



Al-Mustaqbal University / Nursing College
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Epidemiology



Lecture 5

Epidemiology of communicable diseases

By

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- **Communicable disease:** An illness due to specific infectious agent or its toxic products which develops through transmission of that agent or its toxic products from a reservoir to a susceptible host either directly or indirectly.
- examples of diseases include urinary tract infection, food and water- borne disease, and Lyme disease.

- **Contagious disease (infectious disease):** - capable of spreading from one person to another.
- examples of contagious diseases are chickenpox, malaria, flu, and pertussis.

Difference Between

Communicable



Contagious



Incubation period

- The interval between exposure and first clinical manifestation.
- The time between exposure and first case is the minimum incubation period.
- The time between exposure and the last case, maximum incubation period.

- **Communicable period (period of communicability)** The time interval during which an agent may be transferred directly and indirectly from a host to another.

Signs and symptoms of infectious diseases:

The signs and symptoms of an infectious disease vary greatly, depending on the pathogen that caused the infection.

➤ **Fever** and **fatigue** are common symptoms, but infections can cause a wide range of symptoms, ranging from mild to severe and sometimes life-threatening (very severe).

Direct mode of transmission

- If a certain person gets infected in the presence of the reservoir,
- i.e. the organism jumps from one host to another without any intervening period, then the transmission is said to be direct.

1. Person to person contact:

- The organism spreads by contact with breached (broken) epithelium,
- most sexually transmitted diseases can also be transmitted by any kind of contact.

2. Droplets

- Droplets micro particles of respiratory secretions, which, when coughed or sneezed out, are blasted into air with high velocity and inhaled by anyone nearby.
- Most respiratory infections (diphtheria, tuberculosis) are spread by droplets.
- infections are difficult to control in an overcrowded population.

3. Contact with soil

contact may be deliberate (putting soil or cow dung over the cord stumps of newborns, which introduces the tetanus bacilli) or accidental (carrying out deliveries over an unclean surface)

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- Farmers who walk bare feet in open field are infested by hookworms through their feet.

4. Inoculation in anybody fluid:

This gives the organism the most direct access to circulatory system.

For example, hepatitis B and HIV are secreted in all body fluids and if the body fluids of a patient (blood/ serum/ CF/ saliva/ semen/ vaginal secretion).

Trans placental:

5. The blood of fetus and mother are separated throughout the pregnancy except during labor, when the two get mixed, and some organisms can infect the fetus from mothers blood during this period (HIV, hepatitis B).

However, some organisms can cross the placental barrier in early pregnancy resulting in fetal malformation or abortion (rubella, chickenpox).

Indirect mode of transmission:

It implies a stage of external survival of the agent between two hosts, so that it can infect a person sometime after the reservoir is gone from the site.

The methods of indirect transmission are :

1- Vehicle Inanimate objects

carrying the organism around (i.e. water, food, blood). Often a vehicle is responsible for a point source epidemic,

for example, a certain contaminated water source causing diarrhea in everybody who drank it .

Example **Cholera, Typhoid. Hepatitis A**

2- Vectors

An intermediate organism which transports a micro-organism between two hosts.

Examples include

- Man—mosquitoes—man (malaria)
- Rat—flea—man
- Man—sand fly—man (leishmaniasis).

3- Airborne route

- A - Droplet nuclei
- the residue of dried droplets that may remain suspended in the air for long periods, may be blown over great distances, and are easily inhaled into the lungs and exhaled.
- e.g. the droplets sneezed out by an influenza or CORONA virus patient into his bed, remains infective.

B - **Dust** :carries with it the **Streptococcus** bacilli, fungal spores, and tuberculosis bacilli; because dust is a frequent cause of nosocomial infections.

hospitals advise wet mopping of the floors rather than dusting with a broomstick.

4- **Fomites**: are any inanimate object except food and water (like clothes, utensils and personal belongings of a patient) that bear germs and spread the disease.

5- **Fingers** The importance of clean hands can not be overstated

The factors that affect indirect transmission are:

1. **Viability of the agent**—How long can it survive without any host to sustain it?
2. **Virulence of agent**—How dangerous can it still remain after the period of external survival?
3. **Environment**—Is the environment suitable for survival of the organism?

The general strategies to control communicable diseases:

1. **Elimination source of infection** : by effective detection and treatment of cases and carriers or dealing with any other source.
2. **Interruption of transmission path ways**: for example by the destruction of intermediate hosts, destruction of breeding sites and purification of water.
3. **Improvement of host resistance or immunity** against infection as for example by immunization

Big Thanks

