AFRICA UNIVERSITY
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COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

DEPARTMENT OF PUBLIC HEALTH AND NURSING (DPHN)

NSHS 203 INTRODUCTION TO EPIDEMIOLOGY AND BIOSTATISTICS (BHSM/BMLS)

END OF SEMESTER EXAMINATIONS

NOV/DEC 2023

LECTURER: MR. E. CHIKAKA

DURATION: 3 HOURS

INSTRUCTIONS

ANSWER **ALL** QUESTIONS FROM SECTION A AND **ANY THREE (3)** FROM SECTION B

THE MARK ALLOCATION FOR EACH QUESTION IS INDICATED AT THE END OF THE QUESTION

CREDIT WILL BE GIVEN FOR LOGICAL, SYSTEMATIC AND NEAT PRESENTATION

SECTION A [40 MARKS]

QUESTION 1

What do you understand by epidemiology and what are its function and uses in public health? [10]

QUESTION 2

A sample of 10 individuals is selected for participation in a study of cardiovascular risk factors. The following data represent the ages of the enrolled individuals measured in yeas (continuous variable). The data are as follows:

85 83 82 79 77 76 73 63 68 75

(i) Find the sample mean, standard deviation and standard error of the mean. Interpret the standard deviation of the mean [8]

(ii) Explain when you would use the median instead of the mean as a measure of central tendency? [2]

QUESTION 3

In a prospective cohort study to determine the risk of exposure to arsenic and squamous cell carcinoma of skin, 600 non-diseased people were involved in the study. Among them 300 were exposed to arsenic metal and the other 300 were not. After a period of 10 years of follow up, 150 people among those who were exposed had developed squamous cell carcinoma while only 20 people developed squamous cell carcinoma among those who were not exposed to the metal.

Exposure to Arsenic and Squamous Cell Carcinoma in a Cohort Study			
Exposure status	Diseased	Non diseased	Total
Exposed to arsenic			
Not exposed to arsenic			
Total			

Using the above information,

a) Copy and complete the table [6]
b) Calculate Relative risk (RR) of developing squamous cell carcinoma of the skin [2]
c) Interpret the RR [2]
d) Calculate the Attributable Risk (AR) and Attributable Risk Percent (AR%) for the disease [4]
e) Interpret the AR and AR% [4]
f) What is the excess risk in this population [2]

SECTION B [60 MARKS]

QUESTION 4

A mammogram detects 300 positives for breast cancer, of which 170 are incorrect, and 700 negatives, of which 80 are incorrect.

a. Construct a 2 x 2 table to measure the diagnostic performance of a mammogram for breast cancer [4]

TEST	CANCER	NO CANCER	TOTAL
+			
-			
TOTAL			

b. What is the sensitivity, specificity of the mammogram [4]
c. What is the false positive and false negative rate? [4]
d. What is the positive and negative predictive value? [4]
e. What is the accuracy of the mammogram? [4]

QUESTION 5

a. Distinguish with examples the different types of scales of measurement and how each type is presented. [10]
b. Define public health surveillance and list the essential activities and desirable characteristics of well-conducted surveillance activities [10]

QUESTION 6

a. Summarize the historical evolution of epidemiology [10]
b. List and explain the key features and uses of:
   i. Descriptive Epidemiology [5]
   ii. Analytic Epidemiology [5]

QUESTION 7

a. What do measures of central tendency and variation indicate? Describe the important measures of central tendency and variation pointing out the situation when one measure is considered relatively appropriate in comparison to other measures. [10]

b. In a community of 800 households with a population of 4799 health workers found 120 persons with scabies. A total of 480 persons lived in the 80 affected households. Assuming that each household had only one primary case, calculate the secondary attack rate [5]

c. Are the following nominal, ordinal, interval or ratio data? Explain your answers.
   (i) Temperatures measured on the Kelvin scale.
   (ii) Police ranks.
   (iii) National Social Security numbers.
   (iv) Number of passengers on buses from Harare to Mutare.

(v) Code numbers given to the religion of persons attempting suicide. [5]