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MHS-014

POST GRADUATE DIPLOMA IN BIOETHICS (PGDBE)

Term-End Examination

June, 2015

MHS-014 : RESEARCH METHODOLOGY

Time : 2 hours *Maximum Marks : 70*

PART A

*Attempt **all** questions. Each question carries **one** (1) mark. Select the most appropriate answer from the given alternatives for each of the following questions. Write answer in your answer-sheet.* *50×1=50*

1. James Lind carried out the first controlled clinical trial. The disease he studied was
   (1) Pellagra
   (2) Rickets
   (3) Scurvy
   (4) Angular chelitis

2. Critical evaluation of the quality of a study requires all of the following *except*
   (1) An understanding of study design
   (2) An understanding of analysis methods
   (3) An ability to reproduce the study
   (4) An ability to assess the strength of evidence

3. Translational research is
   (1) Cycling of research and feedback from laboratory to clinic to laboratory
   (2) Development of potential new therapeutic modalities
   (3) Evaluation of safety and efficacy of treatment
   (4) Research conducted in an area with a predominantly different language

4. Preclinical research refers to
   (1) Testing of new products before marketing
   (2) Testing of drug levels in patients to determine optimal dose
   (3) Development of potential new therapeutic modalities
   (4) Development of methods for evaluation of efficacy

5. An independent variable in a study
   (1) Is a parameter that can be determined or manipulated at the outset
   (2) Is an outcome that is determined by an unbiased observer
   (3) Cannot be determined by inclusion and exclusion criteria
   (4) Can only be a single variable

6. Which of the following is ***not*** included in the Bradford-Hill criteria for assessing causality ?
   (1) Consistency
   (2) Sensitivity
   (3) Specificity
   (4) Temporality

7. If 400 people are surveyed and 40 are found to have hypertension, the survey has measured
   (1) Disease frequency
   (2) Disease probability
   (3) Disease incidence
   (4) Disease prevalence

8. Incidence rates can be best calculated in
   (1) Case series
   (2) Case control studies
   (3) Cohort studies
   (4) Randomized controlled trials

9. A random error

(1) Is transient, inconsistent and cannot be corrected

(2) Is not affected by sample size

(3) Can be controlled by increasing accuracy

(4) Can be corrected by adjusting for the error in measurement

10. Sources of variation in measurement may arise from

(1) Instrument

(2) Observer

(3) Biological differences

(4) All of the above

11. An example of an analytic study design is

(1) Case series

(2) Case control

(3) Cross-sectional

(4) Ecological

12. A case control study

(1) May begin with exposure

(2) Always begins with exposure

(3) May begin with disease

(4) Always begins with disease

13. Multiple outcomes are best studied in

(1) Randomized controlled trial

(2) Case-control study

(3) Cohort study

(4) None of the above

14. When the period of follow-up in a study varies, appropriate analytic techniques include

(1) Survival analysis, which predicts probability of an event at any point in the study

(2) Proportional hazards model which provides a hazard ratio, similar to relative risk

(3) Both of the above

(4) None of the above

15. The advantages of a cohort study are all of the following *except*

(1) Ability to assess incidence

(2) Ability to assess rare exposures

(3) Ability to assess rare outcomes

(4) Ability to study temporality between exposure and outcome

16. A phase-4 trial evaluates

(1) Dosage

(2) Delivery mechanisms

(3) Short term safety

(4) Long term safety

17. The process to assign patients without bias to different patient groups in a clinical trial is called

(1) Allocation

(2) Assignment

(3) Randomization

(4) Blinding

18. The use of serially numbered opaque sealed envelopes is a method for

(1) Allocation concealment

(2) Randomization

(3) Blinding

(4) Interventional compliance

19. Analysis by intention to treat is carried out without considering all of the following *except*

(1) Protocol deviation

(2) Allocation assignment

(3) Compliance

(4) Withdrawal

20. A trial can be stopped before completion because of

(1) Unacceptable side effects

(2) Fraud or misconduct

(3) Treatment arm is convincingly different

(4) All of the above

21. T-tests are most useful for which type of data ?

(1) Continuous

(2) Ordinal

(3) Nominal

(4) Binary

22. Level of measurement for the variable temperature is

(1) Nominal

(2) Ordinal

(3) Interval

(4) Ratio

23. If the grading of anaemia is classified as mild, moderate and severe, the scale of measurement used is

(1) Interval

(2) Nominal

(3) Ordinal

(4) Ratio

24. Appropriate graphical representation for the continuous data is
(1) Bar graph
(2) Histogram
(3) Line chart
(4) None of the above

25. Variables which can be experimentally manipulated by an investigator are called
(1) Dependent variables
(2) Independent variables
(3) Confounding variables
(4) Extraneous or secondary variables

26. The height of a student is 50 inches. This is an example of
(1) Qualitative data
(2) Categorical data
(3) Continuous data
(4) Discrete data

27. Which one of the following is ***not*** a measure of dispersion ?
(1) Range
(2) Percentile
(3) Inter-quartile range
(4) Variance

28. Which of the following is ***not*** based on all the observations ?
(1) Arithmetic mean
(2) Geometric mean
(3) Harmonic mean
(4) Mode

29. In descriptive statistics, we study
(1) Description of decision-making process
(2) Methods for organising, displaying and describing the data
(3) To describe the probability distribution
(4) None of the above

30. You asked 10 of your friends about their weights. On the basis of this information, you stated that the average weight of the group is 48 kilograms. This is an example of

(1) Descriptive statistics
(2) Parameter
(3) Inferential statistics
(4) Population

31. If a statistical test does not reject null hypothesis, it is called as

(1) Type-I error
(2) Type-II error
(3) Both (1) and (2)
(4) The power of test is high

32. Which one of the following actions will increase the power ?

(1) Increase Alpha
(2) Increase Beta
(3) Increase the sample size
(4) None of the above

33. A sample mean is a _____ estimate and we do not know how close it is to the population mean.

(1) point
(2) sample
(3) distribution
(4) confidence

34. Which of the following is a measure based on every item of observation ?

(1) Mode
(2) Standard Deviation
(3) Range
(4) Quartile Deviation

35. Which of the following is the strongest correlation ?

(1) – 1
(2) 0·98
(3) 0·0
(4) 0·5

36. In a single-factor ANOVA, the computed value of F will be zero when

(1) There is no difference in the treatment means

(2) There is no difference in the block means

(3) The data are skewed left

(4) F will never be zero

37. To test whether or not two population variances are equal, the appropriate distribution is

(1) Z distribution

(2) Chi-square distribution

(3) F distribution

(4) T distribution with $n_1 + n_2 - 2$ degrees of freedom

38. Error deviations measure distances

(1) Within groups

(2) Between groups

(3) Both (1) and (2)

(4) None of the above

39. A larger sample size is required when

(1) The population of interest for a study is less diverse

(2) A low level of precision is required

(3) The population of interest is easily recruited to the study

(4) High level of precision is required

40. Representative sample is used so that the results of a study are

(1) Reliable

(2) Generalisable

(3) Convenient

(4) Limited

41. A sample can be defined as a

(1) Population of interest to a researcher

(2) Quota from within the whole population

(3) Subset of a population representative of the population of interest to the researcher

(4) Criterion used to define eligibility for the research study

42. A random sample is expected to approximate a normal distribution because

(1) A small sample size is not an issue

(2) There are equal numbers of below and above average cases

(3) The sample will contain mainly average cases

(4) The goal is to maximise the sampling error

43. The population from which the study sample is selected is called the

(1) Accessible population

(2) Target population

(3) Total population

(4) Universal population

44. Suppose that the probability of event A is 0·2 and the probability of event B is 0·4. Also, suppose that the two events are independent. Then P(A | B) is

(1) P (A) = 0·2

(2) P (A)/P (B) = 0·2/0·4 = $\frac{1}{2}$

(3) P (A) × P (B) = (0·2) (0·4) = 0·08

(4) None of the above

45. A sampling distribution is the probability distribution for which one of the following ?

(1) A sample

(2) A sample statistic

(3) A population

(4) A population parameter

46. Which of the following statements best describes the relationship between a parameter and a statistic ?

(1) A parameter has a sampling distribution with the statistic as its mean.

(2) A parameter has a sampling distribution that can be used to determine what values the statistic is likely to have in repeated samples.

(3) A parameter is used to estimate a statistic.

(4) A statistic is used to estimate a parameter.

47. Which of the following is the most common example of a situation for which the main parameter of interest is a population proportion ?

(1) A binomial experiment

(2) A normal experiment

(3) A randomized experiment

(4) An observational study

48. The expected value of a random variable is the

(1) Value that has the highest probability of occurring.

(2) Mean value over an infinite number of observations of the variable.

(3) Largest value that will ever occur.

(4) Most common value over an infinite number of observations of the variable.

49. Which one of these variables is a binomial random variable ?

(1) Time it takes a randomly selected student to complete a multiple choice exam.

(2) Number of textbooks a randomly selected student bought this term.

(3) Number of women taller than 68 inches in a random sample of 5 women.

(4) Number of CDs a randomly selected person owns.

50. A multi-center clinical trial in lung cancer is comparing traditional treatment, and a new treatment protocol. The remission rates are found to be similar for both traditional treatment and the new one. P value is 0·45. Which of the following conclusions can be reached ?

(1) Both traditional and new drugs are effective in lung cancer.

(2) Neither is effective.

(3) Statistical power of the study is 55%.

(4) Not enough information to reach any conclusion.

PART B

*Write short notes (in about 200 – 300 words) on any **four** of the following. Each carries **five (5)** marks.* 4×5=20

51. Graphical Presentation of Data

52. Phases of Clinical Trials

53. Advantages and Disadvantages of a Cohort Study

54. Assessment of the Validity of a Study

55. Probability Sampling