

UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES
(SECOND SEMESTER)

MAIN EXAMINATION PAPER

MAY, 2015

COURSE CODE : NUR 521

COURSE TITLE : COMMUNITY HEALTH NURSING IV (EPIDEMIOLOGY)

TIME ALLOWED : 2 HOURS

MARKS : 75

INSTRUCTIONS:

- 1. THERE ARE TWO SECTIONS IN THIS PAPER.**
- 2. SECTION A COMPRISES OF MULTIPLE CHOICE QUESTIONS.**
- 3. SECTION B COMPRISES OF CALCULATIONS AND SHORT ESSAY QUESTIONS.**
- 4. ANSWER ALL QUESTIONS FROM THE TWO SECTIONS**

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SECTION A: MULTIPLE CHOICE QUESTIONS

For each of the following questions, write down the letter that indicates the best answer out of the given options by writing the question number and the letter representing the answer; e.g. 27. A.

1. Epidemiology is considered as the basic science of public health; therefore the primary goal of public health is to:
 - A. Protect the infected
 - B. Protect the uninfected
 - C. Protect the identity of those who have died from an infectious disease
 - D. B and C. (1)

2. One of the fundamental premise underlying the study of epidemiology is...
 - A. disease, illness and ill health are randomly distributed in a population
 - B. disease, illness and ill health are not randomly distributed in a population
 - C. disease, illness and ill health are only randomly distributed in large populations
 - D. disease, illness and ill health are very rarely distributed in large populations (1)

3. The major purpose of randomisation in a clinical trial is to:
 - A. Help ensure that study subjects are representative of the general population
 - B. Help ensure double blinding
 - C. Help ensure that the study groups are comparable on baseline characteristics
 - D. Facilitate measurement of the outcome variables (1)

4. The attack rate in susceptible people who have been exposed to a primary case is referred to as.....
 - A. The attack rate
 - B. The post primary attack rate
 - C. The secondary attack rate
 - D. The person-to-person attack rate (1)

5. A researcher is interested in knowing the number of new measles cases that developed at Montessori's Elementary School in April 2015. Assuming that no children enrolled during that month, and no children moved during that month (all children were followed for the entire month), which measure of morbidity would be most appropriate in answering the researcher's question?
- A. Prevalence
 - B. Point prevalence
 - C. Cumulative Incidence
 - D. Incidence Density (1)
6. A study to test the hypothesis that volcanic dust causes silicosis is to be tested by comparing the population of an island very close to a volcanic eruption with the population of an island not so exposed. After 5 and 10 years the incidence of silicosis will be measured and compared in both populations. This study is.....
- A. a cross sectional study
 - B. a case control study
 - C. a prospective study
 - D. a randomised controlled trial (1)
7. A double-blind study of a vaccine is one in which:
- A. Neither the observers or the participants know the nature of the placebo
 - B. Neither the observers or the participants know who received the vaccine and who received the placebo
 - C. The participants in the vaccine group do not know the participants in the control group
 - D. A, B and C are all true (1)
8. All of the following are characteristics of a case control study, **EXCEPT**:
- A. It is relatively inexpensive compared with most other epidemiologic study designs
 - B. Incidence rates may be computed directly
 - C. Cases with the disease are compared to controls without the disease
 - D. Assessment of past exposure may be biased (1)

9. In a study, over a period of two months, 5 out of 100 men aged 30-35 years old reported having migraine headaches. Over a period of four months, 20 of 100 women aged 30-35 years old reported having migraine headaches. In this study, the relative risk of women developing headaches compared to men was.....
- A. 0.5
 - B. 5
 - C. 4
 - D. 2
- (1)
10. Which of the following factors is most important when considering the validity of the results of a clinical trial?
- A. There are equal numbers of people in the intervention and control groups
 - B. A relatively high incidence of the outcome of interest in the study population
 - C. Inclusion of people of all ages
 - D. Random allocation of participants to the intervention and control groups
- (1)
11. The surveillance testing strategy associated with the least selection bias is:
- A. Compulsory
 - B. Unlinked anonymous
 - C. Voluntary anonymous
 - D. Voluntary confidential
- (1)
12. Which of the following is **NOT** a primary requirement for conducting screening for disease control?
- A. Prevalence of the disease should be high in the population under study
 - B. There should be a favourable prognosis for early treatment of the disease
 - C. The government should fund the program.
 - D. The disease should be serious
- (1)

13. The health inspector working at Motsahne clinic tells you that in collaboration with laboratory technicians, a new serological test has been developed for diagnosis of bovine paratuberculosis. The health inspector then tells you that the test has since been used on 200 dairy cattle known to be infected with bovine paratuberculosis based on isolation of *Mycobacterium paratuberculosis* from fecal samples, and 300 dairy cattle designated free of disease. Among the 200 dairy cattle known to be infected with bovine paratuberculosis, 120 had a positive test and 80 had a negative test. Among the 300 dairy cattle designated free of bovine tuberculosis, 30 had a positive test and 270 had a negative test. The health inspector is requesting you to help him determine the sensitivity of the serological test. You tell him that the sensitivity of the serological test for detecting bovine paratuberculosis is

- A. 90%
 - B. 80%
 - C. 60%
 - D. 40%
- (1)

14. Which is a **TRUE** statement about hypothesis tests for categorical data?

- A. *P*-values are not appropriate for categorical data.
 - B. The chi-squared (χ^2) test can be used to test association between two categorical variables.
 - C. Confidence intervals cannot be calculated.
 - D. None of the statements is true
- (1)

15. The resistance of a population to an attack by a disease to which a large proportion of the members of the group are immune is referred to as.....

- A. group resistance
 - B. population immunogenesis
 - C. herd immunity
 - D. vaccination
- (1)

16. According to the table below, which food is the most likely cause of the outbreak of food poisoning?

Food	Number of people who ate that food	Number of people who ate the food and got sick
Cold chicken	86	34
Potato salad	54	38
Egg sandwiches	76	40
Fruit pie and cream	32	12
Cheese	48	12

- A. Cold chicken
- B. Potato salad
- C. Egg sandwiches
- D. Fruit pie and cream (1)

17. What was the attack rate among those who ate the egg sandwiches?

- A. 70 per 1000 people per year
- B. 53 per 1000 people per year
- C. 70%
- D. 53% (1)

18. Which of the following is **NOT** something that you might consider when assessing whether an association could be causal?

- A. The strength of the association
- B. The specificity of the association
- C. Whether it is possible to intervene to prevent people from becoming exposed to prevent the outcome from occurring
- D. Whether there is a dose-response relation between the exposure and the outcome (1)

19. To determine attack rates for a respiratory disease of unknown origin among people attending a conference, random samples of guests staying at four hotels were surveyed for subsequent illness. Because it was not feasible to survey all guests, random sampling provided the best information because:
- A. It would identify all cases of disease
 - B. It would avoid selection bias
 - C. It would eliminate confounding
 - D. It would reduce measurement bias (1)
20. In the investigation of an epidemic of a fatal disease such as Ebola, the most appropriate measure to describe the frequency of death from the disease is the:
- A. Mortality rate
 - B. Case-fatality rate
 - C. Attack rate
 - D. Standardised mortality ratio (1)
21. The strength of an association between exposure and disease is best measured by the:
- A. Incidence rate of disease in the exposed group
 - B. Attributable risk
 - C. Population attributable risk
 - D. Relative risk (1)
22. In a study of alcohol and oral cancer the relative risk is 2.0 for men and 2.0 for women but 4.0 for both sexes combined. This suggests that:
- A. There is confounding by sex in these data
 - B. There is evidence of effect modification in these data
 - C. The results have been adjusted for age and sex
 - D. The results are due to bias (1)

The following table shows data from an epidemiological study. Refer to the table to answer questions 23, 24 and 25.

		Number of episodes	Person-years (py) at risk
Exposure	Present	700	1950
	Absent	300	2250
Total		1000	4200

23. What type of study was this most likely to be?

- A. Case-control
- B. Cohort
- C. Randomised controlled trial
- D. Cross-sectional

(1)

24. What is the incidence rate among those who are exposed to the factor under study?

- A. 35.9 per 100 py
- B. 35.9 per 100,000 py
- C. 35.9 per 1000 py
- D. 13.3 per 100,000 py

(1)

25. What is the population attributable risk?

- A. 22.6 per 100 py
- B. 22.6 per 100,000 py
- C. 12.1 per 100 py
- D. 10.5 per 100 py

(1)

[Total = 25 marks]

SECTION B: CALCULATIONS AND SHORT ESSAY QUESTIONS

Question 1

- A. Between 2000 and 2004; 7, 381 persons were enrolled in a follow up study. At the time of enrolment, each participant was classified as having or not having diabetes. During 2010-2014, the participants were reported to have either died or still alive. The results were summarised as follows:

	Original enrolment (2000-2004)	Dead at Follow-up (2010-2014)
Diabetic men	189	100
Non diabetic men	3 151	811
Diabetic women	218	72
Non diabetic women	3 823	511

- i) Calculate the ratio of non-diabetic to diabetic men. (2)
- ii) Calculate the proportion of deaths among men. (3)
- iii) Calculate the risk of death among men using $n=2$. (2)
- iv) Given that the diabetic women were followed up for 1862 person-years and the non-diabetic women were observed for a total of 36 653 person years, calculate the incidence rates for both the diabetic women and the non-diabetic women. (Use $n=3$). (4)
- B. During the past 10 years, 1-3 cases of flaccid paralysis were reported among children, hence the proposal for eradication. During the past three months 17 cases have been reported. All but two of these suicide cases have been reported from one region. The Swazi Observer carried an article about the first reported cases, a young girl. Describe five possible causes of the increase in reported cases. (5)

C. Four cases of rabies are reported to the Emergency Preparedness Response (EPR) unit by the laboratory technician from the National Referral hospital. It is said that the cases will be duly reported in the tables of the monthly newsletter from the Ministry of Health. Is this sufficient? Support your answer and specify stakeholders that need to know this information. (5)

D. Describe the criteria (any four) for exposure to be causally associated with an outcome. (4)

[Total = 25 marks]

Question 2

A. Assuming that you are managing the school health program and you have just received funding for premodial prevention regarding childhood injuries. You are to decide whether to conduct a survey or establish a surveillance system. Discuss any 4 advantages and disadvantages of these two approaches to justify your decision.

(16)

B. A certain scientist reports a high prevalence rate of chlamydial infections which are said to be significantly and positively correlated with HIV infection among Swazi females in the reproductive age group. The scientist then argues that chlamydial infections should be added to the country's list of reportable diseases. What would be your arguments for and against the scientist's submission?

(6)

C. What alternative methods of surveillance for chlamydial infections would you propose?

(3)

[Total = 25 marks]