

7

CHAPTER

UNIT - III

Human Health and Diseases



Sneezing spreads diseases through the droplets of mucus

Chapter outline

- 7.1 Common diseases in human beings: Infectious and non infectious diseases
- 7.2 Maintenance of personal and public hygiene
- 7.3 Adolescence – Drug and alcohol abuse
- 7.4 Mental health – Depression
- 7.5 Lifestyle disorders in human beings



Learning Objectives

- *Learns about various bacterial, viral, fungal, protozoan and helminth diseases.*
- *Understands the life cycle of malarial parasite.*
- *Learns the ill effects of drugs and alcohol.*
- *Realizes the responsibility for their behaviour, health care and life styles.*
- *Understands the importance of mental health and life style modifications to be followed for their well being.*



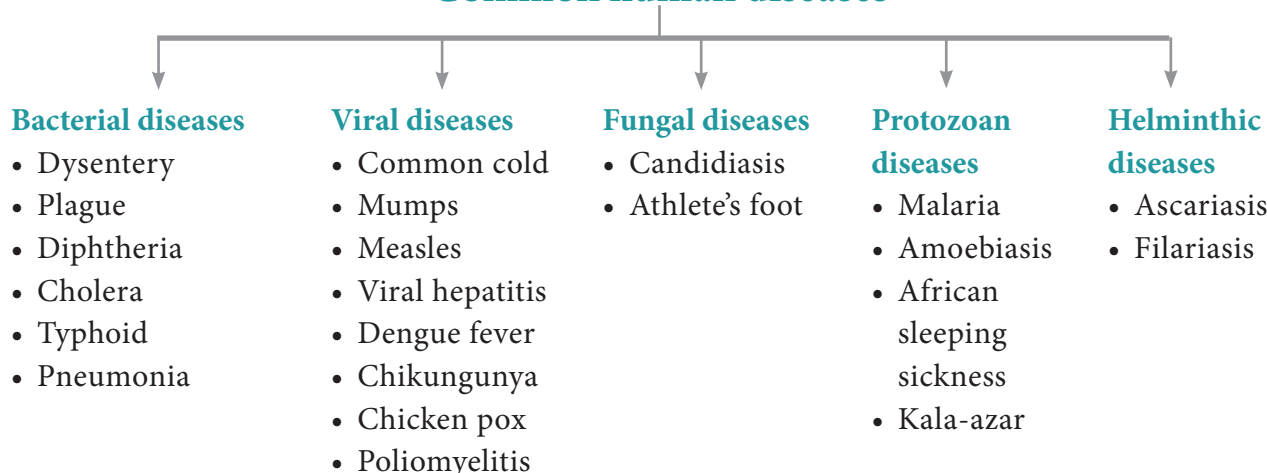
The World Health Organization [WHO] defines health as ‘a state of complete physical, mental and social wellbeing and not merely absence of diseases’. We can also say “HEALTH IS WEALTH”, when people are healthy they are more efficient at work. Health increases longevity of people and reduces infant and adult mortality. Personal hygiene, regular exercise and balanced diet are very important to maintain good health.

7.1 Common diseases in human beings

Disease can be defined as a disorder or malfunction of the mind or body. It involves morphological, physiological and psychological disturbances which may be due to environmental factors or pathogens or genetic anomalies or life style changes. Diseases can be broadly grouped into infectious and non infectious types.

Diseases which are transmitted from one person to another are called infectious diseases or **communicable diseases**. Such disease causing organisms are called **pathogens** and are transmitted through air, water, food, physical contact and vectors. The disease causing pathogen may be virus, bacteria, fungi, protozoan parasites, helminthic parasites, etc., Infectious diseases are common and everyone

Common human diseases



suffers from such diseases at some time or the other. Most of the bacterial diseases are curable but all viral diseases are not. Some infectious disease like AIDS may be fatal.

Non-infectious diseases are not transmitted from an infected person to a healthy person. In origin they may be genetic (cystic fibrosis), nutritional (vitamin deficiency diseases) and degenerative (arthritis, heart attack, stroke). Among non-infectious diseases, cancer is one of the major causes of death.

7.1.1 Bacterial and viral diseases

Bacterial diseases

Though the number of bacterial species is very high, only a few bacteria are associated with human diseases and are called **pathogenic bacteria**. Such pathogens may emit toxins and affected the body. Common pathogenic bacteria and the bacterial diseases are given in **table 7.1**.

Bacteria spread through air, water or by inhaling the droplets/aerosols or even by sharing utensils, dresses with an infected person. Typhoid fever can be confirmed by **Widal test**.

Viral diseases

Viruses are the smallest intracellular obligate parasites, which multiply within

Bacterial resistance

If an antibiotic is used too often to fight a specific bacterial infection, the bacteria may become resistant to the specific antibiotic. Hence the specific antibiotic can no longer be used to treat the bacterial infection. Some bacteria have developed resistance to many antibiotics. Therefore, infections caused by these bacteria are difficult to be cured.

Risk of bacterial resistance can be reduced by observing the following steps

- Avoid using antibiotics to treat minor infections that can be taken care by our immune system.
- Do not use an antibiotic to treat viral infections such as common cold or flu.
- Always follow the prescription. Skipping doses or failing to complete the prescription may allow antibiotic resistance to develop.

living cells. Outside the living cells they cannot carry out the characteristics of a living organism. Viruses invade living cells, forcing the cells to create new viruses. The new viruses break out of the cell, killing it and invade other cells in the body, causing

Table 7.1. Bacterial diseases in human beings

S. No	Diseases	Causative agent	Site of infection	Mode of transmission	Symptoms
1	Shigellosis (Bacillary dysentery)	<i>Shigella sp.</i>	Intestine	Food and water contaminated by faeces / faecal oral route	Abdominal pain, dehydration, blood and mucus in the stools
2	Bubonic plague (Black death)	<i>Yersinia pestis</i>	Lymph nodes	Rat flea vector- <i>Xenopsylla cheopis</i>	Fever, headache, and swollen lymph nodes
3	Diphtheria	<i>Corynebacterium diphtheriae</i>	Larynx, skin, nasal and genital passage	Droplet infection	Fever, sore throat, hoarseness and difficulty in breathing
4	Cholera	<i>Vibrio cholerae</i>	Intestine	Contaminated food and water/ faecal oral route	Severe diarrhoea and dehydration
5	Tetanus (Lock jaw)	<i>Clostridium tetani</i>	Spasm of muscles	Through wound infection	Rigidity of jaw muscle, increased heart beat rate and spasm of the muscles of the jaw and face
6	Typhoid (Enteric fever)	<i>Salmonella typhi</i>	Intestine	Through contaminated food and water	Headache, abdominal discomfort, fever and diarrhoea
7	Pneumonia	<i>Streptococcus pneumoniae</i>	Lungs	Droplet infection	Fever, cough, painful breathing and brown sputum
8	Tuberculosis	<i>Mycobacterium tuberculosis</i>	Lungs	Droplet infection	Thick mucopurulent nasal discharge

diseases in human beings. *Rhino viruses* cause one of the most infectious human ailment called the “**Common cold**”.

Viral diseases are generally grouped into four types on the basis of the symptoms produced in the body organs.

- i. Pneumotropic diseases (respiratory tract infected by influenza)
- ii. Dermotropic diseases (skin and subcutaneous tissues affected by chicken pox and measles)

Table: 7.2 Viral diseases in human beings

S. No	Diseases	Causative agent	Site of infection	Mode of transmission	Symptoms
1	Common cold	<i>Rhino viruses</i>	Respiratory tract	Droplet infection	Nasal congestion and discharge, sore throat, cough and headache
2	Mumps	<i>Mumps virus (RNA virus)</i> <i>Paramyxo virus</i>	Salivary glands	Saliva and droplet infection	Enlargement of the parotid glands
3	Measles	<i>Rubella virus (RNA virus),</i> <i>Paramyxo virus</i>	Skin and respiratory tract	Droplet infection	Sore throat, running nose, cough and fever. reddish rashes on the skin, neck and ears.
4	Viral hepatitis	<i>Hepatitis - B virus</i>	Liver	Parenteral route, blood transfusion	Liver damage, jaundice, nausea, yellowish eyes, fever and pain in the abdomen
5	Chicken pox	<i>Varicella -Zoster virus (DNA Virus)</i>	Respiratory tract, skin and nervous system	Droplet infection and direct contact	Mild fever with itchy skin, rash and blisters
6	Poliomyelitis	<i>Polio virus (RNA virus)</i>	Intestine, brain, spinal cord	Droplet infection through faecal oral route	Fever, muscular stiffness and weakness, paralysis and respiratory failure
7	Dengue fever (Break bone fever)	<i>Dengue virus or Flavi virus (DENV 1-4 virus)</i>	Skin and blood	Mosquito vector <i>Aedes aegypti</i>	Severe flu like illness with a sudden onset of fever and painful headache, muscle and joint pain.
8	Chikungunya	<i>Alpha virus (Toga virus)</i>	Nervous system	Mosquito vector <i>Aedes aegypti</i>	Fever and joint pain, headache and joint swelling

Nipah virus is a zoonotic virus (transmitted from animals to humans) and also transmitted through contaminated food. In infected people, it causes a range of illness from asymptomatic infection to acute respiratory illness and fatal encephalitis.



iii. Viscerotropic diseases (blood and visceral organs affected by yellow fever and dengue fever)

iv. Neurotropic diseases (central nervous system affected by rabies and polio). Some common viral diseases of human beings are given in **table 7.2**.



Swine flu was first recognised in the 1919 pandemic and still circulates as a seasonal flu virus. Swine flu is caused by the H1N1 virus strain. Symptoms include fever, cough, sore throat, chills, weakness and body aches. Children, pregnant women and the elderly are at risk from severe infection.

7.1.2 Protozoan diseases

About 15 genera of protozoans live as parasites within the human body and cause diseases.

Amoebiasis also called amoebic dysentery or amoebic colitis is caused by *Entamoeba histolytica*, which lives in the human large intestine and feeds on food particles and bacteria (**Fig. 7.1**). Infective stage of this parasite is the **trophozoite**, which penetrates

the walls of the host intestine (colon) and secretes histolytic enzymes causing ulceration, bleeding, abdominal pain and stools with excess mucus. Symptoms of amoebiasis can range from diarrhoea to dysentery with blood and mucus in the stool. **House flies** (*Musca domestica*) acts as a carrier for transmitting the parasite from contaminated faeces and water.

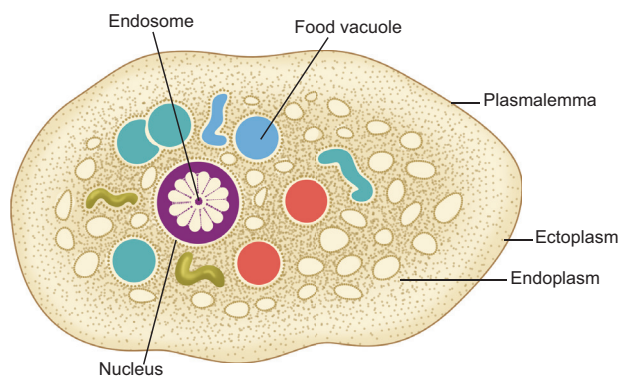


Fig. 7.1 *Entamoeba histolytica*

African sleeping sickness is caused by *Trypanosoma* species. *Trypanosoma* is generally transmitted by the blood sucking **Tsetse** flies. Three species of *Trypanosoma* cause sleeping sickness in man.

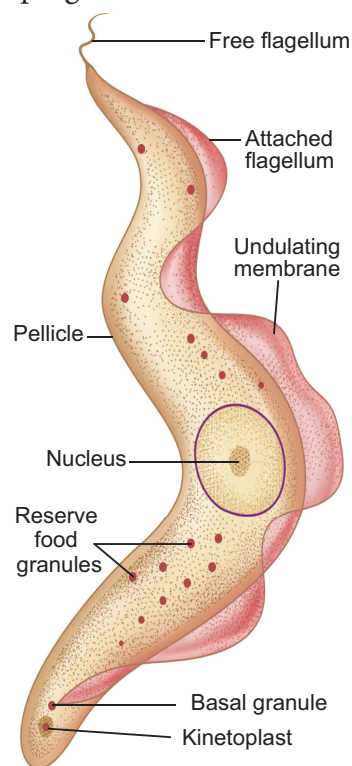


Fig. 7.2. *Trypanosoma gambiense*



1. *T. gambiense* is transmitted by *Glossina palpalis* (**Tsetse fly**) and causes Gambian or Central African sleeping sickness (**Fig. 7.2**).
2. *T. rhodesiense* is transmitted by *Glossina morsitans* causing **Rhodesian or East African sleeping sickness**.
3. *T. cruzi* is transmitted by a bug called *Triatoma megista* and causes **Chagas disease or American trypanosomiasis**.

Kala - azar or visceral leishmaniasis is caused by *Leishmania donovani*, which is transmitted by the vector *Phlebotomus* (**sand fly**). Infection may occur in the endothelial cells, bone marrow, liver, lymph glands and blood vessels of the spleen. Symptoms of Kala azar are weight loss, anaemia, fever, enlargement of spleen and liver.

Malaria is caused by different types of *Plasmodium* species such as *P. vivax*, *P. ovale*, *P. malariae* and *P. falciparum* (**Table 7.3**). *Plasmodium* lives in the RBC of human in its mature condition it is called as **trophozoite**. It is transmitted from one person to another by the bite of the infected female *Anopheles* mosquito.

Life cycle of *Plasmodium*

Plasmodium vivax is a digenic parasite, involving two hosts, man as the secondary host and female *Anopheles* mosquito as the primary host. The life cycle of *Plasmodium* involves three phases namely **schizogony**, **gamogony** and **sporogony** (**Fig. 7.3**).

The parasite first enters the human blood stream through the bite of an infected **female *Anopheles*** mosquito. As it feeds, the mosquito injects the saliva containing the **sporozoites**. The sporozoite within the blood stream immediately enters the hepatic cells of the liver. Further in the liver they undergo multiple asexual fission (**schizogony**) and produce **merozoites**. After



being released from liver cells, the merozoites penetrate the RBC's.

Inside the RBC, the merozoite begins to develop as unicellular trophozoites. The trophozoite grows in size and a central vacuole develops pushing them to one side of cytoplasm and becomes the **signet ring stage**. The trophozoite nucleus then divides asexually to produce the **schizont**. The large schizont shows yellowish - brown pigmented granules called **Schuffners granules**. The schizont divides and produces mononucleated merozoites. Eventually the erythrocyte lyses, releasing the merozoites and haemozoin toxin into the blood stream to infect other erythrocytes. Lysis of red blood cells results in cycles of fever and other symptoms. This erythrocytic stage is cyclic and repeats itself approximately every **48 to 72 hours** or longer depending on the species of *Plasmodium* involved. The sudden release of merozoites triggers an attack on the RBCs. Occasionally, merozoites differentiate into **macrogametocytes** and **microgametocytes**. When these are ingested by a mosquito, they develop into male and female gametes respectively.

In the mosquito's gut, the infected erythrocytes lyse and male and female gametes fertilize to form a diploid zygote called **ookinete**. The ookinete migrates to the mosquito's gut wall and develop into an **oocyte**. The oocyte undergoes meiosis by a process called **sporogony** to form **sporozoites**. These sporozoites migrate to the salivary glands of the mosquito. The cycle is now completed and when the mosquito bites another human host, the sporozoites are injected and the cycle begins a new.

The pathological changes caused by malaria, affects not only the erythrocytes but also the spleen and other visceral organs. Incubation period of **malaria** is about 12 days. The early symptoms of malaria are headache, nausea and muscular pain. The classic

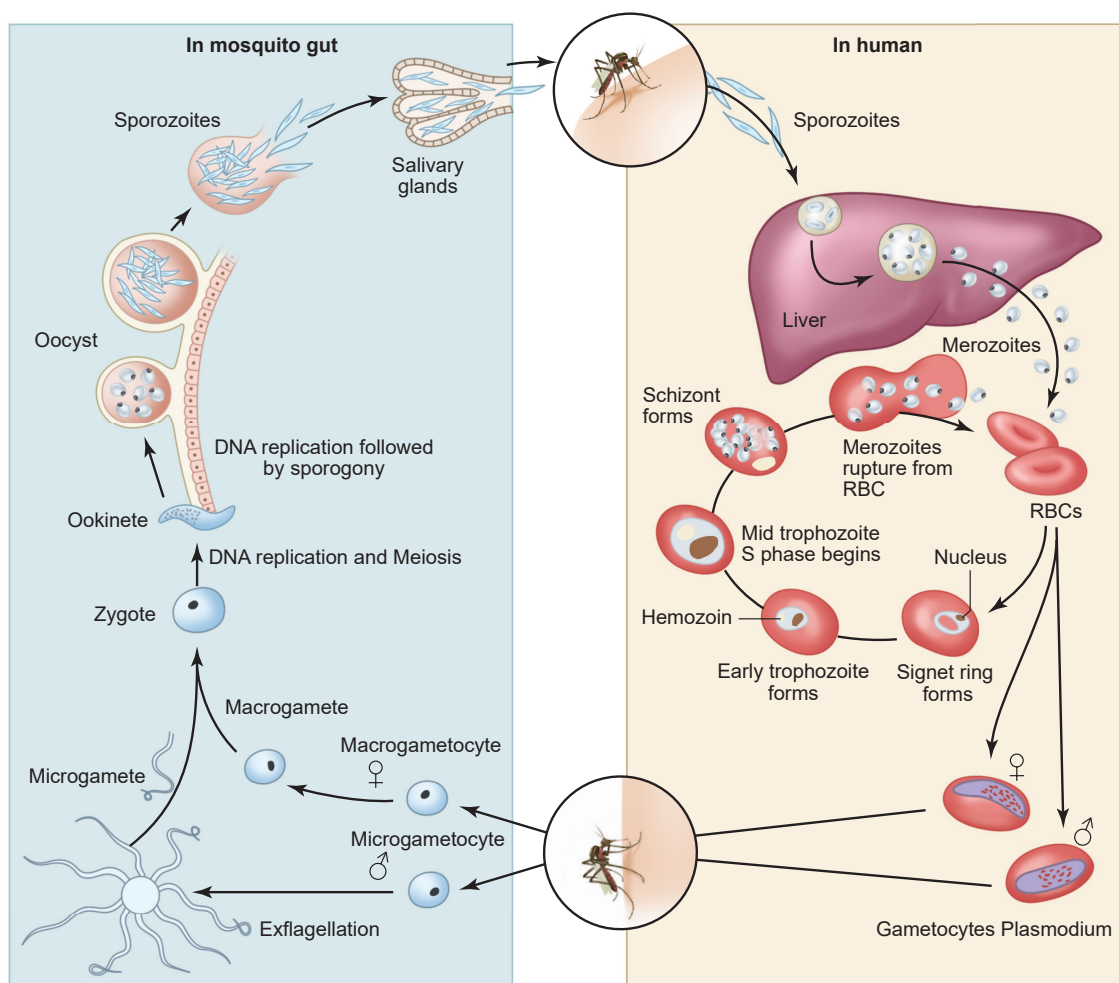


Fig. 7.3 Life cycle of *Plasmodium*

symptoms first develop with the synchronized release of merozoites, **haemozoin** toxin and erythrocyte debris into the blood stream resulting in malarial paroxysms – shivering chills, high fever followed by sweating. Fever and chills are caused partly by malarial toxins that induce macrophages to release tumour necrosis factor (TNF- α) and interleukin.

Prevention

It is possible to break the transmission cycle by killing the insect vector. Mosquitoes lay their eggs in water. Larvae hatch and develop in water but breathe air by moving to the surface. Oil can be sprayed over the water surface, to make it impossible for mosquito larvae and pupae to breathe.

Table 7.3 Types of malaria

Sl No	Types of Malaria	Causative agent	Duration of Erythrocytic cycle
1	Tertian, benign tertian or vivax malaria	<i>P. vivax</i>	48 hours
2	Quartan malaria	<i>P. malariae</i>	72 hours
3	Mild tertian malaria	<i>P. ovale</i>	48 hours
4	Malignant tertian or quotidian malaria	<i>P. falciparum</i>	36 – 48 hours



Ponds, drainage ditches and other permanent bodies of water can be stocked with fishes such as *Gambusia* which feed on mosquito larvae. Preparations containing *Bacillus thuringiensis* can be sprayed to kill the mosquito larvae since it is not toxic to other forms of life. The best protection against malaria is to avoid being bitten by mosquito. People are advised to use mosquito nets, wire gauging of windows and doors to prevent mosquito bites.

In the 1950's the World Health Organisation (WHO) introduced the Malaria eradication programme. This programme was not successful due to the resistance of *Plasmodium* to the drugs used to treat it and resistance of mosquito's to DDT and other insecticides.



Malaria vaccine is used to prevent malaria. The only approved vaccine as of 2015 is RTS,S(Mosquirix). It requires four injections and has relatively low efficacy (26–50%). Due to this low efficacy, WHO does not recommend the use of RTS,S vaccine in babies between 6 and 12 weeks of age.

7.1.3 Fungal diseases

Fungi was recognized as a causative agent of human diseases much earlier than bacteria. Dermatomycosis is a cutaneous infection caused by fungi belonging to the genera *Trichophyton*, *Microsporum* and *Epidermophyton*.

Ringworm is one of the most common fungal disease in humans (Fig. 7.4). Appearance of dry, scaly lesions on the skin, nails and scalp are the main symptoms of the disease. Heat and moisture help these fungi

to grow and makes them to thrive in skin folds such as those in the groin or between the toes. Ringworms of the feet is known as **Athlete's foot** caused by *Tinea pedis* (Fig. 7.5). Ringworms are generally acquired from soil or by using clothes, towels and comb used by infected persons.



Fig. 7.4 Symptoms of ringworm



Fig. 7.5 Symptoms of Athlete's foot

7.1.4 Helminthic diseases

Helminthes are mostly endoparasitic in the gut and blood of human beings and cause diseases called **helminthiasis**. The two most prevalent helminthic diseases are Ascariasis and Filariasis.

Ascaris is a monogenic parasite and exhibits sexual dimorphism. **Ascariasis** is a disease caused by the intestinal endoparasite *Ascaris lumbricoides* commonly called the **round worms** (Fig. 7.6). It is transmitted through ingestion of embryonated eggs through contaminated food and water. Children playing in contaminated soils are also prone to have a chance of transfer of eggs from hand to mouth. The symptoms

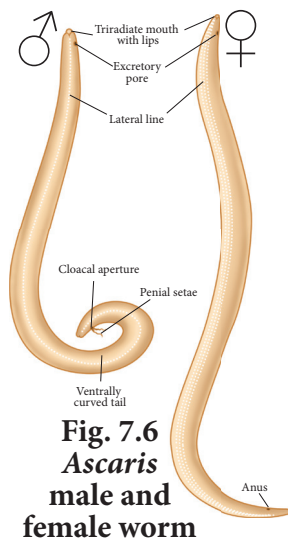


Fig. 7.6
Ascaris
male and
female worm

of the disease are abdominal pain, vomiting, headache, anaemia, irritability and diarrhoea. A heavy infection can cause nutritional deficiency and severe abdominal pain and causes stunted growth in children. It may also cause enteritis, hepatitis and bronchitis.

Filariasis is caused by *Wuchereria bancrofti*, commonly called **filarial worm**. It is found in the **lymph vessels** and **lymph nodes** of man (**Fig. 7.7**). *Wuchereria bancrofti* is sexually dimorphic, viviparous and digenic. The life cycle is completed in two hosts, man and the female *Culex* mosquito. The female filarial worm gives rise to **juveniles** called **microfilariae larvae**. In the lymph glands, the juveniles develop into adults. The accumulation of the worms block the lymphatic system resulting in inflammation of the lymph nodes.

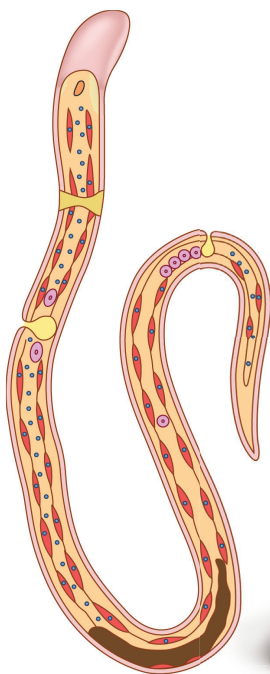


Fig. 7.7 *Wuchereria bancrofti*



Fig. 7.8 Chronic inflammation of the lower limbs

In some cases, the obstruction of lymph vessels causes elephantiasis or filariasis of the **limbs**, **scrotum** and **mammary glands** (**Fig. 7.8**).

7.2 Maintenance of personal and public hygiene

Hygiene is a set of practices performed to conserve good health. According to the World Health Organization (WHO), hygiene refers to “conditions and practices that help to maintain health and prevent the spread of diseases.” **Personal hygiene** refers to maintaining one’s body clean by bathing, washing hands, trimming fingernails, wearing clean clothes and also includes attention to keeping surfaces in the home and workplace, including toilets, bathroom facilities, clean and pathogen-free.

Our public places teem with infection, contamination and germs. It seems that every surface we touch and the air we breathe are with pollutants and microbes. It’s not just the public places that are unclean, but we might be amazed at the number of people who do not wash their hands before taking food, after visiting the restroom, or who sneeze without covering their faces. Many infectious diseases such as **typhoid**, **amoebiasis** and **ascariasis** are transmitted through contaminated food and water.

Advancement in science and technology provide effective controlling measures for many infectious and non-infectious diseases. The use of vaccines and adopted immunization programmes have helped to eradicate **small pox** in India. Moreover a large number of infectious diseases like **polio**, **diphtheria**, **pneumonia** and **tetanus** have been controlled by the use of vaccines and by creating awareness among the people.

7.3 Adolescence – drug and alcohol abuse

Adolescence begins with a period of rapid physical and sexual development called **puberty** to maturity at 12 to 19 years of age. Adolescence is also a highly dynamic period of psychological

and social changes in individuals. Adolescents are vulnerable to group (peer) pressure and many youngsters are pushed into experimenting with drugs and alcohol. Proper education and guidance would enable youth to say no to drugs and alcohol and to follow a healthy life style.

Alcohol is a psychoactive drug, which acts on the brain, affecting a person's mind and behaviour. It is a depressant, which slows down the activity of the nervous system. The intake of certain drugs for a purpose other than their normal clinical use in an amount and frequency that impair one's physical, physiological and psychological functions is called **drug abuse**.

The drugs which are commonly abused include **opioids, cannabinoids, coca-alkaloids, barbiturates, amphetamines and LSD**.

Opioids are drugs which bind to specific opioid receptors present in the **central nervous system** and **intestinal tract**. Heroin (smack) is chemically diacetyl morphine, which is white, odourless and bitter crystalline



Fig. 7.9 Opium plant (poppy plant)

compound. It is obtained by acetylation of morphine, which is extracted from flowers of the poppy plant (**Fig. 7.9**). **Morphine** is one of the strongest pain killer and is used during surgery. It is the most widely abused narcotic drug which acts as a depressant and slows down body functions.

Cannabinoids are a group of chemicals obtained from *Cannabis sativa*, the Indian **hemp plant** (**Fig. 7.10**). Natural cannabinoids are the main source of **marijuana, ganja, hashish** and **charas**. It interferes in the transport of the neurotransmitter, dopamine and has a potent stimulating action on the CNS, producing increased energy and a sense of euphoria.



Fig. 7.10 Cannabis sativa (Hemp plant)

Cocaine is a white powder that is obtained from the leaves of the coca plant, *Erythroxylum coca*. It is commonly called coke or crack. Cocaine causes serious physical and psychological problems including **hallucinations** and **paranoia**. The other plants with hallucinogenic properties are *Atropa belladonna* and *Datura* (**Fig. 7.11** and **Fig. 7.12**).

Table 7.4 classification of drugs

Group	Drugs	Effects
Stimulants	Amphetamines, cocaine, nicotine and tobacco	Accelerates the activity of the brain
Depressants	Alcohol, Barbiturates, Tranquilizers	Slows down the activity of the brain
Narcotic/ Analgesics	Opium, Morphine	Act as depressants on the Central Nervous System
Cannabis	Bhang (Marijuana), Ganja, Charas	Affects the cardiovascular system
Hallucinogens	Lysergic acid diethylamide (LSD), Phencyclidine	Distorts the way one sees, hears and feels



Fig. 7.11 *Atropa belladonna*



Fig. 7.12 *Datura*

Drugs like **methamphetamine**, **amphetamines**, **barbiturates**, **tranquilizers**, **Lysergic acid diethylamide (LSD)** are normally used as medicine to treat patients with mental illness like **depression** and **insomnia** and are often abused.

Tobacco is smoked, chewed and used as snuff. It increases the carbon monoxide content of blood and reduces the concentration of haem bound oxygen, thus causing oxygen deficiency in the body. Tobacco contains **nicotine**, **carbon monoxide** and **tars**, which cause problems in the heart, lung and nervous system. Adrenal glands are stimulated by nicotine to release adrenaline and nor adrenaline which increases blood pressure and heart beat.

7.3.1 Addiction and dependence

Addiction is a physical or psychological need to do or take or use certain substance such as alcohol, to the point where it could be harmful to the individual. This addictive behaviour can be personally destructive to a person. Overtime addicts start to lose not only their jobs, homes and money, but also friendship, family relationships and contact with the normal world. Addiction to drugs and alcohol can lead to a psychological attachment to certain effects such as **euphoria** and temporary feeling of well being.

Repeated use of drugs and alcohol may affect the tolerance level of the receptors present in the body. These receptors then

respond only to highest doses of drugs and alcohol leading to greater intake and addiction. Excessive use of drug and alcohol leads to physical and psychological dependence. When psychological dependence develops, the drug user gets mentally '**hooked on**' to the drug. The drug user constantly thinks only about the drug and has continuous uncontrollable craving for it. This state called "**euphoria**" is characterized by mental and emotional preoccupation with the drug.

Physical dependence is a state in which the user's body requires a continuous presence of the drug. If the intake of the drug or alcohol is abruptly stopped, he or she would develop **withdrawal symptoms**. In a sense, the body becomes confused and protests against the absence of the drug. The withdrawal symptoms may range from mild tremors to convulsions, severe agitation and fits, depressed mood, anxiety, nervousness, restlessness, irritability, insomnia, dryness of throat, etc, depending on the type of drug abuse.

7.3.2 Effects of drugs and alcohol

Short-term effect appears only for a few minutes after the intake of drugs and alcohol. The abuser feels a false sense of well being and a pleasant drowsiness. Some short term effects are euphoria, pain, dullness of senses, alteration in behaviour, blood pressure, narcosis (deep sleep), nausea and vomiting.

Drugs and alcohol have long-term effect that lead to serious damages, because of the

Alcoholism is the inability to control drinking due to physical and emotional dependence on alcohol. Treatment involves counseling by a healthcare professional. Detoxification programme in a hospital or medical facility is an option for those who need additional assistance. Medications are available to reduce the desire to drink and smoke.



constant and excessive use. The physical and mental disturbance makes the life of the user unbearable and torturous. For example heavy drinking permanently damages the liver and brain.

The use of alcohol during adolescence may have long-term effects. Alcohol interferes with the ability of the liver to break down fat. Over time fat accumulation and high levels of alcohol destroy the liver cells and a scar tissue grows in the place of dead cells. This scarring of the liver is called “**Liver cirrhosis**”. Alcohol irritates the stomach lining due to the production of excess acid leading to ulcers. Excessive alcohol use weakens the heart muscle, causing scar tissue to build up in the cardiac muscle fibers. As a result, heavy drinkers have an increased risk of high blood pressure, stroke, coronary artery disease and heart attack. **Korsakoff syndrome**, a chronic memory disorder is most commonly caused by alcohol misuse.

7.3.3 Prevention and control

It is practically possible to prevent some one from using drugs and alcohol. Here are some ways that help to prevent drug and alcohol abuse.

1. Effectively dealing with peer pressure

The biggest reason for teens to start on drugs is due to their friends / peer groups imposing pressure on them. Hence, it is important to have a better group of friends to avoid such harmful drugs and alcohol.

2. Seeking help from parents and peers

Help from parents and peer group should be sought immediately so that they can be guided appropriately. Help may even be

sought from close and trusted friends. Getting proper advice to sort out their problems would help the young to vent their feelings of anxiety and guilt.

3. Education and counselling

Education and counselling create positive attitude to deal with many problems and to accept disappointments in life.

4. Looking for danger signs

Teachers and parents need to look for sign that indicate tendency to go in for addiction.

5. Seeking professional and medical assistance

Assistance is available in the form of highly qualified psychologists, psychiatrists and de-addiction and rehabilitation programmes to help individuals to overcome their problems.

7.4 Mental health – Depression

Mental health is a state of well being of the mind, with self esteem. Self esteem means liking yourself and being able to stand up for what you believe is right. Positive mental health is an important part of wellness. A mentally healthy person reflects a good personality. Activities of mentally healthy people are always appreciated and rewarded by the society as these persons are creative as well as cooperative with others. Mental health improves the quality of life.

Depression is a common mental disorder that causes people to experience depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep poor appetite, low energy and poor concentration.

Alcoholic Anonymous

Alcoholic anonymous was started in 1935 by a businessman and a doctor who had been a “hopeless drunk” for many years. After the men helped each other to stop drinking and to stay sober, they then founded the alcoholic anonymous to help other alcoholics. Since that time alcoholic anonymous has spread throughout the world.

Signs and symptoms of mental depression

- Loss of self confidence and self esteem
- Anxiety
- Not being able to enjoy things that are usually pleasurable or interesting.

Lifestyle changes like exercise, meditation, yoga and healthy food habits can help to be relieved from depression. Exercise stimulates the body to produce **serotonin** and **endorphins**, which are neurotransmitters that suppress depression. Practicing exercise in daily life creates a positive attitude .

Participating in an exercise programme can:

- Increase self-esteem
- Boost self-confidence
- Create a sense of empowerment
- Enhance social connections and relationships

Brain is one of the most metabolically active part of the body and needs a steady stream of nutrients to function. A poor diet may not provide the nutrients for a healthy body and may provoke symptoms of anxiety and depression.

7.5 Lifestyle disorders in human beings

The old saying that “**health is wealth**” is truly applicable to human beings. With the changes in life style, there are many emerging medical conditions and diseases that are reducing human longevity. Life style disorder result due to activities involving smoking, alcohol and drug abuse, consuming high fat diet, lack of exercise or living a latent life.

The World Health Organization (WHO) in its report cautions a slow moving public health disaster due to life style disorders in the form of non-communicable diseases like diabetes, cardiovascular and lung diseases. WHO believes that not thousands but millions of people die every year within the age group

of thirty to sixty due to life style related disorders.

The following facts will help in better understanding of life style disorders.

- Life style disorder causes **cardiovascular diseases** resulting in 31 percent of global deaths.
- The sedentary life style also causes deficiency of vitamins such as **vitamin D** resulting in fatigue, tiredness, back pain, depression, bone loss, muscle pain, etc,
- Life style disorder also includes **social isolation** resulting in age related problems.
- **Eating junk** foods that have high caloric values, rich in carbohydrates and fat can lead to obesity and early health issues.
- Consumption of processed and packaged food, which lacks in fiber may result in constipation.
- Several people today complain of irritable bowel syndrome with stomach discomfort or pain and trouble with bowel movements, causing diarrhoea. The main cause of irritable bowel syndrome is stress and other illnesses.

Life style modifications

- Avoid eating junk food and foods that have preservatives and colouring agents.
- Physical exercises such as brisk walking and yoga can be done regularly.
- Following medical advice, if any health problems in addition to life style disorders.
- To avoid smoking drugs and drinking alcohol.
- To follow a healthy balanced diet rich in vitamins and proteins.
- 7 – 8 hours of sleep every day is required.

Summary

Health is a state of complete physical and psychological well being. Many other extended factors like microbes may cause illness to human body. Protozoans like *Entamoeba*, *Plasmodium* and *Leishmania* cause diseases such as amoebic dysentery, malaria and kala-azar respectively. Personal cleanliness and hygiene, proper disposal of waste, safe drinking water and immunization are very useful in preventing diseases. Drug and alcohol abuse of young and adolescent is another cause of concern. Addiction to drugs and alcohol is happening due to peer pressure, examination-related and competition-related stresses. The addicted person should receive proper counselling, education and professional medical help to liberate themselves from all forms of addiction.

Activities

Activity 1: Students examine the impact of microorganisms in our daily life and consider their applied potential. They can also conduct independent research and communicate their findings.

Activity 2: Students prepare wet mounts to observe the microbes found in curd.

Activity 3: The leader will blow bubbles at the group of students to demonstrate how some diseases can be air borne?

Activity 4: Which parasite acts as a transporter host for other parasites? Discuss

Activity 5: Your friends call you a “sissy boy” because you do not smoke or chew tobacco. What answer will you give? How will you prove your strength?

INTERESTING FACTS

1. Freezing does not kill bacteria; it only arrests their growth.
2. Antibiotics not only kill harmful bacteria, but also kill beneficial bacteria of our body.
3. UTI- Urinary Tract Infection is one of the most common bacterial infections affecting 150 million people each year worldwide.
4. World malaria day is on 25th April .
5. Iceland and the Faroe islands are the only countries in the world, where there are “No mosquitos” (Mosquito free countries).
6. VCRC- Vector Control Research Center is situated in Puduchery. WHO is collaborating with the Centre for Research and Training in Lymphatic Filariasis and

Integrated Methods of Vector Control.

7. Sterile insect technique (SIT)



The screw-worm fly was the first pest successfully eliminated from an area through the sterile insect technique, by the use of an integrated area-wide approach.

8. *Zika virus* could become a surgical weapon against brain cancer.



Evaluation



1. Malaria caused by *Plasmodium* is transmitted through-----
 - a) Air
 - b) Contact
 - c) Fleas on food
 - d) **Mosquito bites**
2. A 30 year old woman has bloody diarrhoea for the past 14 hours, which one of the following organisms is likely to cause this illness?
 - a) *Streptococcus pyogenes*
 - b) *Clostridium difficile*
 - c) ***Shigella dysenteriae***
 - d) *Salmonella enteritidis*
3. Which of the following disease is spread through droplet nuclei?
 - a) Tularemia
 - b) Listeriosis
 - c) **Chicken pox**
 - d) Mumps
4. Exo-erythrocytic schizogony of *Plasmodium* takes place in -----
 - a) RBC
 - b) Leucocytes
 - c) Stomach
 - d) **Liver**
5. The sporozoites of *Plasmodium vivax* are formed from -----
 - a) Gametocytes
 - b) Sporoblasts
 - c) **Oocysts**
 - d) Spores
6. *Poliomyelitis* which causes infantile paralysis enters the body through.....
 - a) Skin
 - b) Mouth and nose
 - c) Ears
 - d) **Eyes**
7. Amphetamines are stimulants of the CNS, whereas barbiturates are ----
 - a) CNS stimulant
 - b) both a and b
 - c) hallucinogenic
 - d) **CNS depressants**
8. Marijuana is extracted from
 - a) **Dried leaves and flowers of hemp plant.**
 - b) Ergot fungus
 - c) Roots of hemp plant
 - d) Cocoa plant
9. Choose the correctly match pair.
 - a) **Amphetamines - Stimulant**
 - b) LSD - Narcotic
 - c) Heroin - Psychotropic
 - d) Benzodiazepine - Pain killer
10. The Athlete's foot disease in human is caused by-----
 - a) Bacteria
 - b) **Fungi**
 - c) Virus
 - d) Protozoan
11. Cirrhosis of liver is caused by chronic intake of -----
 - a) Opium
 - b) **Alcohol**
 - c) Tobacco
 - d) Cocaine
12. The sporozoite of the malarial parasite is present in ----
 - a) **saliva of infected female *Anopheles* mosquito.**
 - b) RBC of human suffering from malaria.
 - c) Spleen of infected humans.
 - d) Gut of female *Anopheles* mosquito.
13. Haemozoin is
 - a) A precursor of haemoglobin.
 - b) A toxin from *Streptococcus*.
 - c) **A toxin from *Plasmodium* species.**
 - d) A toxin from *Haemophilus* species.
14. The drug synthesised from *Datura* is
 - a) **Hallucinogen**
 - b) Depressant
 - c) Stimulant
 - d) Pain killer



15. Where do the following events in the life cycle of *Plasmodium* takes place?

- a) Fertilization - _____
- b) Development of gametocytes - _____
- c) Release of sporozoites - _____
- d) Schizogony - _____

16. Match the pathogens with respective diseases caused by them and select the correct match using the codes given below.

		Codes			
I.	Leishmania donovani	-	1. Malaria	I	II III IV
II.	Wuchereria bancrofti	-	2. Amoebiasis	a) 1	4 2 3
III.	Trypanosoma gambiense	-	3. Kala – azar	b) 3	5 4 2
IV.	Entamoeba histolytica	-	4. Sleeping sickness	c) 3	5 2 4
			5. Filariasis	d) 1	4 3 2

17. Complete the following table

Diseases	Causative agent	Site of infection	Incubation period
Mumps			
Chicken pox			
Dengue fever			

18. List the causative agent, mode of transmission and symptoms for Diphtheria and Typhoid.

19. Compare and contrast bacillary dysentery and amoebic dysentery.

20. A patient was hospitalized with fever and chills. Merozoites were observed in her blood. What is your diagnosis?

21. (i) Write the scientific name of the filarial worm that causes filariasis.

(ii) Write the symptoms of filariasis.

(iii) How is this disease transmitted?

22. List the common withdrawal symptoms of drugs and alcohol abuse.

23. Complete the given table.

Diseases	Causative agent	Symptoms
Ascariasis	<i>Ascariasis</i>	
	<i>Trichophyton</i>	Appearance of dry, scaly lesions on various parts of the body
Typhoid		High fever, weakness, headache, stomach pain and constipation.
Pneumonia		

24. What is Kala-azar?

25. Why do you think it is not possible to produce vaccine against 'common cold'?



Human health and diseases

- Bacterial diseases**
 - Airborne diseases
 - Corynebacterium diphtheriae → Diphtheria
 - Streptococcus pneumoniae → Pneumonia
 - Contaminated food and waterborne diseases
 - Shigella → Bacillary dysentery
 - Salmonella typhi → Typhoid
 - Vibrio cholerae → Cholera
 - Vector borne diseases
 - Rat flea → Yersinia pestis → Plague
 - Contaminated soil borne diseases → Tetanus → Clostridium tetani
- Fungal diseases**
 - Candidiasis
 - Athlete's foot
- Protozoan diseases**
 - Contaminated food and water borne diseases
 - Entamoeba histolytica → Amoebiasis
 - Vector borne diseases
 - Female Anopheles mosquito → Plasmodium vivax → Malaria
 - Sand fly → Leishmania donovani → Kala-azar
 - Tsetse fly → Trypanosoma gambiense → Sleeping sickness
- Helminths diseases**
 - Contaminated food and water borne diseases
 - Ascaris lumbricoides → Ascariasis
 - Vector borne diseases
 - Wuchereria bancrofti → Filariasis
- Effects of drugs and alcohol**
 - Stimulants
 - Depressants
 - Narcotic
 - Cannabis
 - Hallucinogens
- Viral diseases**
 - Contaminated food and water borne diseases
 - Poliovirus → Poliomyelitis
 - Air borne diseases
 - Common cold → Rhinovirus
 - Mumps → Mumps virus
 - Measles → Rubella virus
 - Chicken pox → Varicella zoster virus
 - Vector borne diseases
 - Dengue fever → Dengue virus
 - Chikungunya → Chikungunya virus
 - Toga virus → Toga virus
 - Blood and other body fluids
 - Viral hepatitis → Hepatitis B virus