First Lecture

Introduction to Epidemiology

Learning Objectives for the Lecture:

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

1. Fundamental of epidemiology (history & development).
2. Definition of epidemiology.
3. Purpose of epidemiology.
4. List the uses of epidemiology.
5. Risk, risk factors, relative risk and causality.

Definition of Epidemiology :

The World Health Organization (WHO) defines epidemiology as a branch of medicine that relates to the study of the incidence, distribution, and possible control of disease or determinants of health. Or

Epidemiology is the study of the distribution of disease and its impact upon a population .

study:

Epidemiology is the basic science of public health.

Distribution :means the presentation of frequency of events within groups in a population.

(**Determinants**: **Are risk factors and (Health-related states) causes of health problem.**

Determinants in epidemiology are factors or causes that can increase or decrease the likelihood of developing disease according to:
- environmental problems,
- behavioral problems, and
- infectious disease.

<u>Population</u> : Is one of the most distinguishing characteristics of epidemiology as a science that deals with groups of people.

<u>Control</u> : Public health decision making and aids in developing and evaluating interventions to control and prevent health problems.

What is Epidemiology?

• They systematically gather information about what happened—

 Who is sick? affected persons.

 What are their symptoms? for the problem,

When did they get sick? for the time,

Where could they have been exposed to the illness? for the place

Using statistical analysis, investigators study the answers to these questions to find out how a particular health problem was introduced into a community.

Disease detectives then use what they have learned to prevent further illness.

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For example, when in 1993 more than 200 people in Washington State developed similar gastrointestinal symptoms, investigators traced the illnesses to undercooked hamburgers from a fast-food chain. Warnings to cook beef until it is no longer pink halted the outbreak and prevented further transmission.

Epidemiologist study the variation of disease in relation to **age, sex, race, occupational and social characteristics, place of residence, susceptibility, exposure to specific agents** or other pertinent characteristics.

Three essential components

1. **Disease frequency**:

how many cases of the condition occur over a given time period?

2. Disease distribution:

how are cases of the condition of interest spread across a population differently by gender, age, geographic location, socio-economic status.

3. **Disease determinants:**

What risk factors are associated with the appearance of a disease or condition?

Purpose of Epidemiology:

The primary purpose of epidemiology is to provide a basis of data for developing strategies of diseases control and prevention.

Epidemiology and Public Health

Public Health:

The science and act of :

1- Preventing diseases.
2- Maintenance health.
3- Promoting health.

• Public health is community health.

Uses of Epidemiology:

1. Identify risk factors and causes for health problems.

2. Identify (investigate) the natural history of health conditions .

3. Intervention for controlling health problems.

4. Evaluate the effectiveness of those interventions.

Causality : refers to the relationship between a cause and its effect. A purpose of epidemiologic study has been to discover causal relationships, so as to understand why conditions develop and offer effective prevention and protection**.**

Causality is based on the idea that one event is the result of other events

1. Religious Era (2000-600 B.C.): Disease is caused by divine intervention, as

   a punishment of or sins or test of faith.

2. Environmental Era (400 B.C.): Disease is caused by harmful miasma , or

   other substances in the environment.(pollution, waste, toxic and hazardous substances,)

3. Bacteriologic Era (1870-1900): Disease is caused by specific bacteriologic agents.

4. Multiple Causation Era (1900 to present): Disease is caused by interaction of multiple factors. e.g poisoning, burning, cancer.

 Risk: The probability of developing a health problem.

Risk Factors: Variables that influences population' health status and cause a health problem.

Population at **Risk**: Groups of people who have the greatest potential and susceptibility to develop health problems due to the presence or absence of certain contributing factors.

The Epidemiological Triangle Model

The Host

   A host is a susceptible human.

The Agent

 An agent is a factor whose presence or absence can contribute (cause) to a health problem.

Types of Agents:

1. **Biological agents**: Including viruses, bacteria, fungi , and worms.

2. **Chemical agents**, chemical substances like ..lipids, gases, dust .

3. **Physical agents**: noise , temperature , weather, radiation, freezing

4. **Nutritional agents**: These are chemicals in nature but they are basic dietary components.

5. **Psychological agents**: Any events that produce **stress** leading to health problem.

The Environment

It refers to all external factors surrounding the host that constitute the context in which he lives and influence the host-agent interaction that may cause a health problem.

Types of Environments:

1. **Physical Environment**: Physical factors which include, air, water,

   buildings, temperature, and humidity.

2. **Biological Environment**: All living beings.

3. **Social Environment**: Social, cultural and economic influences.