

Concept and investigation of epidemic

Objectives

Students have to know about :

- 1- Concept of epidemic .
- 2- Causes of epidemics .
- 3-Dynamics of epidemics .
- 4- Types of epidemics.

Epidemic

Definition: The occurrence of an illness, in the community or region, in clear excess of normal expectancy and the cases are related to each other and derived from a common or propagated source. Alternatively, it may be defined as a substantial increase in the incidence rate of a disease in a specified population or region over a specified period of time.

The term **excess** means that a public health emergency is created which needs urgent action. A single case of smallpox anywhere in the world is considered as an epidemic, because the normal expectancy of smallpox is zero.

Causes of epidemics:

- 1-Introduction of a new disease agent into a susceptible population.
- 2-Deterioration of environmental conditions.
Such deterioration may facilitate disease agent transmission and reactivation of an already existing agent or agents.
- 3-Change in population immunity with increased susceptible pool.
- 4-Any combination of the above factors.

Dynamics of epidemics

Two factors determine the shape of an epidemic pattern:

- 1-The relative frequency of the incubation periods of reported cases.
- 2- The duration of exposure to the source of infection.

Types of epidemics

Common source: which is either **point** source •
(the exposure to a single source of disease is brief and simultaneous and all the resultant cases develop within one incubation period (they all develop between the minimum and maximum incubation period))

extended source (the exposure is also to a single •
source but it extends for a time and the resultant cases continue to appear beyond one incubation period.)

Propagated source In this type a serial •
transmission of cases takes place until
susceptible are exhausted or control measures
are in effect .

Relevant concepts

Outbreak: an acute short epidemic such as an outbreak of food poisoning.

Pandemic: An epidemic which involves more than one country.

Endemic: The constant presence of a disease or its causative agent in a defined geographical area. An endemic disease may show epidemic waves every now and then. Measles for example is an endemic disease in many populations with epidemics every 3-4 years. Immunization against measles, of course, has modified very much such pattern.

Investigation of an epidemic

1. Verification of the diagnosis. It is important to make sure that the cases under investigation are definite cases of that disease. This is done by careful history, physical examination and relevant laboratory investigation. For example, blood culture in typhoid fever is very reliable diagnostic method.
2. Confirmation of the existence of epidemic (excess cases above normal expectancy). This is ascertained by comparing the reported cases at the time of the epidemic with cases reported in previous months or years.

3. Identification of the affected cases and their characteristics.
This is important because, it may help to identify a common experience or exposure of the cases and thus to facilitate the identification of source of epidemic.
4. Further investigation of the population at risk, contacts, carriers and hidden cases.
5. Study of the environment to identify factors which are likely to be related to the epidemic. Search for any change in the environment at or immediately before the onset of the epidemic.
6. Formulation of hypotheses about the epidemic regarding source of infection, mode of transmission and existence of reservoir of infection and carriers.

7. Management of the epidemic. This includes:
- a. Treatment of cases and carriers.
 - b. Protection of high risk and susceptible persons
immunization and chemoprophylaxis
 - c. Writing a report about the epidemic.
 - d. Continuous surveillance to prevent
future epidemics.
 - e. Experimental verification of agent of the disease
and mode of transmission.

Quiz

1- Define :

Epidemic , outbreak , pandemic , endemic

2- Numerate :

❖Types of epidemics

❖Systematic method to investigate an epidemics

Thanks