DIPLOMA IN PUBLIC HEALTH

D012-DIPOLMA IN PUBLIC HEALTH

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MODULE THREE

SUBJECT: EPIDEMIOLOGY ASSIGNEMENT.

STUDENT NAME: EMMANUEL MALISH PHILIP

LOCATION: SOUTH SUDAN

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Assignment.

**Q1. Distinguish between descriptive epidemiology and analytical epidemiology?**

The purpose of an analytical study in epidemiology is to identify and quantify the relationship between an exposure and a health outcome.

Descriptive epidemiology is to organize and analyze data in order to understand the host characteristics e.g person, animal, place and time.

Analytic epidemiology is organizing and analyzing the data, it also guides additional research into the cause of diseases and explains the questions e.g why and how.

Epidemiologists use analytic epidemiology to quantify the association between exposures and outcomes and to test hypotheses about causal relationships.

Descriptive are pretty much as they sound, they describe situations, they do not make accurate predictions and they do not determine cause and effect. There are three main types of descriptive such as observation, case study and survey.

Analytic epidemiology is used to answered research questions or to test hypotheses, while the most common method of collecting data is the questionnaire, the means by which you gather response may vary.

Q2. **Write down and explain the mathematic expression of the following**

1. **Incidence**
2. **Prevalence.**

Measures of morbidity frequency characterize the number of persons in a population who become ill (incidence) or are ill at a given time (prevalence). Commonly used measures are.

Incident should not be confused with prevalence, which is the proportion of cases in the population at a given time rather than rate of occurrence of new cases. Thus, incidence convey information about the risk of contracting the disease, whereas prevalence indicates how widespread the disease is.

**Incidence**: is refers to the occurrence of new case of disease or injury in a population over a specified period of time, sometime incidence is means the number of new cases per unit of population, there are two types of incidence; incidence proportion, is the proportion of an initially disease free population that develops disease, injury, dies in specified period of time, its include attack rate, risk probability of getting disease and cumulative incidence, is a measure of incidence that incorporates time directly into the denominator is generally calculate from long term cohort follow-up study usually each person is observed from established starting time until one of four to end.

**Mathematic method for calculating incidence is**

Number of new cases of diseases or injury during specified period

Time each person was observed to test for all persons

**Example A:** In the study of diabetics, 100 of the 189 diabetic men died during the 13-year follow-up period. Calculate the risk of death for these men. Numerator = 100 deaths among the diabetic men Denominator = 189 diabetic men 10n = 102 = 100 Risk = (100 / 189) x 100 = 52.9%

**Example B:** In an outbreak of gastroenteritis among attendees of a corporate picnic, 99 persons ate potato salad, 30 of whom developed gastroenteritis. Calculate the risk of illness among persons who ate potato salad. Numerator = 30 persons who ate potato salad and developed gastroenteritis Denominator = 99 persons who ate potato salad 10n = 102 = 100 Risk = ―Food-specific attack rate‖ = (30 / 99) x 100 = 0.303 x 100 = 30.3%.

**Prevalence:** Is a proportion of people in a community who have a particular disease or attribution at specified point in time or over a specified period of time. It differs from incidence in that of prevalence includes all cases both new and old in the population. Prevalence have categories, point prevalence, refers to the prevalence measured at a particular point in time, attribute on a particular date. And period prevalence refers to measure over an interval of time, attribute at any time during the interval.

**Mathematic method for calculating prevalence of disease is**

All new and pre-existing cases during a given time period/

Population during the same time period

Or person having a particular attribution during the same time period/

Population during the same time period

The value of 10n is usually 1 or 100 for common attributes. The value of 10n might be 1,000, 100,000, or even 1,000,000 for rare attributes and for most diseases.

**EXAMPLE: Calculating Prevalence** In a survey of 1,150 women who gave birth in Maine in 2000, a total of 468 reported taking a multivitamin at least 4 times a week during the month before becoming pregnant.7 Calculate the prevalence of frequent multivitamin use in this group. Numerator = 468 multivitamin users Denominator = 1,150 women Prevalence = (468 / 1,150) x 100 = 0.407 x 100 = 40.7%

***Properties and uses of prevalence***  Prevalence and incidence are frequently confused. Prevalence refers to proportion of persons who **have** a condition at or during a particular time period, whereas incidence refers to the proportion or rate of persons who **develop** a condition during a particular time period. So prevalence and incidence are similar, but prevalence includes new and pre-existing cases whereas incidence includes new cases only. The key difference is in their numerators

**Q3. A part from Randomized trials, describe four other epidemiology research designs.**

The four basic study designs, it should first be emphasized that all epidemiological studies are based on a particular population. The sources population follow over a particular period of time or the four main types of quantitative research designs are

* Descriptive: case study naturalistic observation survey.
* Correlation: case control study and observation study
* Semi-experiment: field, experiment, quasi-experiment.
* Experiment: (experiment with random assignment)

The epidemiology study, randomization is possible that is each individual in the study has an equal or random chance of being designed to an expose or unexposed group, procedures in the study design and conduct are used to prevent or reduce possible.

Q4**. Data from hospital records are one of the most important sources of information in epidemiology study**.

1. Outline the limitation of using hospital data.
2. Describe the possible sources of error in interview survey.
3. **Outline the limitation of using hospital data.**

Data in hospital is an any investigation relating cases identified in the hospital to the population obtained from either these same hospitals or a definable community served by these hospitals. The purpose is to discover attributed associated with the case or the frequency and distribution of the cases which may lead to a bather understanding of the cause and prevention of the condition.

Possible Type I Studies (Epidemiology within Hospitals)

1. To study disease resulting from hospitalization

2. To study the natural history of a disease

3. To study attributes associated with disease

4. To study associations between diseases

5. To facilitate cooperative experimental, clinical, and epidemiologic studies Possible

Type II Studies (Community-wide Hospital Epidemiology)

1. To determine disease morbidity

2. To describe demographic and geographic patterns of disease

3. To identify instances of familial occurrence of disease

4. To facilitate comparative study of hospital and death certificate indexing of causes of death

5. To study administrative planning principles apply to outpatient invest

1. **Describe the possible sources of error in interview survey.**

The various disciplines that embrace the survey method, including statistics, psychology, sociology, and economics, share a common concern with the weakness of the measurement process, the degree to which survey results deviate from "those that are the true reflections of the population. The disciplines vary in the terminology used to describe error as well as their emphasis on understanding the impact of measurement error on analyses or the reduction of the various sources of error. The existence of these terminological differences and desire to limit the focus of this research to measurement error suggests that a brief commentary on the various conceptual frameworks may aid in defining interests unambiguously.

shortcomings and pitfalls of decision making that can result in bias should begin at the medical undergraduate level and students should be provided with examples to demonstrate how bias can occur. Moreover, adjusting for bias or any deficiency in the analysis is necessary when bias cannot be avoided. Finally, when presenting the results of a medical research study, it is important to recognize and acknowledge any possible source of bias.

. Population Specification

This type of error occurs when the researcher selects an inappropriate population or universe from which to obtain data.

Example: Packaged goods manufacturers often conduct surveys of housewives, because they are easier to contact, and it is assumed they decide what is to be purchased and also do the actual purchasing. In this situation there often is population specification error. The husband may purchase a significant share of the packaged goods, and have significant direct and indirect influence over what is bought. For this reason, excluding husbands from samples may yield results targeted to the wrong audience.

**2. Sampling**

Sampling error occurs when a probability sampling method is used to select a sample, but the resulting sample is not representative of the population concern. Unfortunately, some element of sampling error is unavoidable. This is accounted for in confidence intervals, assuming a probability sampling method is used.

Example: Suppose that we collected a random sample of 500 people from the general South Sudanese. adult population to gauge their entertainment preferences. Then, upon analysis, found it to be composed of 70% females. This sample would not be representative of the general adult population and would influence the data. The entertainment preferences of females would hold more weight, preventing accurate extrapolation to the South Sudanese general adult population. Sampling error is affected by the homogeneity of the population being studied and sampled from and by the size of the sample.

**3. Selection**

Selection error is the sampling error for a sample selected by a nonprobability method.

Example: Interviewers conducting a mall intercept study have a natural tendency to select those respondents who are the most accessible and agreeable whenever there is latitude to do so. Such samples often comprise friends and associates who bear some degree of resemblance in characteristics to those of the desired population.

**4. Non-responsive**

Nonresponse error can exist when an obtained sample differs from the original selected sample.

Example: In telephone surveys, some respondents are inaccessible because they are not at home for the initial call or call-backs. Others have moved or are away from home for the period of the survey. Not-at-home respondents are typically younger with no small children, and have a much higher proportion of working wives than households with someone at home. People who have moved or are away for the survey period have a higher geographic mobility than the average of the population. Thus, most surveys can anticipate errors from non-contact of respondents. Online surveys seek to avoid this error through e-mail distribution, thus eliminating not-at-home respondents.

**5. Measurement**

Measurement error is generated by the measurement process itself, and represents the difference between the information generated and the information wanted by the researcher.

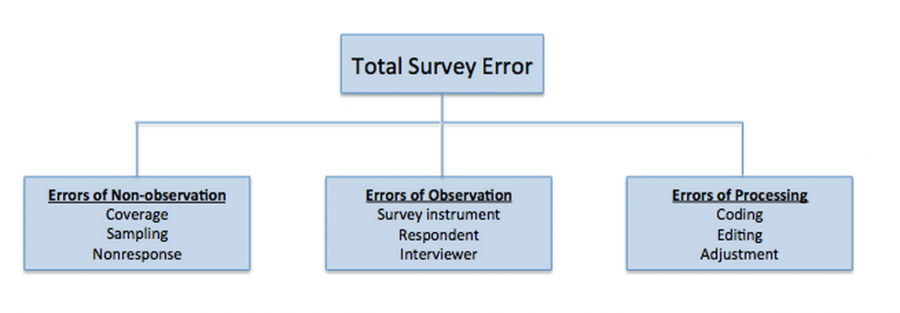
Example: A retail store would like to assess customer feedback from at-the-counter purchases. The survey is developed but fails to target those who purchase in the store. Instead, results are skewed by customers who bought items on.

 In this context, errors should not be interpreted to mean “mistakes” – rather, errors are sources of uncertainty, both in the estimates in the data and the inferences about the results. The goal of a survey is usually to make inference to a larger population of interest. Evaluations of survey data quality typically reflect the degree of success in that effort.

 Survey errors reduce, but don’t necessarily eliminate, ability to accurately make inference to the larger population. Consequently, understanding survey errors is key to understanding survey data quality. Increasing error typically results in larger confidence intervals (reduced certainty) around the estimates in the data and inferences made about the population of interest. If these confidence intervals grow too large, the quality of the data and inferences can be degraded to the point of making them uninformative.

 The Total Survey Error (TSE) model\*\* is a helpful conceptual framework for understanding sources of error and their effects on survey estimates and inferences. In this framework, the mean square error is used to sum all of the variable errors and biases for a particular survey. These errors are specific to a survey estimate or statistic, and in practice the MSE is rarely measured comprehensively and precisely, but the goal is to estimate the MSE as accurately as possible.

Using the TSE framework, survey errors can be classified in three broad categories illustrated in the figure below.

[](https://www.qualtrics.com/wp-content/uploads/2015/04/TSE1.png)

The list in each category of error above is not exhaustive as there are many potential sources of errors in surveys. The data collection method influences many sources of error and is often the primary focus for efforts aimed at reducing error.

**Q5. Explain the main determinants of health.**

Many factors combine together to affect the health of individuals and communities. Whether people are healthy or not, is determined by their circumstances and environment. To a large extent, factors such as where we live, the state of our environment, genetics, our income and education level, and our relationships with friends and family all have considerable impacts on health, whereas the more commonly considered factors such as access and use of health care services often have less of an impact.

The determinants of health include**:**

* the social and economic environment,
* the physical environment, and
* the person’s individual characteristics and behaviors’.

The context of people’s lives determines their health, and so blaming individuals for having poor health or crediting them for good health is inappropriate. Individuals are unlikely to be able to directly control many of the determinants of health. These determinants—or things that make people healthy or not—include the above factors, and many others:

* Income and social status - higher income and social status are linked to better health. The greater the gap between the richest and poorest people, the greater the differences in health.
* Education – low education levels are linked with poor health, more stress and lower self-confidence.
* Physical environment – safe water and clean air, healthy workplaces, safe houses, communities and roads all contribute to good health. Employment and working conditions – people in employment are healthier, particularly those who have more control over their working conditions
* Social support networks – greater support from families, friends and communities is linked to better health. Culture - customs and traditions, and the beliefs of the family and community all affect health.
* Genetics - inheritance plays a part in determining lifespan, healthiness and the likelihood of developing certain illnesses. Personal behavior and coping skills – balanced eating, keeping active, smoking, drinking, and how we deal with life’s stresses and challenges all affect health.
* Health services - access and use of services that prevent and treat disease influences health
* Gender - Men and women suffer from different types of diseases at different ages.

With thanks

Student Emmanuel Malish Philip.