

Chapter 8: Diseases and Disorder

Communicable
Diseases



8.1 Communicable Diseases

Objectives:

- 1) **Describe how** communicable diseases are caused, spread and prevented.
- 2) **Identify causes**, treatments, and methods of prevention of some common diseases.

Definitions



8.1.1 Definitions

A communicable disease (infection) is **an illness that is caused by entry of pathogens into the body**. Pathogens (disease-causing organisms) are of six main types: **bacteria, viruses, fungi, protozoa, rickettsia, and parasitic worms**. They range in **size** from those that can be seen by the **naked eye**, e.g., *Ascaris* worms, to those that can only be resolved by the **electron microscope**.

Sources and
Spread of
Pathogens

8.1.2 Sources and Spread of Pathogens

Pathogens **may originate inside the body**, (endogenous infections, e.g., bacteria in the bowel causing urinary tract infection in the same person), **or outside the body** (exogenous infections). spread of pathogens in exogenous infections can occur by: 1-contact (person-to-person, e.g., by kissing and touching, or by using an infected person's toothbrush, clothes, or eating utensils, 2-air-borne spread, e.g., germ-laden mist from sneezing or coughing as in tuberculosis and droplet infections, 3-feecal contamination of food or drink, e.g., water pollution by sewage, or insects landing on sewage and then on food as in typhoid fever and dysentery, 4-transplacental spread from a pregnant mother to her fetus as in rubella, 5-from animal and their products, e.g., salmonellosis from poultry and eggs, through insects, e.g., malaria from mosquito bites, or through medical and nursing procedures, e.g., hepatitis B from a needle prick.

The Body's
Defenses
against
Infection

8.1.3 The Body's Defenses against Infection

Pathogens in exogenous infections must first penetrate the physical and chemical barriers between the body and the environment, such as unbroken skin and mucous membranes, hairs in the nose and mucus secretion by the airway, which trap inhaled microbes, and the antibacterial substances in sweat, saliva, tears, and the acid in gastric juice. If these barriers are penetrated, pathogens have still to avoid

being destroyed by antibacterial substances and the white cells both at the site of infection, in lymph nodes and in the blood. The immune system of the body produces specific antibodies that attach to the microbes and neutralize or kill them. These antibodies may remain in the body after the microbes are destroyed, giving a permanent immunity. Vaccination, i.e., introducing dead or weakened microbes into the body to stimulate the immune system to produce specific antibodies is another way to acquire immunity. Immunity may be passive, when preformed antibodies are given to a person at risk to prevent the development of infection, e.g., a tetanus shot when you are pricked by a rose thorn or a rusty nail.

Stages of
Diseases

8.1.4 Stages of Diseases

The **pathogen may overcome the body's defenses**. disease develops and generally passes through four stages: a- **the incubation stage** (the period from the time the pathogen enters the body until the first symptom appears), b- **the prodromal stage** (general symptoms of fever, fatigue, or irritability), c- **the acute stage** (symptoms characteristic of the disease appear, e.g., jaundice in virus hepatitis), d- **the recovery stage** (the immune system, with or without the help of medical treatment, gets the upper hand). The patient may be infectious to others in any of these stages.

Common
Communicable
Diseases
Cold

8.1.5 Some Common Communicable Diseases

Common cold Everybody gets the common cold and knows the symptoms: stuffy and running nose, watering eyes, headache...any of hundreds of different viruses can be responsible; a specific vaccine cannot be developed. The initial symptoms of influenza are similar to those of a cold, and since giving aspirin to children who have the flu may cause Reye syndrome (damage to the brain and/or liver), children who develop the cold should not be given aspirin; paracetamol works just as well without the risk of Reye syndrome.

Viral hepatitis

Viral hepatitis This illness is becoming a national health problem in Egypt, almost overtaking bilharzias is in this respect. There are three common types: **hepatitis A, hepatitis B, and hepatitis C**. **the first** is acquired by the feacal-oral route, is relatively innocuous in children and gives life-long immunity; it **can be serious in pregnant women and adults**; hepatitis A vaccine is available. Hepatitis B and C are more serious because they can lead to **chronic liver damage (cirrhosis) and liver cancer**.

They are spread by the blood (contaminated needles, surgical/dental instruments, toothbrush...), **saliva, and sexual intercourse** and through the placenta. A vaccine for active immunization and antibodies for passive immunity are available for **virus hepatitis B** and have decreased the incidence of the condition in high-risk populations. The usual presentation is with a Prodrome of fever and

flu-like symptoms followed by jaundice, i.e., yellowish discoloration of the eyes and skin, with tea-colored urine.

Sexually transmitted diseases

Sexually transmitted diseases Sexually transmitted diseases (STDs) are a serious health problem in permissive societies where sexual experiences are acquired early in life, often with multiple partners. **Gonorrhea** is one of the commonest STDs; pathogens do not survive easily and require intimate contact to spread from person to person. Males develop painful and frequent urination and a urethral discharge. Women are often asymptomatic, this increases the chance of complications - e.g., pelvic inflammatory disease and sterility -, as well as the possibility of unknowingly infecting sexual partners. **Syphilis, genital herpes, and Trichomoniasis** are other examples of STDs.

Aids is the scourge of modern times; it is basically incurable so far and has a high effect of **Mortality**; avoiding sexual promiscuity should help in controlling aids and other STDs; using condoms during sexual intercourse is of value but is not always successful. Persons who suspect that they have a STD should seek immediate medical help; their sexual partners also need medical attention.

Cardiovascular Diseases

8.2 Cardiovascular Diseases

Introduction



8.2.1 Introduction

Cardiovascular diseases, including coronary artery disease and stroke are among the most important causes of morbidity and mortality in advanced countries. Healthful behaviors and modification of risk factors reduce the mortality of these diseases. Some risk factors cannot be changed (advancing age, male sex, genetic predisposition). Modifiable risk factors include cigarette smoking, high blood cholesterol, high blood pressure, lack of exercise and obesity. Significant declines in cardiovascular disease mortality have been achieved by cessation of smoking, **control of cholesterol levels (LDL)** with statin drugs, aggressive control of hypertension and changing a sedentary lifestyle to an active one, even mild exercise is beneficial. Regular low-dose aspirin can also reduce the risk of myocardial infarction (heart attack). **Obesity (overweight)** is linked to hypertension, high cholesterol levels and diabetes. Being careful about the amount and type of foods consumed is important to control body weight; saturated fats (animal fats, e.g., red meats, butter, eggs, cream) are linked to high cholesterol; salt is linked to hypertension; both animal fats and salt should be reduced; vegetable oils, especially olive oil, are healthier. Stress is also linked to hypertension. It is important to check blood pressure frequently if you feel under stress.

Atherosclerosis **8.2.2 Atherosclerosis**

Atherosclerosis is the basis of most cardiovascular diseases. The arteries are clogged by fatty deposits called plaques. The arteries harden; the heart must pump harder to move the blood through the narrowed arteries, blood pressure rises. Plaque build-up can cause complete obstruction of the artery by a thrombus (a clot), this stops blood flow. When this happens in the arteries of the heart (the coronary artery), a heart attack results (myocardial infarction). A thrombus or plaque may break away within the artery and forms an embolus (a moving clot). This can obstruct another artery and cause gangrene of limbs or organs supplied by the obstructed artery, leading to amputation of the limb or even death of the patient. Angina pectoris is the chest pain that results when the heart has to pump more blood but cannot itself receive more blood because the coronary arteries are narrowed by atherosclerosis.

A stroke results from sudden interference with blood flow through the brain. This may be due to a thrombus, an embolus, or a cerebral hemorrhage due to rupture of a blood vessel secondary to hypertension or a ruptured aneurysm (a dilatation of an artery to form a blood-filled pouch).

Cancers

**8.3 Cancers****What is cancer?**

Cancer is a disease characterized by abnormal, uncontrolled growth of cells to form a lump (tumor), and spread of the abnormal cells to other areas of the body to form secondary tumors (metastasis).

Causes of cancer

Causes of cancer

Normal growth and division of cells is controlled by genes in the DNA of the cell nucleus. During cell division, another copy of the DNA is produced for the new daughter cell. Some genes are called tumor suppressor genes; they normally prevent cancerous growth. Other genes are called proto-oncogene. When cells reproduce, an error (mutation) may occur during the copying of genetic material. A mutation in a tumor suppressor gene would cancel its tumor suppressor function. A mutation in a proto-oncogene would turn it into an oncogene, which stimulates tumor growth.

The risk of mutations is increased by carcinogens, e.g., cigarette tar, hydrocarbons from automobile exhaust, asbestos, exposure to ionizing radiation, or the mutation may occur on a hereditary basis.

Types of
cancer

Types of cancer

Cancer can arise from any cell in the body. Breast cancer is common in women and most commonly present as a lump in the breast. Lung cancer is related to smoking and has overtaken breast cancer as the leading cause of cancer deaths in women.

Skin cancers are collectively the most common type of cancers; the most aggressive type is melanoma. Exposure to sunlight is the main cause. Leukemia (cancer of blood cells) is the most common form of cancer in children.

Early detection
of cancer



Early detection of cancer

Cancer may be curable if detected early before it has spread to other body parts, as shown in Table 8.1.

Awareness of warning signals and screening may help detect cancer early

Warning signal can be remembered by the acronym “caution”

Change in bowel or bladder habits

A sore that does not heal

Unusual bleeding or discharge

Thickening or lump in the breast or elsewhere

Indigestion or difficulty in swallowing

Obvious change in the size of a mole or wart

Nagging cough or hoarseness

Screening may vary from procedures done by persons, e.g., regular self-examination of the breast or the testis for a lump, to medical examinations and tests, e.g., digital rectal examination and serum prostate specific antigen (PSA) for cancer of the prostate in males over age 50, and mammography in women over age 50 every year.

Table 8.1: Some Risk Factors and Preventions for Specific Cancers

Type of cancer	Uncontrollable risk factors	Possible prevention
Breast	Age>50 personal or family history	Monthly self-examination
Colon and rectum	personal/family history polyps in colon /rectum	Diet low in beef and high in fibre. regular examination at age 50 and over
Leukemia	Possible inherited susceptibility	Avoid exposure to radiation and chemical such as benzene
Lung		Avoid smoking and exposure to industrial substances such as asbestos
Skin	Having a fair complexion	Avoid excessive exposure to the sun
Testicular		Monthly self-examination
Uterine neck		Pap smear