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Epidemiology Test Answers

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Epidemiology is the study of disease distribution and determinant of health related events in a specific population and the application of the study to the control of health problems.

Objectives of epidemiology

1. To describe disease patterns and frequency i.e understand the distribution of diseases in terms of time,place, and person.

2. To identify risk factors i.e to determine the causes and risk factors associated with diseases or health outcomes.

3. To access the effectiveness of health interventions, treatments or policies.

4. To provide evidence for decision making in health policy and practice.

5. To prevent and control diseases by developing strategies for disease prevention, control, and health promotion.

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Descriptive Epidemiology:- These focus on what,who,where,when and also describe pattern of disease occurrence and using the tools which includes survey, case report,case series,correlational study,crossectional study,incidence and prevalence rate.

Example: Reporting the number of cholera cases in ibadan, Nigeria, by age group,sex and neighborhood

While

Analytical Epidemiology:-These focus on the causes and risk factors for disease and outcomes i.e it focuses on why and how diseases occur,it involve a test hypothesis about disease determinants, control, exposure and unexposure. These tools involve case control study, cohort study and risk ratio.

Example: 1. Investigating associations between smoking and lung cancer in Nigeria

2.Examining the relationship between dietary habits and risk of hypertension in a cohort of Nigerian civil servants.

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Component of the epidemiology triangle is also known as the epidemiological triad. It consist of three main components which are;

I. Agent: The pathogen (e.g. virus, bacterial, parasite) causing the disease.

ii. Host: The human or animal susceptible to the disease.

iii. Environment: External factors influencing disease transmission (physical, biological, social).

HOW THEY INTERACT IN THE SPREAD OF AN INFECTIOUS DISEASE

The interaction among these components determines disease occurrence and spread.

* An infected mosquito (Agent) bites human (Host) in conducive Environment.

* A disease can only survive when the agent causing the disease finds a susceptible host i.e a vulnerable host to infection and a conducive environment for the agent to develop

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Concept of Determinants In epidemiology, a determinant refers to a factor that influences the occurrence, distribution,or outcome of a health related events or disease. Determinants can be characteristics, exposures or behaviors that affect health outcomes.

Determinants helps to identify risk factors,inform health policies and guide prevention strategies.

Types of Determinants are : Biological, Environmental,Behavioural and Social Determinants

Examples of Biological Determinants

* Age

* Genetic predisposition

Examples of Environmental Determinants

* Air pollution

* Water quality

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The levels of prevention in public health are:

I. Primary prevention: it aids in preventing disease occurrence before it happens.

Goal: to reduce risk factors and promote health

Examples

* Routine immunization program against major diseases to prevent the manifestation of the diseases in children

* Health promotion: Campaigns promoting healthy diets and physical activity to prevent obesity and diabetes.

ii. Secondary prevention: Detecting and treating disease early.

Goal: to identify and intervene in early stages

Examples

* Blood pressure screening: regular checks to identify hypertension early

* Screening for cervical cancer: for early detection of cervical abnormalities in women and for early treatment

iii. Tertiary prevention: managing disease to reduce complications.

Goal: to improve quality of life, reduce disease impact.

Examples

* Physical therapy and support for stroke survivors to regain function and improve quality of life

* providing care for people with diabetes in Nigeria to manage blood glucose, prevent complications like foot ulcers and kidney disease

John Snow contribute to the development of modern epidemiology by investigating a cholera outbreak in London and he traced it source to a contaminated water pump by using early form of MAPPING AND STATISTICAL ANALYSIS.

Incidence is the number of new cases of a disease occurring in a population over a specified period.

Prevalence is the total number of cases (new and existing) of a disease in a population at a given time.

The comparison of incidence reflects risk: it indicates how many new cases are occuring.

It shows the total disease load in population.

Prevalence= Incidence × Duration (for chronic diseases)

 *The contrast of incidence and prevalence is

* The time aspect: Incidence relates to new cases over time, prevalence is a snapshot at a point.

* the disease duration impact: Prevalence increases with longer disease duration

* usefulness: Incidence helps identify risk factors; prevalence informs healthcare planning.

The reason why it is important to understand both when studying disease like diabetes is

 Incidence

* Trend Analysis: Rising incidence indicates increasing risk factors (e.g. obesity, lifestyle)

* Etiology: Helps to study risk factors for developing diabetes.

 Prevalence

* Healthcare planning: High prevalence indicates need for services, resources for management of diabetes.

* Burden: Shows impact on population, informing policy, resource allocation

Incidence informs primary prevention while prevalence guides planning for care, complications management.

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Common types of epidemiology study design are

* Cohort studies

* case control studies

* cross-sectional studies

* clinical trials(Experimental studies)

Cohort study differ from a case control study in the sense of:

* Directionality: Cohort (exposure outcome), case-control (outcome exposure)

* Timing: Cohort often prospective, case control retrospective

* Outcome assessment: Cohort can look at multiple outcomes,case control focuses on specific outcome.

* Bias risks: Different biases affect each design (e.g. recall bias in case control)

* Rare diseases: case control often used for rare outcomes, cohort for common or multiple outcomes.

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 Relative Risk(RR): Ratio of the risk of an outcome in the exposed group to the risk in the unexposed group.

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

Different between relative risk and odds ratio

* RR: is directly interpretable as risk multiplier while OR is used for common outcomes.

* RR: more intuitive for common outcomes while OR is used for rare diseases

RR is commonly used in cohort studies and clinical trials.

OR is often used in case control study and logistics regression.

Roles of epidemiology surveillance in managing public health

* Monitoring trends: helps to track disease patterns over time

* Detecting outbreaks: identifies unusual increases in disease incidence

* Informing interventions: Guides control measures based on data

* Evaluating programs: Assesses effectiveness of public health actions

* Policy support: informs health policy and resources allocation

How it can help during an emerging epidemic

* Early detection: Surveillance systems can identify unusual disease patterns early

* Rapid response: Timely data enable quick public health actions

* Helps to understand pathogen, transmission and risk factors

* Helps in resource allocation

* Helps to guide control measures