AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF REHABILIATIVE MEDICINE

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

END OF TRIMESTER EXAMINATIONS JANUARY TO APRIL 2024

UNIT CODE: PHT 315
UNIT NAME: INTRODUCTION TO BIOSTATISTICS

DATE: 17th APRIL 2024 **TIME: 6PM-8PM**

INSTRUCTIONS

1. **All students will have two (2) hours to complete the examination**
2. **This is an online exam, Attempt all questions as per the instruction**
3. **It is the student's responsibility to report any page and number missing in this paper.**
4. **Check that the paper is complete**
5. **Total number of pages is 10 including the cover.**
6. **Read through the paper quickly before you start.**
7. **Upon finishing the exam paper, on submission, the message 'Your examination has been submitted' will appear.**

All the Best!!

TOTAL: _____/70

PERCENT: _____/100%

POINTS EARNED TOWARDS FINAL GRADE_____/70

INSTRUCTIONS: Answer Question **ONE** and any other **TWO** Questions.

Question one (30 Mks)

1) Distinguish by giving examples in Physiotherapy.
   - i) Ordinal and Nominal Variables (3mks)
   - ii) Observation and Subjects (3mks)
   - iii) Continuous and Discrete variables (3mks)
   - iv) Sample and Population (3mks)

2) The period starting from initial exposure to the diagnosis of the Ebola virus is referred to as the incubation period. Below are the incubation periods, measured in days, for a random sample of 7 individuals infected with Ebola. Calculate the following and interpret the result.

12.0	9.5	7.2	13	6.3	10.5	10

   - i. sample mean and median (4mks)
   - ii. sample variance and standard deviation and CoV (8mks)

3) The following table shows hemoglobin levels for miners, compute the probabilities described below.

Class Interval for Hemoglobin (g/cc)	Number of Miners
12.0–17.9	24
18.0–21.9	53
22.0–27.9	13
Total	90

Source: Adapted from Dunn, O. J. (1977). *Basic Statistics: A Primer for the Biomedical Sciences,* 2nd Edition. Wiley, New York, p. 17.

   a. Compute the probability that a miner selected at random from the population has:
      - i) a hemoglobin level in the 12.0–17.9 range. (3mks)
      - ii) a hemoglobin level in the 18.0–21.9 range. (3mks)

Question Two (20 Mks)

Denzel and Cherie are patients who often go to physiotherapy treatment . on such a visit there is a probability of 0.4 that Denze will purchase medicine prescribed . The probability that Cherie will purchase medicine prescribed is 0.7 if denzel buys medicine and 0.35 if he does not.

a) Draw a probability tree diagram illustrating this case (6mks)

b) When Denzel and Cherie go for physiotherapy session together :

i. Find the probability that both will buy Medicine prescribed (4mks)

ii. What is the probability that neither buys prescribed medicine (4mks)

iii. Find the probability that exactly one of the buys medicine (4mks)

iv. Why is probability important in this scenario ? (2mks)

Question Three (20 Mks)

A manager provided you with an SPSS output for sample data for workplace study on back pain. The manager wanted to know whether Job stressfulness is associated with the Lower Back pain (LBP). Below is the output.

Lower Back pain * is your job stressful? Crosstabulation

			Is your job stressful?		
			stress free	stressful	Total
Lower Back pain	NoLBP	Count	96	44	140
		% within Lower Back pain	68.6	31.4	100.0%
		% within Is your job stressful?	73.8%	54.3%	66.4%
	LBP	Count	34	37	71
		% within Lower Back pain	47.9%	52.1%	100.0%
		% within Is your job stressful?	26.2%	45.7%	33.6%
Total		Count	130	81	211
		% within Lower Back pain	61.6	38.4%	100.0%
		% within Is your job stressful?	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.521[b]	1	.004		
Continuity Correction[a]	7.669	1	.006		
Likelihood Ratio	8.428	1	.004		
Fisher's Exact Test				.004	.003
Linear-by-Linear Association	8.481	1	.004		
N of Valid Cases	211				

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Lower Back pain * Is your job stressful?	211	79.0%	56	21.0%	267	100.0%

i) State the hypothesis

(4mks)

ii) What was the sample size? (2mks)

iii) Which stress category is greatly affected by the LBP? (2mks)

iv) Which stress category is least affected by LBP? (2mks)

v) Why was the Chi square test appropriate in this case? (4mks)

vi) Was there a statistical difference between stressful job status and Lower Back Pain, Justify? (6mks)

Question Four (20 Mks)

1. Outline steps to conduct hypothesis testing illustrating using a physiotherapy example or case

   (5mks)

2. A statistician provides a SPSS output in for a sample dataset that had test scores (out of 100) on four placement tests: English, Reading, Math, and Writing. Below is the output

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
English	431	59.83	101.95	82.7265	6.82982
Reading	435	55.11	103.62	82.0394	7.63745
Math	435	35.32	93.78	65.4512	8.29165
Writing	435	64.06	93.01	79.5392	5.50151
Valid N (listwise)	431				

Required

i. What is the sample size? (2mks)

ii. Calculate the range of English and Writing test? (3mks)

iii. which was the most passed placement test? Justify (2mks)

iv. Which was the worst performed placement test? Justify. (2mks)

v. Comment on the std deviation of the placement tests? (2mks)

vi. Calculate the coefficient of variance of the Math and reading test? (4mks)