Fayoum University   **Faculty of Nursing**

Statistics model answer

I.   Short Essay question

1. Give an account on   (10 marks)
    a. Types of Study designs used in epidemiological research

Types of Epidemiological Studies:

I- Observational Studies :

   A. Descriptive studies:

     - Cross-sectional studies

   B. Analytic studies:

- Case Control Study

- Cohort

- Cross-sectional studies

II- Experimental Studies (Interventional studies):

- Clinical Trials

- Community Trials

   1. Cross Sectional Survey:

   In this type the health status of individual is assessed with respect to presence or absence of exposure to disease at the same point of time **(a cross-section of the population).** For this reason you can not determine if really exposure preceded disease or not, e.g. assess the presence of obesity in relation to diabetes mellitus.

Advantages of Descriptive Studies:

1. Studies could be conducted with the least resources (personnel and equipment).

2. They give a general overall picture of the problem.

3. Very quick, inexpensive.

Disadvantages of Descriptive Studies:

1- Impossible to calculate disease occurrence rate.

2- Not used to establish relation between exposure to factors and disease

1. Case/Control study:

It is an "observational" design comparing exposures in disease cases versus healthy controls from same population.

➢ Exposure data collected retrospectively.

➢ It is the most feasible design where disease outcomes are rare.

Advantages of Case-Control Study:

- Quick, inexpensive.

- Well-suited to the evaluation of diseases with long latency period.

- Useful in rare diseases.

- Examine multiple etiologic factors for a single disease.

Disadvantages of Case-Control Study:

- Not useful in rare exposure.

- Incidence rates cannot be estimated.

- Selection Bias and recall bias.

2. Cohort Study:

Analytical epidemiological design in which the incidence of disease (or condition) is compared among exposed and unexposed individual of a cohort. It is a prospective study i.e. follows up the incidence of a disease in the future.

It involves:

i. Study cohort:

Individuals exposed to a certain factor that may be associated with a disease e.g. smoking and lung cancer.

ii. Control cohort:

A group of individuals not exposed to the studied factor.The data obtained from both groups are compared.

Advantages of Cohort Study	Disadvantages of Cohort Study
Describe the natural history	Large number
Temporal sequence	Long term of follow up
Study rare exposure	Loss to follow up
Multiple outcome	Expensive
Calculate relative risk	Change of exposure during the study

II- Experimental (Interventional) Studies:

Experimental studies in epidemiology usually take the form of **clinical trials** and **community intervention trials**. The objective of most clinical trials is to test the possible effect, that is, the efficacy, of a therapeutic or preventive treatment such as a new drug, physical therapy or dietary regimen for either treating or preventing the occurrence of a disease.

The objective of most community intervention trials is to assess the effectiveness of a prevention program.

Types of Clinical Trials (according to purpose):

1. Prophylactic (Preventive) Trials, e.g. immunization, Health education program.
2. Therapeutic Trials, e.g. drug treatment, surgical procedure.
3. Early-detection Trials/screening Trials.
4. Diagnostic Trials.

5. Quality-of-life studies/supportive care studies.

6. Safety Trials, e.g. side-effects of oral contraceptives and injectables.

7, Risk-factor Trials

Advantages of clinical trails:

- Provide the strongest evidence of the intervention effect.

Disadvantages:

- Expensive, take long time.

- There are ethical issues concerning the studies.

- Subjects are often highly selected group.

2. Mention briefly (9 marks)
   a. Validity parameters of screening test

Validity Parameters of Screening Test:

- Sensitivity is ability of test to detect people who actually have the disease (True Positives/All diseased

  = A/(A+C) * 100

- Specificity % is ability of test to identify correctly people who actually do not have the disease (True Negatives/All not diseased)

  =D/ (B+D) *100

- +ve Predictive value % is The proportion of a positive test that are truly positive (truly diseased)

= A/(A+B) *100

- -ve predictive value is The proportion of a negative test that are truly negative (truly not diseased)

% =D/(C+D) *100

- Accuracy of the test (Agreement %) It is the proportion of true test results among all test results:

= $\sum$ A+D/ (A+B+C+D) *100

b. Factors affecting sample size
   Factor affecting sample size:
   - Importance of study (more important need larger sample).
   - Variable of study (the more the variable, the larger sample size).
   - Magnitude of the problem (inversely affect sample size).
   - Facilities 3M (man, money and material).
   - Statistical analysis and power.
c. Odds ratio and its role in determining disease causation

3. Enumerate   (6)
   a. Probability sample techniques
   1. Simple Random Sample:

   2. Cluster **Random Sample:**

   3. Stratified Random Sample:

   4. systematic Random Sample

   5. multistage Random Sample

      c. Data collection tools

Data Collection Tools:
   1. Questionnaire.
   2. Observation checklist.

3. Data collection forms.

4. Other data collection tools.

- Photography / Video: provides visually represented information

- Maps and drawing.

II. Exercise   5 marks

Number of children of some families   were 6, 4, 5, 0, 1, 3, 2, 4, 3, 2

Calculate (Mean, Median. Midrange, Mode, range

Mean	3
median	3
midrange	3
mode	No mode
range	6

III. Multiple choice questions

A. put T for correct answer or F for wrong answer   (8marks)

1. Case-control is the optimal design for studying rare exposure   F

3. Mean is one of central tendency measures affected by extreme values   T

4. Qualitative data parameters that relate part to total is called ratio   F

5. Open ended questions in questionnaire take short in data collection F

6. Histogram and pie chart are graphs used in presenting quantitative variables
F

7 Snowball sample is one of the probability sample techniques F

8. Specific objectives of research specify what will be done in the study , where, when.   T

B. Cross match Questions   2 marks

Variable	Type
1, c -Height	a-Nominal qualitative
2 b. -Socioeconomic levels(low- moderate-high)	b-Ordinal qualitative
3-Smoker and non-smokers q.	c-Continuous Quantitative
4-Number of family member/household d.	d- Discrete Quantitative

Good Luck