

Introduction to Infectious diseases

Diseases may be defined as an alteration of the state of the body, or some organs, which disturbs the proper performance of the bodily functions.

Infectious diseases : are the diseases caused by living agents , and can be transmitted from infected animal to others by **direct and/or indirect methods**.

Contagious diseases : are **highly infectious** diseases which could transmitted from infected animal to others by **direct and indirect methods**.

Note : "all contagious diseases are infectious but not all infectious diseases are contagious".

Occurrence of Infectious Diseases According to Rate of Infection

Infectious diseases occur in four patterns :

1. Endemic occurrence : which means the constant presence of a disease in a population. e.g. brucellosis in Iraq

When a disease is continuously present to a high level, affecting all age groups equally, it is called **hyperendemic**.

2. Epidemic occurrence : is sudden ,usually unpredictable, increase in the number of cases of an infectious disease in a population. e.g. ephemeral fever.
3. Pandemic occurrence : is a wide spread epidemic that usually affects a large proportion of the population. many countries may be affected. e.g. rinderpest and FMD.
4. Sporadic occurrence : is irregular and haphazard occurrence of a disease, which occur locally. e.g. Actinobacillosis.

Measures of Disease Occurrence

- * Morbidity rate : is the amount of disease in a population (commonly is defined in terms of incidence or prevalence).
- * Mortality rate : is the amount of deaths in a population.
- * Case fatality rate : is the proportion of diseased animals that die of a disease. It is therefore, a measure of the probability of death in diseased animals.
- * Prevalence (P) : is the number of affected animals in a known population, at a designated time, without distinction between old and new cases. Thus, annual, monthly and lifetime prevalence can be described.

$$P = \frac{\text{number of individuals having a disease at a particular point of time}}{\text{number of individuals in the population at risk at that point of time}}$$

* **Incidence** : is number of new cases that occur in a population over a period of time.

Incidence rate is the usual measure of incidence :

$$I = \frac{\text{number of cases of disease that occur in a population during a particular period of time}}{\text{over all individuals of the length of time at risk of developing disease}}$$

Causes of infectious diseases

The causes of the infectious diseases are living agents such as viruses, bacteria, mycoplasma , etc.

These agents cause the disease by living in, or on surface of, the body of the host leading to damage to the cells and tissues and interference with the physiological function of the tissues or organs.

Robert Koch was formulate his postulates to determine the cause of infectious disease. These **postulates** state that an organism is causal if :

1. It is present in all cases of the disease.
2. It does not occur in another disease
3. It is isolated in pure culture from an animal, is repeatedly passage, and induce the same disease in other animals.

**There are many to factors related with the infectious agents cause diseases include :

- 1) Virulence : is the degree to which the infectious agent cause disease .
more virulent bacteria cause more severe disease.
- 2) Number of the causative agent : some bacteria like *Mycobacterium* and *Bacillus* cause the disease by a small number while, other like *Salmonella* need large numbers of bacteria to cause the disease.
- 3) Portal of entry : if there is only one or two ways of entry into the body, the chance of occurrence of the disease is less While, if there are more than ways the chance is more.

- 4) Infective stage: some microorganisms need to develop inside or outside the host to acquire the ability to inducing the disease.
- 5) Production of disease by more than one strain: if there are more than one strain or species of the microorganisms have the ability to making the same disease, the disease become more severe.
- 6) Establishment of the organism into the body: if the causative agent is more stable in the body , it induce more severe disease.

Spread of the diseases

There are two factors essential to complete the spread of the diseases :

- * Transfer of the causative agent to new host directly or indirectly.
- * Establishment of the disease in the host.

Methods of Control infectious diseases

1. Restriction of the source of infection.
2. Restrict movement of animals and animal products.
3. Dispose of the infected materials.
4. Dispose of infected and in contact animals.
5. Reduce the exposure to the causative agent by housing, management and prophylactic treatment.
6. Control biological .
7. Increment resistance of the host by :
 - a) Vaccination, colostrum for neonates and hyperimmune serum .
 - b) Selection of resistant breeds.
 - c) Provide better management and diet.