UNIT 3 COMMON CONDITIONS -3 – HEART, URINARY SYSTEM AND BLOOD DISORDERS

Structure

3.0 Introduction
3.1 Objectives
3.2 Anatomy and Physiology of Heart
  3.2.1 High Risk Factors of Heart Diseases
  3.2.2 Common Heart Diseases and Their Signs and Symptoms
  3.2.3 Role of Health Worker in Prevention and Management of Heart Diseases
  3.2.4 Taking Appropriate Decision and Referral
  3.2.5 Care of Patients Who are Already Suffering from Heart Diseases
3.3 Blood Disorders
  3.3.1 Some Common Blood Disorders
  3.3.2 Signs and Symptoms of Blood Disorders
  3.3.3 Management of Blood Disorders
  3.3.4 Importance of Counselling in Blood Disorder
3.4 Urinary Tract Infections
  3.4.1 Assessment for Urinary Tract Infections
  3.4.2 Treatment
  3.4.3 Urinary Tract Infection in Children
3.5 Let Us Sum Up
3.6 Model Answers
3.7 References

3.0 INTRODUCTION

In this unit we will discuss about conditions related to heart, blood related disorders and Urinary Tract Infection. Heart diseases are those diseases or condition which affects or damages the heart or blood vessels. Sometimes the word “cardiovascular diseases” is used to describe a number of diseases and conditions that affect the heart and vessels.

Blood related disorders are disorders of Erythrocytes (red blood cells- RBCs), leukocytes (white blood cells), and platelets (thrombocytes) and clotting factors disorders. Blood as compared to other organs, is unique in the sense that it is fluid. Blood related disorders involve entire human body. Patients with blood disorders may have few or no symptoms. Thus an understanding of development of diseases in patient and ability to assess the patient needs is very important.

Urinary Tract Infections include a wide range of clinical entities, including asymptomatic bacteriuria (ABU), cystitis (infections of the urinary bladder), prostatitis (infections of the prostate), and pyelonephritis (infections of the kidneys). Both UTI and ABU signify the presence of bacteria in the urinary tract, usually accompanied by white blood cells in the urine. In ABU there are no symptoms
attributable to the bacteria in the urinary tract and does not usually require treatment, while UTI typically implies symptomatic disease that requires antimicrobial therapy. Much of the literature concerning UTI, particularly catheter-associated infection, does not differentiate between UTI and ABU.

3.1 OBJECTIVES

After completing this unit, you should be able to:

- enumerate common heart diseases;
- list high risk factors of heart diseases;
- identify symptoms and signs of heart conditions;
- carry out assessment of heart conditions;
- provide appropriate care of individual, community and referral;
- explain and identify important blood disorders;
- identify clinical manifestations of various blood disorders;
- provide timely appropriate referral; and
- counsel patients and increase awareness about blood disorders in community;

- identify urinary tract infections; and
- provide care to patients suffering from UTIs.

3.2 ANATOMY AND PHYSIOLOGY OF HEART

Heart is the hollow and muscular organ located in center of chest, between two lungs. Its approximately weighs 300 gram, roughly of size of fist of individual. It pumps blood through the blood vessels of the circulatory system. Blood provides oxygen and nutrients to body, and also assists in the removal of metabolic wastes. Heart is made of four chambers, two atria and two ventricles. The pumping action of heart is because of rhythmic contraction (systole) and relaxation (Diastole) of its muscular wall. During systole (contraction of heart) all the chambers of heart are squeezed to eject blood in the blood vessel. During diastole (relaxation of heart) the heart chambers fill with blood which in turn will be ejected from heart to blood vessel during systole. One systole and one diastole called as one beat. Resting adult heart beats 60–80 times per minute. There are blood vessels which supply blood to heart called coronary arteries.

3.2.1 High Risk Factors of Heart Diseases

There is no a single cause of heart disease. It occurs because of accumulation of multiple high risk factors. There are some risk factors which can be changed (modifiable) and some cannot be changed (non modifiable) risk factors. The risk factors which cannot be changed are older age, sex, ethnicity and family history, but this is essential to know who are at risk of heart disease by understanding modifiable and non modifiable risk factors. The main risk factors for heart disease are. (Box 3.1)
Let us discuss the risk factors for heart diseases in terms of non-modifiable and modifiable as given below:

**Age:** Risk increases with increase in the age.

**Sex:** The risk is more to adult male as compare to female but in later age risk seems to be equal in both sexes.

**Genetic factor:** Genetic factors play some role in the development of heart diseases. Some families show higher risk of heart diseases because of collection of different risk factors in the family due to same life style and dietary pattern.

**Obesity:** The greater the weight the more is the risk. The risk is more if the fat accumulation is mostly around abdomen and waist. The measure of obesity is Body Mass Index (BMI), waist hip ratio and skin fold thickness. BMI is calculated by taking weight of individual in kilogram divided by square of height in meters. The normal BMI ranges from 18.5 to 22.9 kg/m² for Indians. More than this is either overweight (23 to 25) or obesity (>25).

**High blood sugar (Diabetes):** The risk of heart diseases is 2–3 times more in persons with high blood sugar than normal blood sugar. The high blood sugar is labelled as when random blood sugar is > 200 mg/dl or fasting blood sugar >” 126 mg/dl or post prandial (after 2 hours of meals) > 200 mg/dl. There is one more condition where fasting blood sugar is normal but after having meals blood sugar ranges between 140 to 200 mg/dl which is called as “impaired glucose tolerance”. This is the sign of future frank diabetes.

**High blood pressure (Hypertension):** High blood pressure itself is a one of the heart diseases but also the single most risk factor for other heart diseases. The normal blood pressure for adult is systolic blood pressure (SBP) of <120 mm of Mercury (Hg) and diastolic blood pressure (DBP) <80 mm of Hg, which is written
Common Conditions-3 – Heart, Urinary System and Blood Disorders

as 120/80 mm of Hg (“120 by 80 mm of Hg”). Anything more than this is either considered as prehypertension (SBP 120–140 mm of Hg or DBP 80–89 mm of Hg) or hypertension (SBP >140 mm of Hg or DBP >99 mm of Hg). We will learn later about cautions and methods of measuring blood pressure.

**Unhealthy diet:** Diet plays an important role in the development of heart diseases. The major causes are high salt intake (more than 5 grams/day), high fat intake, high intake of refined food items or food items less in fibres, fast food, etc.

**Alcohol use:** High intake of alcohol puts an individual at a higher risk of heart disease.

**Smoking:** It increases plaque formation in the blood vessel and decreases elasticity of blood vessels.

**Physical inactivity:** Physical inactivity increases body weight and causes deposition of fat in the body and blood vessels. The fat accumulation in blood vessels forms plaques in blood vessels, causing loss of elasticity of blood vessels.

### 3.2.2 Common Heart Diseases and their Signs and Symptoms

Let us now discuss heart attack, heart failure, arrhythmia as given below:

- **Heart Attack (Ischemic Heart disease/Coronary artery disease/Angina Pectoris)**

Heart attack is one of the leading killers of both men and women in our country. The good thing is that the chances of surviving a heart attack are greater if people get immediate proper and timely medical care. These treatments can save lives and prevent disabilities. As a health worker, you play an important role in educating your community about the warning signs of a heart attack, the importance of getting immediate medical help, and taking steps to surviving a heart attack.

#### i) What is heart attack?

A heart attack can take place when the blood supply to a part of the heart is stopped or hazardously reduced. The blood vessels which supply the heart muscle are called coronary arteries. Partial or complete block of coronary artery disease is the main cause of heart attack, when one or more arteries become diseased by formation of plaques in coronary arteries resulting in reduced blood flow. The plaque can obstruct the blood flow of an artery slowly, or suddenly by pieces of plaque may break away and cause a blood clot. Due to blocked or reduced blood supply the cells of the heart muscle start dying. This affects the rhythm and function of heart. So it cannot pump enough blood to meet body requirement and meet need of heart muscles requirement. So the part of heart gets damaged. This reduced blood flow can kill a person or can cause heart damage.

If he survives, his capabilities to perform his daily routine get affected. The outcome depends on how much of the heart is damaged and how quickly a person gets medical treatment. Here timing is important! so prompt and timely treatment can save life. The sooner a heart attack is treated, the greater a person’s chances of surviving. Suddenly heart can stop. Unless patient treated immediately, person may die immediately.

**Warning signs and symptoms of a heart attack**

- **Chest pain or discomfort:** Sudden severe chest pain with no known cause is major suspicion of heart attack. It may be of dull aching, choking, strangling, cramping, stabbing type of pain, pressure, heaviness or just discomfort. It
Management of Common Conditions and Emergencies including First Aid

Angina is chest pain or discomfort that a person has if the heart does not get enough blood. Usually angina is felt as uncomfortable pressure, fullness, squeezing or pain in the center of the chest. A person may also feel the discomfort in the neck, jaw, shoulder, back or arm. These feelings are also signs of a heart attack, but if it is angina, the pain or discomfort will last only a few minutes before going away. If these symptoms last longer, it could be a heart attack. Following symptoms may be present with or without chest pain.

- Shortness of breath.
- Palpitations (unpleasant awareness of own heartbeat)
- Feeling weak, light-headed, or faint
- Confusion
- Difficulty in understanding

Immediate management

If you find any suspected case of heart attack do not wait call doctor and equipped ambulance and refer patient to hospital management of heart attack is possible. Also give 300 mg of Aspirin by mouth if available. Transportation in equipped ambulance is the safest and best way to reach to the hospital. Do not let the patient walk because it may worsen the attack. Prefer wheel chair and ambulance. Put on oxygen mask and start oxygen. If you are sure about heart attack then give Sorbitrate sublingually and analgesic to relieve pain. Heart may stop beating during a heart attack. This condition is called sudden cardiac arrest. In this case you may need to give cardiopulmonary resuscitation.

Diagnosis of heart attack

The diagnosis is made by relevant history, physical exam and some investigation like electrocardiogram (ECG) and some blood test of certain markers for damage to the heart.

Treatment

The first treatment given will be medicines that dissolve clots, pain killers, Oxygen. To work best these medicines need to be given within three hours of a heart attack. If this treatment is not given or does not work, other procedures (methods) may be needed.

Unfortunately, the most people wait several hours or even days before seeking medical attention. There may be delay in decision making too. The longer the delay in getting treatment, the more damage the heart is likely to have. Quick reactions to signs of a heart attack can greatly improve the chance of surviving the heart attack. We will discuss taking care of person after a heart attack at the end.

Heart failure

Heart failure is inability of heart to pump blood efficiently to supply oxygenated blood and nutrients to rest of body. Blood moves more slowly through the body and less oxygen and nutrients reach the body and the brain. This results in easy fatigability and shortness of breath. The daily routine gets affected. When the
heart cannot pumps blood efficiently the blood cannot move in vessels properly so it may get stagnant blood vessels, in lungs and leak into the lungs and dependent parts of body. The fluid causes congestion and makes it hard to breathe. Therefore individuals with heart failure can develop swelling in the feet, in ankles, legs when they stand long or stomach and can suddenly gain weight. Therefore it is also called as “congestive heart failure”. Collection of fluid in lung causes breathing difficulty.

**Warning signs of heart failure**

If people have heart failure, it is more likely that they must be a diagnosed as case of heart or other disease.

- Breathlessness on exertion, laying down in bed or at rest. The shortness of breath when you are active, and while resting, and sleeping is one of major symptom of heart failure. There may create difficulty while sleeping so patient wants to elevate his head end by using more pillows. (Patient feels comfortable in upright position rather than lying down flat)
- Swelling in feet, ankle and legs. If we press on ankle or upper surface of feet with thumb there will pitting at pressed area, it called as pitting oedema.
- Increased swelling of feet, ankles, legs, and abdomen. There may be sudden weight gain (1kg or more in one day, 2.4 kg or more in one week).
- Palpitation (Awareness of own heartbeat): There may be faster heartbeat and one may feel like as if the heart is running fast.
- Pain in the abdomen.
- Easy fatigability.
- Confusion.
- Repeated, dry cough, especially when they are lying down.
- Blood in the cough.

**What to do when you encounter patient of heart failure?**

The timely referral of patient with warning signs of heart failure can save life of patient and improve quality of life.

**Confirmation of heart failure**

The confirmation of heart failure is made by relevant history, physical examination and few investigations like chest X ray, ECG, echocardiography and some blood investigation.

**iii) Arrhythmia or irregularity of rhythm (Atrial Fibrillation and ventricular fibrillation)**

An arrhythmia is a problem with the rate or rhythm of the heartbeat. During an arrhythmia, the heart can beat too fast, too slow, or with an irregular rhythm. Normally, the heart contracts and relaxes in regular, evenly timed beats. It keeps a steady rhythm—about 60 to 100 beats per minute. Arrhythmias may be atrial (heart’s upper chambers) or ventricular (heart’s lower chambers) in origin. Atrial fibrillation is the most common type of arrhythmia. The irregular beating of heart may cause difficulty in pumping blood properly. For several different reasons, the heart sometimes begins beating irregularly, and it may beat too fast or too slow.
The most common cause is diseased heart valves. The risk of developing arrhythmias increases if patient is having, or have had, other pre-existing heart problems like heart failure, high blood pressure, diabetes, heart attack, Coronary artery disease (blockage of blood vessels in the heart) etc.

**Signs and symptoms of Arrhythmias**

Some people may not have any symptoms. Some may have one or more of the following signs:

- Palpitation: fast or irregular heartbeat
- Shortness of breath
- Chest discomfort or pain
- Lightheadedness or dizziness.
- Extreme weakness

**Management**

Check pulse. Try to see rhythm of heartbeat or pulse rate. (An easy way to see the regularity of the rhythm is either by palpation of the pulse, or auscultation of the precordium). If it is irregular then please refer this patient to health facility for further evaluation by doctor. Assurance to patient has positive impact.

Treatment for arrhythmia includes anti arrhythmic drugs or electric shock through special machine called as defibrillators. Some time needs surgery for pacemaker installation.

iv) **Hypertension (High Blood Pressure)**

Blood pressure is the force of blood pushing against the walls of arteries as the heart pumps blood through these blood vessels. If this pressure goes up and stays continuously high over a period of time, it can damage the body. High blood pressure is very common. But less than half of all people with high blood pressure are treated for blood pressure and taking medicine. The high blood pressure is dangerous because it is a separate heart diseases as well as its a risk factor for other heart diseases. It is a condition where heart has to pump blood very forcefully than normal to push blood through stiff vessels to get to all parts of the body. Often the heart must work harder if the arteries are too narrow or stiff or there is too much fluid in the body. If high blood pressure is not treated, then heart has to work very hard in adverse condition. A heart increases in size and become weaker.

As we discussed the normal blood pressure for an adult is systolic blood pressure (SBP) of <120 mm of Mercury (Hg) and diastolic blood pressure (DBP) <80 mm of Hg, which is written as 120/80 mm of Hg (“120 by 80 mm of Hg”). Anything more than this is either considered as prehypertension (SBP 120-139 mm of Hg or DBP 80-89 mm of Hg) or hypertension stage I (SBP 140-159 mm of Hg or DBP 90-99 mm of Hg) and hypertension stage II (SBP >160 mm of Hg or DBP>100 mm of Hg). We will learn about cautions to be taken while measuring blood pressure.

**Signs and symptoms of Hypertension**

Generally people suffering from hypertension will not have many symptom, unless it is of very severe grade. Therefore it remains undetected and silently it damage
the health of individual, therefore it is called as silent killer too. Some of the patient may have vague complaints like headache, generalise body pain, easy fatigability, heaviness in head etc. But unless we measure blood pressure we will not be able to know the blood pressure status of individual.

**Record of blood pressure**

It is simple but important skill, and needs practice to get correct measurement. It is important to take the blood pressure the right way and correct measurement. Knowing how to take a blood pressure will pay more than just guessing about hypertension. The instrument we use for blood pressure measurement is called sphygmomanometer. There are different types of instruments for measuring blood pressure available in market. Measuring BP in adults has two parts. One part is the blood pressure cuff, and the other part is the dial or monitor that shows the blood pressure numbers.

**Preparation for measuring BP:**

Before measuring Blood Pressure you need to know the following:

1) Do not measure BP immediately as person comes to you for BP measurement. Allow him to settle down. Because there is always a fair probability to measure higher blood pressure after walking, running, climbing stairs, eating large meal. Wait for 20–30 mins.

2) Check whether the person had coffee, tea or had smoked just minutes before the visit. If yes then wait for 20–30 mins.

3) Make him/her comfortable. Explain about the importance of BP measurement.

4) Avoid measuring BP on the side of injured arm, post-mastectomy side, AV fistula made for dialysis.

5) Check cuff of BP apparatus. Deflate it if it was inflated. Check mercury column, where it is? Is it at 0 (zero) mm of Hg marking? If no, release any pressure in cuff. If mercury column is at higher marking then probably you will record falsely higher BP of individual.

**Steps in measurements**

1) Ask individual to sit comfortably without any discomforting posture. You can take blood pressure while laying down too. Talk with person. Give time to the patient to relax.

2) Keep forearm of patient on table with palm facing upward. Keep cuff and instrument at same level as the heart.

3) Put the proper adult size blood pressure cuff on the patient’s arm.

4) Place stethoscope, ear piece in both ear and diaphragm at inner side of elbow fold slightly toward chest of person where you can feel brachial artery pulsations.

5) Lock the knob on pressure bulb and Squeeze it to raise pressure in pressure cuff tied to arm. While inflating the cuff listen the sound by stethoscope. While inflating at some point you will stop listening sounds through stethoscope. Inflate it for more than 20–30 mm of Hg more from this point.
6) Then start deflating cuff slowly while waiting to listen sounds through stethoscope again.

7) Note down the blood pressure numbers corresponding where sound appears (record as systolic BP) and disappears again (record as diastolic BP).

8) Remove the cuff from the person’s arm.

If you are confused or not able to measure it properly then you can repeat measurement after waiting for a while. Interpret the reading as discussed previously.

**Management**

Refer patient to doctor for further evaluation. This patient may need thorough examination and a few investigations to know the cause of hypertension in this patient. If we could find some cause of hypertension then we call it as “Secondary hypertension” that is the hypertension is caused by some other problem say kidney problem. If we could not find any cause then it is “Primary or essential hypertension”.

Early treatment has positive outcome. So it should be encouraged to take treatment for preventing future heart problem and other complications. Care of known hypertensive patient we will discuss at the end of this module. Get investigated for ECG, chest X-ray, urine routine specifically urinary protein and sugar, serum creatinine.

There are many antihypertension drugs available like thiazide diuretics, loop diuretics, potassium sparing diuretics, aldosterone receptor blockers, beta adrenergic blockes, Angiotensin – converting enzyme (ACE) inhibiters, angiotensin II antagonist, calcium channel blockers. Generally treatment is started with Thiazide diuretics. But most of the time patient land up in muple drugs with rationale combination required.

**3.2.3 Role of Health Worker in Prevention and Management of Heart Diseases**

In community you may be the first person to be contacted for heart problem. As we studied, almost all heart problems need to be attended promptly without wasting time. Your right decision at given point of time can save patients’ life.

- Discuss with individual or community members, regarding risk factors present in individuals or in the community.
- Create awareness about risk factor of heart disease.
- Modify the modifiable risk factors it will prevent good chunk of heart diseases in the community.
- Risk factors
- Living healthy life style
- Diet
- Work on risk factors in individual and community.
- Encourage community and individual to adopt healthy and active life style.
- Encourage people to have ideal weight. Discourage tobacco alcohol use in any form. Also discourage people taking alcohol. Help them to quit these addictions with the help of counsellor, doctor or psychiatrist.
• Advise all high risk people to get investigated for hypertension, high blood sugar, and high blood cholesterol.

• Screen people for high blood pressure, high blood cholesterol, and high blood sugar as advised in national programme for prevention and control of Cancer, diabetes, cardiovascular diseases and stroke guidelines. In this national programme (opportunistic screening is advised).

• During the camps/designated day health worker shall examine persons at and above the age of 30 years for alcohol and tobacco intake, physical activity, blood sugar and blood pressure.

• During the examination, health worker shall also carry out the measurement of weight, height, and calculate Body Mass Index (BMI) etc.

• Encourage people to adopt daily exercise or brisk walk to prevent development of risk factors.

• Encourage to play outdoor activities and sports and lose weight if overweight.

• Diet help individuals to adopt healthy dietary habit.

• Advise them to reduce salt intake <5gm/day in their diet. Avoid too much sweets and fatty food, fried food items. Include vegetables and fruits in diet.

**Role in diagnosis of heart disease**

Your knowledge of warning symptoms and signs of heart disease will make huge difference in patient’s life. Keep high suspicion for symptom and signs of heart disease. Do not worry about being wrong, if your suspicion is wrong it will be bit embarrassing but if your suspicion was right then you will save life! You being wrong will still be an opportunity for screening of the patient and reassure them.

3.2.4 Take Appropriate Decision and Referral

• A timely right decision is must for positive outcome of heart diseases.

• Know health facilities in your area where heart problems can be dealt properly.

• Have communication with doctors in your working area.

• Have ambulance number for emergency.

3.2.5 Care of Patients Who are Already Suffering from Heart Disease

As mid level health care provider(mn), you should give psychological support to the patient. Encourage them to have positive attitude to have good outcome. Understand what were specific advice given by doctor. Encourage them to stick the treatment protocol and medicine prescribed by doctor. Monitor risk factor in individual. Take routinely BP, check blood sugar, body weight of patient. Encourage them to have healthy life style. Advice them to adopt healthy dietary practices in their day to day life. Help them to quit alcohol and tobacco addiction. Though it is not easy but de-addiction will have very positive impact on outcome. Help them to keep all essential medicine in sufficient quantity. Clear the importance of routine follow up with doctor. Help them to keep good follow up. Understand any problem they are facing with medicine. Link them to doctor for any query.
3.3 BLOOD DISORDER

Blood is composed of cells and plasma. Cells include red blood cells, white blood cells, and platelets. Plasma is the liquid part of blood composed of water, various proteins, such as albumin, globulin, fibrinogen, and other clotting factors. The primary site of blood formation is bone marrow. Disease of blood cells and clotting factors are called as blood disorders. The cells in blood have a limited lifespan so they are continuously produced and replaced from bone marrow.

3.3.1 Some Common Blood Disorders

Anaemia: There are three types of anaemia – nutritional, haemolytic, and due to blood loss. Let us discuss these as given below:

1) Nutritional anaemia
   a) Iron deficiency anaemia
   b) Megaloblastic anaemia
   c) Aplastic anaemia (related to immune system)

2) Haemolytic anaemia
   a) Sickle cell anaemia
   b) Thalassemia

3) Blood loss anaemia: Due loss of blood volume

   a. Abnormal generation of cells
      Polycythemia vera
      Leukaemia (Blood cancers)

   b. Bleeding disorders
      Thrombocytopenia
      Disseminated Intravascular Coagulation
      Von Willebrand’s disease
      Haemophilia

Anaemia: Anaemia is characterised by a decrease in the number of red blood cells (RBCs) or by decrease in haemoglobin concentration. Haemoglobin is found in red blood cells, which helps in transporting oxygen to tissues in the body. So the decrease in RBCs or haemoglobin will decrease oxygen carrying capacity of blood. Hence body cells will receive less oxygen, which will affect the function of body in general. In severe cases patient may land up in heart failure. There are various causes of anaemia. For easy understanding the common anaemias were...
classified in nutritional anaemia, haemolytic anaemia and blood loss anaemia. It is important to know the type of anaemia.

**Iron deficiency anaemia:** Iron deficiency is by far the commonest nutritional cause of anaemia; it may be associated with folate deficiency, especially during pregnancy, adolescence and in childhood. Along with nutritional deficiencies there are other causes like intestinal helminthes infestation and malaria which may predispose to anaemia. Patient may not be having any symptoms in mild cases. The vague symptoms like easy fatigability, shortness of breath, palpitations, headache etc are the common symptoms and there may be a history of eating mud in children. The diagnosis of iron deficiency anaemia will be done by complete blood counts (CBC) with peripheral smear and iron profile. There will be decreased haemoglobin, decreased pack cell volume. Serum iron and ferritin will confirm diagnosis but this investigation not possible in PHC. Smear showing microcytic hypochromic RBCs in our country can be suggestive of iron deficiency anaemia.

**Megaloblastic anaemia:** Megaloblastic anaemia is a condition in which the bone marrow produces unusually large, structurally abnormal, immature red blood cells (megaloblasts). Megaloblastic anaemia has several different causes. Deficiencies of either cobalamin (vitamin B12) or folate (vitamin B9) are the two most common causes. These vitamins play an essential role in the production of red blood cells.

Along with general symptoms like easy fatigability, shortness of breath, sore mouth, glossitis, the megaloblastic anaemia may present with neurological symptoms like tingling or numbness in the hands or feet. Additional symptoms may develop over time including balance or gait problems, vision loss due to degeneration (atrophy) of the nerve that transmits impulses from the retina to the brain (optic nerve), and mental confusion or memory loss. A variety of psychiatric abnormalities have also been reported in individuals with cobalamin deficiency including depression, insomnia (difficulty or unable to sleep), listlessness, and panic attacks. The spectrum of neuropsychological symptoms potentially associated with cobalamin deficiency is large and varied. A complete blood count with opinion on peripheral smear will give a good clue of diagnosis.

**Aplastic anaemia:** This is the condition in which insufficient quantity of blood cells like RBC, WBCs and platelets are produced at its site of production that is at bone marrow. The exact cause may not be known; mostly it is related with immune system. All the general symptoms of anaemia will be present along with bleeding tendency from gums, internal bleeding in organs or gastro intestinal tract due to decrease in platelets. The management of this anaemia requires expert opinion and evaluation; so refer this patient to health facility.

**Sickle cell anaemia:** Sickle cell anaemia is an inherited disorder of haemoglobin (Hb). The red blood cells (RBC) become hard, sticky and shaped like a farmer’s sickle. These sickle cells block blood and oxygen flow in blood vessels, and break down more rapidly than normal RBCs. This can cause a low blood count (anaemia). There are two types one is called sickle cell disease (SCD) where haemoglobin pattern is SS and another is sickle cell trait where haemoglobin pattern is AS type. SCD is severe condition and will frequently have complications whereas most of the sickle cell trait patients lives life asymptotically.

The complications of Sickle Cell Disease: SCD can block the flow of blood in small arteries in many parts of the body, causing variety complications. The
hallmark symptom of SCD is sickle cell crisis, it causes sudden attacks of severe pain. An infection or blockage of blood vessels in the lungs can lead to acute chest syndrome (ACS), another common and serious occurrence. The abnormal shape of red blood cells found in patients with SCD contributes to co-morbidities throughout the lifespan including pneumococcal infections and acute spleen sequestrations in infants, pulmonary hypertension, stroke, gallbladder disease, and organ damage. SCD is also associated with premature mortality. The sickle cell crisis can be an emergency so better refer the patient to facility for evaluation and management.

**Sickle Cell Trait**: SCT is different from SCD. Individuals with SCT cannot develop SCD later in life; however, they can pass the sickle cell gene to their children. Therefore pre-marriage counselling is important to these patients too.

**Thalassemia**: This is also a haemolytic condition where the proper haemoglobin formation gets affected (defect in beta globulin chain of haemoglobin). Patient will have symptoms of anaemia. Patient may need repeated blood transfusions so refer this patient to health facility.

**Blood loss anaemia**: There may be history blood loss from any site from body commonly haemorrhoid (piles), heavy menses or internal organs and gastrointestinal tract bleed etc. Some time bleeding cannot be noticed unless we do investigate for blood in stool or urine. Refer these patients for detail investigations.

**Abnormal proliferation of blood cells**: It may be polycythemia vera (abnormally increase in number of RBC) or leukaemias (blood cancers). Common symptoms include are reddish purple skin and mucosa in polycythemia vera especially after bathing and in leukaemia pallor, easy fatigability, shortness of breath, abnormal bleeding or bruising. There may be enlarged liver and spleen in these patients. Refer this patient to health facility.

**Bleeding disorders**: They are very annoying to the patients. Patient may have complaint about bleeding tendency from gums, mouth, nose, heavy bleeding during menses or concealed internal organ bleeding presenting as pain in abdomen, blood in vomiting. Bleeding spots or bruising in the skin is also common. There may be history of passing black coloured stool or red streak on stool. Patients need to be investigated for concealed bleeding in urine and stool. Refer this patient immediately.

### 3.3.2 Signs and Symptoms of Blood Disorders

**General non specific symptoms** in a patient of blood disorders include weakness, easy fatigability, shortness of breath, malaise, pallor (conjunctival, tongue and palmer) and recurrent infection are few of the symptoms which may appear to be non specific in nature.

**Specific symptoms and signs** which warrant urgent medical care are jaundice (yellowish discolouration of eyes), acute bleeding from gums, nose, anus, passing blood in stool or dark coloured stools, acute abdominal pain, acute chest pain, blood in vomiting, lump in abdomen (liver enlargement, Spleen enlargement), swellings around neck and other parts of body (lymph nodes), swelling over feet, ankle and legs.

On investigation an abnormally increase or decrease in the counts and shape and size of blood cells should raised the suspicion of blood disorder. Decrease in haemoglobin concentration is suggestive of anaemia.
3.3.3 Management of Blood Disorders

Management of blood disorder will be discussed under suspected case and diagnosed case. Care of suspected case of blood disorder.

Ask about previous history of similar complaints. Any history of blood loss, menorrhagia or amenorrhoea. Whether any history of blood transfusion in past?

Examine eyes for jaundice and pallor. See for pallor in tongue (pale and smooth tongue is suggestive anaemia), and palms. Search for any neck swelling, abdominal lump (liver mass on right side of lower chest cage and for spleen enlargement on left side of lower part of chest). Check for any bruises or bleeding spots in skin. Examine for spoon shaped fingernail. Check for pitting oedema (presence of pit on pressing on upper side of feet, ankles or lower leg). Check haemoglobin. Get complete blood count to know the cell counts with peripheral smear opinion for any abnormality of blood cells. If suspicion is of sickle cell anaemia or thalassemia get Hb electrophoresis to confirm type of sickle cell or thalassemia. The sickle cell crisis can be an emergency so better refer the patient to facility for evaluation and management.

If you had any suspicion based on above symptoms and signs then immediately you should refer this patient to doctor or health facility for further evaluation. Get thoroughly investigated and have a diagnosis after discussing with doctor.

Care of diagnosed case of blood disorder

Nutritional anaemia: For anaemia first try to know the type of anaemia. If you are sure it is mild Iron deficiency anaemia which is common in pregnancy, adolescent or in children then asses diet to known whether patient is taking iron rich foods or not. Advise patient to take iron rich food items like meat, poultry, fish, jaggery and groundnuts, green vegetables, cereals, legumes, nuts. Take iron rich diet with vit C or with citrus fruits. Provide oral Iron folic acid tablet to the patient. A tablet must contain 100 mg of elemental Iron and 5mg folic acid and it is given for 100 days in cases of pregnancy. For iron deficiency anaemia other than in pregnancy, encourage patient to comply with drug regimen by explaining the duration, importance and side effect of drug therapy as advised by doctor. Warn patient about its side effects like constipation and black colour to stool and explain it is not worrisome. For moderate to severe iron deficiency anaemia you may need to refer patient for injectable Iron or blood transfusion. The technique of giving injectable (parenteral) iron is called as Z track technique. In this technique use 2 inch needle. Retract skin over muscle of outer quadrant of buttock laterally before inserting needle to prevent leakage along track and staining of skin. Please rule out sickle anaemia or other haemolytic anaemia before prescribing Iron therapy.

For megaloblastic anaemia, injectable hydroxycobalamine or cynocobalamine (Vit B12) is given intramuscularly every month with oral folic acid tablets.

For aplastic anaemia, educate patient for his personal care like taking medicine regularly, preventing bleeding incidents. Avoid injections.

Sickle cell anaemia: Know the type of sickle cell anaemia whether it is sickle cell disease (SS pattern) or sickle cell trait (SA pattern) by haemoglobin electrophoresis. Advise to take more and more water and fluids. Avoid stressful conditions which will increase oxygen demand (any strenuous exercise), extreme heat or cold. Make arrangement with blood bank for any blood transfusion if
needed. Make them aware about signs of crisis. Administer analgesic and fluids to the patients who are in crisis. Teach family member about the care and crisis. These individuals need pre-marital counselling to prevent sickle cell disease in their children.

Thalassemia: Patient of major thalassemia needs frequent blood transfusion in every 3 to 4 weeks. Make available blood for transfusion from authorised blood bank. Encourage community members for blood donation which may help this kind of people.

Blood loss anaemia: Try to know the site and cause of blood loss. It may be haemorrhoids (piles), menorrhagia (excessive loss of blood during menses), internal gas tro intestinal tract bleeding. Some time need more investigation to know the site of bleeding. After conferring diagnosis as patient need to stick to medication as advised by doctor. Act as bridge between patient and doctor to understand problem in patient.

Abnormal proliferation of blood cell occurs in polycythemia vera and blood cancers, it can be confirmed by complete blood count and bone marrow studies. Refer patient to health facility for detail management. Encourage patient and family for regular follow up with health facility.

**Bleeding disorder:**

Avoid bleeding by preventing use of sharps, needles and hard tooth brush. Advise to take stool softeners and plenty of water. Advise to watch on bleeding like number of pad used in menses, colour of urine and stool. Advise to have routine follow up with treating doctor and investigate for concealed blood loss in urine and stool.

### 3.3.4 Importance of Counselling in Blood Disorder

As health worker you may need to help to take right decision regarding their disorder. For example, you may need to give pre-marriage counselling to the haemolytic anaemia patients. Advise to avoid marriage between two sickle cell disease patients. Help them to take decision regarding treatment centers and treatment facilities available nearby. Have contact number of blood bank in case you need to direct them to avail blood in emergency. Encourage community members to donate blood.

### Check Your Progress 2

1) Name the common blood disorder.

...................................................................................................................................................
...................................................................................................................................................

2) When you will suspect blood disorders?

...................................................................................................................................................
...................................................................................................................................................

### 3.4 URINARY TRACT INFECTIONS

A patient with Urinary Tract Infection (UTI) may be symptomatic or asymptomatic. UTI usually presents with
**Cystitis:** The typical symptoms of cystitis are burning micturition, dysuria, increased frequency of micturition, and urgency. Nocturia, hesitancy, suprapubic discomfort, and haematuria may also be present. Unilateral back or flank pain is generally an indication that the upper urinary tract is involved.

**Pyelonephritis:** Mild pyelonephritis can present as low-grade fever with or without lower-back or costovertebral-angle pain. In severe cases, high-grade fever, rigors, nausea, vomiting, and flank pain may be present. Symptoms are generally acute in onset, and symptoms of cystitis may not be present. Fever is the main feature distinguishing cystitis and pyelonephritis. The fever of pyelonephritis typically exhibits a high, spiking “picket-fence” pattern. When it is due to obstructive pathology, urine flow may be decreased.

**Prostatitis:** It may be infectious as well as non-infectious, although infectious form is less common than the non-infectious form. Acute bacterial prostatitis presents as dysuria, frequency, and pain in the prostatic, pelvic, or perineal area. Fever and chills are usually present, and symptoms of bladder outlet obstruction like hesitancy, dribbling, and urgency are common. Chronic bacterial prostatitis presents more insidiously as recurrent episodes of cystitis, sometimes with associated pelvic and perineal pain.

### 3.4.1 Assessment for Urinary Tract Infections

UTI can be diagnosed quite accurately on the basis of symptoms and laboratory tests are seldom needed to initiate the treatment. In absence of complicating factors like pregnancy, STD/RTI, comorbidities, the symptoms of UTI can diagnose about 90% of the infections correctly. The biochemical, pathological and microbiological investigations are needed to reach the etiology of the disease. Care should be taken about complicating symptoms like vaginal discharge, in presence of which the patient may require further evaluation. Other diagnosis that should be considered when a woman presents with dysuria and vaginal discharge are cervicitis, vaginitis, and urethritis. Women with multiple sexual partners, frequent sexual intercourse, with inconsistent use of condoms are at increased risk of STD/RTI and these should be excluded before initiating treatment for UTI. An approach to diagnosing and initiating the treatment among UTI patients has been presented in the following table.

<table>
<thead>
<tr>
<th>Clinical Presentation</th>
<th>Patient Characteristics</th>
<th>Diagnostic and Management Considerations</th>
</tr>
</thead>
</table>
| Acute onset of urinary symptoms  
- Dysuria  
- Frequency  
- Urgency | Non-pregnant healthy women with clear history suggestive of UTI | • Consider uncomplicated cystitis  
• No urine culture needed |
| Women with unclear history or risk factors for STD | | • Consider uncomplicated cystitis or STD  
• STD evaluation and pelvic examination |
| Male with perineal, pelvic or prostatic pain | | • Consider acute prostatitis  
• Urinalysis, culture and urological evaluation may be needed |
### Clinical Presentation

<table>
<thead>
<tr>
<th>Patient Characteristics</th>
<th>Diagnostic and Management Considerations</th>
</tr>
</thead>
</table>
| Patients with indwelling urinary catheter | • Consider catheter associated UTI  
• Exchange or remove catheter  
• Urinalysis and urine and/or blood culture for assessment |
| All other patients | • Consider complicated UTI and refer to higher centres for urinalysis, assessing any anatomical or functional abnormality. |

**Acute onset of**
- Backpain
- Nausea/vomiting
- Fever
- Possible cystitis symptoms

**Otherwise healthy non-pregnant women**

| All other patients | Consider uncomplicated pyelonephritis  
| Urine culture may be needed  
| Consider complicated pyelonephritis and refer to higher centre for further assessment |

**Non localising systemic symptoms**
- Fever
- Altered mental status

| Patients with sign and symptoms of systemic infections and no obvious cause | Consider complicated UTI or pyelonephritis and refer to higher centre for further assessment and management |

**Recurrent acute urinary symptoms**

| | Refer to higher centre for further assessment and management |

Although urine cultures would be ideal in diagnosing UTI, in primary care settings investigations like blood and urine culture, ultrasonography etc. are not available. Microscopic examination of urine is also seldom available depending on the expertise of the laboratory technician. If available it may help in visualising pus cells and RBCs in the urine. A peripheral smear may help in determining if the leucocyte count is raised which may signify inflammatory response to the pathology and bacteria in the urinary tract.

A rough differentiation of pyelonephritis and cystitis can be made by determining the presence of proteins in the urine. Urine dipstick test or heat coagulation test may be performed for the same by collecting 10–15 ml urine in a test tube and heating the upper portion. Appearance of turbidity shows proteins in urine. As proteins are excreted in urine in case of renal pathology, it signifies pyelonephritis if detected in urine. Benedicts test or dipstick test for glucose may also be performed which signifies chronic renal pathology.
### 3.4.2 Treatment

Antibiotics form the mainstay of treatment for all symptomatic cases of UTI. However, asymptomatic bacteriuria cases e.g. asymptomatic patients with catheter should not be given antibiotics as unnecessary antibiotic treatment is associated with significantly increased risk of clinical adverse events due to destruction of normal bacterial flora and development of antibiotic-resistance. Empirical therapy in UTI cases should not be withheld because of unavailability of investigations. The treatment options include:

**Antibiotics:**

1) **Cotrimoxazole**: Cotrimoxazole is the first line drug for treatment of cystitis. In adults a double strength tablet of Cotrimoxazole in BD dose for 5 days is effective in treating cystitis.

2) **Nitrofurantoin**: Nitrofurantoin is generally useful only in case of cystitis as tissue levels of nitrofurantoin do not reach enough concentration to cure pyelonephritis. A 5 day or 7 day treatment regimen with 100 mg BD dosage gives good response in cystitis.

3) **Fluoroquinolones**: Ciprofloxacin 500 mg tablets given for 3 or 5 days in BD dose gives good response in cystitis but in view of antibiotic resistance its use is restricted these days. Fluoroquinolones are the first line drugs for treating pyelonephritis due to antimicrobial resistance to Cotrimoxazole in Pyelonephritis patients.

4) **Penicillins**: Penicillins are generally less useful in treatment of UTI and should be used in complicated cases of UTI and pregnancy. In pregnancy due to the possible effects on foetus Nitrofurantoin, Cotrimoxazole or Fluoroquinolones should be avoided. Ampicillin and cephalosporins are mostly the first line drugs in pregnancy. Among Cephalosporins, Cefixime tablets 100 mg BD dose for 5 or 7 days should be given.

Prostatitis in males: In men with apparently uncomplicated UTI, a 7 to 14 day course of a Fluoroquinolone or Cotrimoxazole is recommended. In case of a recurrent episode of prostatitis or UTI in males a 12 week course of antibiotic should be initiated.

Analgesics: Analgesics and antipyretics often provide symptomatic relief in patients having fever and pain. Paracetamol may be given for fever and pain. Often patients with obstructive uropathy may require injectable analgesics.

General measures: The general measures for UTI patients include plenty of fluids and frequent emptying of bladder which will reduce urinary stasis, reduce the chances of infection and thus help in recovery.

### 3.4.3 Urinary Tract Infection in Children

UTI affects about 6–8% of girls and 1.5–2% of boys. They are important cause of morbidity and may also cause renal damage if not treated effectively. The incidence is higher in boys in infancy and later in girls.

Vesico-ureteric reflux, obstructive uropathy, neurogenic bladder, malnutrition, immunosuppressive therapy and conditions, renal parenchymal disease are important predisposing factors for UTI among children.
In neonates unexplained fever may be the only presenting symptom of UTI. Occasionally the infant may present with failure to thrive or poor weight gain, diarrhoea, vomiting, jaundice and sometimes features of systemic toxicity signifying sepsis may also be present.

UTI presenting with oedema over face typically present in the morning which progresses to feet and legs in few days. Haematuria, polyuria, dysuria, flank pain, ureteric colic, polydipsia, and enuresis may be present. These features signify underlying renal pathology like glomerulonephritis. Chronic renal conditions may also present with rickets, symptomatic hypertension, collagen vascular diseases, anaemia along with UTI.

**Diagnosis:** Children require the use of diagnostic tests more often than adults for confirming the diagnosis. The diagnostic tests are similar to what has been described among adults. Differentiating between upper and lower urinary infections practically is not useful in deciding the initial treatment in children.

**Treatment:** In young infants UTI is often associated with sepsis and requires injectable antibiotic therapy with ampicillin, aminoglycoside or a cephalosporin for 10–14 days. If available an initial dose should be given in such cases and patient should be referred to higher centre for further management. I.V. fluid should be initiated in case of fluid or electrolyte imbalance.

In older children if the child is taking orally, oral amoxicillin in 30–50 mg/kg/day in 3 divided doses or oral cefixime in dose of 10–20 mg/kg/day in 2 divided doses should be given. The treatment should be continued for 7–10 days. In case the child does not respond in 24–36 hours, the child should be referred to a higher centre for management in view of non-response to treatment which may be due to resistance or some other underlying abnormality.

The general measures in management of UTI in children are same as that in adults.

<table>
<thead>
<tr>
<th>Check Your Progress 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) When do you suspect a person to have UTI?</td>
</tr>
<tr>
<td>................................................................................................................</td>
</tr>
<tr>
<td>................................................................................................................</td>
</tr>
<tr>
<td>2) What measures do you take to manage UTI?</td>
</tr>
<tr>
<td>................................................................................................................</td>
</tr>
<tr>
<td>................................................................................................................</td>
</tr>
</tbody>
</table>

### 3.5 LET US SUM UP

Heart diseases are the major cause of death in adult and elderly people in country. The common heart diseases are heart attack, heart failure, arrhythmias and hypertension. There are non-modifiable and modifiable risk factors for heart
diseases. Non-modifiable risk factor are age, sex, genetic factors and ethnicity. The modifiable risk factor are high blood sugar, hypertension, high cholesterol, overweight, unhealthy life style, unhealthy dietary pattern, alcohol and tobacco consumption. The most common symptoms are chest pain, chest discomfort, breathlessness, palpitation, swelling over feet, ankle, legs, breathlessness on exertions, sleep or at rest. All the suspicious cases of heart diseases need prompt response. The timely response can save life.

The common blood disorder are anaemia (nutritional, haemolytic or blood loss), disorders of abnormal proliferation of blood cells like leukaemia (blood cancer) and bleeding disorders. The diagnosis of blood disorder is crucial for its management. So it is essential to have clear diagnosis of patient suffering from type blood disorder. The management include dietary advise and medications in mild case of nutritional anaemia. For moderate and severe cases needs parental iron or blood transfusion and other specific medications. Haemolytic anaemia may need blood transfusion. In sickle cell disease prevention of crisis is important. For leukaemia and bleeding disorder a specialised treatment is required.

We have also discussed urinary tract infections and its treatment in children.

### 3.6 MODEL ANSWERS

#### Check Your Progress 1

<table>
<thead>
<tr>
<th>Non modifiable risk factors</th>
<th>Modifiable risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Age</td>
<td>• Overweight (Obesity)</td>
</tr>
<tr>
<td>• Sex</td>
<td>• Unhealthy diet</td>
</tr>
<tr>
<td>• Genetic factors: Family history of heart attacks and strokes at an early age</td>
<td>• High blood pressure.</td>
</tr>
<tr>
<td>• Ethnicity</td>
<td>• High blood cholesterol (high fat in blood)</td>
</tr>
<tr>
<td>• A previous heart attack</td>
<td>• Diabetes (High blood sugar)</td>
</tr>
<tr>
<td></td>
<td>• Tobacco use</td>
</tr>
<tr>
<td></td>
<td>• High alcohol intake</td>
</tr>
<tr>
<td></td>
<td>• Physical inactivity</td>
</tr>
<tr>
<td></td>
<td>• Stress</td>
</tr>
<tr>
<td></td>
<td>• Some medicines</td>
</tr>
<tr>
<td></td>
<td>• Some diseases like kidney diseases</td>
</tr>
<tr>
<td></td>
<td>• Environmental factors: Increased stress, extremes of condition like too much high altitude (height)</td>
</tr>
</tbody>
</table>

2) Symptoms of heart attack.
   - Chest pain or discomfort: Sudden severe chest pain with no known cause is major suspicion of heart attack. It may be of dull aching, Choking, strangling, cramping, stabbing type of pain, pressure, heaviness or just discomfort. It may be mild to severe. It may start
suddenly or slowly. Some time it is silent as in diabetes. The chest pain may radiate to jaw, neck, arm, shoulders or back. It may associate with raised heart rate, difficulty in breathing, palpitations, nausea and increase or decrease blood pressure. Angina is chest pain or discomfort that a person has if the heart does not get enough blood. Usually angina is felt as uncomfortable pressure, fullness, squeezing or pain in the center of the chest. A person may also feel the discomfort in the neck, jaw, shoulder, back or arm. These feelings are also signs of a heart attack, but if it is angina, the pain or discomfort will last only a few minutes before going away. If these symptoms last longer, it could be a heart attack. Following symptoms may be present with or without chest pain.

- Shortness of breath
- Palpitations (unpleasant awareness of own heart beat)
- Feeling weak, light-headed, or faint
- Confusion
- Difficulty in understanding

**Check Your Progress 2**

1) Some of common blood disorders

A. Anaemia:

Nutritional anaemia

- Iron deficiency anaemia
- Megaloblastic anaemia
- Aplastic anaemia (related to immune system)

Haemolytic anaemia

- Sickel cell anaemia
- Thalassemia

B. Abnormal generation of cells

- Polycythemia vera
- Leukaemia (Blood cancers)

C. Bleeding disorders

- Thrombocytopenia
- Disseminated Intravascular Coagulation
- Von Willebrand’s disease
- Haemophilia

2) General non-specific symptoms in a patient of blood disorders include weakness, easy fatigability, shortness of breath, malaise, pallor (conjunctival, tongue and palmer) and recurrent infection are few of the symptoms which may appear to be non-specific in nature.

Specific symptoms and signs which warrant urgent medical care are jaundice (yellowish discoloration of eyes), acute bleeding from gums, nose, anus, passing blood in stool or dark coloured stools, acute abdominal pain, acute chest pain, blood in vomiting, lump in abdomen (liver enlargement, Spleen enlargement), swellings around neck and other parts of body (lymph nodes), swelling over feet, ankle and legs.
Check Your Progress 3

1) UTI can be diagnosed quite accurately on the basis of symptoms and laboratory tests are seldom needed to initiate the treatment. In absence of complicating factors like pregnancy, STD/RTI, comorbidities, the symptoms of UTI can diagnose about 90% of the infections correctly. The biochemical, pathological and microbiological investigations are needed to reach the etiology of the disease.

2) General measures: The general measures for UTI patients include plenty of fluids and frequent emptying of bladder which will reduce urinary stasis, reduce the chances of infection and thus help in recovery.

3.7 REFERENCES


2) CDC. A Community Health Worker Training Resource for Preventing Heart Disease and Stroke. Available at: http://www.cdc.gov/dhdsp/programs/spha/chw_training/pdfs/chw_training.pdf
