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(1)

Define Epidemiology and explain its main objective

Epidemiology is the study of how diseases and health-related conditions are distributed and what factors influence their occurrence in populations.

The main objectives of epidemiology are:

1. To identify the causes of diseases — determine factors that increase or reduce the risk of illness.

2. To describe the distribution of diseases — study how diseases vary by person, place, and time.

3. To predict disease occurrence — estimate future trends or outbreaks.

4. To control and prevent diseases — develop strategies to reduce the spread and impact of health problems.

5. To evaluate health programs and interventions — assess the effectiveness of public health policies and preventive measures.

(2)

Differentiate between descriptive and analytical epidemiology providing one example of each

Descriptive epidemiology describes the who, where, and when of disease occurrence — e.g., a study showing malaria is common in rural areas.

Analytical epidemiology explains the why and how of disease occurrence — e.g., a study linking stagnant water to malaria infection.

(3)

Discuss the components of the epidemiologic triangle and how they interact in the spread of an infectious disease

The epidemiologic triangle has three components:

1. Agent – the cause of disease (e.g., bacteria, virus, parasite).

2. Host – the organism that can get the disease (e.g., humans, animals).

3. Environment – external factors that affect the agent and host (e.g., climate, sanitation).

Interaction: Disease occurs when a susceptible host and an infectious agent meet in a favorable environment that allows transmission and infection.

(4)

Explain the concepts of determinant in epidemiology and give two examples of biological and environmental determinant

In epidemiology, a determinant is any factor that influences the occurrence, distribution, or severity of a health condition or disease.

Biological determinants: factors within living organisms that affect health.

Examples: age, genetic makeup, immune status.

Environmental determinants: external conditions that impact health.

Examples: poor sanitation, polluted water.

(5)

Describe the three levels of prevition In public health and provide a real life examples of each

The three levels of prevention in public health are:

1. Primary prevention – Aims to prevent disease before it occurs.

Example: Vaccination against measles.

2. Secondary prevention – Detects and treats disease early to stop progression.

Example: Screening for high blood pressure to prevent heart disease.

3. Tertiary prevention – Reduces complications and improves quality of life after disease occurs.

Example: Rehabilitation for stroke patients.

(6)

How did John snow contribute to the development of modern epidemiology ? Describe the method he used during the cholera outbreak

John Snow's contribution:John Snow is known as the father of modern epidemiology. He demonstrated that cholera was spread through contaminated water, not by "bad air," helping to establish the link between environment and disease transmission.

Method he used:

During the 1854 cholera outbreak in London, Snow:

1. Mapped cholera cases around the Broad Street water pump to show the concentration of illness.

2. Collected data on where affected people got their drinking water.

3. Identified the source — the Broad Street pump — as the infection point.

4. Removed the pump handle, which led to a decline in cases, proving his hypothesis.

This systematic investigation laid the foundation for epidemiologic methods like data collection, mapping, and hypothesis testing.

(7)

Compare and contrast incidence and prevalence .why is it important to understand both when studying a disease like diabetes?

Incidence measures new cases of a disease over a specific time, while prevalence measures all existing cases (new and old) at a given time.

Understanding both is important for diseases like diabetes because:

Incidence shows how many new people are developing the disease (risk).

Prevalence shows how widespread diabetes is (burden).

Together, they help plan prevention, treatment, and healthcare resources.

(8)

What are the common types of epidemiological study design and how does cohort study differ from a case control study

Common types of epidemiological study designs:

1. Descriptive studies – describe disease patterns (e.g., case reports, cross-sectional studies).

2. Analytical studies – identify causes and risk factors (e.g., case-control and cohort studies).

3. Experimental studies – test interventions (e.g., randomized controlled trials).

Difference between cohort and case-control studies:

Case-control study: Compares people with a disease (cases) to those without it (controls) to find past exposures.

Used for: studying rare diseases or diseases with long latency periods.

Cohort study: Follows groups with and without exposure over time to see who develops the

disease.

Used for: studying causes and incidence of common diseases or when exposure is rare.

(9)

Define and differentiate between relative risk (RR)and odds ratio(OR) including when each is typically used

Relative Risk (RR): The ratio of disease risk in the exposed group to the risk in the unexposed group.

Used in: Cohort studies and clinical trials (where incidence can be measured).

Odds Ratio (OR): The ratio of the odds of exposure among cases to the odds among controls.

Used in: Case-control studies (where incidence cannot be directly measured).

Difference:

RR measures the actual risk of developing disease from exposure.

OR estimates the likelihood of exposure among cases vs. controls — often used when RR cannot be calculated.

(10)

Explain the roles of epidemiological surveillance in managing public health.How can it help

Epidemiological surveillance is the continuous, systematic collection, analysis, and interpretation of health data essential for planning, implementing, and evaluating public health practices.

Role in managing public health:

1. Early detection of outbreaks – helps identify and control diseases before they spread widely.

2. Monitoring disease trends – tracks changes in disease patterns over time.

3. Guiding public health actions – provides data for decision-making and resource allocation.

4. Evaluating interventions – measures the effectiveness of prevention and control programs.

5. Informing policy – supports the development of evidence-based health policies.

In short: Surveillance helps detect, prevent, and control diseases, protecting communities and improving overall public health response.