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MST–019

M. SC. (APPLIED STATISTICS)

(MSCAST)

Term-End Examination

June, 2025

MST-019 : EPIDEMIOLOGY AND CLINICAL TRIALS

Time : 2 Hours *Maximum Marks : 25*

Note : *Question No. **1** is compulsory. Attempt any **two** questions from question numbers 2 to 4. Use of Scientific (non-programmable) calculator is allowed. Symbols have their usual meanings.*

1. (a) Suppose, we have 1000 males and 500 females in an epidemiological study. What is the odds of being a female in the study ? 1

   (b) Calculate the crude death rate and infant mortality rate of a town whose

mid-year population is 5,00,000, live births in a year is 15,000, number of deaths in 7,000 and the number of infant deaths in 1875. 2

Select the appropriate option from the following questions (c) and (d) :

(c) In a double-blind trial : 1

(i) The patients do not know that they are receiving active treatment or placebo.

(ii) The assessors do not know which patient has received active treatment and which placebo.

(iii) Both of the above

(iv) The patients and the statistician do not know the allocation.

(d) A clinical trial must involve : 1

(i) Randomisation

(ii) Control group

(iii) Blinding

(iv) None of the above

2. (a) Find the risk difference, risk ratio and odds ratio for lung cancer comparing smokers (exposed group) to non-smokers (non-exposed group) from the data given as follows (Period of follow-up is 20 years) : 4

	Lung Cancer (+)	Lung Cancer (–)	Total
Smokers	1200	1800	3000
Non-smokers	800	2400	3200
Total	2000	4200	6200

Also, interpret the result.

(b) If the odds of males in a study are 0.40, then find the proportion of males in the study. 1

(c) Consider a trial on $n = 16$ patients of kidney disease, randomly divided into two equal groups of size 8. The first group received dialysis-A and then dialysis-B, and the second group received dialysis-B and then dialysis-A. Abbreviate them as tr A and tr B. Washout period between the dialyses ensured that there was no carry-over effect. The response variable is serum creatinine level. This is one of the

parameters of kidney function, measured as mg/dL. The data obtained are as follows : 5

Group-I-AB Sequence

Subject No.		1	2	3	4	5	6	7	8
Period 1	tr A	1.2	1.0	0.8	0.7	1.3	1.2	1.1	1.5
Period 2	tr B	1.2	1.2	1.4	1.3	1.3	1.1	1.2	1.2

Group-II-BA Sequence

Subject No.		9	10	11	12	13	14	15	16
Period 1	tr B	1.7	1.4	1.0	1.3	0.9	1.3	1.2	1.2
Period 2	tr A	1.3	1.5	1.1	1.3	1.4	1.3	1.4	1.2

Test for group effect (use $t_{(14,0.025)} = 2.145$.)

3. For a case control study, explain the following in detail : 4+3+3
   (i) Design of case control study
   (ii) Analysis of data of case control study design
   (iii) Advantages and disadvantages of case control study design

4. For a clinical trial, explain the following terms : 6+2+2
   (i) Protocol
   (ii) Objectives
   (iii) Hypothesis

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