which quickly spreads from person to person through coughing and sneezing.

Assessment:

On examination the patient having common cold may have signs and symptoms like sore throat, cough, and nasal congestion, running of nose, fever, headache and body aches.

Primary care:

If the patient with common cold reports to you, proceed as follows:

- Give him/ her decongestants (Chlorotone 1 tablet 3 times a day) to relieve the nasal congestion.
- Give paracetamol tablet/syrup for headache and body aches.
- Ask the patient to take lemon juice extracted from one lemon and a teaspoon of honey in a glass of lukewarm water for few days to relieve cold, cough and flu.
- Ask the patient to sniff few drops of eucalyptus oil placed on a clean handkerchief which will reduce nasal congestion.
- Advise the patient to maintain proper hygiene to avoid the infection from spreading such as: covering mouth and nose during coughing and sneezing, wiping running nose with separate handkerchief and proper hand washing.
- Advise patient to follow the dietary measures.

Referral:

If the patient does feel better within 3 days, refer to PHC for further treatment.

2.3.3 Sinusitis

Sinusitis means inflammation of the sinuses (such as: frontal, ethmoid and maxillary) caused by an infection. The cheekbone (maxillary) and frontal sinuses are the most commonly affected. Sinusitis is said to be acute if it lasts from 4–30 days.

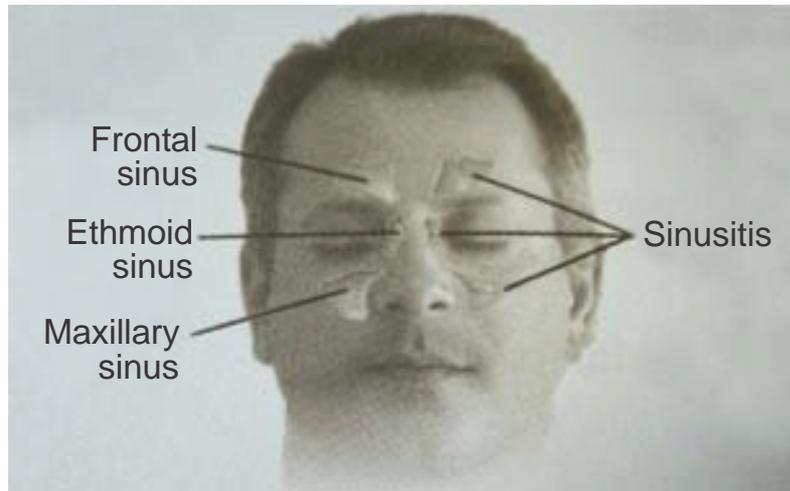


Fig. 2.2: Sites of Sinusitis

Remember:

Children are more prone than adults to complications. Swelling or redness of an eyelid or cheek in a child with sinusitis should be reported to a doctor urgently. As the infection may spread from a sinus to around an eye, into bones, into the blood or into the brain. These severe complications are estimated to occur in about 1 in 10,000 cases of acute sinusitis.

Causes:

Acute sinusitis is caused by:

i) **After a cold or flu:**

In most people, acute sinusitis develops after a cold or flu-like illness. Colds and flu are caused by germs called viruses which may spread to the sinuses.

ii) **Through dental infection:**

In some cases, infection spreads to a cheekbone (maxillary) sinus from an infected tooth.

iii) **Nasal allergy (Allergic Rhinitis):**

The allergy may cause swelling of the tissues on the inside lining of the nose and block the sinus drainage channels. This makes the sinuses more susceptible to infection.

iv) **Miscellaneous factors** causing blockage to sinus drainage channels (Box 2.3)

Box 2.3: Miscellaneous factors causing blockage to the sinus drainage channels

- Growths (nasal polyps).
- Objects pushed into the nose (especially in children, such as peas or plastic beads).
- Facial injury or surgery.
- Certain congenital abnormalities in children.
- Asthma.

- A poor immune system for example, people with HIV, people on chemotherapy etc.
- Inflammatory disorders such as sarcoidosis.
- Pregnancy, which makes you more prone to nasal inflammation (rhinitis).
- Previous injuries to the nose or cheeks.
- Medical procedures such as ventilation or the insertion of a tube through the nose into the stomach (nasogastric tube).
- Smoking.

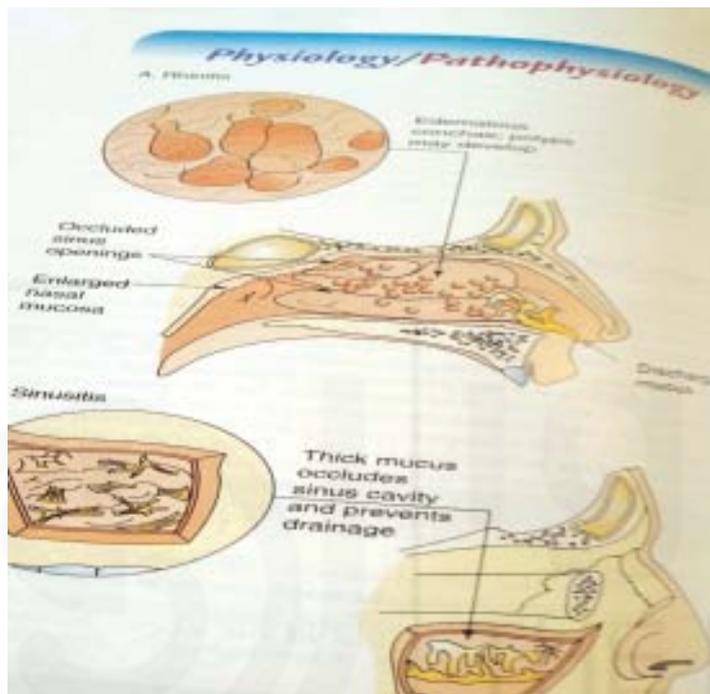


Fig. 2.3: Diagrammatic presentation of Rhinitis and Sinusitis

Assessment:

Acute sinusitis is usually assessed by enquiring and observing the patient for the following signs and symptoms with typical characteristics:

- Low grade fever with malaise.
- Tenderness and pain over the effected sinuses. The pain is often throbbing and worse when the patient is asked to bend the head forward. Chewing may be painful.
- Throbbing type of headache.
- Swelling in the lining of the nose.
- A blocked nose and sense of smell may also go for a while.
- A running nose. If the discharge is green /yellow, it is more likely that the patient have a bacterial infection in the sinuses. The green/yellow colour is due to infected mucous and pus. A running nose may dry up if the sinus drainage channels become blocked with thick mucous. If this happens, pain and tenderness over the infected sinus may become worse.
- Cough

- A feeling of pressure or fullness in the ears
- Tiredness

In children, symptoms may include:

- Irritability
- Ear discomfort
- Snoring
- Mouth breathing
- Bad breath
- Toothache
- Feeding difficulty
- Nasal speech

Primary Care:

In most cases of acute and mild sinusitis the immune system usually clears the viral or mild bacterial infection and symptoms generally go within a couple of weeks.

Remember :

- Antibiotics do not kill viruses. Also antibiotics can cause side-effects like diarrhoea, nausea, vomiting, skin rashes and fungal infection (thrush).
- Therefore in most cases of acute sinusitis, antibiotics are not needed.

As a community health nurse practitioner, you can treat the patient as follows, which may help to relieve symptoms while waiting for the immune system to clear the infection include:

- 1) Give painkillers such as tablet paracetamol or ibuprofen to reduce pain and fever.
- 2) Give stronger painkillers such as codeine for severe pain for a short time.
- 3) Give decongestant nasal sprays / drops to relieve congestion and blockage in the nose.
- 4) Advise the patient to maintain hydration by taking plenty of fluids.
- 5) Advise the patient to apply warm face packs over the sinuses to ease the pain.
- 6) Teach the patient how to use saline nasal drops to relieve congestion and blockage in the nose.

Remember :

DO NOT use a decongestant spray or drops for more than 5–7 days at a time. If used for longer than this, these may cause a worse rebound congestion in the nose.

- 7) Advise the patient to take steam inhalation (breathing in moist heat through the nose and breathing it out through the mouth) to relieve nasal congestion.

Referral:

Refer the patient to hospital if:

- Signs and symptoms become severe or do not ease within a week.
- Patient has reported with following signs and symptoms:
 - Severe pain and / or swelling at the front of the head.
 - Swelling around the eye.
 - Swelling of the face.
 - Bloodstained discharge coming from the nose.
- There is H/O recurring sinusitis, as this may indicate an underlying problem.

2.3.4 Pharyngitis

Pharyngitis is a sore throat caused by inflammation of the back of the throat between the tonsils and the larynx. (also called the pharynx) which usually subsides within a week or less.

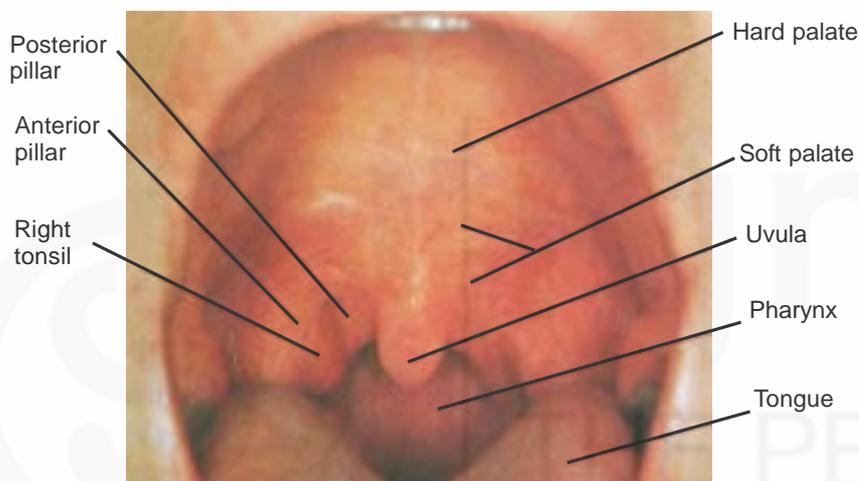


Fig. 2.4 : Structures surrounding the Pharynx



Fig. 2.5 : Diagrammatic presentation of Pharyngitis

Causes:

- Most sore throats occur during colder months and are caused by viral infections such as the common cold, flu, mononucleosis, measles, chickenpox and croup.

- However, bacteria such as Group ‘A’ Streptococcus, whooping cough (caused by the bacteria Bordetella pertussis), and diphtheria can sometimes cause pharyngitis.
- The illness often spreads between people by breathing in bacteria or viruses that are spread in the air, or by touching a surface with germs on it.
- Other causes of a sore throat may include allergies, dryness, irritants, straining of throat muscles, gastroesophageal reflux disease (GERD), HIV infection, or tumours of the throat, tongue, or larynx (voice box).

Box 2.4: Risk Factors for Pharyngitis

- Cold and flu seasons
- Having close contact with someone who has a sore throat or cold /flu
- Smoking
- Exposure to second-hand smoke
- Frequent sinus infections
- Allergy

Assessment:

The common signs and symptoms which you will likely find during assessment in the patient with acute pharyngitis include:

Box 2.5: Common Signs and Symptoms with Acute Pharyngitis

- Sore throat
- Fever
- Headache
- Joint pain
- Muscle ache
- Skin rashes
- Enlarged lymph nodes in neck and armpits
- Swollen tonsils
- Loss of appetite
- Enlarged spleen and liver

Depending on cause of sore throat, symptoms vary as follows:

For example the patient having:

- i) **Sore throat with cold** will report sneezing, coughing, a low grade fever (less than 102°F) and mild headache.
- ii) **Sore throat with flu** will give complaint of fatigue, body aches, chills, fever higher than 102°F.

Primary Care:

One of the most common reasons which make a person to seek treatment is painful swallowing, soreness or scratchiness in the throat. The first aid treatment

will depend upon the cause of pharyngitis, therefore the first step is to find out the cause of sore throat and manage the case accordingly as follows:

- 1) Enquire whether the patient has symptoms of cold or flu. If the sore throat is associated with cold or flu caused by a virus, antibiotics will not help and it will go away of its own within five to seven days. For that time period advise the patient to:
 - a) Take rest
 - b) Quit smoking
 - c) Avoid alcohol
 - d) Drink warm liquids, such as lemon tea or tea with honey
 - e) Gargle with warm salt water (1/2 tsp of salt in 1 cup of water) throughout the day
 - f) Drink cold liquids or sucking on fruit-flavoured ice pops
 - g) Suck on hard candies or throat lozenges (for adults only)
 - h) Use a cool-mist vaporiser or humidifier.
- 2) Give NSAID such as acetaminophen, aspirin or ibuprofen to reduce inflammation.
- 3) If the sore throat is associated with bacterial infection and there are no symptoms of cold or flu, then give the patient a course of antibiotics (capsule amoxicillin 500 mg 8 hourly) for five to seven days in addition to above treatment.

Remember:

Children under 19 should not take aspirin.

Referral:

Refer the patient to ENT hospital (ear, nose and throat doctor) if:

- Signs and symptoms become severe or do not ease within a week.
- The cause of sore throat is other than common cold or flu.
- Patient has frequent bouts of sore throat.
- Explain the patient that the ENT Specialist will do physical examination by:
 - Looking at your throat, ears and nose with a lighted instrument.

Refer the patient to a Laboratory technologist for:

- Throat culture to rule out streptococcal or any other cause of infection.
- Blood test to determine whether an infection is more likely caused by a bacterial or viral agent.

AWARE the patient, about the complications of pharyngitis (given in Box 2.6) if not treated properly at appropriate time.

Box 2.6: List of Complications due to Untreated Pharyngitis

• **Suppurative Complications:**

- Otitis Media
- Sinusitis
- Peritonsillar Abscess

- Retropharyngeal Abscess
- Cervical Adenitis.
- **Non suppurative Complications:**
 - Rheumatic Heart Disease
 - Post-streptococcal Glomerulonephritis.

2.3.5 Laryngitis

Laryngitis is swelling of the voice box, including the vocal cords. Vocal cords normally create sound by vibration. Swelling makes movement of the vocal cords difficult which makes you sound hoarse or prevents sound at all. Parts of larynx are shown in Fig. 2.6.

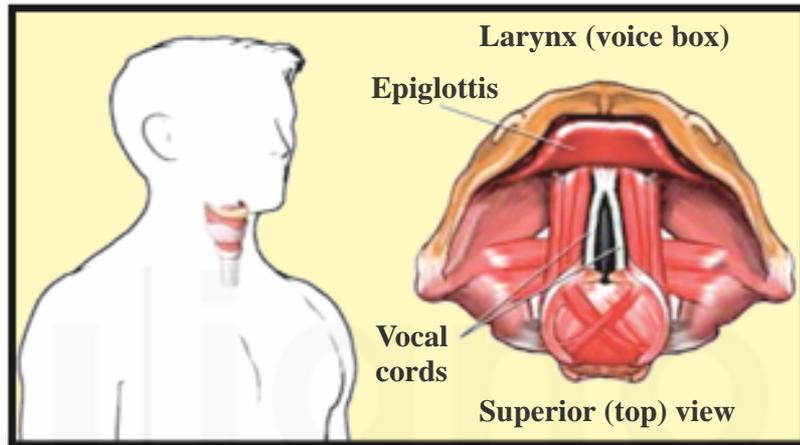


Fig. 2.6 : Parts of Larynx

Causes:

The voice box or vocal cords usually become inflamed from overuse, irritation, or infection. A variety of conditions can cause the inflammation that result in laryngitis. These include viral infections, environmental factors and in rare cases, bacterial infections.

Acute laryngitis is a temporary condition caused by:

- An underlying infection
- Overuse of vocal cords.
- Exposure to harmful chemicals/ allergens / smoke
- Acid Reflux

Assessment:

The physical assessment of the patient with laryngitis include:

- a) Inspecting the patient for following signs and symptoms:
 - Weakened voice or Loss of voice or Hoarseness of voice
 - Dry throat
 - Throat irritation
 - Dry cough

- b) Asking the patient if there is any H/O:
- Overusing of voice
 - An underlying infection
 - Exposure to harmful chemicals/ allergens / smoke
 - Acid Reflux
- c) Visual examination through special mirror by the doctor to view the vocal cords and voice box for signs of inflammations.

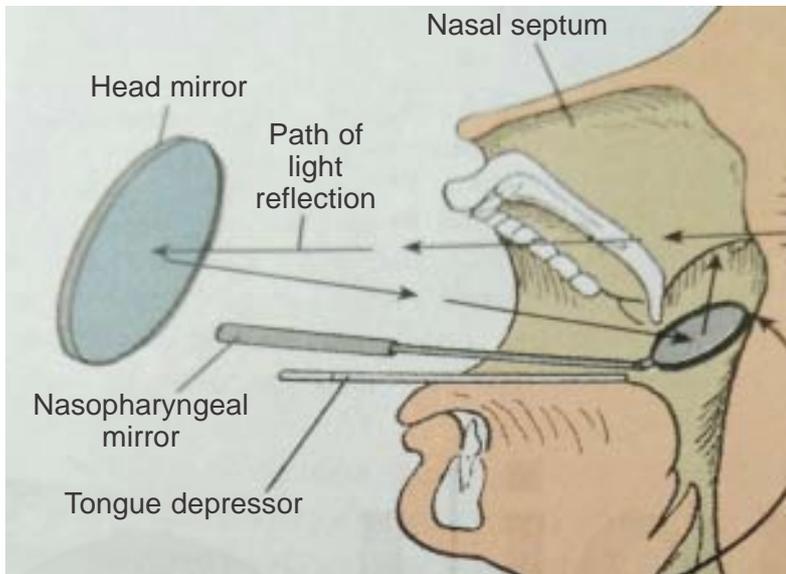


Fig. 2.7 : Visual Examination of Nasopharynx through Mirror

OR

- d) Examination by Laryngoscope (if available) – An instrument having a thin flexible tube with a microscopic camera is passed by doctor through the mouth or nose to magnify the voice box for easy viewing to look for the following signs of laryngitis (Fig. 2.8):
- Redness
 - Lesions on the voice box
 - Widespread swelling

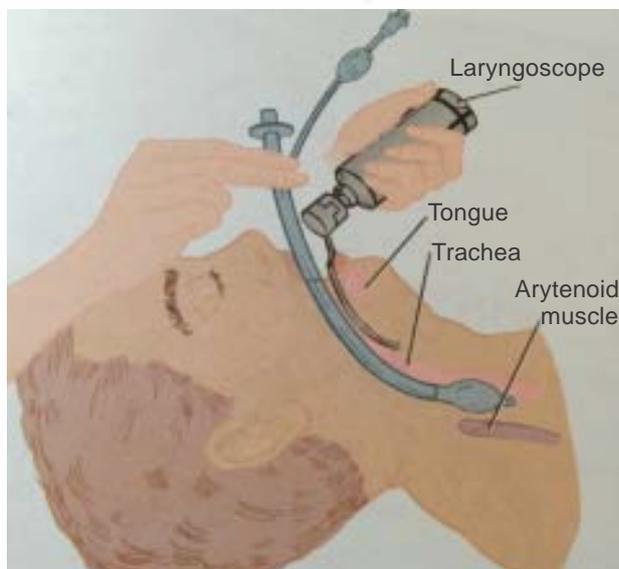


Fig. 2.8 : Laryngoscopy

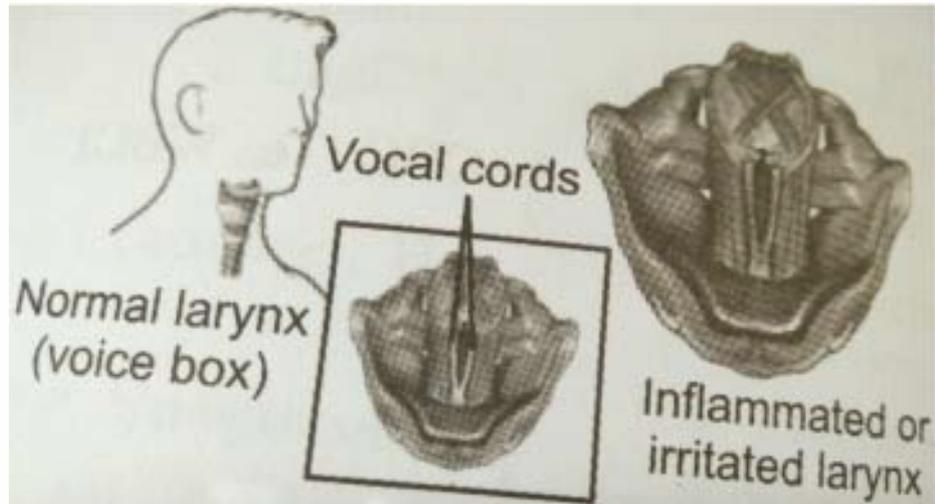


Fig. 2.9 : Laryngitis

Primary care:

Treating the underlying condition will cause the laryngitis to go away.

- If the cause of infection is viral, the symptoms will disappear without treatment and the patient will feel well within a week or two due to good immune system.
- If it is a bacterial laryngitis (although this form of laryngitis is rare). Then give antibiotics such as: capsule amoxicillin 500 mg 8 hourly to the patient for five to seven days.
- Give NSAID such as acetaminophen (Tylenol), aspirin or ibuprofen (Advil, Motrin) to reduce inflammation.
- Advise the patient to follow the instructions given below in the (Box 2.7)

**Box 2.7: Instructions for the Patient with Acute Laryngitis to
Keep Vocal Cords Healthy**

- Keep vocal cords moist and free from irritants.
- Use a humidifier or inhale steam to alleviate dryness.
- Give rest to the voice.
- Correct the way you use your voice and any abnormal speech patterns that place stress on your vocal cords and voice box.
- Get vocal therapy to correct the abnormal speech.
- Avoid screaming or talking loudly for long periods of time.
- Refrain from whispering, which can strain the voice.
- Drink plenty of fluids.
- Gargle with salt water.
- Avoid smoking and being around people who smoke.
- Avoid alcohol and caffeine intake.
- Wash the hands regularly to avoid catching colds and upper respiratory infections.
- Try to avoid toxic chemicals in the workplace if possible.

- Try to avoid clearing the throat. This increases both mucous production and irritation.
- Avoid decongestants which can dry the throat.
- Keep sucking on lozenges to keep the throat lubricated.
- Avoid seasonal allergies.
- Manage acid reflux with medications and healthy food habits.
- Avoid taking antibiotics for cold, flu or other viral respiratory infections, as these will usually go away of their own.
- It may take up to 2 weeks for your voice to completely return.
- Take prescribed antibiotics if the laryngitis is associated with a bacterial infection.

Referral:

Refer the patient to speciality hospital if:

- Hoarseness of voice, throat irritation and dry cough do not subside within a week.
- Patient has H/O recurring laryngitis, therefore to find out and treat underlying problem such as sinusitis.

Remember:

- Chronic laryngitis may require more extensive treatment and this is determined by the cause of the inflammation.
- Surgery may be required in cases where the vocal chords have been damaged as a result of polyp or nodule growth.
- In rare cases, vocal cord inflammation can cause respiratory distress. This situation requires immediate medical attention.

2.3.6 Tonsillitis

Tonsillitis is inflammation of the tonsils caused by viral or bacterial infection. The majority of cases of tonsillitis are caused by cold virus, with only 15 to 30% of cases being caused by bacteria such as streptococcus pyogenes. Tonsillitis occurs mainly in children but rarely in children less than two years of age.

Remember:

Tonsillitis caused by streptococcus pyogenes is highly contagious and tonsillitis caused by the Epstein-Barr virus is contagious the first time a person has it. In both cases, steps to prevent its spread should be taken (refer Box 28)

Assessment:

- Upon assessment the early complaints which a tonsillitis patient may report are:
 - Moderate to severe sore throat lasting longer than 2 days

- Cold symptoms such as: running nose, fever, chills
- Throat congestion.
- The other signs and symptoms of tonsillitis are:
 - Swollen and tender glands (lymph nodes) on the sides of the neck
 - Difficult or painful swallowing
 - Bad breath
 - Tiredness and headache
 - Stomach upset or pain
 - Mouth breathing, noisy breathing and/or snoring (due to enlarged tonsils blocking the airways)
- The assessment of Viral tonsillitis will include following features:
 - Teenager or younger child
 - Accompanied by symptoms of severe lethargy and tiredness, swollen glands in the neck, armpits and/or groin, and an enlarged spleen.
- Throat examination will reveal enlarged and reddened tonsils with spots of white/yellow pus.

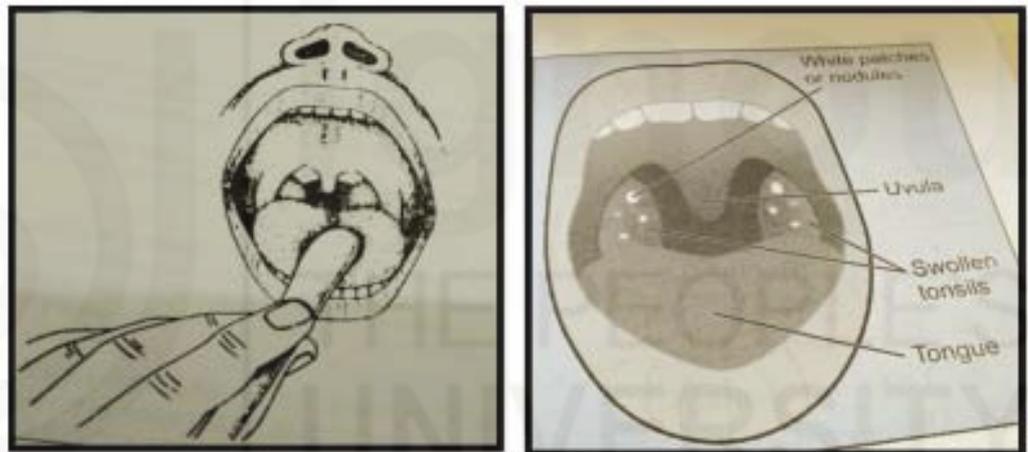


Fig. 2.10: Throat Examination Showing Tonsillitis

Remember:

- Patients with viral tonsillitis usually recover with symptomatic treatment without antibiotics.
- Symptoms of tonsillitis usually resolve after three to four days but may last up to two weeks.

Primary care:

After doing thorough assessment the patient is advised to:

- Take rest till recovery of symptoms.
- Take paracetamol and ibuprofen for pain relief and reduction of fever.
- Take the full course of antibiotics as prescribed to prevent the infection returning and to reduce the likelihood of developing rheumatic fever or kidney disease.

- Take corticosteroids such as dexamethasone or prednisolone as prescribed by physician to reduce inflammation and swelling, particularly when it is making swallowing and breathing difficult.
- Gargle with salt water (1/2 teaspoon of salt to a cup of warm water) to soothen the throat.
- Suck on throat lozenges containing ingredients that are cooling and anti-septic.
- Drink plenty of fluids.
- Have regular soft and non spicy meals.
- Follow hygienic measures given in Box 2.8.

Box 2.8: Precautions for Preventing the Spread of Tonsillitis

- Avoid close contact with people who have tonsillitis to prevent passing on the infection.
- Children and other family members should be kept away from people with tonsillitis as much as possible.
- Hygienic measures should be used to prevent spread of infection such as :
 - Regular and thorough washing and drying of hands.
 - Using a tissue to cover coughs and sneezes.
 - No sharing of foods, liquids or eating utensils or drinking vessels.
 - Frequent cleaning of surfaces particularly in the kitchen and bathroom.

Referral:

- Refer the patient to ENT hospital:
 - If patient shows exacerbations of signs and symptoms and does not respond to the bacterial treatment.
 - For blood test to determine whether an infection is more likely caused by a bacterial or viral agent.
 - For throat culture to rule out streptococcal or any other cause of infection.
 - For surgical removal of tonsils (tonsillectomy) in case of chronic tonsillitis and for people who are allergic to antibiotics.
- **Explain** the patient that:
 - Surgery does carry least risks, including rare bleeding during and after the operation in some people.
 - Throat pain and difficulty eating is usual in the first few days after the operation.
 - Full recovery typically takes two to three weeks.

Remember:

- The streptococcus pyogenes bacteria can cause streptococcal throat infection and associated bacterial tonsillitis which can result in the serious complications of rheumatic fever and kidney disease. For this reason it is important to seek medical advice and treatment if streptococcal infection is suspected.
- The most common complication of viral tonsillitis occurs when the infection becomes deep-seated within the tonsil resulting in a peritonsillar abscess (a collection of pus beside the tonsil).
- Peritonsillar abscesses are extremely painful and if left untreated can spread into the neck, blocking the airways and becoming a life-threatening complication. It can usually occur in teenagers and young adults but can occur at earlier ages.
- Peritonsillar abscesses can be drained using a needle and syringe or by making an incision with a scalpel.
- Tonsillectomy is an option in those with a history of peritonsillar abscess.

Check Your Progress 1

- 1) List the common signs and symptoms of Upper Respiratory system Infections.
.....
.....
- 2) Discuss the primary care measures to be taken for the patient with common cold.
.....
.....
- 3) What instructions will you give to the patient with acute laryngitis to keep his/her vocal cords healthy?
.....
.....
- 4) Fill in the blanks:
 - a) The various risk factors of pharyngitis include
 - b) The streptococcal throat infection if remain untreated can result in the serious complications of and
 - c) A collection of pus around the tonsils called is most common complication of which occurs when the infection becomes deep-seated within the tonsil.
 - d) is an instrument which is having a thin flexible tube with a microscopic camera and is passed by doctor through to visualise the voice box for 3 signs of laryngitis such as:(i) (ii)(iii)

2.4 PRIMARY CARE FOR ACUTE LOWER RESPIRATORY TRACT INFECTIONS (LRTIs)

In 2013 there were about 150 million LRTIs. These resulted in 2.7 million deaths down in 2013 from 3.4 million deaths in 1990, which estimated about 4.8% of all deaths in 2013.

The acute lower respiratory system infections include conditions like Bronchitis and Pneumonia which can be either bacterial or viral. (Asthma is not a lower respiratory tract infection, so it should not be mentioned in this chapter)

2.4.1 Bronchitis

Acute Bronchitis is a sudden inflammation of the lining of bronchial tubes which carry air to and from lungs. Acute bronchitis is a shorter illness usually lasts a few days or weeks. In this the irritated membrane swells and grows thicker, which narrows or shuts off the tiny airways in the lungs, resulting in coughing spells that may be accompanied by phlegm and breathlessness. (Fig.2.11)



Fig. 2.11 : Normal Bronchi Inflammation of Bronchioles

Causes:

Acute bronchitis can be either acute bacterial or viral infection in healthy patients with no history of recurrent disease. It affects on an average 40 adults per 1000 each year and follows a cold or viral infection such as the flu. Some of the factors that can increase the risk for acute bronchitis are given in Box 2.9.

Box 2.9: Risk Factors of Acute Bronchitis

- Contact with the person having bronchitis.
- Exposure to smoke or chemicals
- Dust or Air pollution
- A weakened immune system or taking drugs that weaken the immune system

Approximately 90 per cent of acute bronchitis infections are caused by viruses.

Assessment:

For assessing the patient with acute bronchitis it is important to check signs and symptoms given in Box 2.10 and enquire about their onset, duration and associated factors.

Box 2.10: Signs and Symptoms of Patient with Acute Bronchitis

Upon physical assessment, the bronchitis patient will usually have following S/S:

- Hacking cough with phlegm
- Chest discomfort or Soreness
- Occasional shortness of breath
- Fever (usually less than 101°F)
- Fatigue
- Mild headache
- Body aches
- Watery eyes
- Sore throat

Note: Most symptoms of acute bronchitis last for up to 2 weeks, but the cough can last up to 8 weeks in some people.

Primary care:

- Acute bronchitis is most often caused by viral infection and almost gets better on its own, so antibiotics are not needed. Antibiotic treatment in these cases may even cause harm in both children and adults.
- Acute bronchitis lasts from a few days to 10 days. However, coughing may last for several weeks after the infection is gone.
- Bronchitis shares many symptoms with the common cold, such as coughing, mucous production and blocked or runny nose.
- Symptoms can be managed by :
 - Giving acetaminophen and ibuprofen for fever, headache and body aches.
 - Giving anti-inflammatory drugs and cough expectorants to mitigate the chest discomfort, sore throat and cough and sputum.
 - Giving 500 mg of amoxicillin orally, every 8 hours for 5 days or 100 mg doxycycline orally for 5 days for relief of dyspnoea and purulent sputum.
- In addition to above patient is advised to:
 - Take rest
 - Drink fluids
 - Gargle with salt water to soothe the throat
 - Practice the steps for prevention of acute bronchitis (given in Box 2.11)

Prevention:

There are several steps (Box 2.11) which you can teach to the people to follow for preventing themselves from acute bronchitis.

Box 2.11: Steps for Prevention of Acute Bronchitis

- Avoid smoking and exposure to second hand smoke.
- Practice good hand hygiene.
- Avoid exposure to dust, chemicals or air pollution.
- Minimise contact with the person having bronchitis.
- As 50% of bronchitis cases are infected with Haemophilus influenzae, Streptococcus pneumoniae or Moraxella catarrhalis. Therefore keep you and your child up to date with recommended immunisations.

Referral:

Refer the patient immediately to hospital if he/she has any of the following:

- Temperature higher than 100.4°F
- Cough with thick or bloody mucous
- Shortness of breath or trouble breathing
- If the symptoms last more than 3 weeks
- If viral bronchitis does not subside of its own and needs to be treated by antiviral medications depending on the type of virus causing the infection.
- Repeated episodes of bronchitis
- Chronic heart or lung problems experience any new symptoms of acute bronchitis.
- A child younger than three months of age and has a fever.

Remember:

- Cough is the most common symptom of acute bronchitis which typically persists for approximately three weeks.
- Whenever you see a patient with cough look for the following:
 - Sputum- note whether it is clear or contains pus or blood
 - Chest pain
 - Shortness of breath
- If patient has either of these problems refer immediately to hospital.

2.4.2 Pneumonia

Pneumonia is an infection of the lungs that is characterised primarily by inflammation of the alveoli in the lungs or by alveoli which are filled with fluid (alveoli are microscopic sacs in the lungs that absorb oxygen).

Pneumonia can cause mild to severe illness in people of all ages. It is the leading cause of death in children younger than 5 years of age worldwide. In the United States, more than 3 million people develop pneumonia each year, and about 17% of these receive treatment in a hospital. Most people with pneumonia recover, but about 5% succumb to the condition.

Pneumonia and influenza together are ranked as the eighth leading cause of death in the US and approximately 50% of pneumonia cases are believed to be caused by viruses. Although the disease can occur in young and healthy people, it is most dangerous for older adults, babies, and people with other diseases or impaired immune systems.

Risk factors that increase the chances of getting pneumonia are given in Box 2.12.

Box 2.12: Risk Factors of Pneumonia

- Children younger than 1 year of age and adults older than 65 years of age.
- People who have recently recovered from viral infections such as: cold, flu, laryngitis etc.
- People who have other respiratory conditions, such as chronic obstructive pulmonary disease (COPD), emphysema and asthma.
- People who have a weakened or impaired immune system such as: HIV/AIDS, malignant diseases, stroke, dementia, Parkinson’s disease, Cerebral palsy etc.
- Exposure to smoke/ dust/ air pollution.
- Cigarette smoking.
- Alcoholism.
- Other serious illnesses, such as heart disease, liver cirrhosis or diabetes mellitus.
- Recent surgery or trauma.

Causes of pneumonia

When a person breathes pneumonia-causing germs into his/her lungs and body’s immune system cannot prevent entry, the organisms settle in small air sacs called alveoli and continue multiplying. The body sends white blood cells to attack the infection; the sacs become filled with fluid and pus – causing pneumonia (Fig.2.12).

Pneumonia has bacterial, viral, fungal and nosocomial causes as mentioned below.

i) Bacterial pneumonia

Streptococcus pneumoniae is the most common cause of bacterial pneumonia. People who suffer from chronic obstructive pulmonary disease (COPD) or alcoholism most often get pneumonia from Klebsiella pneumoniae and Hemophilus influenzae. Atypical pneumonia, a type of pneumonia that typically occurs during the summer and fall months, is caused by the bacteria Mycoplasma pneumoniae.

ii) Viral pneumonia

Viral pneumonias are pneumonias that do not typically respond to antibiotic treatment. Adenoviruses, rhinovirus, influenza virus (flu), respiratory syncytial virus (RSV), and para influenza virus are all potential causes of viral pneumonia.

iii) Fungal pneumonia

Histoplasmosis, coccidiomycosis, blastomycosis, aspergillosis, and cryptococcosis are fungal infections that can lead to fungal pneumonia.

iv) Nosocomial pneumonia

Organisms that have been exposed to strong antibiotics and have developed resistance are called nosocomial organisms. If they enter the lungs, a person may

develop nosocomial pneumonia. Resistant bacteria are often found in nursing homes and hospitals.

For example: Methicillin-resistant Staph aureus (MRSA) can cause skin infections as well as pneumonia. Similarly, outbreaks of the H5N1 influenza (bird flu) virus and severe acute respiratory syndrome (SARS) have resulted in serious pneumonia infections.

Assessment:

The assessment of pneumonia includes:

- Physical examination and taking medical history of the patient for signs and symptoms (given in Box 2.13) which are assessed according to their onset, duration, and associated respiratory condition, because pneumonia symptoms can vary from mild to severe, depending on the type of pneumonia, age and health.

Most people with pneumonia begin with cold and flu symptoms and then develop a high fever, chills, and cough with sputum.

OR

Most patients have previous H/O COPD or asthma with associated symptoms.

- Other confirmatory tests are:
 - Blood tests to measure white blood cell count in order to determine the severity and type of pneumonia whether the infection is bacterial, viral, fungal, etc
 - Chest x-ray to determine location and extent of pneumonia in the lungs.
 - Sputum test to determine the organism that is causing the pneumonia.

Box 2.13: Common Signs and Symptoms of Pneumonia (Fig. 2.13)

- Cough with sputum (greenish or yellow mucous, or even bloody mucous)
- Fever, which may be mild or high shaking chills
- Shortness of breath, which may occur during climbing stairs
- Chest pain that gets worse when taking a deep breath (pleuritic pain) or while coughing
- Headache, Muscle pain
- Fast heartbeat
- Fatigue and feeling very weak
- Excessive sweating and clammy skin
- Nausea, vomiting and diarrhoea
- Loss of appetite, low energy and fatigue
- Confusion or delirium especially in older people
- Dusky or purplish skin colour (cyanosis) due to poorly oxygenated blood
- Symptoms can also vary, depending on type of pneumonia

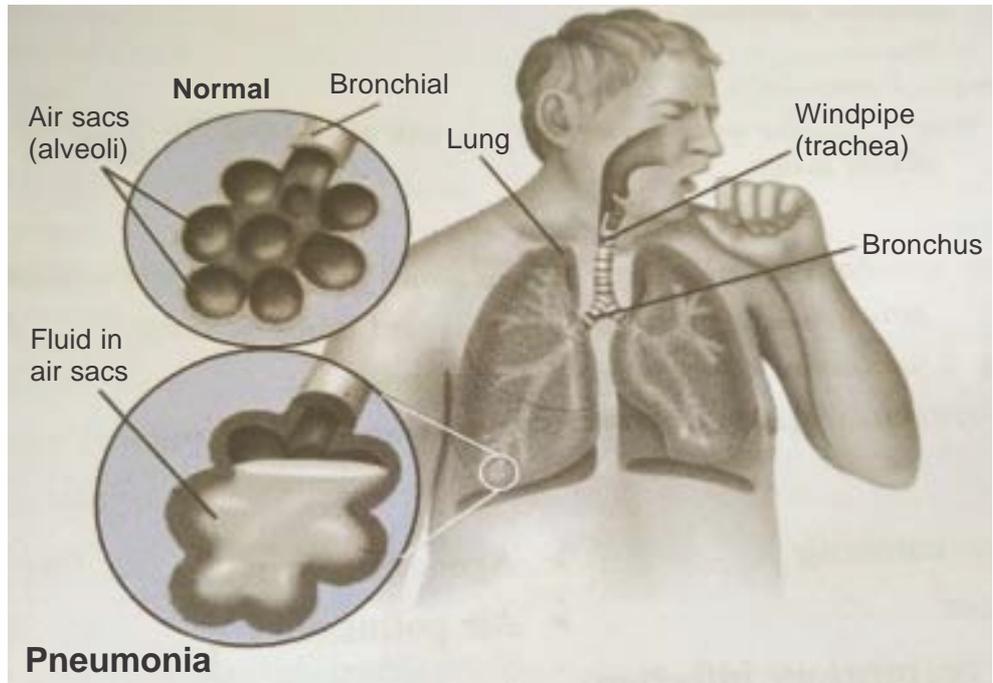


Fig. 2.12: Diagrammatic presentation of pneumonia

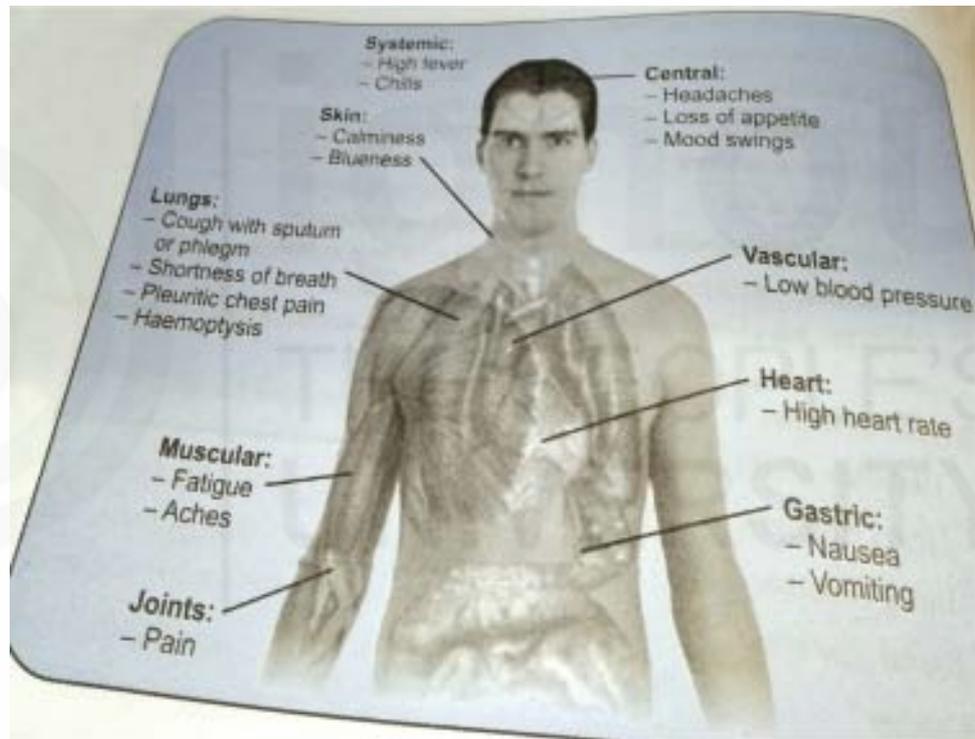


Fig. 2.13: Signs and symptoms of pneumonia

Primary care:

Treatment depends on the type of pneumonia and the severity of symptoms such as:

- Bacterial pneumonias are usually treated with antibiotics.
- Viral pneumonias almost get better on their own, so antibiotics are not needed. Antibiotic treatment in these cases may even cause harm in both children and adults. The patient having viral pneumonia are rather treated with symptomatic management, rest and plenty of fluids. Antivirals are available for certain viral infections.

- Fungal pneumonias are usually treated with antifungal medications.
At sub-centre/ PHC pneumonia patient is treated by generally which include treatment for:
 - Reducing headache and fever such as: paracetamol 500 mg orally every 8 hourly for first few days.
 - Reducing chest pain and body aches such as: ibuprofen 200 mg to 400 mg orally twice a day for first few days.
 - Suppressing cough e.g. syrup Benadryl 1 tea spoon full 3 times a day for a week.
 - Treating infection such as amoxicillin 500 mg orally, every 8 hours for 5 days or 100 mg doxycycline orally twice a day for 5 days.
- In addition to above patient is advised to:
 - Take rest
 - Drink fluids
 - Follow preventive measures given in Box 2.14.

Box 2.14: Preventive Measures of Pneumonia

- Wash hands regularly
- Refrain from smoking
- Avoid exposure to dust, chemicals or air pollution
- Avoid seasonal allergies
- Eat healthy
- Exercise daily
- Stay away from sputum or cough particles from others with pneumonia
- Get yourself and your child vaccinated against influenza virus, measles, rubella, haemophilus influenzae, diphtheria, and chickenpox and bordetella pertussis for prevention from bronchopneumonia.

Note: There are two vaccines that are available to prevent pneumococcal disease (the bacterial infection that is the most common cause of pneumonia) such as:

- i) Prevnar vaccine (pneumococcal conjugate vaccine), and
- ii) Pneumovax vaccine (pneumococcal polysaccharide vaccine)
 - Prevnar vaccine is generally administered as part of the normal infant immunisation procedure and is recommended for children less than 2 years of age or between two and four years with certain medical conditions.
 - Pneumovax vaccine is provided for adults who are at increased risk of developing pneumococcal pneumonia, such as the elderly, diabetics, those with chronic heart, lung, or kidney disease, alcoholics, smokers, and those without a spleen.
 - The pneumonia vaccine may not completely prevent older adults from getting pneumonia, but it can reduce the severity of a future pneumonia.

Referral:

Referral for hospitalisation of pneumonia patient may be required if:

- Symptoms are especially bad or a patient has a weakened immune system or other serious illness.
- He/she has recurrent attacks of pneumonia in order to prevent possible complications of emphysema or lung abscess.

At the hospital, patient may need Bronchoscopy – an invasive diagnostic procedure (which is done under anaesthesia) in which a thin, flexible, and lighted tube is inserted through the nose or mouth to directly examine the infected parts of the lung.

After being diagnosed the patient is treated with:

- Intravenous antibiotics/ antiviral therapy / antifungal drugs depending upon the cause of pneumonia
- Bronchodilators such as deriphyline or aminophylline
- Oxygen therapy
- Physiotherapy
- Barrier nursing

2.4.3 Bronchial Asthma

Bronchial asthma – literally called as asthma is a reversible bronchospasm, in which there is inflammation and narrowing of bronchial lumen due to its hyperactive response to a certain stimuli which leads to wheezing and coughing and difficulty in breathing.

- **Changes taking place in airway passage during bronchial asthma are shown in Fig. 2.14.**

Bronchial Asthma affects air passages in 3 ways:

- 1) When a person has asthma, the air passages are inflamed which means that the airways are red and swollen. During the asthmatic attack, the lining of the passages swell causing the airways narrowing and thus reducing the flow of air in and out of the lungs.
- 2) Airway hyper responsiveness to a wide range of stimuli. Inflammation of the air passages makes them over extra sensitive to a number of different things that can trigger or bring on asthma symptoms.
- 3) Muscles within the breathing passages contract, causing even further narrowing of the airways called bronchospasm. This narrowing makes it difficult for the air to be breathed out (exhaled) from the lungs.

Changes in bronchial asthma are initiated by the action of:

- Mast cells, eosinophils and T lymphocytes found in the blood. Mast cells are the allergy-causing cells that release histamine. Histamine is a chemical substance that causes constriction of airways.
- Eosinophils and T lymphocytes are the types of white blood cell which are associated with allergy and inflammation in asthma leading to the airway hyper-responsiveness, airflow limitation and respiratory symptoms such as feeling of chest tightness and breathlessness that is felt often at night called

nocturnal asthma or in the early morning hours. Some patients may feel symptoms when they exercise called exercise-induced asthma.

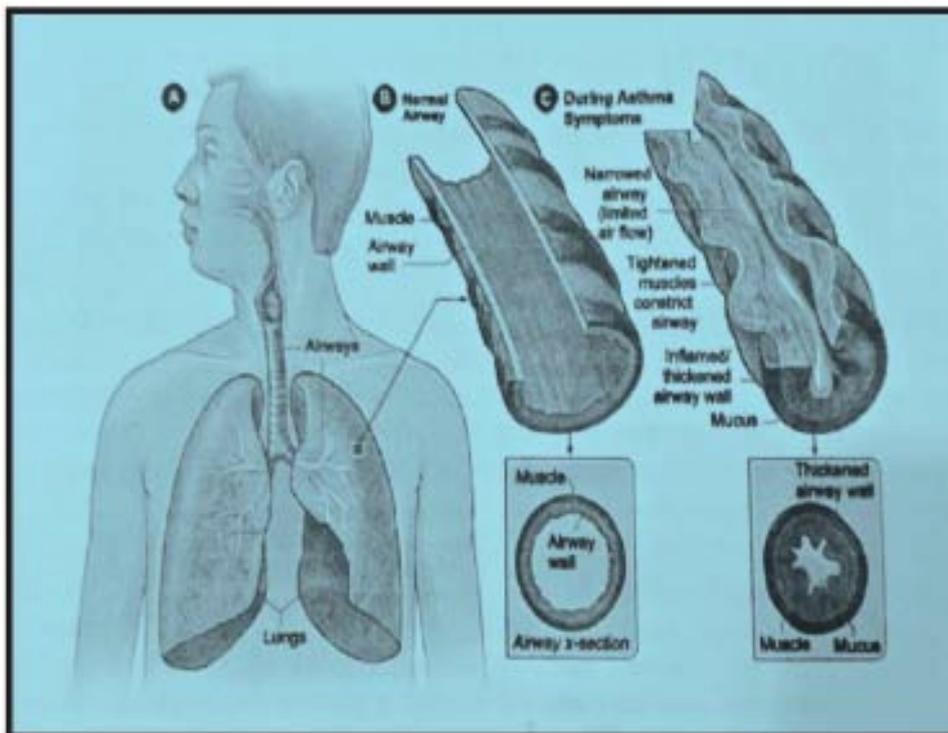


Fig. 2.14: Changes taking place in Airway Passages during Bronchial Asthma

Assessment:

Clinically an asthmatic patient will complain of periodic “attacks” of coughing, wheezing, shortness of breath, and chest tightness which frequently occur and/or gets aggravated at night or in the morning (Box 2.15).

Note

It is important that you assess the patient keenly for triggers and signs/symptoms of bronchial asthma (given in the Box 2.15)

Box 2.15: Assessment of Patient for Triggers and Signs /Symptoms of Bronchial Asthma

a) Bronchial Asthma Triggers:

- 1) Smoking and second hand smoke
- 2) Infections such as colds, flu or pneumonia
- 3) Allergens such as food, pollen, dust mites and pet dander
- 4) Physical exertion
- 5) Air pollution and toxins
- 6) Weather, especially extreme change in temperature
- 7) Drugs such as aspirin, NSAIDs and beta-blockers
- 8) Food additives
- 9) Emotional stress
- 10) Singing, laughing or crying

11) Perfumes and fragrances

12) Acid reflux

b) **Signs / Symptoms:**

- i) Shortness of breath (especially air hunger breathing– use of accessory muscles for breathing and tachypnea)
- ii) Tightness of Chest
- iii) Wheezing (especially expiratory wheezing)
- iv) Excessive Coughing OR a cough that keeps the patient awake at night OR which is frequently associated with exposure to above triggers.
- v) Cyanosis (A bad sign in asthma)
- vi) Other s/s include: Elevated blood pressure, tachycardia, cold and moist skin, fever, anxiety and apprehension.

Prevention:

As bronchial asthma disease is reversible which can be controlled with proper and regular medications as well as by avoiding the triggering factors (given in Box 2.16) therefore it is very important on your part to clarify the questions (given in Box 2.16) and educate these patients thoroughly to enable them to manage effectively with the disease process.

Box 2.16: Questions to be Clarified for Controlling the Bronchial Asthma

The following are the few questions which may be asked by the patient and which need to be clarified by you for preventing the patient from frequent episodes of bronchial asthma:

- What is bronchial asthma?
- How do you get bronchial asthma?
- What are the various triggering factors? (refer Box 2.15)
- What measures to be taken to prevent yourself from these triggers? Such as: avoiding the dust, smoke, cold breeze, perfumes, food allergens and so on.
- What are the various signs and symptoms? (refer Box 2.15)
- How to notice the symptoms if these occur during onset of triggers such as dust, cold breeze, perfumes, food allergens or during exercise or after smelling smoke and explain it in the same manner to the doctor?
- How to take the medicine and why to take it regularly?
- How to make proper use of inhaler?
- Why to keep your rescue inhaler always with you?
- What are various natural home remedies and how to perform them? (refer Box 2.17)
- How to cope with the disease process by sharing problems with those who are asthma victims?

Remember:

- If you find any patient experiencing breathlessness, coughing, and wheezing (whistling sound coming from chest) recently, this means that the patient might have caught bronchial asthma.
- Tell the patient that he /she need to pay early attention to treat bronchial asthma because the prolonged state of asthma can harm lungs in the long run. And clarify the questions (given in Box 2.16) and effective treatment for asthma including natural asthma remedies (given in Box 2.17)



Fig. 2.15: Use of Inhaler

Natural Asthma Remedies:

Lifestyle management is very essential for asthma patients. There are two aspects for this – avoiding the asthma triggers and adopting such ways that increase resistance to allergy-causing factors. Here are certain dietary measures and natural home remedies (given in Box 2.17) which you can teach to patients with bronchial asthma:

Box 2.17: Dietary and Natural Home Remedies for Patients with Bronchial Asthma

- Take diet rich in vitamin B₆ (meat, vegetables and nuts), B₁₂ (meat, milk, eggs and mushrooms) and B₅, Vitamin C (amla, guava, lychee, papaya, strawberry, orange, lemon and grapes) and folic acid (leafy vegetables such as: spinach, turnip greens, beans and peas, sunflower seeds and liver) as well as antioxidants (foods containing vitamin C & coconut, peanuts, olive oil, sunflower seeds, soyabean and maize) to boost immune system.
- Add four minced garlic cloves in the tea while it is steaming. Drink this after it cools down a little. It is good for controlling wheezing and coughing.
- When experiencing asthma attack, get someone to rub mustard oil mixed with camphor on your back. This makes breathing easier.
- Take one cup of water and add half teaspoon of ginger juice. Drink it to get relief from symptoms.

- Drink plenty of water to hydrate yourself.
- Clean home regularly to keep dust at minimal levels.
- Avoid pets with fur or feather. When it is cold, cover your face with mask or cloth.
- Do only mild exercises which will not induce asthma. Such as: deep breathing and meditation. However swimming is not known to precipitate asthma. Also, if a particular activity triggers an asthma attack, it is advisable to take medication before initiating activity.
- Control heartburn and gastroesophageal Reflux Disease (GERD) by avoiding spicy foods and smoking to keep bronchial asthma under control.
- Avoid stress. As stress can precipitate the asthmatic attack.
- Avoid all the triggers for preventing yourself from the asthmatic attack. (refer Box 2.15)

Primary care:

Whenever any patient with problems of coughing, wheezing, shortness of breath or chest tightness reports to your health centre, your immediate duty is:

- a) To stabilise the patient by proceeding with following steps:
 - Make the patient comfortable by giving semi fowler's position to facilitate the full lung expansion and air exchange.
 - Loosen the clothes to prevent chest tightness.
 - Start a slow I/V infusion for giving emergency drugs and preventing dehydration.
 - Start humidified oxygen therapy at the rate of 3 to 5 liters/minute (if available).
 - Obtain quick history of recent medication used particularly bronchodilator, steroid or inhaler.
 - Administer Inj. aminophylline 250 to 500 mg slowly through I/V or through I/V drip in 50 to 100 ml of dextrose 5% under supervision of physician on duty. The patient may also need Inj. hydrocortisone depending upon the condition of the patient.
 - Check the vital signs (temperature, respiration, pulse rate/ heart rate and blood pressure) as well as breath sounds constantly to see if the patient's vital signs are stabilised and his/her breathing has improved.
- b) Obtain a comprehensive baseline data about the illness including:
 - Onset of signs and symptoms, duration, precipitating factors and treatment (if taken) of bronchial asthma.
 - Previous H/O bronchial asthma or any other illness.
 - Family H/O bronchial asthma or any other illness
 - Assess the patient for signs and symptoms. (as given Box 2.15)
 - Enquire whether patient has any related H/O causes/ triggers (as given in Box 2.15).

- Find out whether patient has left the treatment of asthma in between.
- Ask whether patient has been taking any long term drug therapy other than the asthmatic drugs.

Referral:

Arrange for the referral of the patient to the specialty hospital for diagnostic investigations and appropriate treatment in case if patient fulfils the criteria given in the Box 2.18.

Box 2.18: Criteria for referral of Patient with Bronchial Asthma to a Specialty Hospital

- i) Mild to moderate exacerbation with poor treatment response or even worsening of the condition despite above prescribed medications for atleast 24 hours.
- ii) Critical cases of moderate exacerbations particularly the patients with high risk of asthma-related death.
- iii) Severe or extremely severe episode of asthma exacerbation.
- iv) For oxygen therapy and endo-tracheal intubation or if patient needs to be put on ventilator.

Check Your Progress 2

- 1) List down 10 triggers of Bronchial Asthma.
 - i)
 - ii)
 - iii)
 - iv)
 - v)
 - vi)
 - vii)
 - viii)
 - ix)
 - x)
- 2) Upon physical assessment, which signs and symptoms will you find in a patient with acute bronchitis?
 - i)
 - ii)
 - iii)
 - iv)
 - v)

3) List the steps of primary care which you will follow for taking care of a bronchial asthma patient at your level.

.....

.....

4) Fill in the blanks:

a) Bronchial asthma can be defined as

.....

b) Clinically an asthmatic patient will complaint of which frequently occur and aggravate during

.....

c) The two vaccines which are available to prevent pneumococcal bacterial infection that is the most common cause of pneumonia are:

i)

ii)

(d) Bronchoscopy can be defined as

2.5 SCREENING, REFERRAL AND FOLLOW UP OF PATIENTS

We will discuss the conditions of patients with haemoptysis and acute chest pain in patients above 35 years of age.

2.5.1 Haemoptysis

Haemoptysis- (coughing up of blood) can be a sign of a serious medical condition. Infections, cancer, problems in pulmonary blood vessels or in the lungs themselves can be the various causes. Coughing up blood generally requires medical evaluation unless the haemoptysis is due to bronchitis. Haemoptysis can also occur from bleeding outside the lungs and airways. Severe nosebleeds or vomiting of blood from the stomach can result in blood draining into the windpipe (trachea). The blood is then coughed up, appearing as haemoptysis. In many people with haemoptysis, no cause is ever identified. Most people with unexplained haemoptysis are coughing up blood for not more than six months.

Causes of Haemoptysis :

The common conditions which give rise to coughing up of blood are given below in the Box 2.19.

Box 2.19: Causes of Haemoptysis

- Bronchitis (acute or chronic), the most common cause of coughing up blood. Haemoptysis due to bronchitis is rarely life-threatening.
- Pulmonary tuberculosis
- Bronchiectasis

- Lung cancer or non-malignant lung tumors
- Use of blood thinners (anticoagulation)
- Pneumonia
- Pulmonary embolism
- Congestive heart failure, especially due to mitral stenosis
- Trauma such as motor vehicle accident

Assessment of the patient with Haemoptysis

Whenever you will find any patient having the complaint of coughing up of blood as a community health nurse practitioner, your first and the foremost responsibility is to thoroughly assess the patient by taking a comprehensive health history and doing a systematic physical examination including inspection, palpation, percussion and auscultation. The thorough respiratory assessment must be done to focus on determining the cause and amount of bleeding and any risk to breathing. You should proceed with the assessment of the patient as follows:

- Ask the patient for how long he/ she has been coughing up of blood and how it started.
- Ask the patient whether haemoptysis is associated with any of signs and symptoms given in the Box 2.20.
- Assess the patient for these signs and symptoms.
- Enquire whether patient has any related history of causes given in the Box 2.20.
- Ask whether patient has been taking any long term drug therapy such as anticoagulants.
- Find out whether patient has received or left in between anti tubercle drug therapy.

Box 2.20: Signs and Symptoms of Haemoptysis

- Blood in mucous that lasts longer than a week, is severe or getting worse, or comes and goes over time.
- Chest pain
- Weight loss
- Soaking sweats at night
- Fever higher than 101°F
- Shortness of breath with usual activity level

When to refer the patient with Haemoptysis?

At health centre you need to keep a constant watch on patients with bronchitis for having a small amount of blood in the mucous for less than a week and wait for their condition to improve. Because the most common reason for coughing up blood is acute bronchitis, which typically gets better on its own without treatment.

Remember :

If the coughing up blood does not subside after a week or 10 days and is accompanied by the above signs and symptoms (given in Box 2.20), it can be treated as a sign of a serious medical condition and the patient is referred to District hospital where cause is identified and treated to eliminate the threat of serious bleeding.

Referral of patient with haemoptysis for:

a) Screening /Diagnostic Tests:

Once the patient has been found at high risk, then without any delay patient must be shifted to a District hospital for screening to undergo following diagnostic tests to rule out the cause and treat it immediately:

- Chest X-ray to rule out the possible cause such as: a mass in the chest, areas of fluid or congestion in the lungs.
- Sputum test for examining acid fast bacilli.
- Tuberculin skin test for detecting mycobacterium tuberculosis.
- Computed tomography (CT scan). By producing detailed images of structures in the chest, a CT scan can reveal some causes for coughing up blood.
- Bronchoscopy. In which an endoscope (flexible tube with a camera on its end) is inserted (by an expert physician) through the nose or mouth into the windpipe and airways of patient to identify the cause of haemoptysis such as rupture of blood vessel or lung cancer etc. (Fig.2.16)

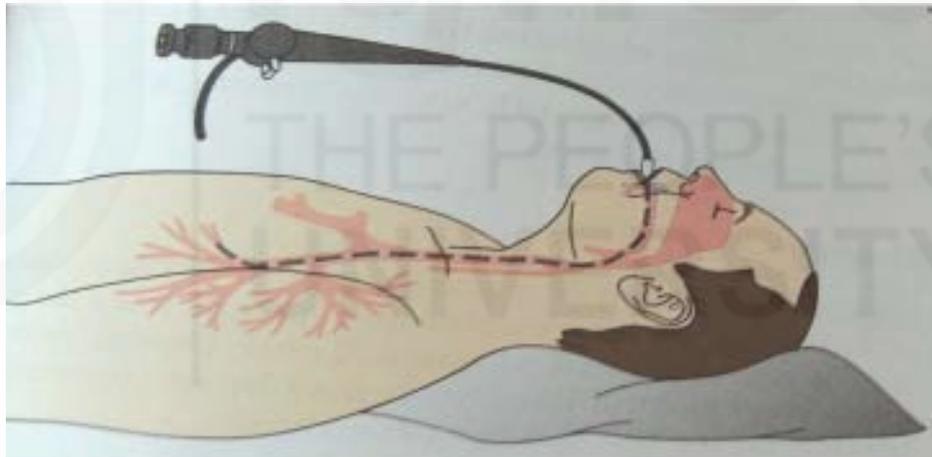


Fig. 2.16: Bronchoscopy

- Complete blood count (CBC) test for examining white and red blood cells including platelets in the blood.
- Urinalysis to detect any urine abnormalities.
- Blood chemistry profile test electrolytes and kidney function, which may be abnormal in some causes of haemoptysis.
- Coagulation tests. Alterations in blood's ability to clot can contribute to bleeding and coughing up blood.
- Arterial blood gas analysis to test the levels of oxygen and carbon dioxide in the blood. Oxygen levels can be low in people coughing up blood.
- Pulse oximetry. A probe (usually on a finger) tests the level of oxygen in the blood which can be low in these cases.

b) **Treatment:**

For people who are coughing up blood for more than a week, treatment aims to stop the bleeding and treat the underlying cause of haemoptysis as early as possible which include following interventions:

- Antibiotic therapy for pneumonia
- Anti microbial therapy for pulmonary tuberculosis
- Chemotherapy and/or radiation for lung cancer
- Steroid therapy for inflammatory conditions such as bronchitis
- People with excessively thin blood because of medication use, may require transfusion of blood products or other medications to curb blood loss
- Bronchial artery embolisation. In this procedure a catheter is inserted through the leg into an artery supplying blood to the lungs. By injecting dye and viewing the arteries on a video screen, the doctor identifies the source of bleeding. That artery is then blocked, using metal coils or another substance. Bleeding usually stops, and other arteries compensate for the newly blocked artery
- Bronchoscopy to treat some causes of coughing up blood. For example, a balloon is inflated inside the airway to stop bleeding.
- Surgery. Coughing up blood, if severe and life-threatening, may require surgery to remove a lung (pneumonectomy).

Note:

As a health worker you must be competent enough to assess the patient with acute chest pain for that it is important to know the possible causes of acute chest pain and their clinical findings and health history (given in Box 2.21)

2.5.2 Acute Chest Pain

Sudden pain in the chest is a common complaint in rural areas because diseases of respiratory system are more prevalent in rural community due to reduced resistance to infections in malnourished rural population. The condition can become more serious in young and aged than the adults and the middle aged.

The chest pain above 35 years of age can also be an urgent signal of a life threatening condition of heart disease leading to shortness of breath. Therefore as a health worker no time should be wasted in debating the cause of chest pain.

Causes of acute chest pain:

The common causes giving rise to chest pain very frequently are the diseases affecting the lungs and bronchi (Fig. 2.17) such as pneumonia, bronchitis, pulmonary embolism and heart diseases (Fig. 2.18) such as coronary artery disease (Fig. 2.19) including unstable angina and acute myocardial infarction; acute rheumatic heart disease, acute congestive heart failure. Besides other conditions which may lead to chest pain are gastro-esophageal acid reflux disease or anxiety disorders.

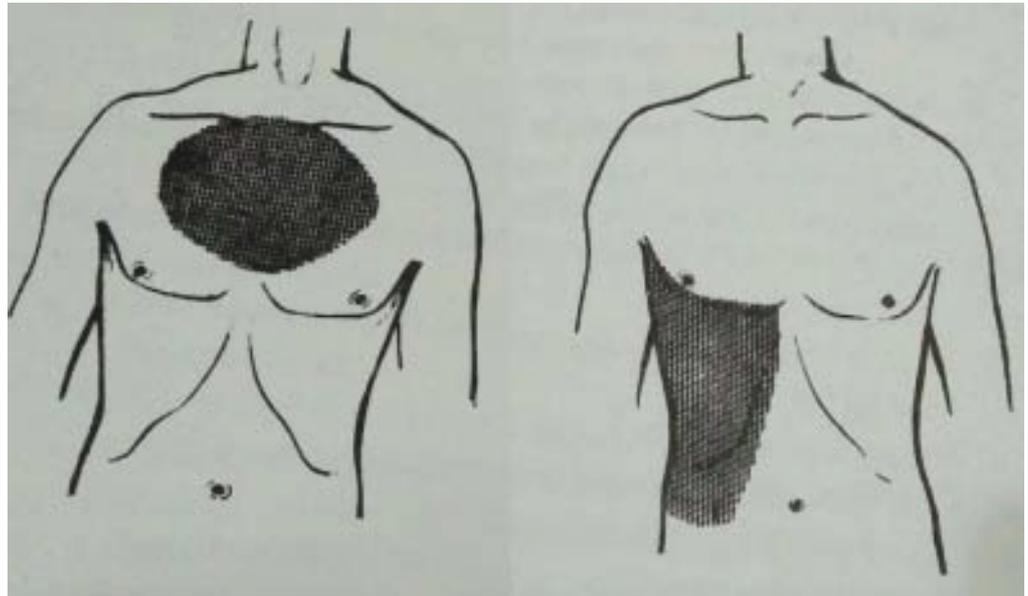


Fig. 2.17: (a) Pain in the Region of the Bronchi (b) Pain in the Region of the Lungs

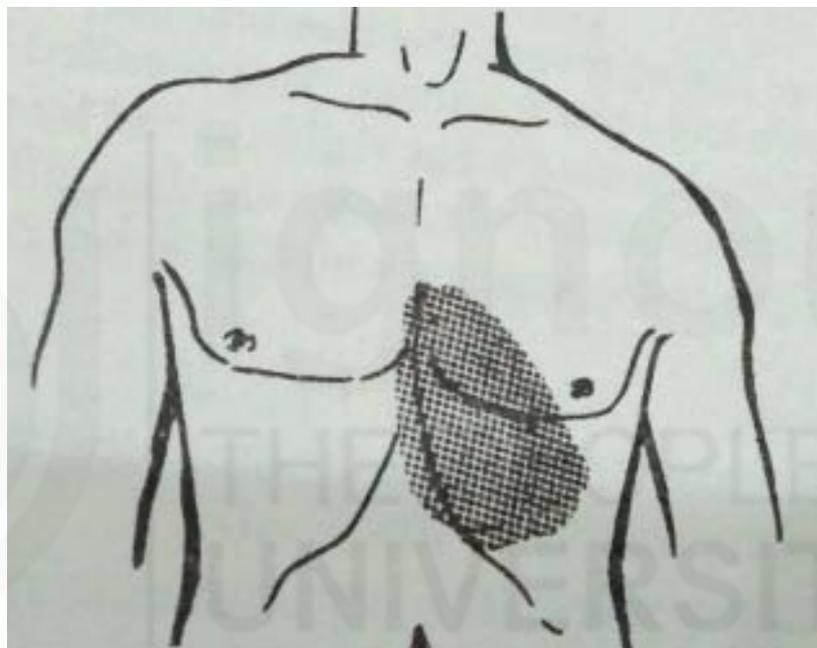


Fig. 2.18 : Pain in the Region of the Heart

Screening and referral:

One of the leading causes of death in the United States is the acute chest pain due to cardiac disease and 1.5 per cent of patients with chest pain presenting to a primary care settings have unstable angina or an acute myocardial infarction. The initial goal in patients presenting with chest pain is to determine if the patient needs to be referred for further investigations to rule out risk for coronary artery disease / pulmonary embolism.

Note:

Assess the patient's characteristics and risk factors quickly to determine whether the patient is at risk for coronary artery disease/ pulmonary embolism/ pericarditis /rheumatic heart disease/ heart failure. Such patients need quick referral to a speciality hospital for further investigation and treatment.

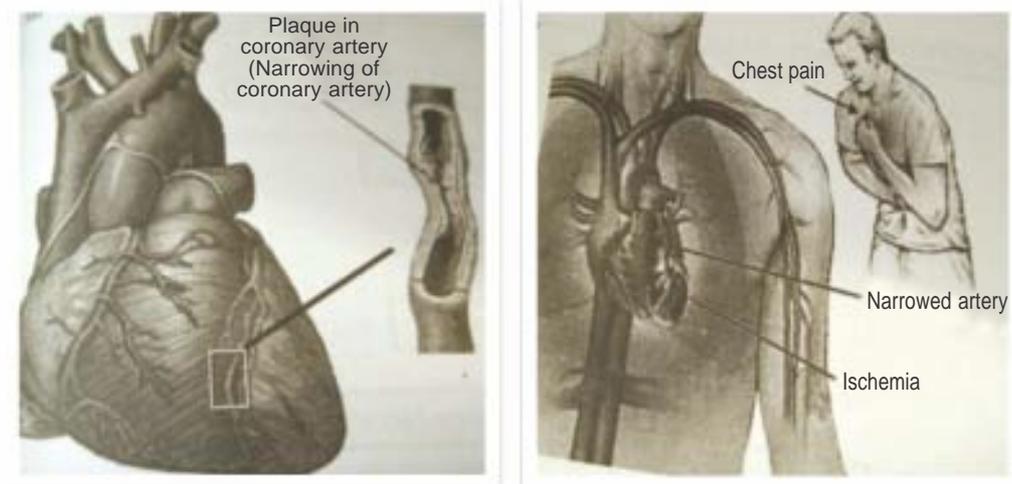


Fig. 2.19 : Patient Having Coronary Artery Disease

2.5.3 Screening of Patient for Acute Chest Pain

Once the patient with acute chest pain is brought to the health centre, the immediate responsibility of public health practitioner and physician on duty is to stabilise the patient, take a thorough health history from patient and his/her relatives and do the complete physical assessment of patient's heart and chest to find out the cause of chest pain and any risk to coronary artery disease for immediate referral to a specialty hospital. The assessment of chest pain is made on following characteristics. (also refer Box: 2.21)

- 1) Clinical characteristics associated with an increased likelihood of acute myocardial infarction include male sex; age older than 60 years; diaphoresis; pain that radiates to the shoulder, neck, arm or jaw and a previous history of angina or acute myocardial infarction.
- 2) A twelve-lead electrocardiography is performed on the patient to find out any ST segment changes, left bundle branch block, presence of Q waves and T wave inversions which can increase the likelihood of acute coronary syndrome or acute myocardial infarction.
- 3) Patients with localised musculoskeletal pain that is reproducible by palpation, or pain reproducible by palpation in the parasternal/costochondral joints, likely have chest wall pain.
- 4) Gastro-esophageal acid reflux disease should be considered in patients with burning retrosternal pain, acid regurgitation, and a sour or bitter taste in the mouth.
- 5) Panic disorder and anxiety state often cause chest pain and shortness of breath.
- 6) Pericarditis / rheumatic heart disease/heart failure should be considered in patients with pleuritic chest pain that increases with inspiration or when reclining; pericardial friction rub and Electrocardiographic changes (diffuse ST segment elevation and PR interval depression without T wave inversion).
- 7) Pneumonia can be recognised by dullness of chest to percussion, fever, chest pain, and cough with sputum.
- 8) Pulmonary embolism should be assessed in patients with symptoms of chest pain, tachycardia and dyspnoea associated with clinical signs of DVT such as: asymmetric leg swelling, palpable calf pain or previous diagnosis of DVT with PE or bed rest immobilisation or surgery within the past four weeks.

Box 2.21: Assessment of Chest Pain

Causes	Clinical Findings and Health History
1. Acute myocardial infarction	<ul style="list-style-type: none"> • Strangulating chest pain radiates to shoulder, neck, arm or jaw • Third heart sound on auscultation • Hypotension
2. Chest wall pain (localised musculoskeletal pain)	<ul style="list-style-type: none"> • Localised muscle tension • Stinging pain • Pain reproducible by palpation • Absence of cough
3. Gastro-esophageal acid reflux disease	<ul style="list-style-type: none"> • Burning retrosternal pain • Acid regurgitation, • Sour or bitter taste in the mouth • One-week trial of high-dose proton pump inhibitor relieves symptoms
4. Panic disorder/anxiety state	<ul style="list-style-type: none"> • Single question: In the past four weeks, have you had an anxiety attack (suddenly feeling fear or panic)?
5. Pericarditis /rheumatic heart disease/ heart failure	<ul style="list-style-type: none"> • Pleuritic chest pain (increases with inspiration or when reclining and is lessened by leaning forward), • Pericardial friction rub
6. Pneumonia	<ul style="list-style-type: none"> • Dullness to percussion • Fever • Chest pain • Cough with sputum
7. Pulmonary embolism	<ul style="list-style-type: none"> • Heart rate greater than 100 beats per minute • Dyspnoea and chest pain • Clinical signs of DVT (asymmetric leg swelling, palpable calf pain) OR • Previous diagnosis of DVT with PE OR • Bed rest immobilisation OR • Surgery within the past four weeks

Treatment and referral for the patient with acute chest pain:

Whenever a person with acute chest pain reports at your PHC, as health worker you have to decide what assistance you can give depending upon the history and signs and symptoms presented by the patient. The immediate steps to be taken to stabilise the patient's condition include:

- 1) Make the patient to lie down in a comfortable position.
- 2) Start I/V line for giving drugs and fluids.

- 3) Administer humidified oxygen @ 3–5 l/min if patient has shortness of breath.
- 4) Watch and record vital signs (TPR and blood pressure) every 2 hourly
- 5) Observe the patient continuously for the intensity of chest pain.
- 6) Get the patient’s emergency investigations such as: blood tests, coagulogram, chest X ray, ECG done to find out the cause of chest pain.
- 7) Give the following prescribed drugs if the patient is found with pneumonic episode:
 - a) Antibiotics (Amoxicillin, Levofloxine, Doxycycline)
 - b) Cough expectorants (Benadryl)
 - c) Non steroid anti inflammatory analgesics (Ibuprofen)
- 8) Give inj. Morphine, and oral/ sublingual nitrates. Start Nitro-Glycerine I/V infusion as prescribed by physician if the signs and symptoms and history of patient support the chest pain due to acute coronary artery disease.
- 9) Refer the patient to district hospital if the patient:
 - a) Does not improve with the treatment.
 - b) Breathing is painful and difficult.
 - c) Gives history of cough for more than two weeks or above.
 - d) Upon assessment is found high risk for acute coronary syndrome/ pulmonary embolism/ pericarditis /rheumatic heart disease/ heart failure.

Check Your Progress 3

- 1) List the signs and symptoms of Haemoptysis.
 - a)
 - b)
 - c)
 - d)
 - e)
 - f)
- 2) Mention the various steps to be followed for doing assessment of a haemoptysis patient:
 - i)
 - ii)
 - iii)
 - iv)
 - v)
 - vi)

3) List the causes of acute chest pain:

- a)
- b)
- c)
- d)

4) Fill in the blanks:

- a) The patient with acute myocardial infarction has chest pain which radiates to
- b) In pulmonary embolism patient the chest pain may be associated with following signs:
 - i)
 - ii)
 - iii)
- c) In a probe is connected to a finger to test the in the blood.
- d) is the most common cause of Haemoptysis.

2.6 LET US SUM UP

In this unit you have learnt the meaning, causes and signs and symptoms of some of the common acute upper respiratory tract infections such as: catarrh (rhinitis), common cold (viral rhinitis), sinusitis, pharyngitis, laryngitis and tonsillitis as well as acute lower respiratory tract infections such as: bronchitis, pneumonia and bronchial asthma. You have also learnt how to assess and manage the patients with these conditions at primary level and when the referral of these patients and further treatment is needed.

You have also learned screening, referral and follow-up of Haemoptysis and Acute Chest pain in patients above 35 years of age.

2.7 MODEL ANSWERS

Check Your Progress 1

- 1) The common signs and symptoms of Upper Respiratory system Infections are:
 - a) Running nose
 - b) Nasal congestion
 - c) Sneezing
 - d) Postnasal drip
 - e) Cough

- f) Sore throat
 - g) Headache
 - h) Difficulty in breathing
 - i) Fever
 - j) Fatigue
 - k) In addition to above signs and symptoms, the patient has other symptoms associated with specific condition/ disease.
2. The patient with common cold is treated with the primary care as follows :
- a) Give him/ her decongestants (such as : Chlorotone 1 tablet 3 times a day) to relieve the nasal congestion.
 - b) Give paracetamol tablet/syrup for headache and body aches.
 - c) Ask the patient to take lemon juice extracted from one lemon and a teaspoon of honey in a glass of lukewarm water for few days to relieve cold, cough and flu.
 - d) Ask the patient to sniff few drops of eucalyptus oil placed on a clean handkerchief which will reduce nasal congestion.
 - e) Advise the patient to maintain proper hygiene to avoid the infection from spreading such as: covering mouth and nose during coughing and sneezing, wiping running nose with separate handkerchief and proper hand washing.
3. The following are the various instructions which will be given to the patient with acute laryngitis to keep his/her vocal cords healthy.
- Keep vocal cords moist and free from irritants.
 - Use a humidifier or inhale steam to alleviate dryness.
 - Give rest to the voice.
 - Correct the way you use your voice and any abnormal speech patterns that place stress on your vocal cords and voice box.
 - Get vocal therapy to correct the abnormal speech.
 - Avoid screaming or talking loudly for long periods of time.
 - Refrain from whispering, which can strain the voice.
 - Drink plenty of fluids.
 - Gargle with salt water.
 - Avoid smoking and being around people who smoke.
 - Avoid alcohol and caffeine intake.
 - Wash the hands regularly to avoid catching colds and upper respiratory infections.
 - Try to avoid toxic chemicals in the workplace if possible.
 - Try to avoid clearing the throat. This increases both mucous production and irritation.
 - Avoid decongestants which can dry the throat.

- Keep sucking on lozenges to keep the throat lubricated.
 - Avoid seasonal allergies.
 - Manage acid reflux with medications and healthy food habits.
 - Avoid taking antibiotics for cold, flu or other viral respiratory infections, as these will usually go away of their own.
 - It may take up to 2 weeks for your voice to completely return.
 - Take prescribed antibiotics if the laryngitis is associated with a bacterial infection.
- 4) Fill in the blanks:
- a) The various risk factors for pharyngitis include:
flu, smoking, exposure to second-hand smoke, frequent sinus infections and allergy.
 - b) The streptococcal throat infection can result in the serious complications of Rheumatic fever and kidney disease.
 - c) A collection of pus around the tonsils called peritonsillar abscess is most common complication of viral tonsillitis which occurs when the infection becomes deep-seated within the tonsil.
 - d) Laryngoscope is an instrument which is having a thin flexible tube with a microscopic camera and is passed by doctor through the mouth or nose to visualise the voice box for the 3 signs of laryngitis: such as
(i) Redness (ii) lesions on the voice box (iii) widespread swelling.

Check Your Progress 2

- 1) The 10 triggers of Bronchial Asthma are:
- a) Smoking and second hand smoke
 - b) Infections such as colds, flu or pneumonia
 - c) Allergens such as food, pollen, dust mites and pet dander
 - d) Physical exertion
 - e) Air pollution and toxins
 - f) Weather, especially extreme change in temperature
 - g) Drugs such as aspirin, NSAIDs and beta-blockers
 - h) Food additives
 - i) Emotional stress
 - j) Singing, laughing or crying
- 2) Upon physical assessment, the acute bronchitis patient may usually have following signs and symptoms:
- a) Hacking cough with phlegm
 - b) Chest discomfort or Soreness
 - c) Occasional shortness of breath
 - d) Fever (usually less than 101° F)

- e) Fatigue
 - f) Mild headache
 - g) Body aches
 - h) Watery eyes
 - i) Sore throat
- 3) The various steps of primary care to be given to a bronchial asthma patient include:
- 1) Make the patient comfortable by giving semi fowler's position to facilitate the full lung expansion and air exchange.
 - 2) Loosen the clothes to prevent chest tightness.
 - 3) Start a slow I/V infusion for giving emergency drugs and preventing dehydration.
 - 4) Start humidified oxygen therapy at the rate of 3 to 5 liters/ minute (if available)
 - 5) Start nebulisation with short acting beta 2 agonists like salbutamol, with or without anticholinergis ipratropium.
 - 6) Obtain quick history of recent medication used particularly bronchodilator, steroid or inhaler.
 - 7) Administer Inj. aminophylline 250 to 500 mg slowly through I/V or through I/V drip in 50 to 100 ml of dextrose 5% under supervision of physician on duty. The patient may also need Inj. hydrocortisone depending upon the condition of the patient.
 - 8) Check the vital signs (temperature, respiration, pulse rate/ heart rate and blood pressure) as well as breath sounds constantly to see if the patient's vital signs are stabilised and his/her breathing has improved.
 - 9) Obtain a comprehensive baseline data about the illness including:
 - a) Onset of signs and symptoms, duration, precipitating factors and treatment (if taken) of bronchial asthma
 - b) Previous H/O bronchial asthma or any other illness
 - c) Family H/O bronchial asthma or any other illness
 - d) Assess the patient for signs and symptoms
 - e) Enquire whether patient has any related H/O causes/ triggers
 - f) Find out whether patient has left the treatment of asthma in between.
 - g) Ask whether patient has been taking any long term drug therapy other than the asthmatic drugs.
- 4) Fill in the blanks:
- a) Bronchial asthma can be defined as a reversible, bronchospasm in which there is inflammation and narrowing of bronchial lumen due to its hyperactive response to a certain stimuli.

- b) Clinically an asthmatic patient will complain of periodic “attacks” of coughing, wheezing, shortness of breath and chest tightness which frequently occur and aggravate during night or in the morning .
- c) The two vaccines which are available to prevent pneumococcal bacterial infection that is the most common cause of pneumonia are:
 - i) Prevnar vaccine (pneumococcal conjugate vaccine)
 - ii) Pneumovax vaccine (pneumococcal polysaccharide vaccine)
- d) Bronchoscopy can be defined as an invasive diagnostic procedure in which a thin, flexible, and lighted tube is inserted through the nose or mouth to directly examine the infected parts of the lung.

Check Your Progress 3

- 1) The haemoptysis patient may have following signs and symptoms :
 - a) Blood with cough
 - b) Chest pain
 - c) Weight loss
 - d) Soaking sweats at night
 - e) Fever higher than 101°F
 - f) Shortness of breath with usual activity level
- 2) The following are the various steps to be followed for doing assessment of a haemoptysis patient:
 - a) Ask the patient for how long he/ she have been coughing up of blood and how it started.
 - b) Ask the patient whether haemoptysis is associated with any other signs and symptoms such as: chest pain, weight loss, night sweats, fever, shortness of breath.
 - c) Assess the patient for these signs and symptoms.
 - d) Enquire whether patient has any related history of causes.
 - e) Ask whether patient has been taking any long term drug therapy such as anticoagulants.
 - f) Find out whether patient has received or left in between anti tubercle drug therapy.
- 3) The common causes giving rise to acute chest pain are :
 - a) Pneumonia
 - b) Bronchitis
 - c) Pulmonary embolism
 - d) Coronary artery disease
- 4) Fill in the blanks:
 - a) strangulating, shoulder, neck, arm or jaw.

- i) Heart rate greater than 100 beats per minute
 - ii) Dyspnoea
 - iii) Clinical signs of deep vein thrombosis (asymmetric leg swelling, palpable calf muscle pain)
- b) In pulse oximetry oxygen
 - c) Bronchitis

2.8 KEY WORDS

Antihistamine	: A substance that blocks the release of histamine which induces allergic reaction and inflammatory reaction.
Antiviral	: Destructive to viruses
Assessment	: It includes health history and physical examination of the patient
Auscultation	: A method of physical examination in which body sounds are listened by using stethoscope.
Bronchodilator	: A substance that relaxes contractions of the smooth muscle of the bronchioles to improve ventilation of lungs.
Contagious	: Spread of infection or disease from person to person by direct or indirect contact.
Confusion	: Disorientation to time, place and person
Congenital	: Present at birth
Cyanosis	: Bluish discolouration of skin or mucous membrane.
COPD	: Chronic Obstructive Pulmonary Disease.
Decongestant	: A substance that reduces congestion.
Delirium	: A state of disorientation.
Diaphoresis	: Profuse sweating.
Dyspnoea	: Difficulty in breathing.
DVT	: Deep vein thrombosis.
Endo-tracheal intubation	: Insertion of airway catheter through the mouth or nose into the trachea.
Exacerbation	: An increase in the seriousness of the disease or disorder as marked by greater intensity in the signs and symptoms of the patient being treated.
Expectorant	: A substance that promotes the ejection of sputum.
Flu	: Any viral infection, especially of respiratory system.
Gaseous exchange	: Involves delivering oxygen to the tissues through the blood-stream and expelling waste gases such as carbon dioxide during expiration.
Hormone	: A substance secreted by endocrine gland.
Inflammation	: A protective response of the body tissues to irritation or injury.
NSAID	: Non Steroid Anti Inflammatory Drug.

Malignant	: Cancerous
Nosocomial	: Pertaining to hospital
Orthopnea	: Inability to breath easily except in an upright position.
Palpation	: Feeling the part of body with the hands.
Phlegm	: It is a slimy substance made by the lining of the bronchial tubes.
Percussion	: Technique of physical examination which is performed by striking finger of one hand, placed over the organ/body part with finger of another hand.
Perfusion	: It is the filling of the pulmonary capillaries with blood.
Polyp	: A fleshy growth that projects from the surface of mucous membrane.
PE	: Pulmonary Embolism.
Reflux	: An abnormal return flow of fluid.
Regurgitation	: Return or backward flow food/acid /fluid or blood from stomach to esophagus and mouth
Retro-sternal	: Behind the sternum
Sarcoidosis	: A chronic granulomatous disease containing growths of non-necrotizing epithelial cells.
Tachycardia	: Increased heart rate (> 100 beats/ minute).
Steroid	: A substance containing hormone.
Ventilation	: Movement of in or out of airways.
Vasomotor	: Pertaining to nerves and muscles that control the calibre of blood vessels.

2.9 REFERENCES

- 1) Ansari J & Kaur D. A Text Book Of Medical Surgical Nursing-1, 1st edition, part -A S.Vikas & company (Medical publishers) India Jalandhar city-144008.2011. p 285-330.
- 2) Steven EW, David AL. Cough and Hemoptysis. In: fauci Anthony S et.al. Harrison's Principles of Internal Medicine, 17th edition vol. 1, McGraw-Hill Companies USA.2008. p 227-228.
- 3) Brunner& Suddarth's Text Book Of Medical Surgical Nursing , 11th edition, vol.1, Wolter Kluwer publishers (India) Pvt .Ltd. New Delhi-19. 2009. p 588-601.
- 4) Black JM,Hawks JH, Medical Surgical Nursing- Clinical Management For Positive Outcomes, 7th edition, vol.1, Reed Elsevier India, Pvt .Ltd. New Delhi-65, 2007.p 1807-1814, 1839-1842.
- 5) Nair UR, Text Book Of Medical Surgical Nursing, 1st edition, Jaypee Brothers Medical Publishers, India. Pvt. Ltd New Delhi – 02, 2009 p 538-540.
- 6) Antonio M. Gotto. The Cornell Illustrated Emergency Medicine & First Aid Guide. 1st edition. Life Line Press Regnery Publishing Company, Washington DC.2002 p.46-48,64-66,82-83,105-108,127-128,132-134,186-187.

- 7) Panwar PK. Clinical Pharmacology: Medical Surgical Nursing. 4th edition. AITBS Medical Publishers, New Delhi -51 India. 2015 p. 24-36
- 8) Antonio M. Gotto. The Cornell Illustrated Emergency Medicine & First Aid Guide. 1st edition. Life Line Press Regnery Publishing Company, Washington DC. 2002 p. 71-72
- 9) Kenneth N. Anderson, Lois E. Anderson. Mosby's Pocket Dictionary of Medicine, Nursing and Allied Health. 1st edition. Japee Brothers Medical Publishers (P) Ltd. New Delhi-02 (India) 1993.
- 10) Manual for Health Worker Female. Directorate General of Health Services Ministry of Health and Family Welfare. 2nd edition, vol. 2, printed by Rekha Printers Pvt. Ltd. New Delhi-110020, 1984, p 20.1-20.5

