Unit 3

Health, Diseases and Prevention

After studying this chapter the students will be able to:

- Explain the relationship among dietary intake eating behaviours, physical activity and emotional health.
- Explain the cleanliness and its importance for health.
- Briefly describe the composition of blood and mention the causes and effects of important blood diseases like leukemia, hemophilia and anemia.
- Describe the viral, bacterial and fungal infection and parasitic diseases in terms of their causes, signs and symptoms, prevention and treatments.
- Relate HIV with the human immune system and describe the ways to cope with the spread of this disease.
- Research the relationship of strokes to the following risk factors: obesity, high-fat diets and smoking.
- Collect and interpret local, national and international statistics on a specific disease spread by germs.
- Design and evaluate a personal action plan for good health and nutrition.
- Analyze ways in which research and medical advance have changed the process which help to prevent, diagnose, monitor and to treat the specific diseases and their spread.
- Describe the first aid of dog bites, snake bites, insect bites and artificial respiration and role play the same situation for the first aid.

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Introduction

We all need food for our survival but at the same time merely eating food cannot guarantee us healthy life. The health of an individual and communities are affected by a wide range of contributory factors. People's good or bad health is determined by their environment and situations. Dietary intakes, eating habits, physical activities and emotional health all in one way or the other way affects our health. Health is metabolic efficiency and disease is metabolic inefficiency an abnormal condition of an organism produced as a result of infection, inherent weakness or environmental stress that impairs normal physiological functioning. Being healthy is important because it makes you feel good and live longer. Getting healthy depends on eating the right food, doing the right exercise and knowing what to do if you have an illness or disability. Good health is much more than merely the absence of disease. People generally do not go from a healthy condition to a sick condition overnight – although we feel the problem when the symptoms of illness appear. Our body is extremely effective at achieving and maintaining good health, if it is given what it needs.

3.1 Health and Food

Your food choices play a vital role in how you look and feel. Eating a nutritious and balanced diet is best way to protect and promote good health. We consume a variety of food e.g our dietary intakes may include natural food products, processed food, fast food or junk food.

a. Natural and organic food diet

Natural and organic food diet is a key factor in any nutrition program. By eating natural and organic foods and consuming lots of fruits and vegetables one can ensure good health as one can avoid the use of foods that contain artificial sweeteners and other additives.

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It causes the body to build up toxins and generally leads to bad health. Similarly, use of unnaturally occurring fats and oils can also lead to disease.

b. Processed Food

Processed foods have been altered from their natural state for safety reasons and for convenience. The methods used for processing foods include canning, freezing, refrigeration, dehydration and aseptic processing.

We generally think that processed foods are not good for health, but some processed foods are not bad for your health at all. For example, milk would be considered a processed food because it is pasteurized to kill bacteria and homogenized to keep fats from separating.

Another example of good food processing is frozen vegetables. Freezing vegetables preserve vitamins and minerals and makes them convenient to cook and eat all year around. Fruit and vegetable juice is also an example of a healthy processed food. In fact, some orange juice is fortified with calcium to make it even more nutritious.

Of course, there are a lot of processed foods that aren't good for you. Many processed foods are made with fats, and large amounts of sodium and sugar e.g chips, candies etc. These types of foods should be avoided, or at least eaten not frequently.

c. Fast and Junk food

Junk food, also called as fast food, is defined as any food packed with "full of calories", which contains abundance of fat, sugar, sodium, and other chemicals, which has less nutritional value.

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People especially in big cities take junk food in addition to their routine lunch, dinner e.g burgers, chips, pizza etc.

Fig: 3.1 Fast food items are attractive but these are with less nutritional value.

Fast food nutrition should make up a minimal part of a healthy diet. High fat, sodium and sugar, can lead to obesity and a range of attendant health problems, including diabetes, heart disease and arthritis. Here are the facts about how excessive junk food consumption affects your body.

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3.2 Malnutrition, under nutrition, overeating and obesity

Nutrition and physical activity are the two most important factors which influence our health. The balance of nutrients we consume and burn impacts our health. Nutritional imbalances like overnutrition and undernutrition may lead to severe health difficulties.

Overnutrition is frequent or habitual overconsumption of nutrients by eating too much food to the point that it becomes dangerous to your health. Nutrients are all compounds necessary for bodily function, including minerals, vitamins, fats, carbohydrates and proteins.

Although most nutrients can be harmful in excess, the danger of overnutrition relates mostly to carbohydrates and fats.

Undernutrition is the opposite of overnutrition, meaning that it is a nutrient deficiency from not eating enough food. Undernutrition usually affects the balance of all the nutrients in the body. Nonetheless, problems relating to a deficiency in carbohydrates and fats will manifest first.

If a person is undernourished then initially, the body starts using its glycogen or sugar reserves, stored water and body protein. Then, your body consumes stored fatty acids and lean muscle. These two effects of undernutrition result in a dramatic decrease in body weight.

Malnutrition is a condition resulting from not consuming enough nutrients. However, it is not synonymous with undereating -- it can occur despite overeating.

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This is because proper nutrition requires a balance of all nutrients not present in all foods; this means that your body requires a balance of many different foods.

Tips for Healthy Eating

Eat a variety of fresh and green vegetables. Drink at least 3 cups of milk daily to fulfill your calcium requirements. Make half your grains whole. Take a balanced amount of cereals, breads, rice and protein like meat, fish, beans etc. Eat at least 3 ounces of whole-grain cereals, breads, rice, or pasta each day. Use of saturated fats like banaspati ghee, butter should be limited to 10 percent of your calories used. Unsaturated fats like vegetable oils, fish and nuts should be preferred.Excessive use of salt should be avoided to reduce the risk of heart diseases. Use of less than 1 teaspoon of salt each day is generally recommended.

Even in the case of overnutrition, when you may be eating too much food, you can still develop a deficiency in certain nutrients if you fail to consume the proper variety foods.

Other causes of malnutrition unrelated to the amount of food you eat include digestion or absorption problems and certain medical conditions e.g if a person takes rice only in his diet, he may suffer from protein deficiency.

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Activity

Visit a super market , select a few bottled, canned, or packet foods. fpr each item look carefully at its labels and record the amount of carbohydrate, fats and protein it contain. Organize your data and work out the total amount of energy each item can supply. 1gram of carbohydrates gives 16Kj of energy, 1gram of proteins gives 16Kj of energy, 1gram of fats gives 16Kj of energy,

3.3 Physical Activity and Health

People of all ages, both male and female, benefit from regular physical activity. Significant health benefits can be obtained by doing a moderate exercise e.g., 30 minutes of brisk walking, 15 minutes of running, or 45 minutes of playing volleyball daily. Physical activity reduces the risk of premature death in general, and of coronary heart disease, hypertension, colon cancer, and diabetes mellitus in particular.

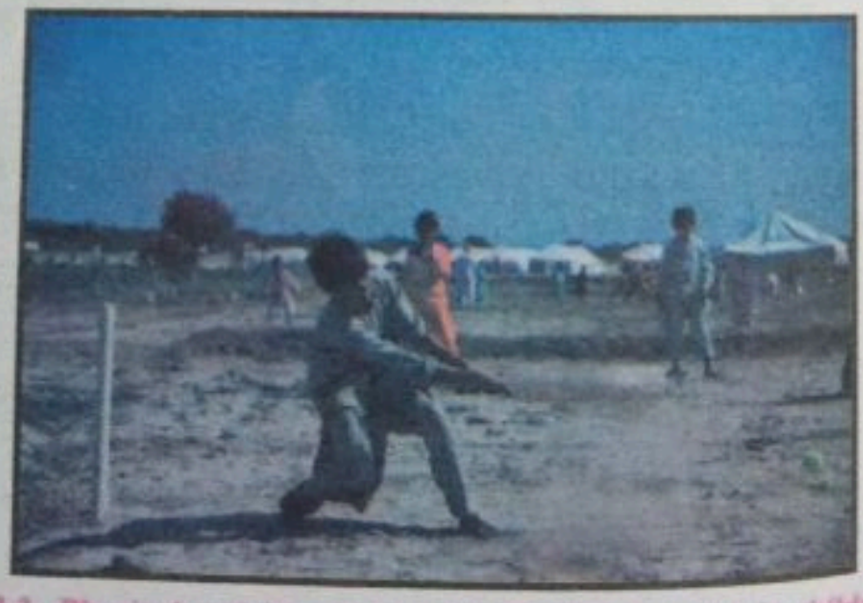

Fig: 3.2 Physical activities are vital for healthy growth in children.

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physical activity also improves mental health and is important for the health of muscles, bones, and joints.

7.4 Rest and Sleep

Humans are not created to work indefinitely. Keeping yourself working is great, but there has to be some limits. There should be some balance between times when you are being productive and times when you are resting.

Health really does depend on our ability to get enough rest and sleep. If we try to keep going without any breaks, we may start feeling exhausted, tired, and worn out. Rest can take different shapes and forms. It can be a relaxing sleep at night.

Getting enough sleep is important for adults as well. That is the time when your brain grows intellectually. How much sleep you need depends on your age and health status. Infants, children, and even teenagers need more sleep than full grown adults because growth happens at night while they are sleeping.

Processes active in the body during sleep

While you rest and sleep your body cleanses, repairs, heals, renew itself. Your body gets revived, the tissues of your brain get restored, new information and memories are stored, and your nerves get recharged.

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If you are not getting enough sleep, your body will not be able to rebuild itself and recharge itself properly. Your body will begin to suffer.

Modern research has proved that insufficient rest and sleep can even shorten life of an individual. Lack of sleep can also put people at higher risk for accidents.

3.5 Abuse of Drugs and Smoking

People use and experiment with drugs for many different reasons. Generally people try drugs out of curiosity, to have a pleasurable time. They may start using drugs just because their friends are doing it, or in an effort to improve athletic performance or ease problems, such as stress, anxiety, or depression.

If your drug use is causing problems in your life you likely have a drug abuse or addiction problem.

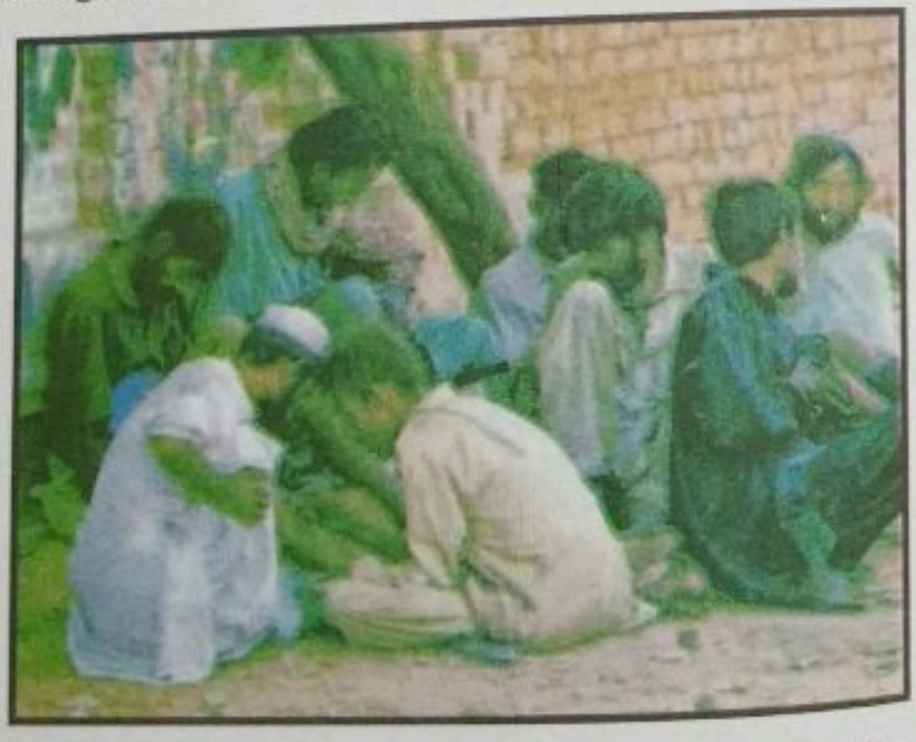

Fig: 3.3 Drug addicts unfortunately a common sight in every city of Pakistan

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Taking a recreational drug causes an increase in levels of dopamine in the brain, which trigger feelings of pleasure.

Brain remembers these feelings and wants them repeated. It makes a person to use these drugs again and again and become addicted.

Drug abuse interfere with the ability to think clearly, exercise good judgment, controlling behavior, and feel normal.

Common signs and symptoms of drug abuse

Although different drugs have different effects, the symptoms of addiction are similar. Some of the common signs and symptoms of drug abuse are:

- Neglecting responsibilities
- problems in relationships, such as fights with family members etc.
- Nausea, restlessness, insomnia, depression, sweating, shaking, and anxiety.
- Avoiding activities such as hobbies, sports, and socializing
- Red eyes, pupils larger or smaller than usual.
- Changes in appetite and sudden weight loss or weight gain.
- Unusual smells on breath or from body or clothes.
- Drop in attendance and performance at work or school.
- Sudden change in friends and hobbies.
- Frequently getting into trouble (fights, accidents, illegal activities).

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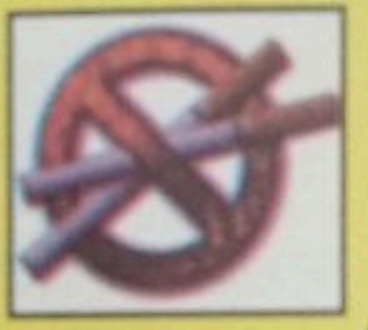
a. Why quit smoking?

Smoking is regarded as a first step before someone gets into some serious drug addiction. Although the harms related to smoking are not seriously considered and very easily ignored especially among theteenagers who considered it be one of the fashionable things to be proud of, but infact it is the first step towards self destruction.

The damage caused by smoking is influenced by the number of cigarettes smoked and whether the cigarette has a filter or not.

Tidbit

On average, each cigarette shortens a smoker's life by around 11 minutes. and reduces life expectancy by seven to eight years.



Cigarettes contain more than 4000 chemical compounds and at least 400 toxic substances. When you inhale, a cigarette burns and breaks down the tobacco to produce various toxins. The products that are most damaging are:

- tar, a carcinogen (substance that causes cancer)
- nicotine is addictive and increases cholesterol levels in your body
- carbon monoxide reduces oxygen in the body

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Major diseases caused by smoking

a. Cardiovascular disease

Cardiovascular disease (diseases related to heart and vessels) is the main cause of death due to smoking.

Hardening of the arteries is a process that develops over years, when cholesterol and other fats deposit in the arteries makes it narrow, blocked or rigid.

When the arteries narrow (atherosclerosis), blood clots are likely to form. Smoking accelerates the hardening and narrowing in arteries. Blood clots in the heart and brain are the most common causes of sudden death.

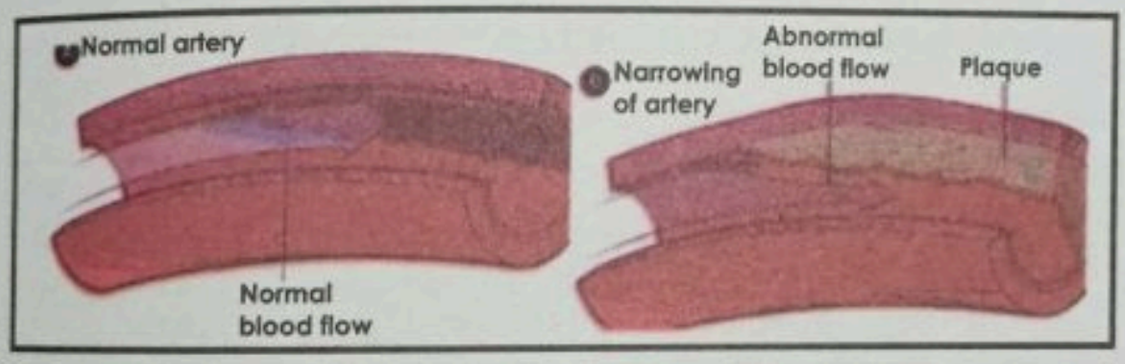

Fig: 3.4 Smoking accelerates the hardening and narrowing in arteries causing atherosclerosis as is seen in fig B where plague has narrowed the path of blood.

b. Cancer

Smokers are more likely to get cancer than non-smokers. This is particularly true of lung cancer, throat cancer and mouth cancer, wh ich hardly ever affect non-smokers

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WARNING
SMOKING DAMAGES YOUR TEETH

Smoking stains your teeth and gums. Smoking increases your risk of periodontal disease, which causes swollen gums, bad breath and teeth to fall out.

Passive Smoking

There are many health-related reasons to give up smoking- not just for smokers, but to protect those people who are around. Children who grow up in a home where their parents and relatives smoke have twice the risk of getting asthma and asthmatic bronchitis. They also have a higher risk of developing allergies. For adults, passive smoking seems to increase the risk of lung cancer.

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Cleanliness and Importance for Health

In the Holy Quran, there are a number of verses which throw light at the importance of cleanliness:

"Truly, Allah loves those who turn to Him constantly and He loves those who keep themselves pure and clean."

(Al Baqarah 2:222)

At another place Allah says:

"In it (mosque) are men who love to clean and to purify themselves. And Allah loves those who make themselves clean and pure."

Surah-e-Taubah (9:108)

Cleanliness and purity has been also emphasized in Hadith of the Prophet (peace be upon him). In a Hadith he said:

Cleanliness is half of faith.

(Sahih Muslim Book 2, Number 0432).

Cleanliness, is the most essential practice for good health. The widely accepted definition of health is that given by the World Health Organization (1948).

According to this definition "Health is a state of complete physical, mental and social well being and not merely an absence of disease or infirmity". This definition covers three specific aspects-the physical, the mental and the social.

Islam is a religion of purity and it emphasizes purity of all sorts. The noble soul can reside only in a clean body. Only by maintaining the outer cleanliness, one can obtain inner purity. As for as personal hygiene The Holy Qur'an teaches great importance to personal and environmental cleanliness.

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Think for a moment do you know what dirt holds for you? It is the source of different microorganisms like parasites, bacteria, fungi and viruses which cause diseases. Will you permit these microscopic organisms ruin your health?

Eating clean food is very important. We shall take care of all the utensils and the raw ingredients of our food as being clean. Cleanliness in our toilets should also be maintained. A daily bath prevents skin infection and a habit of hand washing, especially after using the toilet and, before eating should be implemented.

3.7 Blood and Its Composition

Blood is a body fluid that delivers essential \substances like nutrients and oxygen to the cells of the body. Blood also transports carbon dioxide and other waste products for removal from the body. In addition, the blood also helps fight infection.

Our body has billions of cells that need regular supply of fuel and oxygen to function. Blood meets these requirements and ensures proper functioning of cells, thus, also making sure that our body keeps in good health.

An average adult human body has about five liters of blood. Blood in our bodies is pumped by the heart through a network of arteries and veins. It is interesting to note that even the heart cannot survive without blood flowing through the vessels that bring nourishment to its muscular walls.

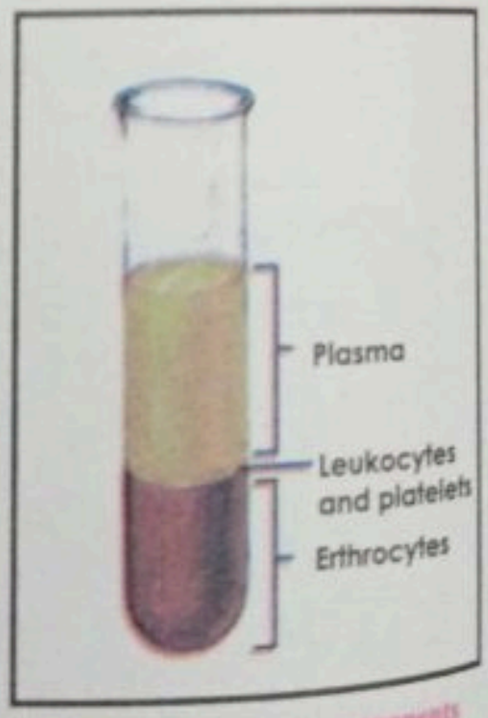

Fig: 3.5 Blood and its components

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Blood is composed of a large variety of dissolved and suspended materials. The blood contains nutrients (digested substances), protein, gases, hormones, water, etc. If some human blood is collected from a person and placed in a test tube after adding some anti-coagulants to prevent it from clotting, you will notice that it quickly separates into two layers. The upper layer is yellowish and semi transparent (plasma) while lower layer is thick and reddish in colour (blood cells).

Blood is made of three specialized elements called erythrocytes (red blood cells), leukocytes (white blood cells) and platelets that are suspended in a complex liquid called plasma. The constant flow of blood keeps the cells evenly distributed in the plasma.

(a) Plasma

It is the liquid part of the blood which is about 55% by volume of the blood. The main component of plasma is its water part which is about 90% by weight of the plasma. The other components are different types of about 7-8% proteins, e.g fibrinogen, antibodies etc, about 0.9% salts e.g sodium chloride, calcium ions etc and about 0.1% glucose. The other components are the products of digestion e.g amino acid, fatty acids etc, which are about 2–3%.

(b) Blood Cells

It is the part that is about 45 percent by volume of blood. Besides platelets there are two types of cells present in this part Fig3.2.

i. Red blood cells (RBCs)
ii. White blood cells (WBCs)
iii. Blood platelets

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Tidbit

Blood cells are mostly manufactured in the bone marrow, especially in the bone marrow of bones that make up the spine (vertebrae), ribs, pelvis, skull, and breast bone (sternum).

i. Red Blood Cells (RBCs)

Red blood cells are also called erythrocytes. They are the most numerous cells in the blood. Each cubic millimeter of blood contains about five million red blood cells in man. Red blood cell is biconcave in shape and is without a nucleus. These cells contain a special type of protein called haemoglobin.

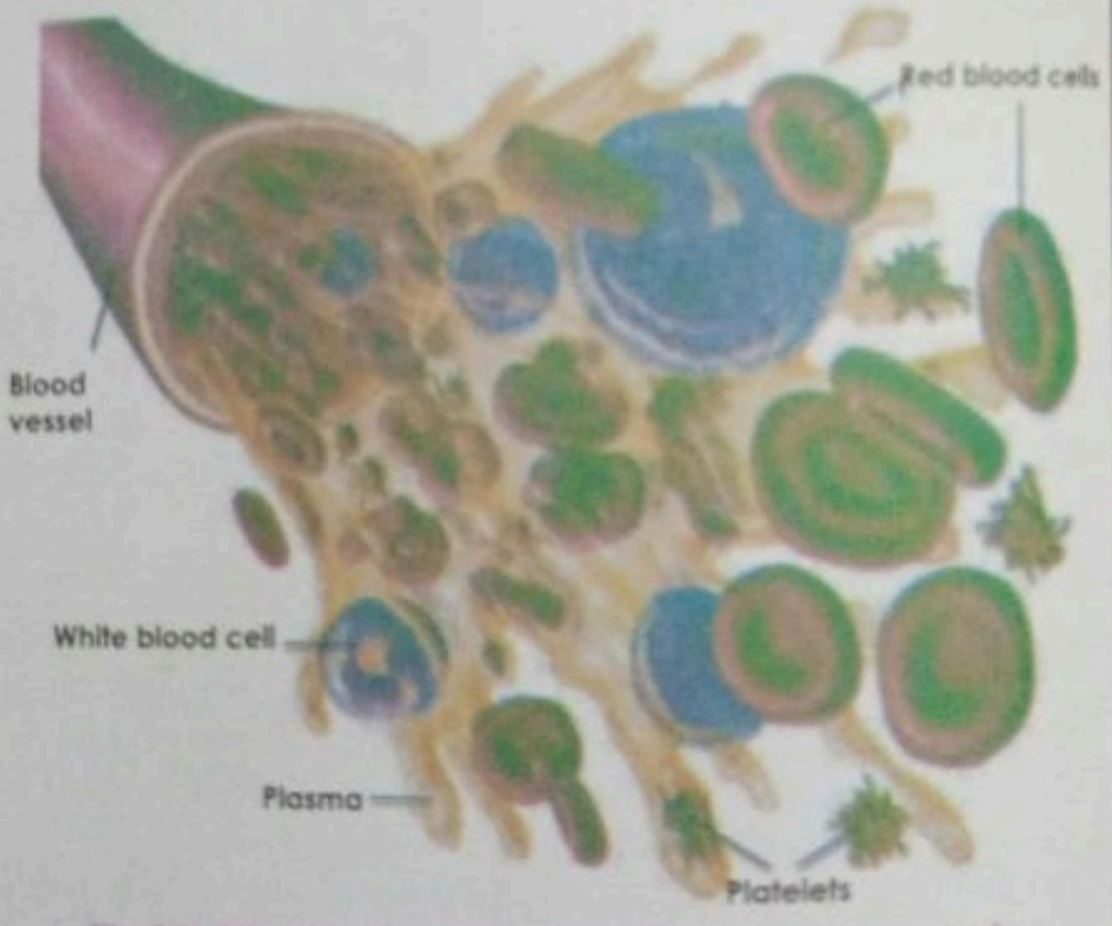

Fig: 3.6 Blood and its components passing through blood vessel.

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The haemoglobin has the capability to carry oxygen to all cells and tissues of the body. The red colour of the blood is because of haemoglobin which is an iron containing pigment compound. The average life of a red blood cell is about 120 days

ii. White Blood Cells (WBCs)

White blood cells are also called leucocytes. These cells are colourless, larger than red blood cells and with a nucleus in each cell. They are of many types because of their different shapes and functions. Their number is less in blood than that of RBCs. One cubic millimeter of blood contains about 7000 to 8000 WBCs.

Most of them have a short life span of only three to four days. They are also formed in red bone marrow. Their main function is to protect the body against attacking microorganisms and diseases.

For Your Information

Blood clotting – An important mechanism to heal wounds

Blood, in addition to platelets, also contains important proteins called clotting factors. These clotting factors are vital for the process of blood clotting. Although platelets alone can plug leaks in small blood vessels and even temporarily stop/slow down bleeding, the action of clotting factors is needed to produce a strong, stable clot.

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iii. Blood Platelets

They are much smaller than red blood cells and white blood cells. They are oval in shape and without a nucleus. One cubic millimeter of blood contains about 250,000 - 500,000 blood platelets. They play an important role in clotting of blood during bleeding.

3.8 Blood diseases

a. Leukemia

In Greek the meaning of Leukemia is "white blood". Leukemia is a cancer of blood-forming cells in the bone marrow. These abnormal white cells accumulate the bone marrow and flood the bloodstream, but they cannot perform their proper role of protecting the body against disease because they are defective. As leukemia progresses, the cancer interferes with the body's production of other types of blood cells, including red blood cells and platelets.

Studies have found the following risk factors for leukemia:

- People exposed to very high levels of radiation.
- Exposure to high levels of chemicals like benzene.
- Cancer patients treated with certain cancer-fighting drugs sometimes later develop leukemia.

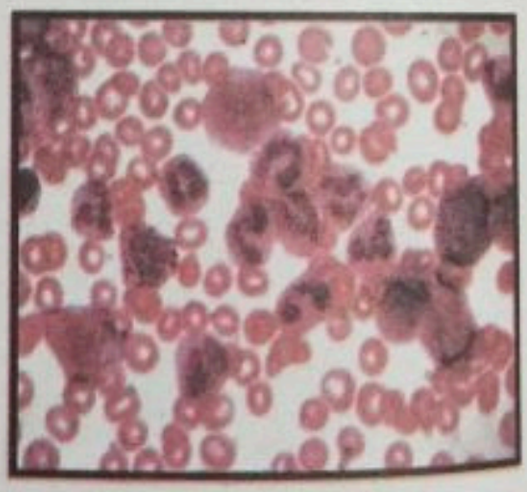

Fig: 3.7 Uncontrolled growth of defective WBCs results in leukemia.

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The symptoms of leukemia are numerous but it may not available in all the persons. It varies in many cases. Commonly seen symptoms are: weakness or chronic fatigue, headaches, skin rash, non specific bone pain, fever of unknown origin, frequent bacterial or viral infections, weight loss, easy bruising, bleeding from gums or nose. Many cases of leukemia can be effectively treated, and some can be cured.

b. Anemia

Anemia is a common blood disorder that is caused by an acquired or inherited abnormality of red blood cells to provide adequate oxygen supplies to body tissues. The causes of anemia are numerous, but most can be grouped within three major mechanisms that produce anemia:

- Blood loss (excessive bleeding)
- Inadequate production of red blood cells
- Excessive destruction of red blood cells

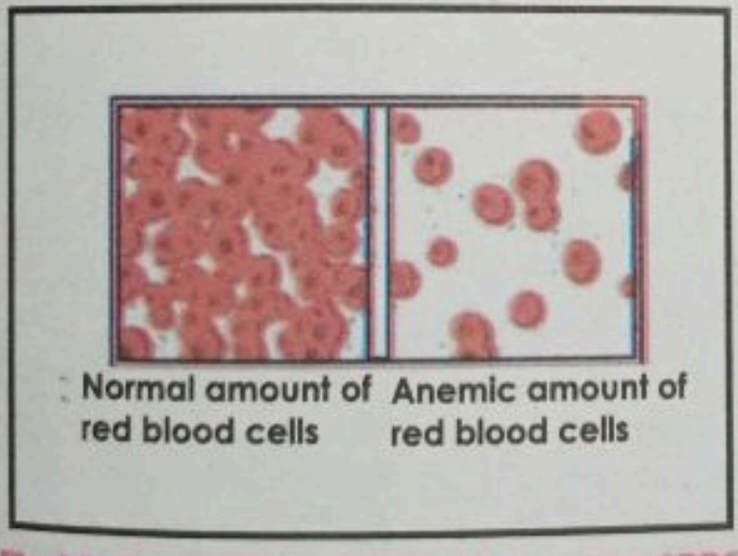

Fig: 3.8 Comparative account of the number of RBCs in normal and anemic blood.

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Mild anemia often causes fatigue, weakness, and paleness. In addition to these symptoms, more severe anemia may produce faintness, dizziness, increased thirst, sweating, a weak and rapid pulse, and rapid breathing. Severe anemia may produce painful lower leg cramps during exercise, shortness of breath, and chest pain.

c. Haemophilia

Haemophilia is a rare bleeding disorder in which the blood doesn't clot normally. The major signs and symptoms of haemophilia are excessive bleeding and easy bruising. Bleeding can occur on the body's surface (external bleeding) or inside the body (internal bleeding).

Signs of external bleeding may include:

- Bleeding in the mouth from a cut or bite or from cutting or losing a tooth
- Nosebleeds for no obvious reason
- Heavy bleeding from a minor cut

Signs of internal bleeding may include:

- Blood in the urine (from bleeding in the kidneys or bladder)
- Blood in the stool (from bleeding in the intestines or stomach)
- Large bruises (from bleeding into the large muscles of the body)
- Bleeding in the Joints

Fig: 3.8 Internal bleeding in haemophilic patient can occur in muscles and joints, especially the knees, elbow and ankle.

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Haemophilia usually is inherited. "Inherited" means that the disorder is passed from parents to children through genes. People born with hemophilia have little or no clotting factor.

Clotting factor is a protein needed for normal blood clotting. There are several types of clotting factors. These proteins work with platelets to help the blood clot.

3.9 Disorders and Diseases

Stability of the body results from normal metabolic activities. But this normalcy is often disturbed when body suffers from certain disease. In daily life we encounter various circumstances which expose us to various diseases.

Agents of diseases are present every where from home to school and from play ground to bookshop, we are never sure of our total safety.

Microorganisms like bacteria and viruses are the major source of many diseases. Apart from them, certain fungi and parasites play significant role in causing various common diseases.

a. Bacterial Diseases

Bacterial diseases include any type of illness caused by bacteria. Bacteria are a type of microorganism that can only be seen with a microscope.

Other types of microorganisms include viruses, some fungi, and some parasites. Millions of bacteria normally live on the skin, in the intestines, and in the mouth.

The vast majority of bacteria do not cause disease, and many bacteria are actually helpful and even necessary for good health. These bacteria are sometimes referred to as "good bacteria" or "healthy bacteria. "Harmful bacteria that cause bacterial infections and disease are called pathogenic bacteria.

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Bacterial diseases occur when pathogenic bacteria get into the body and begin to reproduce and crowd out healthy bacteria, or to grow in tissues that are normally sterile.

Harmful bacteria may also emit toxins that damage the body. Bacteria are cause of many diseases such as tuberculosis, whooping cough, diphtheria, tetanus, typhoid and cholera.

I. Tuberculosis

Tuberculosis (TB) is a bacterial infection caused by a germ called Mycobacterium tuberculosis The bacteria usually attack the lungs, but they can also damage other parts of the body, like bones, brain, liver, spleen and intestine. TB spreads through the air.

Fig: 3.10 ***Mycobacterium tuberculosis*** **usually attack the lungs, but it can attack any part of the body such as the kidney, spine, and brain.**

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The major route of spread of the disease is through infective respiratory droplets. The droplets are formed when a patient coughs or sneezes. A healthy person may get the disease by inhaling these droplets. Intestine may become infected by drinking unpasteurized or unboiled milk.If you have been exposed, you should go to your doctor for tests. You are more likely to get TB if you have a weak immune system.

Signs and Symptoms

Symptoms of TB in the lungs may include;

- A bad cough that lasts 3 weeks or longer
- Weight loss
- Coughing up blood or mucus
- Weakness or fatigue
- Fever and chills

If not treated properly, TB can be deadly. You can usually cure active TB by taking several medicines for a specific period of time. Unhygienic conditions, over crowding and dark, damp houses with poor aeration expose a person to contracting tuberculosis.

Prevention and Treatment

The disease can be prevented by:

1) Vaccinating infants with BCG vaccine.
2) Isolating infectious patients.
3) Improving hygienic condition and housing.
4) Using pasteurized and properly boiled milk.

Tuberculosis can be cured by a course of antibiotics taken

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For Your Information

TB can remain in an inactive (dormant) state for years without causing symptoms or spreading to other people. When the immune system of a patient with dormant TB is weakened, the TB can become active (reactivate) and cause infection in the lungs or other parts of the body. Drug-resistant TB is a serious, as yet unsolved, public-health problem, especially in Southeast Asia, the countries of the former Soviet Union, Africa, and in prison populations.

Unhygienic conditions, over crowding and dark, damp houses with poor aeration expose a person to contracting tuberculosis.

Prevention and Treatment

The disease can be prevented by:

1) Vaccinating infants with BCG vaccine.
2) Isolating infectious patients.
3) Improving hygienic condition and housing.
4) Using pasteurized and properly boiled milk.

Tuberculosis can be cured by a course of antibiotics taken over several months.

ii. Pertussis (Whooping Cough)

Whooping cough or pertussis is an infection of the respiratory system caused by the bacterium Bordetella pertussis.

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The bacteria thrive in the respiratory passages. Here it produce toxins that damage the tiny hairs (cilia) these cilia helps to remove particulate matter and cellular debris that are normally introduced into the airways with each breath. This results in an increased inflammation of the respiratory passages and the typical dry cough characterized by severe coughing spells that end in a "whooping" sound when the person breathes in.

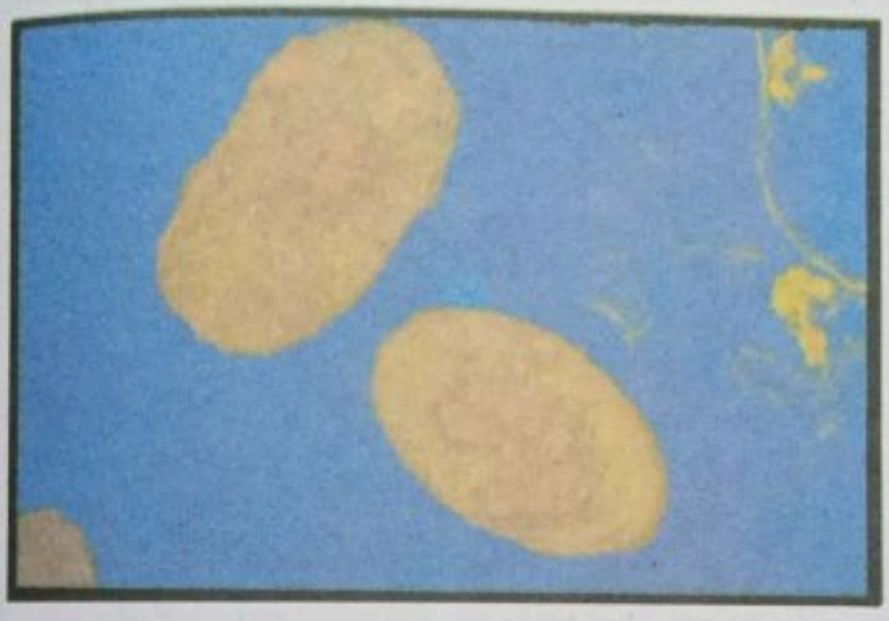

Fig: 3.11 *Bordetella pertussis.*

Tidbit

The incubation period (the time between infection and the onset of symptoms) for whooping cough is usually 7 to 10 days, but can be as long as 21 days.

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It mainly affect infants younger than 6 months old before they're adequately protected by immunizations and young people between 11 to 18 years old whose immunity has faded with the passage of time.

Signs and Symptoms

The first symptom of whooping cough are similar to those of a common cold: runny nose, sneezing, mild cough,low-grade fever After about 1 to 2 weeks, the dry, irritating cough evolves into coughing spells which can last for more than a minute.

Between spells, the child usually feels well. Adults and adolescents with whooping cough may have milder or a typical symptom, such as a prolonged cough without the coughing spells or the whoop.

Whooping cough is highly contagious i.e spread from person to person. Tiny drops of fluid from an infected person's nose or mouth may infect a healthy person. Sneezes, coughs, or laughs are the cause of air borne droplets. Others then can become infected by inhaling the drops or getting the drops on their hands and then touching their mouths or noses.

Prevention and treatment

Whooping cough can be prevented with the pertussis vaccine, which is part of the DTaP (diphtheria, tetanus, acellular pertussis) immunization. DTaP immunizations are routinely given in five doses before a child's sixth birthday. Once a disease occurs it can be effectively treated with antibiotics like erythromycin.

Anyone with whooping cough should be isolated for five days after starting antibiotics or until three weeks after the onset of the coughing spasms if the person has not received antibiotic treatment.

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iii. Tetanus

Tetanus, also known as lockjaw, is a serious but preventable disease that affects the body's muscles and nerves. It is caused by a spore forming bacteria called Clostridium tetani. The bacteria live in soil, saiiva, dust and manure..

Signs and Symptoms

The bacteria usually enter the body through a deep cut, like those you might get from cutting yourself with a knife or stepping on a nail. Spores are dormant form of the bacterium. Once inside the body they germinate into multiplicative form called vegetative bacteria.

Fig: 3.12 a. *Clostridium tetani* b. Tetanus is characterized bymuscle spasms as is seen in this child suffering from

These vegetative bacteria increase in number by repeated divisions and produce a harmful substance called toxin.

The tetanus toxin causes strong and continuous muscle contraction. When muscles of chest wall undergo such prolong contraction, the victim is unable to move the air in and out of the lungs, and without breathing the patient soon dies.

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A special form of tetanus occurs in newborn babies if they are born in dirty environment and if unsterilized instruments are used during deliveries.

Prevention and treatment

Every person should be immunized against tetanus by giving vaccine against harmful toxin. If a patient is suspected to have tetanus he is given antitoxin to neutralize the toxin and antibiotics to kill the bacteria.

iv. Diptheria

Diphtheria is an acute infectious disease caused by the bacteria Corynebacterium diphtheriae. It spreads from person to person by respiratory droplets through coughing and sneezing. Diphtheria can also be spread by contaminated objects or foods (such as contaminated milk).

Fig: 3.13 a. *Corynebacterium diphtheriae.* b. Affected tonsils can make the swallowing process painfu in diphtheria patients.

Signs and Symptoms

Diphtheria usually affects the tonsils, pharynx, larynx and occasionally the skin. Symptoms range from a moderately sore throat to toxic life-threatening diphtheria of the larynx or of the lower and upper respiratory tracts. Symptoms usually occur 2 to 5 days after the patient have come in contact with the bacteria. Some of the significant symptoms are bluish coloration of the skin, bloody and watery drainage from nose, breathing problems, chills, cough and painful swallowing.

Prevention and treatmen

The disease can be prevented by immunization with DPT. If the disease has occurred it is treated with antibiotics such as Penicillin and erthromycin to kill the bacteria and antitoxin to neutralize the toxin. Diphtheria antitoxin is given as a shot into a muscle or through an IV (intravenous line).

v. Typhoid

Typhoid is a severe bacterial infection affecting several organs of the body. The causative agent is Salmonella typhi. Diagnosis of typhoid fever is made when the Salmonella bacteria is detected with a stool culture. This disease is very common in areas with poor sanitary conditions. It affects the people of all ages and both the sexes.

Fig: 3.14 *Salmonella typhi.*

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Signs and Symptoms

The bacteria enter the body through contaminated food or water. The bacteria cross the wall of small intestine and enter the blood to reach other organs like liver, spleen, brain, and bones. Some of the bacteria also multiply within the wall of intestine causing localized destruction leading to formation of an ulcer. Such ulcers may bleed. The disease manifests itself by high fever, headache and diarrhoea or constipation. People with typhoid fever usually have a sustained fever as high as 103 °F-104 °F.

Prevention and treatment

The disease can be prevented by improving the sanitary conditions and by providing immunization of susceptible person. Antibiotics provides effective cure for typhoid fever.

vi. Cholera

Cholera is an infection of the small intestine that causes a large amount of watery diarrhea.Cholera is an acute diarrheal disease caused by Vibrio cholerae. The bacteria releases a toxin that causes increased release of water in the intestines. It is transmitted through contaminated food or water. Houseflies play an important role in the spreading of germs. The flies carry the germs from faeces to the uncovered food.

Fig: 3.15 *Vibrio cholerae.*

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Signs and Symptoms

The bacteria are ingested with food. Inside the intestine they multiply and produce a toxin. This toxin acts on intestine itself and causes severe diarrhea which leads to dehydration. Cholera generally erupts in the form of an epidemic during rainy season or after floods. A patient with cholera has sever and painless watery diarrhea and vomiting. Fever is usually absent.

Tidbit

It takes about 100 million cholera bacteria to infect a healthy adult so significant contamination of food or water is required to transmit the disease and person-to-person transmission is uncommon.

Prevention and treatment

The disease can be prevented by "improving hygiene". Food and water should be properly covered. Hands should always be washed properly before eating and after going to toilet. A patient of cholera requires plenty of fluids e.g. ORS (Oral rehydrate salt).

Antibiotics are used to kill the bacteria. Travelers should always take precautions with food and drinking water, even if vaccinated. When outbreaks of cholera occur, efforts should be directed toward establishing clean water, food, and sanitation, because vaccination is not very effective in managing outbreaks.

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b. Viral Diseases

In 1898, Friedrich Loeffler and Paul Frosch found evidence that the cause of foot-and-mouth disease in livestock was an infectious particle smaller than any bacteria. This was the first clue to the nature of viruses and their ability to cause diseases.

Viruses are capable of infecting animals, plants and even bacteria. Even with present development in medical science viral diseases are still a major concern for humanity. Some of the common human viral diseases are discussed below.

i. Small Pox

Smallpox is caused by variola which is a member of the genus orthopoxvirus. Smallpox is the only disease that has been completely wiped out throughout the world. Smallpox is also potentially one of the most devastating biological weapons ever conceived. Due to the success of an intense worldwide public health initiative, not one documented naturally occurring case of this highly infectious, deadly disease has occurred since October 26, 1977. The World Health Organization (WHO) officially declared smallpox eradicated in 1980

Fig: 3.16 a. Variola (Genus orthopoxvirus) b. Virus Filled sores are present all over the body of this small pox affected child.

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Signs and Symptoms

After infection, symptoms may take from 7-17 days to appear for major types of smallpox. The virus begins growing in the bloodstream 72-96 hours after infection, but no obvious symptoms appear immediately.

People who have contracted smallpox initially develop such symptoms as fever, body aches, headache, chills, and, particularly, backache. Over half of people with smallpox experience chills and vomiting.

A rash appears 48-72 hours after the initial symptoms and turns into virus-filled sores, which later scab over. The process can take up to 2 weeks.

Just after the rash appears, the virus is highly contagious as it moves into the mucous membranes. The body sheds the cells, and virus particles are released, coughed, or sneezed into the environment.

The infected person can be infectious for up to 3 weeks (until the scabs fall off the rash). After the scabs or crusts fall off (in 2-4 weeks), a depression or light-skinned scar remains.

Prevention and treatment

Symptoms of smallpox stops when the disease is medically treated. This includes replacing fluid lost from fever and skin breakdown. Antibiotics may be needed for secondary skin infections.

The infected person is kept in isolation for 17 days or until the scabs fall off. Vaccinations and post exposure interventions is the main treatment. Vaccination is the most effective means of preventing smallpox infection.

Vaccination can even be administered up to 4 or 5 days after a person is exposed to the virus. This practice may not completely prevent disease, but probably it will result in a significantly less severe case of the illness.

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ii. Polio

Polio (also called poliomyelitis) is a contagious, historically devastating disease that was almost eliminated from the Western hemisphere in the second half of the 20th century. Polio is an acute viral infection caused by polio virus. The disease occurs among young children especially under 5years of age.

The virus enters the body through the mouth. When it reaches the intestine it crosses the wall of the gut and enters blood stream thus it spreads to various organs of the body specially nervous system. It damages motor neurons (neurons attached to the muscles) due to which the patient loses power in limbs leading to paralysis.

Tidbit

Although polio has plagued humans since ancient times, its most extensive outbreak occurred in the first half of the 1900s before the vaccination created by Jonas Salk became widely available in 1955.

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Signs and Symptoms

Initial symptoms are fever, fatigue, headache, vomiting, stiffness in the neck and pain in the limbs. One in 200 infections leads to irreversible paralysis (usually in the legs). Among those paralysed, 5% to 10% die when their breathing muscles become immobilized

Polio Eradication Programme

The World Health Organization (WHO) is working toward eradicating polio throughout the world. Significant success have already been achieved. In 2010, only four countries (Afghanistan, India, Nigeria and Pakistan) in the world remain polio-endemic, down from more than 125 in 1988 when this programme was launched.

Prevention and treatment

Immunization against the disease through oral vaccine (polio drops) is highly effective. It should be given to all children under the age of 5 years. Once polio occurs and damages neurons its effects can not be reversed thus immunization is very important.

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Measles

Measles is a highly contagious viral disease of the children caused by the measles virus (a paramyxovirus) which spreads through respiratory droplets.

Signs and Symptoms

Initially the symptoms are mild but as the disease progresses patient runs high fever and rash all over his body. The fever that occurs with measles is called a stepwise fever. The patient starts with a mild fever that progressively gets higher. Fevers often reach temperatures greater than 103 °F (39.4 °C).

Left untreated, the disease settles by itself in about 2 weeks but complications may occur.

Prevention and treatment

The disease can be prevented by immunization with vaccine. Drugs are used to prevent fever and secondary bacterial infections.

Fig: 3.17 Rash all over the body is one of the sign of measeles.

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Activity

Dengue fever has been responsible for a number of deaths in different parts of Pakistan. From different sources collect data regarding the number of deaths in various parts of Pakistan. Analyze major factors which contributed in the spread of this disease. List down some precautionary measures against this disease.

iv. Hepatitis

It is a viral disease which damages the liver and its functioning. There are different agents, which can cause hepatitis. These include hepatitis A, B and C viruses. The less dangerous of these is hepatitis A virus. Hepatitis B and C are more dangerous infections.

The virus enters the body through contaminated are water, food, blood products, razors, needles and close personal contact.

Signs and Symptoms

The patient of hepatitis loses appetite and has jaundice, dark urine and pale stools.

Prevention and treatment

Vaccines are available against hepatitis A and B. There is no vaccine for hepatitis C. Use of screened blood products, disposable syringes and avoiding dangerous sexual practices are the mainstay of prevention against hepatitis B and C.

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v. AIDS

Acquired immunodeficiency syndrome (AIDS) is fatal disease caused by a virus called Human immunodeficiency virus (HIV). AIDS was first described in 1981 and HIV was identified as causative agent in 1983. The virus enters the body through the blood products, shared needles and razors and sexual relationship with a patient or carrier of AIDS.

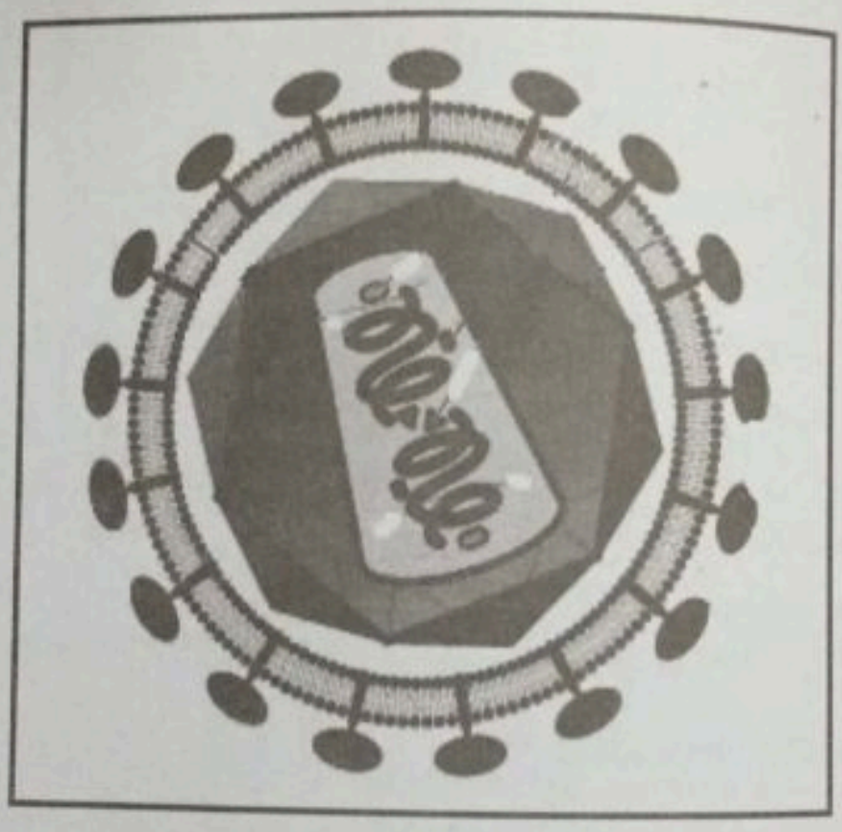

Fig: 3.17 Structure of HIV

Signs and Symptoms

The virus destroys the defense system of the body by damaging the white blood cells. The immune system i.e. body defense system is weakened so much that even a mild infection can cause death.

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Prevention and treatment

There is no cure for AIDS as yet. Disease can however be prevented by use of disposable syringes, new razors, use of blood which has been tested for HIV.

c. Fungal Diseases

Kingdom Fungi (singular: fungus) includes organisms which are usually regarded as saprophytes. Such organisms break down the complex organic matter and convert it into simple organic materials.

During this process they extracts their nutrition from the decaying organic matter. You might be familiar with some common fungi like the mushrooms which grow on heaps of dung and debris.

Fungi are special organisms because as they play an important role in our environment. Along with bacteria they are regarded as decomposers.

Some fungi are edibles e.g. mushrooms, some are a great source for the production antibiotics and still many fungi are causing many serious diseases and thus have pathogenic nature.

Some of the common fungal diseases in humans are ringworm, Athlete's foot, histoplasmosis etc.

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Ringworm

The causative agents of ringworm are collectively known as dermatophytes. They may infect skin, hair and nails. If the fungi invade the skin they produce a circular white area, which grows in all directions. Nail destruction and hair loss may occur.

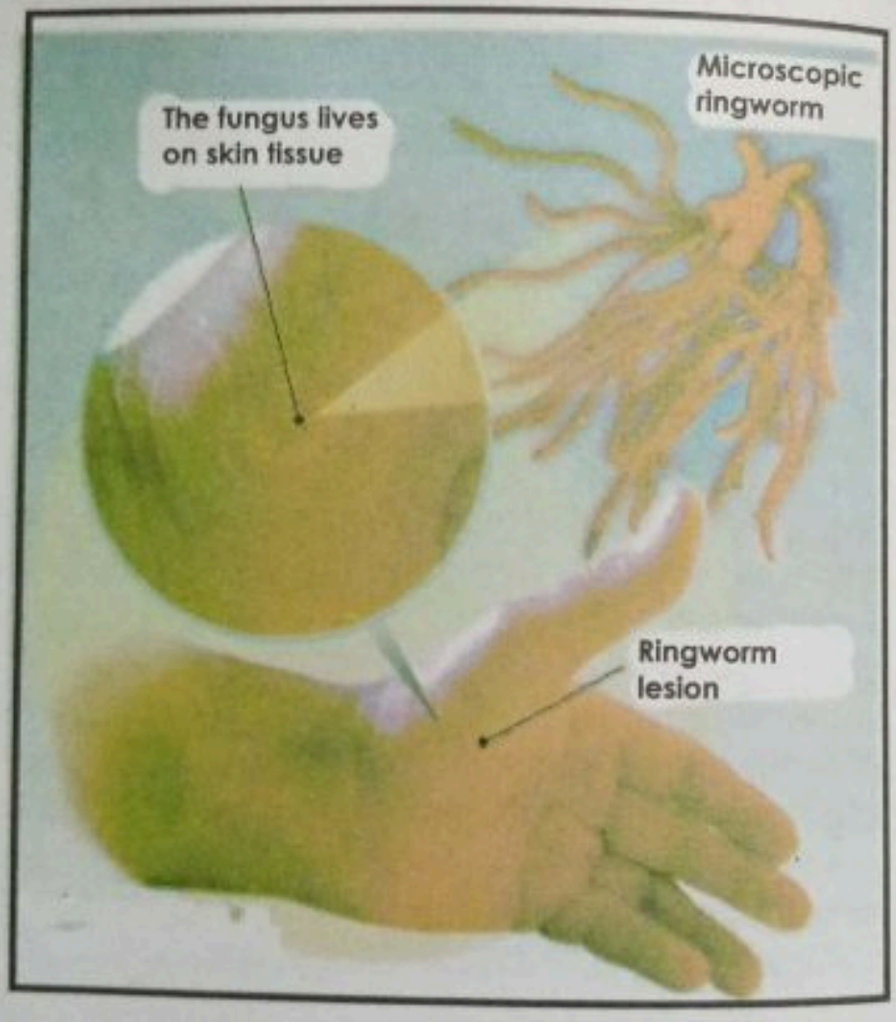

Fig: 3.19 Attack of ringworm

Ringworm spreads in the community by direct contact with the patient or infected animals. Use of common showers and swimming pools or sharing of towels and sports wear are the cause of transmission.

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Prevention and treatmen

Disease can be prevented by:

1) Avoiding common baths and poorly managed swimming pools.
2) Using the personal towels and sports wear only.

Ringworm can be treated by antifungal tablets and ointments.

d. Parasitic diseases

Parasites are living things that use other living things - like your body - for food and a place to live. You can get them from contaminated food or water and bug bite. Parasitic diseases can cause mild discomfort or be deadly. Parasites range in size from tiny, one-celled organisms called protozoa to worms that can be seen with the naked eye.

Lets study some of the common parasitic diseases.

I. Malaria

Malaria is a particular problem and a major one in areas of Asia, Africa, and Central and South America. Malaria occurs in about 100 countries; approximately 40% of the world population is at risk for contracting malaria.

Malaria is an infectious disease caused by a parasite, Plasmodium, which infects red blood cells. Malaria is characterized by cycles of chills, fever, pain, and sweating.

Signs and Symptoms

The symptoms characteristic of malaria include flulike illness with fever, chills, muscle aches, and headache. Some patients develop nausea, vomiting, cough, and diarrhea. Cycles of chills, fever, and sweating that repeat every one, two, or three days are typical.

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Prevention and treatment

Mild malaria can be treated with oral medication. Drug treatment of malaria is not always easy. Chloroquine phosphate (Aralen) is the drug of choice for all malarial parasites except for chloroquine-resistant Plasmodium strains.

Malaria in History

Historical records suggest malaria has infected humans since the beginning of mankind. The name "mal aria" (meaning "bad air" in Italian) was first used in English in 1740 by H. Walpole when describing the disease. The term was shortened to "malaria" in the 20th century. C. Laveran in 1880 was the first to identify the parasites in human blood. In 1889, R. Ross discovered that mosquitoes transmitted malaria.

If people must travel to an area known to have malaria, they need to find out which medications to take, and take them as prescribed.Currently, there is no vaccine available for malaria, but researchers are trying to develop one.

To reduce the chance of getting malaria, people should avoid malaria-endemic areas of the world, use mosquito repellents, cover exposed skin, and use mosquito nets while sleeping.

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How is malaria transmitted?

The life cycle of the malaria parasite (Plasmodium) is complicated and involves two hosts, humans and Anopheles mosquitoes. The disease is transmitted to humans when an infected Anopheles mosquito bites a person and injects the malaria parasites into the blood.

ii. Threadworm

There are a number of types of worm (helminth) infestations that humans are susceptible to. Of these, the most common is the Enterobius vermicularis, also known as the threadworm, pinworm or seatworm.

Threadworms derive their name from their appearance, with the adult worms resembling fine pieces of white cotton. The adult female threadworm is larger than its male counterpart and can grow up to 1.5cm in length.

Threadworms are the most commonly encountered human host specific nematode.

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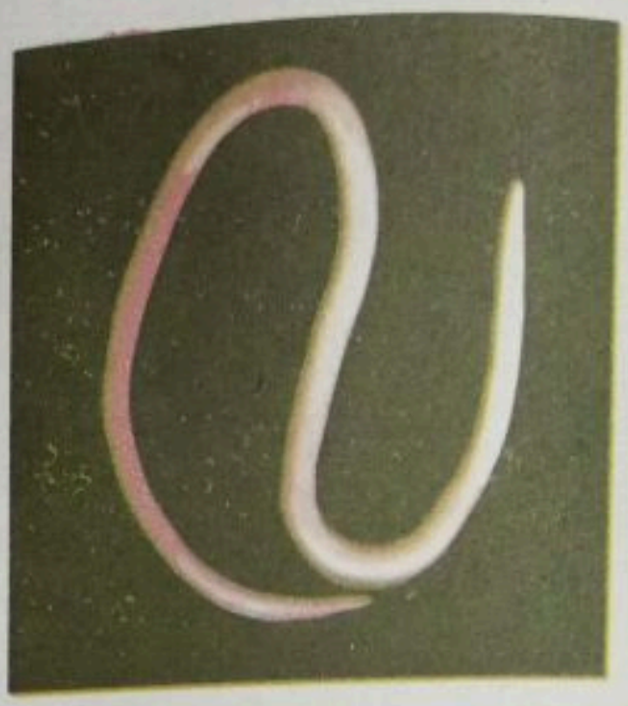

Fig:3.20 *Enterobius vermicularis*

Signs and Symptoms

There may not be many external symptoms to indicate that you have a threadworm infestation so it may go undetected.

Common signs include an intense itchy feeling around the anus, usually at night or early in the morning. Other symptoms include restless sleep, irritability, grinding teeth during sleep, or a loss of appetite. In rare cases slight stomach pains associated with gastrointestinal upsets may be experienced.

Prevention and treatment

The common treatment is to take a medicine to kill the worms. Mebendazole is the usual treatment for people aged over six months. Just one dose kills the worms. A second dose two weeks after the first is sometimes needed if the infection has not cleared (which may occur if you swallow some eggs after taking the medication).

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Piperazine is an alternative medicine. It can be used by anyone aged over three months. Medication will kill the worms in the gut, but not the eggs that have been laid around the anus. These can survive for up to two weeks outside the body on underwear, bedding, in the dust, etc (as described above). So, hygiene measures aim to clear any eggs from the body and the home, and to prevent any eggs from being swallowed. This will then break the cycle of re-infection. However, it may not be your home which is a main source of threadworm eggs.

Children may come into contact with eggs in schools particularly in the toilets if they are not cleaned properly. This is why child may have recurring threadworms, even if home and personal hygiene is of a very high standard.

iii. Ascariasis

Ascariasis is an intestinal infection caused by a parasitic roundworm. It is the most common human infection caused by worms in the world.

Ascariasis occurs when worm eggs of the parasite Ascaris lumbricoides commonly found in soil and human feces are ingested.

The eggs can be transmitted from contaminated food, drink, or soil. Ascariasis is frequently found in developing countries where sanitary conditions are poor.

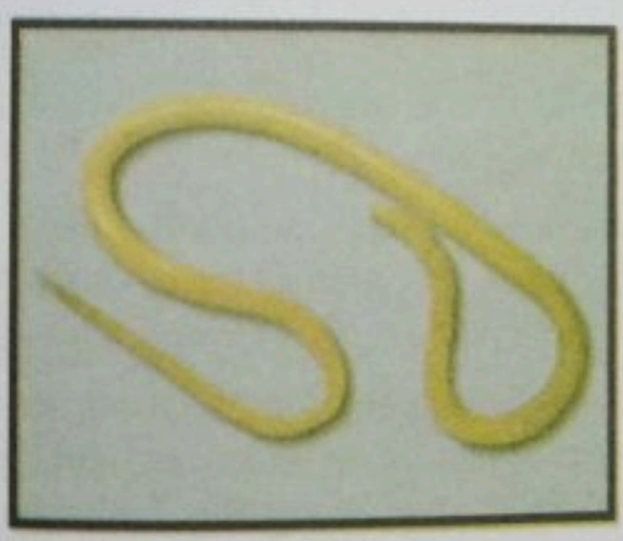

Fig: 3.21 *Ascaris lumbricoides*

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Signs and Symptoms

Although no symptoms may occur, the greater the number of worms involved in the infestation, the more severe a child's symptoms are likely to be. Kids are more likely than adults to develop gastrointestinal symptoms because they have smaller intestines and are at greater risk of developing intestinal obstruction.

Symptoms seen with mild infestation include: worms in stool, coughing up worms, loss of appetite, fever, wheezing. More severe infestations can result in more serious signs and symptoms, including: vomiting , shortness of breath, swelling of the abdomen, severe stomach or abdominal pain etc.

Prevention and treatment

Antiparasitic medication to be taken orally to kill the intestinal roundworms. Sometimes the stool will be re-examined about three weeks after treatment to check for eggs and worms. Symptoms usually disappear within one week of starting treatment.

The most important measure of protection against ascariasis is the safe and sanitary disposal of human waste, which can transmit eggs.

Areas of the world that use human faeces as fertilizer must thoroughly cook all foods or clean them with a proper iodine solution (particularly fruits and vegetables).

Children may be prescribed a preventive deworming medication. Teach children to wash hands thoroughly and frequently, especially after using the bathroom and before eating.

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3.10 First Aid and its administration.

First aid is an immediate help given at the place of accident, till the patient is taken to the hospital. It is usually performed by non-expert, but trained personnel to a sick or injured person until definitive medical treatment can be accessed.

In certain circumstances illnesses or minor injuries are self-limiting and these may not require further medical care treatment once the first aid intervention has been successfully done.

It generally consists of a series of simple and in some cases, potentially life-saving techniques that an individual can be trained to perform with minimal equipments

In the following text you will study how first aid administration can become a life saving activity.

a. Dog Bite

If a dog bites or scratches the body of a person, it may be dangerous. The wound may become infected with viruses of rabies present in dog's saliva.

In case of bleeding, pressure bandage should be administered until bleeding stops. The damaged area should be covered with clean cotton or piece of cloth.

b. Burn

If some part of the body is burnt the cloths from the burnt part should be immediately removed. Run off the tap water on burnt area. In case of severe injury the patient should be rushed to the nearest hospital.

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c. Artificial Respiration

Due to suffocation a person may become breathless. If the patient is breathless lift the chest of the patient slightly upward so that the respiratory tract may become straight. Open the mouth of the patient and remove any blood, vomiting or secretion accumulated in the mouth.

Clean the mouth with some clean piece of cloth. The clearance of respiratory pathway may help the patient to breathe. If the patient is still breathless, try to help him breathe artificially. If breathing starts take the patient to the hospital immediately.

1. Clear victim's mouth quickly. Tilt head back.

2. Cover victims's mouth with your mouth. Pinch nostrils shut and blow hard. For child, place your mouth over his mouth and blow gently.

3. Remove your mouth, allowing air to come out. Repeat every 5 seconds for adults, every 3 seconds for children.

4. If unable to get air into victim's lungs retilt head into proper position. If you suspect foreign matter in airway, place victim on back, straddle the victim's thigs, perform 6-10 abdominal thrusts, clear matter from mouth, resume artificial respiration.

Fig: 3.22 Steps to be followed for providing artificial respiration

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Snake Bite

In case of snake bite take the following measures.

(i) First tie up the bitten arm or leg tightly with cloth so that poison may not move further.

(ii) Wash the wound with water and lay down the patient and restricts its movement.

(iii) Avoid sucking the patients blood from injury because it may be fatal for you.

(iv) Let the wound bleed.

(v) Take the patient to hospital as soon as possible for medical help.

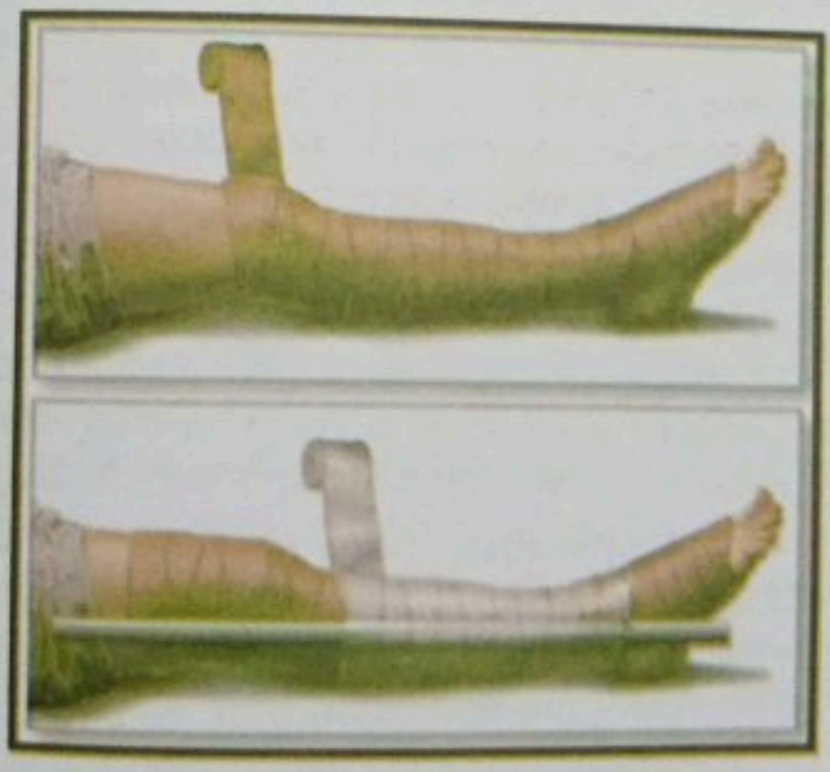

Fig: 3.23 Snake bite first aid.

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3.11 Research and medical advances in Disease control

Health and disease have been part and parcel of human life since its existence. Human being employed different methods and techniques which were available at that time to cure the sick and diseased.

Primitive man apparently often distinguished between ordinary conditions (such as old age, coughs, colds, and fatigue) and illnesses caused by spirits and evil forces that required the special services of a medicine man, witch doctor etc.

Since illness among primitive peoples was caused by gods, spirits, and magic, the purpose of diagnosis was to determine the offense committed and the person or spirit administering the punishment.

Surgery at that time was consisted principally as treatment for wounds and injuries to the bones. Hemorrhage was controlled by pressure, tourniquet,(any device for arresting bleeding by forcibly compressing a blood vessel, as a bandage tightened by twisting.) by some plant substances and binding of blood vessels was apparently unknown.

Although amputations (to cut off a body parts like limbs through surgery) were performed, they seem to have been mainly related with the religious or cultural practices.

During surgery, drugs were used to make the body less sensitive or to relieve severe pain from a wound. Apparently, primitive societies were subject to many of the same diseases which afflict humans today like stomach upsets, diarrhea, respiratory illnesses, rheumatic ailments etc.

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There were methods of preventing disease other than ceremonial and religious among some primitives, but the time of their introduction is unknown. Long before the colonial period in Africa, some tribes had practiced a type of protection against smallpox by variolation (inserting fluid from smallpox blisters under the skin). This was aimed at producing a mild form of the disease which would save the person from severe illness, for it was recognized that one never acquired it a second time.

Primitive man also observed that some dread diseases never struck a person twice and worked out ways of purposely contracting a mild case rather than risk the full-blown effects.

He recognized that excessive bleeding could be stopped by applying extreme heat to a wound, but he also believed that releasing moderate amounts of blood by opening a vein improved certain conditions. Of course many of his most favoured techniques had no rational or pharmacological basis, but he certainly recognized the psychological benefits to the sick of a healer's even appearing to do something effective, that under certain conditions the body seems better able to cure itself.

The first medical diagnoses made by humans were based on what ancient physicians could observe with their eyes and ears, which sometimes also included the examination of human body. The ancient Greeks attributed all disease to disorders of bodily fluids called humors, and during the late medieval period, doctors routinely performed uroscopy.

Later, the microscope revealed not only the cellular structure of human tissue, but also the organisms that cause disease. More sophisticated diagnostic tools and techniques - such as the thermometer for measuring temperature and the stethoscope for measuring heart rate - were not in widespread use until the end of the 19th century.

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The clinical laboratory would not become a standard fixture of medicine until the beginning of the 20th century.

Now we have variety of equipments and methods to diagnose, treat, and prevent the diseases. Some of the more important are discussed below:

1. CT or CAT scans are special x-ray tests that produce cross-sectional images of the body using x-rays and a computer. These images allow the radiologist, a medical doctor who specializes in images of the body, to look at the inside of the body. CT scans are frequently used to evaluate the brain, neck, spine, chest, abdomen, pelvis, and sinuses.

2. An MRI (or magnetic resonance imaging) scan is a radiology technique that uses magnetism, radio waves, and a computer to produce images of body structures. The image and resolution produced by MRI is quite detailed and can detect tiny changes of structures within the body.

3. The electrocardiogram (ECG or EKG) is a diagnostic tool that is routinely used to assess the electrical and muscular functions of the heart. Most often, the ECG assessment includes the determination of the rate, assessment of the rhythm, evaluation of the electrical conduction patterns of the heart.

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4. Ultrasound is an imaging technique which uses sound waves that are beamed into the body causing return echoes that are recorded to "visualize" structures beneath the skin. The ability to measure different echoes reflected from a variety of tissues allows a shadow picture to be constructed.

5. Immunization (vaccination) is a way to improve your immune system and prevent serious, life-threatening diseases. Various types of vaccines are given to childern and adults at different stages of life which prevents them from various fatal diseases. Some of the prominent diseases for which vaccines are administered are polio, measles, hepatitis etc.

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- Our body is extremely effective at achieving and maintaining good health, if it is given what it needs
- our dietary intakes may include natural food products, processed food, fast food or junk food.
- The methods used for processing foods include canning, freezing, refrigeration, dehydration and aseptic processing.
- Fast food, is defined as any food packed with "full of calories", which contains abundance of fat, sugar, sodium, and other chemicals, which has less nutritional value.
- Nutritional imbalances like overnutrition and undernutrition may lead to severe health difficulties.
- Malnutrition is a condition resulting from not consuming enough nutrients.
- Physical activity reduces the risk of premature death in general, and of coronary heart disease, hypertension, colon cancer, and diabetes mellitus in particular.
- Insufficient rest and sleep can shorten life of an individual.
- Drug abuse interfere with the ability to think clearly, exercise good judgment, controlling behavior, and feel normal
- Smoking is a first step before someone gets into some serious drug addiction.
- The Holy Qur'an attaches great importance to personal and environmental cleanliness.

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KEY POINTS

- Blood in our bodies is pumped by the heart through a network of arteries and veins.
- Blood is made of three specialized elements called erythrocytes (red blood cells), leukocytes (white blood cells) and platelets that are suspended in a complex liquid called plasma.
- Leukemia is a cancer of blood-forming cells in the bone marrow.
- Anemia is a common blood disorder that is caused by an acquired or inherited abnormality of red blood cells to provide adequate oxygen supplies to body tissues.
- Haemophilia is a rare bleeding disorder in which the blood doesn't clot normally.
- Microorganisms like bacteria and viruses are the major source of many diseases.
- You are more likely to get TB if you have a weak immune system.
- Whooping cough — or pertussis — is an infection of the respiratory system caused by the bacterium Bordetella pertussis.
- Tetanus, also known as lockjaw, is a serious but preventable disease that affects the body's muscles and nerves.
- Diphtheria is an acute infectious disease caused by the bacteria Corynebacterium diphtheriae.
- Cholera is an infection of the small intestine that causes a large amount of watery diarrhea.
- Smallpox is the only disease that has been completely wiped out throughout the world.

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KEY POINTS

- Polio is an acute viral infection caused by polio virus.
- Measles is a highly contagious viral disease of the children caused by the measles virus (a paramyxovirus) which spreads through respiratory droplets.
- Acquired immunodeficiency syndrome (AIDS) is fatal disease caused by a virus called Human immunodeficiency virus (HIV).
- Fungi are a great source for the production antibiotics and still many are causing serious diseases and thus have pathogenic nature.
- The causative agents of ringworm are collectively known as dermatophytes.
- Parasites are living things that use other living things - like your body - for food and a place to live.
- Malaria is an infectious disease caused by a parasite, Plasmodium, which infects red blood cells.
- First aid is an immediate help given at the place of accident, till the patient is taken to the hospital.

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EXERCISE

A. Select the correct answers in the following questions.

1. Fast food or junk food has _____ nutritional value.
   a. Less
   b. High
   c. Moderate
   d. No

2. Malnutrition means
   a. Consuming enough nutrients
   b. Consuming not enough nutrients
   c. Consuming fats only
   d. Eating at irregular intervals

3. In human body the first choice for the body to consume will be
   a. Body protein
   b. Body fats
   c. Body vitamins
   d. Glycogen

4. What is drug abuse?
   a. Using drug when it is required
   b. Taking drug in control quantities
   c. Using drugs irregularly
   d. Taking a prescription medication that is not prescribed

5. Which one of the following can results in increasing blood cholesterol level?
   a. Tar
   b. Nicotine
   c. Carbon dioxide
   d. Carbon monoxide

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6. What could be one of the possible health risk associated with smoking
   a. Production of red blood cells decreases
   b. Brain cell degrade at a fast rate
   c. Hardening and narrowing of arteries accelerate
   d. All of the above

7. Erythrocyte is another name for a
   a. Red blood cell
   b. White blood cell
   c. Platelet
   d. Plasma

8. Leucocyte is another name for a Red blood cell
   a. Red blood cell
   b. Platelet
   c. Plasma
   d. White blood cell

9. Which of the following blood components provide the major defense for our bodies against invading bacteria and viruses?
   a. Platelets
   b. Plasma
   c. White blood cells
   d. Red blood cells

10. Most of the volume of normal human blood is composed of
   a. Platelets
   b. Plasma
   c. White blood cells
   d. Red blood cells

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11. In Leukemia the white blood cells are:
    a. Defective
    b. Numerous but defective
    c. Produce in less number
    d. Helping the body immune responses

12. In anemia the body is unable to get:
    a. Proper immune response
    b. Proper blood circulation
    c. Adequate amount of nutritional support
    d. Adequate amount of oxygen supply

13. The main factor behind hemophilia is the absence of :
    a. Gene for platelets production
    b. Normal bone marrow
    c. Clotting factor protein
    d. Normal hormonal control

14. One of the following is a bacterial disease:
    a. Small pox
    b. AIDs
    c. Diphtheria
    d. Measles

15. Tuberculosis is treated by :
    a. Antiviral drugs
    b. Antibiotics
    c. Surgery
    d. Chemotherapy

16. The agent that cause typhoid fever is:
    a. Salmonella typhi
    b. Escherichia coli
    c. Vibrio cholerae
    d. Shigella

17. Which symptom of small pox infection appears first?
    a. Rash
    b. Fever
    c. Painful muscles
    d. Bleeding from nose

18. Which of the following is NOT a symptom of polio?
    a. Runny nose
    b. Paralysis
    c. Breathing difficulty
    d. Unable to walk

19. Paramyxovirus causes which one of the following disease?
    a. Typhoid
    b. Measles
    c. Polio
    d. Small pox

20. Which organ does hepatitis affect?
    a. Heart
    b. Brain
    c. Liver
    d. Kidneys

21. HIV is transmitted when the _____ of an infected person comes into contact with the blood or mucous membrane of a healthy person.
    a. clothing or skin
    b. blood or other body fluids
    c. drugs or alcohol
    d. blood or hair

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22. HIV is _____.
a. a virus that attacks the immune system
b. a sexually transmitted virus
c. the virus that causes AIDS
d. all of the above

23. Drug abusers are at risk for HIV infection _____.
a. only when they inject drugs
b. because drugs can affect the way people make d decisions
c. when they share drug injection equipment
d. both B and C

B. Write answers to the following questions.

1. Cleanliness ensures health. Elaborate the statement.

2. Briefly describe the composition of the blood.

3. Leukemia and anemia are blood disorders. State their causes and their effects on the body.

4. Eating behaviour are a major cause of health disorders. List down some health issues which have a relationship with our eating behaviours.

5. Differentiate between malnutrition and under nutrition.

6. Proper sleep and physical activities are vital for healthy growth and healthy life. Give your assessment of this statement.

7. Enlist the viral, bacterial, fungal and parasitic diseases that you have studied in this unit.

8. Give a detail note on the causes, symptoms and preventions of the following diseases.

b. Malaria

c. Ringworm

9. Polio can be prevented by vaccination. Pakistan is one of the few countries in the world where polio cases have been still identified. Investigate into the causes why people in some parts of the country are hesitant to give polio vaccines to their children.

10. Smoking is the first step to drug addiction. Enlist some of the health hazards associated with smoking.

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