**DisModule six questions**

Name of student: Daniel Majur Majok

Course Code: D002

Course: Post Graduate Diploma in Public Health.

Year: 2020

Month of Submission: 31st \_ January \_ 2020

Admission number: SN321/05/2019

**1. define the following terms as used in Public Health**

1. **Epidemic :**

An epidemic is an increase in the frequency of a disease above the usual and expected rate, which is called the endemic rate. Medical Author: William C. Shiel.

1. **Epidemiology:**

is defined as “the study of the distribution and determinants of disease frequency in human populations” Farlex Partner (2012).

1. **Chronic disease:** A chronic condition is a human health condition or disease that is persistent or otherwise long-lasting in its effects or a disease that comes with time. The term chronic is often applied when the course of the disease lasts for more than three months (Medical Author: William C. Shiel.
2. **Morbidity:** Refers to having a disease or a symptom of disease, or to the amount of disease within a population. Morbidity also refers to medical problems caused by a treatment. (“Morbidity.” Merriam-Webster.com).

**2. Discuss the five objectives of epidemiology**

* to identify the etiology or cause of disease.
* to determine the extent of disease.
* to study the progression of disease.
* to evaluate preventive and therapeutic measures for a disease or condition.
* to develop public health policy.

**3. Using examples explain three types of epidemiologic studies**

The study of disease distributions in the populations and the factors that influence this distribution is called as Epidemiology. In simple words, it is the study of the frequency with which diseases affect different groups of people and the reasons why they occur. Epidemiology has been quite helpful in determining and measuring the health hazards of smoking cigarettes or exposure to materials like asbestos. In this article, you will learn about the types of epidemiological studies and gain information regarding the issues which are to be kept in mind when understanding the results of the various study designs.

Types of Epidemiological Studies

There are two main types of epidemiological studies: 1. experimental studies and 2. Observational studies, and both of them are divided into several subtypes, but base on this question I will choose 3 few examples under the two main types of Epidemiological studies

1**. Observational Studies**

Observational studies are one of the most common types of epidemiological studies. They comprise of simple questioning, medical examinations and routine laboratory tests or X-rays. Below are its two examples study methods:

1. Cross-Section Comparison Studies

Cross-section comparison studies focus on comparing data collected from various smaller groups instead of large groups. These studies can be completed in a very small period of time and usually do not cost that much as well because their target is to obtain observations that are made at one point in a time. However, since these studies only sample data once, they cannot tell the sequence of events that have taken place over a longer period of time. One of the examples of cross-section comparison studies is comparing rate of a type of cancer in one place with that of another.

1. Case Control Studies

Case control studies are analytical studies which compare people that have been diagnosed with a disease with people that haven't been diagnosed with it. The diseased people are known as cases while the healthy ones are known as controls. These studies make use of a number of data sources like hospital and medical records and personal interviews of both the cases and the controls. This data is then compared in relation to the exposures that they had in the past to determine the differentiating factors between the two groups. The biggest drawback of these studies is that they heavily rely on the unreliable memories of people.

2. **Experimental Studies**

Experimental studies are also main types of epidemiological studies that scientists will carry out experiments where they change things in some sets and compare the outcomes.one example is describe below

1. In Vitro Studies

Under in Vitro studies, a piece of human or animal cell is usually removed from the body for the experiment. These types of experiments are carried out inside a test tube. Scientists are trying to observe the chain reactions that take place between the cells of the body and the nutrient that has been consumed. These experimental studies can help in identifying which nutrients can help in protecting against cancer and why this happens. In vitro studies are very strictly structured and the scientist is in full control of all the variables. The downside of these studies is that their findings are only applicable at a cellular level.

### 4.

### a. Identify the problems associated with epidemiologic studies involving humans

All epidemiologic studies have the advantage of studying humans rather than experimental animals; but all are also limited by that fact. Each type of epidemiologic study has its own strengths and weaknesses. Consider the design of an epidemiologic study to test the hypothesis that a low-fat diet reduces the risk of heart disease. The average South Sudanese already eats fat diet and has a risk of heart disease and brucellosis compared with residents of many other countries, so it should be possible ethically to compare the health of people who eat diet with others who have other dietary patterns.

The randomized controlled trial, the most rigorous form of intervention study, is the most similar in concept to a biomedical scientist’s experiment with rats. Suppose researchers choose a group of subjects who have been eating an average diet and divide them randomly into an experimental group, who will be instructed to eat a strict low-fat diet over the next seven years, and control group, who will be told to continue eating normally. Researchers will monitor both groups, watching for signs of heart disease, and they expect that, if their hypothesis is correct, fewer people in the low-fat group will become ill.

In fact, researchers are likely to be disappointed with the results. **The problem is that it is impossible to control the behavior of human beings under such circumstances.** If the experiment was being conducted using rats, researchers would feed them the assigned diets and could thus be certain of the relative exposures of the two groups. With people, however, even if researchers could find enough of them who would agree to participate in the experiment, it is questionable whether they would remain on the appropriate diet over the necessary length of time. People in the experimental group might succumb to temptation and drop out of the study or lie about what they have eaten. People in the control group might become concerned about their health and voluntarily cut back on the amount of fat they eat. It is unrealistic to expect to succeed at a randomized controlled trial that requires people to alter their behavior over a significant period of time, unless the subjects have a special motivation to participate if they are suffering from a serious disease, for example participation in a trial is their only chance to have access to a new, potentially more effective treatment.

To test the dietary hypothesis, researchers might try, instead of a randomized controlled trial, a cohort study. They would choose a large group of people who are free of heart disease, ask them detailed questions about their diets, and then, over the next six to seven years, compare the health of those who already eat a low-fat diet with those who eat an average diet. This would not require people to change their behavior. **The problem with this scenario is that people who have voluntarily chosen to eat a low-fat diet may differ in other respects from the group who eat the average diet.** The low-fat group members are likely to be more health in general. They may be less likely to smoke and more likely to exercise, for example. These people, therefore, would have reduced risk of heart disease even if a low-fat diet did not have a protective effect.

The third type of study, the **case-control study**, has its own difficulties. In this study, researchers would choose a group of people who already have heart disease; perhaps they would go to a hospital and interview patients recovering from a heart attack. A comparable group of people who do not have heart disease would serve as the control group. Researchers would question people in both groups about their diets over the past four years and decide whether the diets should be classified as high-fat or low-fat. If the researchers’ hypothesis is correct, the patients who have had a heart attack will report a diet higher in fat than the control group. **This approach also has obvious problems. People are not likely to remember what they ate in the past, or they might be embarrassed to admit how self-indulgent they have been.** The information researchers obtain concerning exposure in the case-control trial may not be reliable.

These difficulties do not mean that no valid conclusion can be drawn from any kind of epidemiologic study. However, they demonstrate the types of errors to which different kinds of studies may be prone and alert researchers about what to watch out for in choosing a study design and in interpreting the results.

**b. Explain three guiding principles of ethical research involving humans**

All research involving human subjects should be conducted in accordance with four basic ethical principles, namely respect for persons, beneficence, non-maleficence, and justice. It is usually assumed that these principles guide the conscientious preparation of proposals for scientific studies.

Respect for potential and enrolled participants

Individuals should be treated with respect from the time they are approached for possible participation — even if they refuse enrollment in a study — throughout their participation and after their participation ends. This includes:

respecting their privacy and keeping their private information confidential

respecting their right to change their mind, to decide that the research does not match their interests, and to withdraw without a penalty

informing them of new information that might emerge in the course of research, which might change their assessment of the risks and benefits of participating

Monitoring their welfare and, if they experience adverse reactions, unexpected effects, or changes in clinical status, ensuring appropriate treatment and, when necessary, removal from the study

Informing them about what was learned from the research

**5. What does it mean when an epidemiologist says there is “interdependence’ between factors.**

Synergism" of two factors in the causation or prevention of an all-or-none event means the existence of instances in which both factors are needed for the effect, while "antagonism" means that at least one can block the solo effect of the other. The manifestation of such interdependences--or of their complement, independence--in terms of event rates is complicated by the correlation of the susceptibilities to the two factors. Thus, given the risk difference (RD) values representing the solo effects, the RD corresponding to the joint exposure has a range consistent with independence so that independence cannot be inferred even from very ample data without knowledge of the degree of co relatedness of the susceptibilities. The definition of this range is closely analogous for causal and preventive factors, respectively. However, when knowledge about interdependence is used in inference about the factors' interrelation in the mechanisms for the effect, sharp distinctions may have to be made between causal and preventive factors. In each case, the interdependence is a result of the interrelation of the actions of the two factors and/or interaction between them. Operational decisions, having to do with the wisdom of the joint exposure, can be guided by knowledge about the interdependence of the factors; however, knowledge of the risks corresponding to the various exposures is a sufficient guide, without any need for inferences about causal or preventive interdependence.

**6. Identify factors that can lead to an epidemic**

* Human population dynamics and behavior.
* Changes in insect or reservoir populations.
* Weather and climate changes.
* Technology.
* Changes to the viruses themselves.
* Meeting the challenges of new epidemics.

**7. Explain the difference between incidence and prevalence of a disease.**

**Incidence** is the rate of new cases of a disease in a defined population over a defined period of time. For notifiable diseases, it is ascertained by counting cases reported to the local or state health departments and dividing by the population at risk. While **Prevalence** is the total number of cases existing in a defined population at a specific time. It would generally be measured by doing a survey.

**8. Discuss the importance of data in Public Health.**

Data is essential to reliable and valid public health research Data can be used to evaluate program impact, to determine appropriate public health interventions, to monitor progress, to determine populations to target for an intervention, to determine barriers to care, and to influence public policy.se Healthcare data management and also is the process of storing, protecting, and analyzing data pulled from diverse sources. Managing the wealth of available healthcare data allows health systems to create holistic views of patients, personalize treatments, improve communication, and enhance health outcomes, also are the vital signs of public health. Local, state, and federal governments collect data on their citizens, starting with birth certificates and ending with death certificates. The census, conducted after every 10 years, provides information on the age, sex, and ethnic composition of communities, information that allows the calculation of birth rates, death rates, infant mortality rates, life expectancies, and other data that form the basis for public health’s assessment function.

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