

UNIVERSITY COLLEGE HOSPITAL (UCH) IBADAN

DEPARTMENT: SCHOOL OF COMMUNITY HEALTH

COURSE: PRINCIPLE OF COMMUNICABLE DISEASE AND EPIDEMIOLOGY

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LEVEL:300LEVEL

TEST

1. Define Epidemiology and explain it's main objective

Epidemiology can be defined as the branch of medical science that studies the distribution and determinant of health related state or event in a specified population, and the application of this study to the control of health problems. It is considered as the cornerstone of public health and serves as fundamental discipline for understanding disease pattern, causes and preventive measures.

It's main objective are :

- a To describe the health status of population:- By identifying patterns and frequency of disease (Who, Where,and When).
- b. To identify causes of disease:-By investigating determinat or risk for disease.
- c. To predict the occurrence of disease:-By estimating risk and forecasting future health trends.
- d. To control and prevent diseases:-By informing public health policies, intervention and health promotion strategies.
- e. To study the natural history and progression of disease:-Track how diseases develop and progress without treatment, and what outcomes result.

2. Differentiate between Descriptive and Analytical Epidemiology providing one example of each.

.a. Descriptive Epidemiology:- This focus on What,Who, Where and When and also describe the pattern of disease occurrence and tools. Example, Case report.

b Analytical Epidemiology:- This focus on Why and How disease occur. It also involve test hypothesis about relationship between exposure and outcome, cases and control, exposure and unexposure. Example,Case control studies.

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

The Epidemiologic Triangle:

The epidemiologic triangle is a model used to explain how infectious diseases spread and what factors influence their transmission. It consists of three key components:

1. Agent
2. Host
3. Environment

1. Agent

The agent is the cause of the disease. In infectious diseases, it is usually a pathogen, such as:

Bacteria (e.g., *Mycobacterium tuberculosis*)

Viruses (e.g., influenza virus)

Parasites (e.g., *Plasmodium* causing malaria)

Fungi (e.g., *Candida*)

Role in spread: The agent must be present and virulent enough to infect the host. Mutations or antibiotic resistance can make an agent more harmful.

2.. Host

The host is the organism (usually human) that can become infected.

Factors that influence host susceptibility include:

Genetics

Immunity (natural or acquired)

Nutrition

Age

Chronic conditions (e.g., diabetes, HIV)

Role in spread: A susceptible host allows the agent to invade, multiply, and cause disease. Strong immunity or vaccination can block the spread.

3. Environment

The environment includes external factors that affect both the agent and the host.

Examples:

Climate and weather

Living conditions (e.g., overcrowding)

Sanitation and hygiene

Vectors (e.g., mosquitoes for malaria)

Role in spread: The environment can promote or hinder the survival of the agent and the interaction between host and agent.

Infectious disease outbreak

Example: Malaria

Agent: Plasmodium parasite

Host: Uninfected human, especially with low immunity

Environment: Warm, stagnant water for mosquito breeding; poor mosquito control.

Their Interaction:

- a. The agent must be present for the disease to occur but its ability to cause disease depends on the host and environmental factors.
 - b. The host provides the environment in which agent can live, reproduce, and possibly be transmitted to others.
 - c. The environment determines whether the agent can survive, reach the host and whether conditions support transmission.
4. Explain the concept of determinant in epidemiology and give two examples of biological and environmental determinants.

Determinant:- These are factors or exposure that increases or decreases the risk of disease

In epidemiology, a determinant is any factor—whether biological, environmental, social, behavioral, or economic—that influences the occurrence, distribution, or severity of health-related events (such as diseases or conditions).

Determinants help explain why some people get sick while others do not. They are essential for identifying causes of diseases, targeting prevention strategies, and shaping public health interventions.

Determinants can be:

Causal (directly responsible for disease)

Contributory (influence risk but not directly causal)

Protective (reduce the risk of disease)

Two examples of Biological Determinant: Genetic predisposition, Immune system

Two examples of Environmental Determinant: Poor sanitation, Climate condition.

5. Describe the three levels of prevention in public health, and provide a real life example for each.

. a. Primary Prevention:- This prevent the onset of disease before it occurs. A real-life example is vaccination against measles.

b . Secondary Prevention:- This is to detect and treat disease early to halt or slow it's progression. A real-life example is mammography for breast cancer screening

c. Tertiary Prevention:- This target individual who are already diagnosed with disease. A real-life example is therapy for stroke patients.

6. How did John snow contribute to the development of modern epidemiology, describe method he used during the cholera outbreak.

John Snow contributed to the development of modern epidemiology by investigating a cholera outbreak in London and trace its source to a contaminated water pump.

The method John Snow used was early forms for mapping and statistical analysis.

Method Used During the 1854 Cholera Outbreak

John Snow used several investigative steps that mirror modern epidemiological methods:

1. Observation

Snow noticed that cholera cases were concentrated in certain areas of Soho, London.

He hypothesized that the source of infection might be contaminated drinking water.

2. Mapping (Spot Map)

He created a dot map showing the location of cholera deaths.

The map revealed a cluster of cases around the Broad Street water pump.

3. Data Collection

Snow went house to house to gather data about water sources people were using.

He noted that people who drank from the Broad Street pump had much higher cholera rates.

4. Comparative Analysis

He compared groups exposed to different water sources:

Workers in a nearby brewery who only drank beer had almost no cases.

Nearby residents using other water pumps were less affected.

5. Intervention

Snow convinced local authorities to remove the handle of the Broad Street pump.

After the pump was disabled, cholera cases declined, supporting his theory.

7. Compare and contrast Incidence and Prevalence, why is it important to understand both when studying a disease like diabetes.

Incidence:- This is the number of new cases of a disease in a population over a specified time

Prevalence:- This is the total of existing case(new and old) of a disease in a population at a given time.

Why is it important to understand both incidence and prevalence when studying a disease like diabetes.

Incidence. It helps track how many new cases of diabetes are emerging

It reveals whether the disease is spreading, stabilizing or declining in the population

It also helps identifying new risk factors,,for example, diet, physical inactivity, obesity.

Prevalence:- it shows total number of people living with diabetes including both diagnosed and long standing cases.

This help to understand the current burden on the health care system and society,it means more resources are needed for treatment, monitoring, education and complication management.

8. What are the common types of epidemiological study designs, and how does a cohort study differ from a case control study.

a. . Observational Studies:- Here there is no intervention, researcher observe natural/ outcome pattern. Example are Cohort study, case control study, criss sectional study

b. Experimental Studies:- Researcher assign exposure intervention. Example are Randomized controlled trials, field trials, community trials.

Different between Cohort study and Case control study

Cohort study

It starts with exposure and follows people over time and sees who develop the disease.

Example are:

* It starts with a group of smokers and non-smokers

*It follows them for 10years

*See who develop lungs cancer

While

Case control study

It starts with disease and look back to see what exposures people had.

Example are

*It starts with people who have lung cancer (case) and people who don't (control)

*Ask both groups about their past smoking habit.

9. Define and differentiate between Relative Risk (RR) and Odds Ratio (OR) including when each is typically used.

a Relative Risk(RR):- this is ratio of the risk (incidence) of an outcome (e.g disease) in the exposed group to the risk in the unexposed group.

While

b. Odd Ratio is the ratio of the odds of exposure in cases (those with the disease) to the odds of exposure in controls (those without the disease)

Different between Relative Risk (RR) and Odds Ratio (OR)

Relative Risk (RR) is the probability (or risk) of an outcome (like disease) occurring in the exposed group, compared to the unexposed group, WHILE Odd Ratio (OR) that a person with the disease was exposed compared to odds that a person without the disease was exposed.

When each is typically used:

Relative Risk (RR):- cohort study, randomized controlled trials.

Odds Ratio (OR):- case control studies, sometimes used in cohort studies.

10. Explain the role of the epidemiological surveillance in managing public health. How can it help during an emerging epidemic.

Epidemiological surveillance is the systematic collection, analysis, interpretation and disseminating of health data to guide public health decision making and action.

a. Early detection of outbreak:- this identifies new or unusual pattern of disease, it also enable rapid response to contain the spread.

b. Monitoring trends over time:- This track long term changes in disease pattern, it also helps to evaluate whether interventions (like vaccinators) are working.

c. Assessing public health interventions:- It evaluates effectiveness of policies e.g lockdown, mask mandates, vaccination campaigns. It also help to decide whether to continue, stop, or modifying an intervention.

d. Resource allocation;- this inform decision makers on where to allocate resources like vaccine, funding or health personnel.

e. Guiding public health policy:- This provide evidence based data to shape laws and health regulations e.g food safety standards, pollution, also support policy making that improves population health.

f. Detecting emerging or re-emerging disease:- surveillance can identify new threats (like SARS-CoV-2) or returning disease like measles outbreak in under vaccinated population.

g. Public awareness and education:- Data from surveillance campaign, increasing public awareness about health risk and prevent.

h. Intervention collaboration:- this help global organization like WHO track disease across borders also to support global disease control efforts and pandemic preparedness.

How can it help during an emerging epidemic:

Epidemiological surveillance is the foundation of epidemic response.

It enables health authorities to detect outbreaks early, monitor their impact, guide interventions, and ultimately control the epidemic.