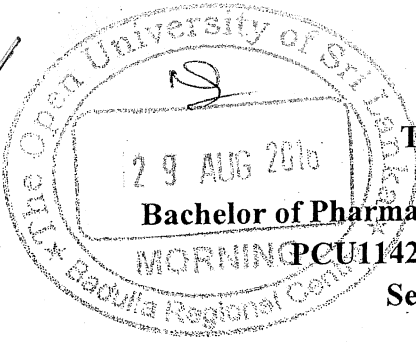


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The Open University of Sri Lanka
Faculty of Health Sciences
Bachelor of Pharmacy/ Bachelor of Medical Laboratory Sciences (B.MLS)
PCU1142/ MLU1141 – Biostatistics/ Health Statistics
Semester 02- Academic year 2015/2016
Final Examination



Date: 27/07/2016	Duration – 2 hours
Time: 1.30pm -3.30pm	Index No.....

Please read the following instructions carefully before you answer the paper.

1. There are Six (06) questions. Answer FOUR (04) questions only.
2. Each question is allocated twenty five marks.
3. If the random number table is used to describe a design for data collection, you are advised to clearly describe how you use it.
4. Statistical tables are provided.

1. In a study to identify factors that are likely to be associated with arthritis, a researcher collected data on all the patients who have attended a clinic in October 2015. The following variables were recorded in the study.

V_1 : age of the patient as of January 2016, to the nearest year

V_2 : body mass index, which is, the weight in kilograms divided by the square of the height in meters

V_3 : gender of the person coded as 1: male; 2: female

V_4 : physical activity level recorded as 1: not active at all; 2: somewhat active; 3: very much active

V_5 : status of arthritis recorded as 1: mild; 2: moderate; 3: severe

- i) Classify the variables as qualitative or quantitative.
- ii) Classify the quantitative variables as discrete or continuous.
- iii) Classify the variables as nominal, ordinal, interval or ratio.
- iv) State whether the study described here is an observational study or an experimental study. Give reasons for your answer.
- v) State whether the researcher has done probability sampling or not. Give reasons for your answer.

2. In a study focused on assessing the effectiveness of a newly introduced vaccine (N) compared to a standard vaccine presently used (S) for pneumonia in improving the health status of elderly persons, 800 persons receiving the new vaccine (N) and 400 persons receiving the standard vaccine (S) were followed up for a period of fifteen years. Among the 800 persons receiving the new vaccine (N), 600 were females. Among the persons receiving the standard vaccine (S), 200 were females. During the entire observation period, whether hospitalized due to pneumonia related causes, and if so, the length of stay in the hospital in each admission was recorded for each person. The purpose of the study was to examine whether the persons who received the new vaccine have a low rate of hospitalization due to pneumonia related conditions compared to the standard vaccine.

State whether each of the following statements is true or false in relation to this study. In each case, give reasons for your answer.

- i) The study described here is a case-control study.
- ii) The study described here is a retrospective study.
- iii) The study described here is a clinical trial.
- iv) Since there are more females in the group receiving new vaccine, the study will have a bias.
- v) In this study, a randomized block design is used for data collection.

3. A researcher is interested in estimating the percentage of students in a school who have dental problems. The school has 3400 students who belong to 85 classes with 40 students in each class. It is difficult to have a complete list of all the students in the school, but a separate register of students is available in each class. The researcher only has resources to examine 320 students for dental problems.

- i) If the researcher seeks your advice on how to do the sampling, clearly describe how you advise.
- ii) In relation to this study, clearly describe the following:
 - a) Population
 - b) Sampling unit
 - c) Sampling error

4. Literature reveals that regular exercise has an impact on blood pressure. A researcher interested in finding out how well this applies to autism children, plans to sample 120 children from among the 400 children in a child care center for autism children. The researcher plans to make the selected children engage in a regular exercise programme for one year. Prior to the engagement in the programme and at the end of every two weeks from commencement, the researcher plans to record the blood pressures of all the 400 children in the center at a specified time of the day.

- i) If the researcher seeks your advice on how to select the children for the exercise programme, clearly describe how you advise.
- ii) State whether each of the following statements is true or false. In each case, give reasons for your answer.
 - a) The population in this study is an infinite population.
 - b) The study described here does not have a control group.
 - c) The researcher can reduce the sampling error by increasing the sample size.

5. A researcher is interested in comparing the effects of two drugs as an antibiotic for a tooth pain. For each drug, the researcher wants to compare two methods of administering the drug, which are, giving as a pill or as an injection. Suppose the researcher has resources to collect data on 400 persons with tooth pain. Of the 400 persons, 80 are smokers and the rest are non-smokers. The researcher suspects smokers and non-smokers to respond differently to the drugs.

Suppose that the participants are willing to take any drug in any form they are requested to take.

- i) If the researcher seeks your advice to design this study, clearly describe how you advise.
- ii) Explain the following terms in relation to this study:
 - a) Replicate
 - b) Random variation
 - c) interaction

6. Past records of a hospital indicate that around 600, 400 and 300 patients attend daily to the eye clinic, diabetic clinic and the heart clinic respectively. The management of the hospital plans to sample 600 patients on a pre-planned day to get the views about the facilities provided to them at these clinics. Patients attending different clinics may have different opinions on the facilities.

- i) If the management seeks your advice to plan the data collection, clearly describe how you advise.
- ii) In relation to this study, clearly explain the following:
 - a) Non-sampling error
 - b) Confounding
 - c) Bias

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