



CHAPTER 15 HUMAN DISEASES

NOTES

- **Health** is a state of complete physical, mental and social wellbeing. **Homeostasis** is the biological term for health.
- The ability to resist changes in the internal environment is known as **homeostasis**.
- The four determinants of health are: human biology, environment, lifestyle and health care services.
- Lack of adequate nutritious food, physical exercise, unfavourable environmental condition and diseases etc. may degrade health of an individual.
- **Mental health** is a concept that refers to an individual's emotional and psychological well-being.

DISEASE is an abnormal condition of an organism that impairs bodily functions.

Causes of Disease:

1. Intrinsic factors (**genetic defects or nutritional deficiencies**)
 2. Extrinsic factors (**social, psychological and environmental factors**) or combination of intrinsic and extrinsic factors.
- **Pathology** is the study of diseases.
 - **Nosology** is the systematic classifications of diseases.
 - **Etiology (Aetiology)** deals with causes and origins of diseases.
 - Any organism which spread the pathogen from an infected person to healthy person is known as **vector**.
 - **A symptom** is a change in body functions experienced by a patient.
 - **A sign** is the evidence of the presence of a disease noticed by the doctor.
 - **Infectious or Contagious Diseases** are diseases caused by presence of pathogenic microbial agents and can be transmitted from one species to another through physical contact with infected agents.
 - Diseases that remain confined to the person who develops them and do not spread to other are known as **non-infectious or non-communicable disease**.

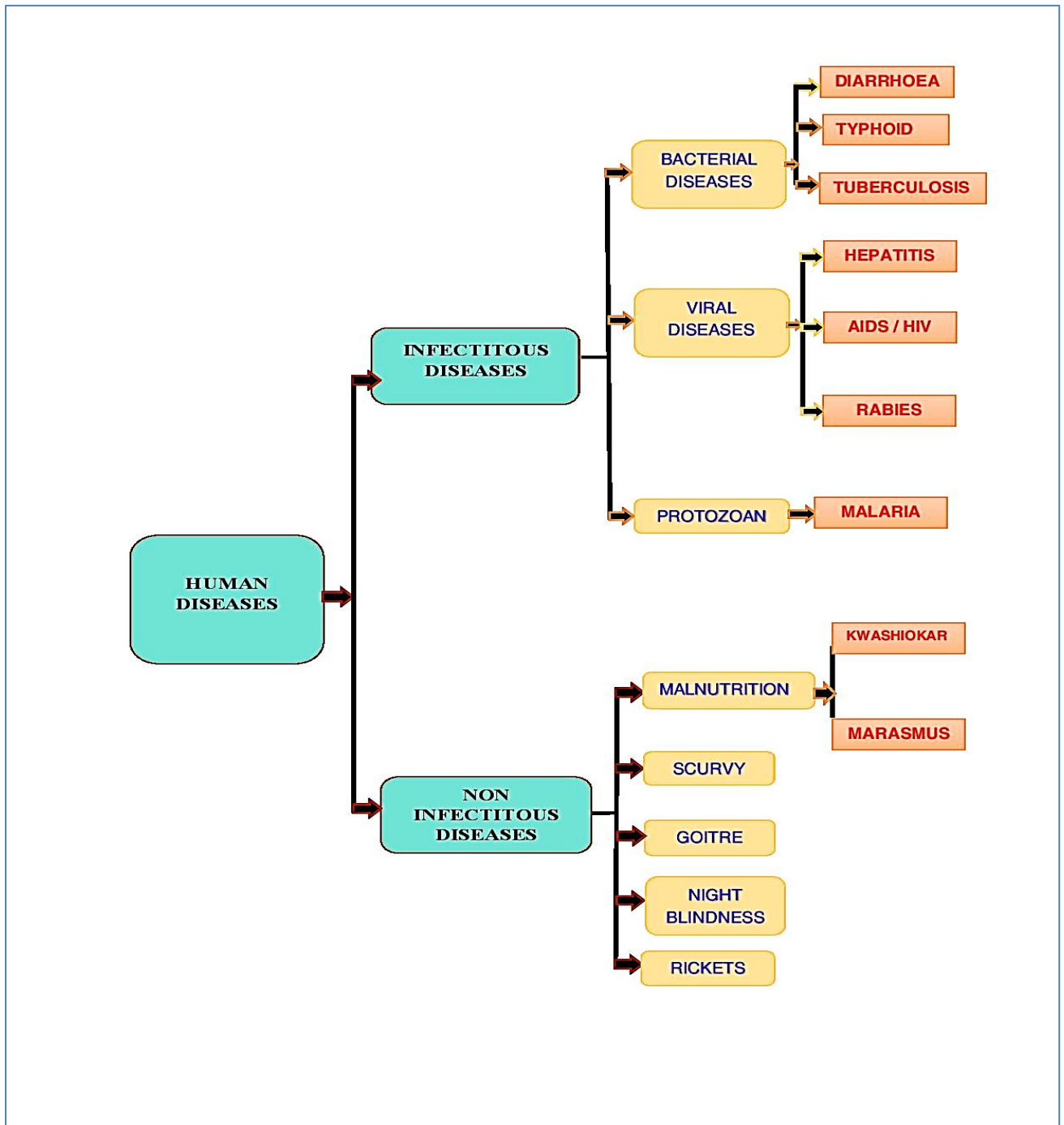


Fig. A flowchart of Human Diseases



DIARRHOEA: It is a common disease characterized by an increase frequency of bowel movement with a decrease in the form of stool.

Types of diarrhoea:

- **Acute diarrhoea** (last for upto a week)
- **Chronic diarrhoea** (can last more than 3 weeks)

Types of Acute diarrhoea:

- **Viral gastroenteritis** is caused by several different viruses like **calciviruses**.
- **Food poisoning** is caused by toxin release by *Staphylococcus aureus* and *Clostridium perfringens*.
- **Traveller's diarrhoea** is caused by pathogenic strain of *E. coli*.
- **Bacterial enterocolitis** is caused by bacteria like *Campylobacter jejuni*, *Shigella*, *Salmonella* and *E.coli*.

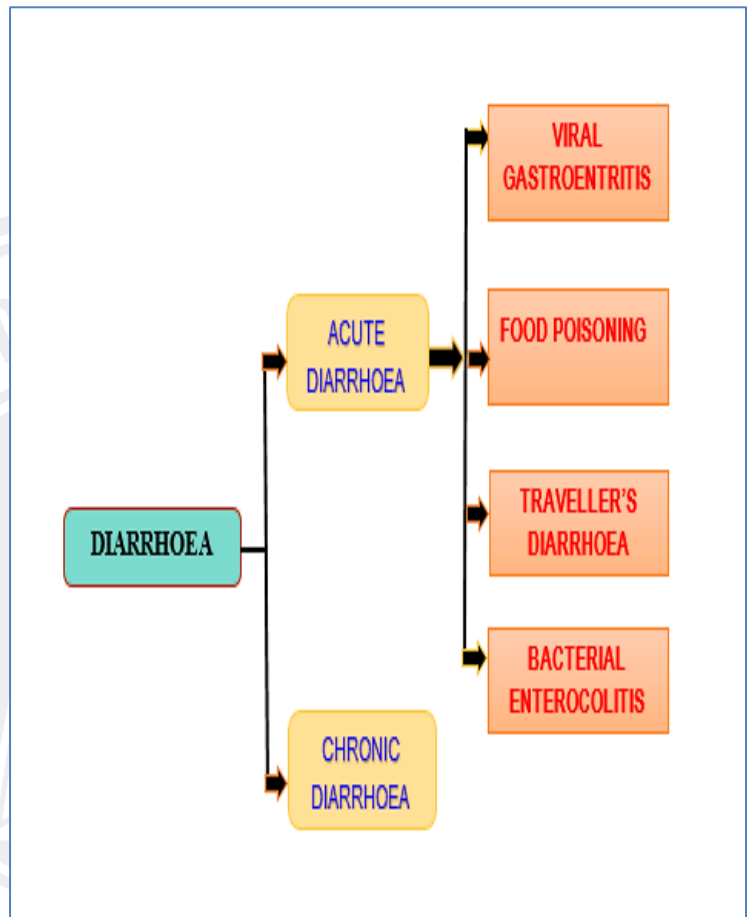


Fig. A flowchart of types of diarrhoea

Complication of diarrhoea:

- Dehydration with or without vomiting.
- Reduce blood pressure and urine output.
- Severe weakness, confusion, acidosis and coma.

Treatment:

- ORS (**glucose + electrolytes**) to rehydrate the victims, **antibiotics** (prevent infection), **absorbents** (reduce water loss) and **anti-motility medications** (reduce bowel movement) are given to the patients.



TYPHOID OR ENTERIC FEVER

- It is caused by infection with *Salmonella typhi*.

Symptoms: It includes continuous high fever with profuse sweating, rosy spots of the lower chest and abdomen, slow heartbeat, delirium with headache and cough, bleeding from the nostrils, abdominal pain, diarrhoea and dehydration.

Diagnostic Test: widal test.

Prevention: Vaccination, use of disinfected or boiled water for drinking, proper community sanitation, avoids contaminated raw food etc.

MALARIA

- It is an infectious disease caused by the protozoan parasite of the genus *Plasmodium*. The disease is spread by female *Anopheles* mosquito.

- *Plasmodium falciparum* and *Plasmodium vivax* cause severe malaria while *Plasmodium vivax* and *Plasmodium ovale* cause chronic malaria.

- **The classical symptom** of malaria is cyclical occurrence of sudden coldness followed by rigor and fever and sweating lasting for 4-6 hrs.

Symptoms include fever, shivering, arthralgia, vomiting, anaemia, haemoglobinuria, convulsions.

Prevention and Control:

- Eradication of mosquitoes and prevention of Mosquito bite.
- Use of mosquito repellent or mosquito net impregnated with pesticides (such as permethrin or deltamethrin).
- Using several prophylactic (antimalarial) drugs. (like quinine, quinacrine, chloroquine, primaquine, etc.)

TUBERCULOSIS

- It is a common and deadly infectious disease caused by *Mycobacterium tuberculosis*. It commonly infects the lungs but can also infect CNS, lymphatic system, circulatory system, urogenital system, bones, joints and even the skin.

Symptoms include chest pain, coughing up blood, productive & prolonged cough for more than three weeks, fever, chills, night sweats, appetite loss, weight loss, pale complexion and often a tendency to fatigue very easily.



Transmission

- It can be transmitted from infected individuals to the healthy one in the following ways:
- Infectious minute aerosol droplets released during cough, sneeze, kiss or spit.

Protection: Avoid prolonged, frequent cold intense contact with infected one, children are vaccinated (BCG vaccine); however there is no reliable vaccine for protection to adults.

HEPATITIS is a disease which is characterized by injury to the liver.

Causes: By hepatitis viruses, alcohol, drugs, auto immune condition etc.

Types of Hepatitis:

- **Hepatitis A:** It is an acute infectious disease (affecting children and young adults), caused by a **picornavirus**.
- **Hepatitis B:** It is caused by a **hepadnavirus (Hepatitis B Virus)** that causes both acute and chronic hepatitis.
- **Hepatitis C:** It is caused by a **flavivirus** and may cause chronic hepatitis leading to cirrhosis.
- **Alcoholic hepatitis:** Alcohol is a significant cause of hepatitis.

Symptoms: Joint and muscle ache, fever, vomiting, diarrhoea, dark urine, loss of appetite, yellowing of eyes and skin, abdominal discomfort etc.

Treatment: vaccination, adequate rest, drinking good amount of water, avoid alcohol etc.

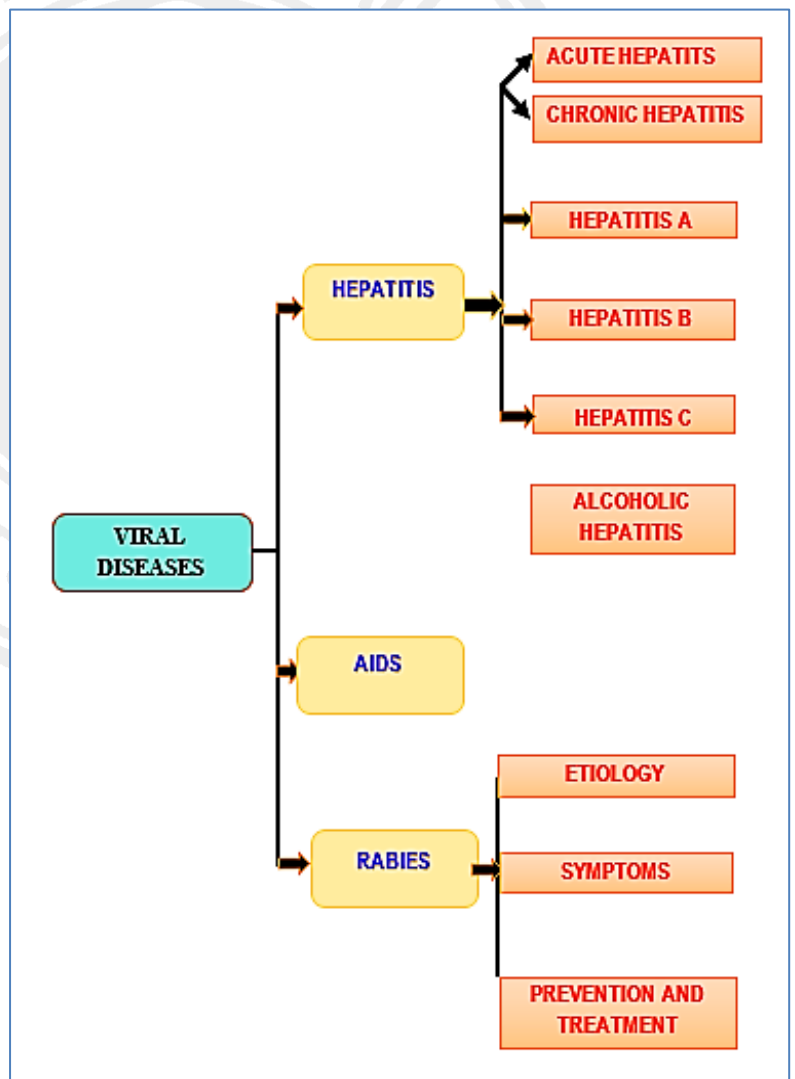


Fig. A flowchart of Viral Diseases



AIDS (ACQUIRED IMMUNE DEFICIENCY SYNDROME)

- **AIDS** refers only to the last stage of the HIV infection.
- It is caused by a **retrovirus** (RNA is the genetic material) known as **HIV** which breaks down the body's immune system.
- **HIV** (Family: Retroviridae, Genus: Lentivirus).
- **December 1** is celebrated as **World AIDS Day** and **red ribbon** is the international symbol of AIDS awareness. In India **NACO** is the nodal organization for formulation of policy and implementation of programmes for prevention and control of AIDS.
- The time period after infection during which an individual test negative is called **window period** (may last up to 6 months) while the time period from infection to the appearance of symptom is called **incubation period** (ranges from months to years).
- During asymptomatic period number of **CD4+ T cells** (1000 or more in bloods of healthy ones) in blood decline rapidly (less than 200 CD4+ T cells) which are the key component of immune system.

Transmission: HIV is present in the **blood, semen, vaginal fluids, pre-ejaculate, or breast milk** of infected persons. The disease can be transmitted through **unprotected sexual route, blood contact** with infected one and infected **mother to child**.

Symptoms:

Initial temporary symptoms: Sore throat, fever, headache, malaise and enlarge lymph nodes.

Complication (Symptoms) of AIDS:

- Enlarged lymph nodes, lack of energy, weight loss, frequent fevers and sweats, persistent or frequent yeast infections (oral or vaginal), persistent skin rashes or flaky skins, pelvic inflammatory disease, short term memory lost etc.

Diagnosis: **Antibody testing** (recommended after 6 months), **test for virus itself** (Rapid testing techniques are now available)

Treatment: Education and other preventive measure, prevention of HIV infection among high risk population and adolescents, prevention of mother to child transmission, treatment of AIDS. **(No specific vaccines till date).**



RABIES

- It is a viral zoonotic disease caused by Lyssavirus that causes inflammation of the brain in mammals.

Transmission:

- Most animals can be infected by the virus and can transmit the disease to humans.
- The route of the infection is usually by a bite from the infected animal.

Treatment:

- Rabies can be prevented through vaccination.
- **Louis Pasteur** and **Emile Roux** first developed rabies vaccine in 1885.
- It was given to a 9 year old boy named **Joseph Meister** mauled by a rabid dog on July 6, 1885.
- At present several HDCV, CECV and purified Vero cell rabies vaccine are available.

NUTRITION is a process by which organisms obtain food and utilize for various processes of life.

- The chemical substances present in our food are called **nutrients** that gave us energy, bring growth, health, repair body tissues and regulate body functions.
- The different types of nutrients are: **Carbohydrates, proteins, fats, vitamins, minerals, water.**
- **A calorie** is a measure of energy content in foods.
- **Vitamins** are the organic nutrients essential for human body for fighting infection and aiding bone growth, promoting cell production and boosting the immune system.
- **A balanced diet** is a combination of the various essential nutrients in the proper proportions to meet the daily needs of the body.
- The approximate proportion of nutrients in a balanced diet must contain **Carbohydrate** - 40-50%; **proteins**-20-30%; **fats**-30%; **vitamins**-adequate amount; **minerals**-adequate amount; **water**-adequate amount.

DEFICIENCY DISEASES

- Malnutrition is a condition caused by improper or insufficient diet.
- **Undernutrition** results from inadequate consumption, poor absorption or excessive loss of nutrients
- Overnutrition** results from overeating (**obesity**) or excessive intake of specific nutrients.



Common forms of Malnutrition:

- **Protein-Energy Malnutrition (PEM):** It is a form of malnutrition arising from lack of dietary protein and / or energy. e.g. **Kwashiorkor and Marasmus**

| DIFFERENCES | |
|---|--|
| KWASHIORKAR | MARASMUS |
| <ul style="list-style-type: none"> ➤ It is caused by deficiency of protein. ➤ It occurs in children after 18 months of age. ➤ Discolouration of skin and hair. ➤ Oedema with swollen abdomen (pot belly). ➤ No loss of adipose tissue. | <ul style="list-style-type: none"> ➤ It is caused by deficiency of protein and calories ➤ It occurs mostly in infants. ➤ No change in skin and hair. ➤ No oedema and pot belly. ➤ Drastic loss of adipose tissue. |

Micronutrients malnutrition: It refers to the diseases caused by dietary deficiency of vitamins and minerals. e.g. **scurvy and rickets etc.**

SCURVY

- It is a deficiency disease caused by insufficient intake of vitamin C.
- The alternative name of scurvy is **Barlow's disease**.

Symptoms: Gradual weakening and muscle pain, dark purplish spots on tongue, skin on legs, bleeding from all mucous membranes, spongy tender gums often leading to tooth loss, sunken eyes and pale skin.

Prevention: It can be prevented by a diet that includes good sources of vitamin C like orange, lemon, Indian gooseberry, tomato, spinach etc.

GOITRE is a disease characterized by enlargement of thyroid gland in the neck due to insufficient intake of iodine.

Causes:

- Prolonged iodine deficient in diet.
- **Hashimoto's thyroiditis** - an autoimmune disease characterized by inflammation of the gland.
- **Graves-Basedow disease** - a thyroid disorder characterized by hyperthyroidism
- Inborn errors of thyroid hormone synthesis, causing congenital hypothyroidism.



THYROID CANCER

Symptoms: swelling of the thyroid gland, diminished power of concentration, depression, and feeling tired and sleeping excessively, increases appetite, sweaty moist palms etc.

Prevention: It can be prevented by using iodised salt in the diet.

NIGHT BLINDNESS OR NYCTALOPIA

➤ It is a condition making in difficult to see in relatively low light.

Causes:

- Deficiency of vitamin A or Retinol.
- Retinitis pigmentosa
- Cataracts
- Certain medications
- Birth defects.

Symptoms: Difficulty or inability to see in low light or darkness, dry eyes, blurred vision.

Prevention: It can be prevented by eating a diet with adequate amounts of vitamin A (fish liver oil, butter, fortified margarine, yellow, yellowish-red and green vegetables and fruits).

RICKETS

- It is a vitamin D deficiency disease leading to bone softening, deformity and fractures found in children.
- A similar condition in adults is known as Osteomalacia.

Causes:

- Vitamin D deficiency
- Calcium deficiency

Signs and symptoms: Bone pain or tenderness, dental problems, muscle weakness, skeletal deformity, hypocalcaemia, tetany, soft skull.

Prevention:

- Exposure to sunlight.
- Adequate supplies of calcium and phosphorus in the diet.
