

Epidemiology

Dr Hameed Othman

Lec. 4

Epidemiology of Diseases Communicable Diseases and Non- Communicable Diseases

Learning Objectives for the Lecture:

At the end of the lecture the student is going to be able to:

1. Define communicable and non-communicable diseases.
2. Describe the chain of infection.
3. Describe the links in the chain of infection.

Communicable Diseases

Communicable Diseases: They are diseases that spread by direct contact from infected person to a susceptible host.

Chain of infection: Series of events or conditions that lead to the development of communicable diseases.

Links in the chain are; the infectious agent (Pathogenic Microorganism), the reservoir, the agent's portal of entry, the mode of transmission of the agent, a susceptible host, and the agent's portal of exit.

Pathogenic Microorganism:

The species capable of causing human disease are termed pathogens or Pathogenic Microorganism. There are five basic categories of biological etiologic agents: Protozoa, Metazoan, Bacteria, viruses and fungi.

Factors that enhance their capabilities to cause disease vary among the categories of biological agents as well as between members of any single category; this is according to their characteristics.

Characteristics of the infectious agent:

1. Morphology: Color, shape and size
2. Spores: The ability to produce capsules in order to survive.
3. Life cycle: The nature of life that the agent spends in the host body.
4. Viability: The ability to survive.
5. Pathogenicity: The ability to cause a disease and create pathological changes in the host body.
6. Virulence: The severity and damage that is created to the host tissue.
7. Infectivity: the ability to have access to the host system
8. Tissue selectivity.
9. Host selectivity.
- 10 Toxicity: the ability to produce toxin.

Reservoir: The natural habitat, in which an agent lives, grows and multiplies.

Types of Reservoirs:

1. Human: persons with symptomatic illness, or may be unapparent or chronic carriers.
2. Animals - cows, pigs, sheep, raccoons, bats, dogs, cats, birds, rodents etc.
3. Environmental - plants, water, food and soil.

Modes of Transmission:

It is the means by which the infectious agent which cause the disease transferred to a susceptible host.

Types for Modes of Transmission:

1. Air-borne transmission: The infectious agent is present in the air and inhaled (inspired) by susceptible host during respiration. Ex. Measles.
2. Feco-oral transmission. Ex. Hepatitis A, Salmonella.
3. Skin to skin contact. Ex. Dermatological diseases and STDs.
4. Transmission by direct inoculation, transmission through blood. Ex. AIDS, Hepatitis B, C and D.
5. Transmission by vectors. ex. Scabies, Malaria.

Portal of Entry: The means by which an infectious agent invades the host. This may include the respiratory tract, ingestion, dermal, blood borne, mucous membranes, etc.

Incubation period: It is the time between the entry of the infectious agents and the occurrence of clinical features.

Benefits of the incubation period:

1. Clinically for diagnosis and treatment.
2. Epidemiologically for preventive and therapeutic measures.
3. Administratively for budget, planning, implementation, and evaluation.

Non-communicable Diseases

Non-communicable (Infectious) Diseases: are those diseases that are not caused by a pathogen and cannot be shared or transferred from one person to another.

Causes of Non-Communicable Diseases:

1. The environment.
2. Nutritional deficiencies.
3. Lifestyle choices.
4. Genetic inheritances.

Unlike communicable diseases, non-communicable diseases are not communicable or contagious, although some kinds can be passed down genetically to the children of a carrier.

Examples of non-communicable include: ■

1. Many types of cardiovascular disease.
2. Chronic obstructive pulmonary disease caused by smoking tobacco.
3. Diabetes mellitus type 2 .
4. Lower back pain caused by too little exercise.
5. Malnutrition caused by too little food, or eating the wrong kinds of food (e.g. Scurvy due lack of Vitamin C).
6. Skin cancer caused by radiation from the sun.

Characteristics of Non- Infectious Agents:

1. The extent to exposure to the agent (Infective dose) affects the ability to cause a health problem. EX. Alcohol, stress.
2. Infectivity of the agent (Asbestos, stress).

3. Pathogenicity (stress has low pathogenicity).
4. Virulence (stress-from mild stomach upset to suicide).
5. Chemical composition (poisoning).
6. Latency period.

