



**AMREF INTERNATIONAL UNIVERSITY  
SCHOOL OF MEDICAL SCIENCES  
DEPARTMENT OF NURSING & MIDWIFERY SCIENCES  
END OF SEMESTER MARCH 2024 EXAMINATIONS**

**COURSE CODE AND TITLE: DOP 115- EPIDEMIOLOGY & RESEARCH METHODS**

**DATE:**

Duration: 2 HOURS

Start: 9:00 AM

Finish: 11:00 AM

**INSTRUCTIONS**

1. This exam is out of 70 marks
2. This Examination comprises THREE Sections. Section I: Multiple Choice Questions (20 marks)  
Section II: Short Answer Questions (30 marks) and Section III: Long Answer Questions (20 marks)
3. Answer ALL Questions.
4. Do Not write anything on the question paper -use the back of your booklet for rough work if need be.

**SECTION I: MULTIPLE CHOICE QUESTIONS****(20 MARKS)**

1. What is the primary purpose of conducting a literature search in research?
  - A. To identify gaps in current knowledge
  - B. To summarize data analysis findings
  - C. To promote the researcher's previous work
  - D. To develop research hypotheses
  
2. When conducting a literature search, what does the term "grey literature" refer to?
  - A. Research papers published in high-impact journals
  - B. Peer-reviewed articles available through institutional subscriptions
  - C. Unpublished or non-commercially published research material
  - D. Longitudinal studies conducted over several decades
  
3. Which search strategy is most effective for retrieving a broad range of relevant literature in a systematic review?
  - A. Using only one keyword per search
  - B. Limiting the search to recent publications
  - C. Employing Boolean operators (AND, OR, NOT)
  - D. Focusing solely on open-access articles
  
4. In the context of literature search, what does the term "citation chaining" refer to?
  - A. Tracing references backward and forward from key articles
  - B. Creating a bibliography for a research paper
  - C. Organizing search results by date of publication
  - D. Using citation software to manage references
  
5. A key limitation of cohort studies is: -
  - A. They are prone to recall bias.
  - B. They cannot establish temporal relationships between exposure and outcome.
  - C. They require large sample sizes to detect associations.
  - D. They are unethical for studying harmful exposures.
  
6. The term that describes the ratio of the incidence rate of a disease in the exposed group compared to the non-exposed group in a cohort study is: -
  - A. Odds ratio
  - B. Relative risk
  - C. Hazard ratio
  - D. Rate ratio
  
7. Which of the following is a characteristic feature of a double-blind RCT?
  - A. Participants are randomly assigned to treatment groups.
  - B. Researchers are aware of which treatment each participant receives.
  - C. Participants and researchers are unaware of which treatment is being given.
  - D. Only one group of participants is studied over time.
  
8. What is the term for a group of participants in an RCT that receives a placebo or standard treatment, against which the experimental treatment is compared?
  - A. Experimental group
  - B. Intervention group
  - C. Control group
  - D. Comparator group

9. The potential bias that occurs when participants in a study are systematically different from those who are not included in the study?
- Selection bias
  - Attrition bias
  - Performance bias
  - Detection bias
10. In a randomized controlled trial, the process of ensuring that each participant has an equal chance of being assigned to any treatment group is referred to as: -
- Random allocation
  - Stratified randomization
  - Allocation concealment
  - Block randomization
11. In hypothesis testing, if the p-value is less than the significance level ( $\alpha$ ):
- The null hypothesis is rejected.
  - The alternative hypothesis is rejected.
  - The sample size is too small to draw a conclusion.
  - The test is inconclusive
12. Type I error in hypothesis testing refers to:
- Failing to reject the null hypothesis when it is actually false.
  - Incorrectly estimating the effect size of the alternative hypothesis.
  - Having insufficient power to detect a significant result.
  - Rejecting the null hypothesis when it is actually true.
13. A researcher wants to test whether the mean score of a new treatment group differs from that of a control group. Which hypothesis is typically tested for this scenario?
- Null hypothesis: The treatment group has a higher mean score.
  - Null hypothesis: There is no difference between the two groups.
  - Alternative hypothesis: There is no difference between the two groups.
  - Alternative hypothesis: The treatment group has a lower mean score.
14. What distinguishes a case report from a case series in medical literature?
- Case reports involve a single patient, while case series involve multiple patients.
  - Case reports include only quantitative data, whereas case series include qualitative data.
  - Case reports are primarily focused on treatment outcomes, whereas case series focus on epidemiological trends.
  - Case reports are published in medical journals, while case series are published in conference proceedings.
15. The primary objective of publishing a case series is: -
- To establish causal relationships between variables.
  - To provide evidence for the effectiveness of a treatment.
  - To describe a series of similar cases with similar outcomes.
  - To compare the outcomes of different treatment options.
16. In a cross-sectional study, how is the prevalence of a disease typically assessed
- By tracking changes in disease incidence over time.
  - By comparing treatment outcomes between two groups.
  - By measuring the number of new cases diagnosed during the study period.
  - By estimating the proportion of individuals affected at a specific point in time.

17. Which statistical test is most appropriate for comparing means of two unrelated groups?
- Paired t-test
  - Chi-square test
  - ANOVA (Analysis of Variance)
  - Independent samples t-test
18. Which of the following is an example of inferential statistics?
- Calculating the mean and standard deviation of a sample.
  - Conducting a hypothesis test to compare two population means.
  - Presenting a bar chart showing the frequency distribution of data.
  - Describing the characteristics of a dataset using summary statistics.
19. In a survey where oncology nurses are asked to rate the level of cancer from 1 to 5, what type of data is being collected?
- Nominal
  - Ordinal
  - Interval
  - Ratio
20. If the Pearson correlation coefficient ( $r$ ) is close to +1, it indicates:
- A weak positive relationship between the variables.
  - A strong positive relationship between the variables.
  - No relationship between the variables.
  - A perfect negative relationship between the variables.

**SECTION II: SHORT ANSWER QUESTIONS (30 MARKS)**

- Outline THREE (3) differences between descriptive and analytical epidemiology 6 Marks
- State FOUR (4) advantages of cross-sectional study design 4 Marks
- Draw a well labelled diagram of a boxplot indicating all its parts 5 Marks
- You are conducting a study that intends to compare the mean BMI levels of patients in different stages of cervical cancer (Stage I, Stage II, Stage III, Stage V)
  - State the statistical method that is best suited in comparing the mean 1Mark
  - Outline a justification of the method you have chosen 1 Mark
  - Write the null hypothesis that will be used in this scenario 1 Mark
  - Given the p-value is 0.015, give the conclusion of this study 2 Marks
- List FOUR (4) types of consent used in research 2 Marks
- Explain the PICO model of developing research questions 8 Marks

**SECTION III: LONG ANSWER QUESTION – (20 MARKS)**

- A small town has been experiencing an outbreak of osteosarcoma over the past year. The town's population is 10,000 people. The health department has been monitoring the number of new cases of osteosarcoma each month.

- a) At the beginning of the outbreak, the health department recorded 150 individuals who had been diagnosed with osteosarcoma. What is the prevalence rate of osteosarcoma in the town at that time?  
5 Marks
- b) After six months, a total of 500 individuals in the town had been diagnosed with osteosarcoma. If no individuals were previously diagnosed with the illness, what is the point prevalence rate of osteosarcoma at six months?  
5 Marks

2. In a prospective study of pregnant women, Magann et al. collected extensive information on exercise level of low-risk pregnant working women. A group of 217 women did no voluntary or mandatory exercise during the pregnancy, while a group of 238 women exercised extensively. One outcome variable of interest was experiencing preterm labor. The table below summarizes the results:

Risk factor	Cases of Preterm labor	Non cases of preterm labor	Total
Extreme Exercising	22	216	238
Not exercising	18	199	217
Total	40	415	455

- a) Calculate the appropriate measure for this study  
6 Marks
- b) What is the interpretation for the result obtained above  
4 Marks