Epidemiological Studies

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Epidemiological Design Strategies:

- A. Descriptive:
- A.1: Population:
- *Correlation studies.
- A.2: Individuals:
- *Case report and case series.
- *Cross section

- **B. Analytic:**
- **B.1: Observational studies:**
  - ***Case control.**
  - ***Cohort.**
- **B.2: Interventional studies: Experimental (clinical trial, lab. Animal)**

A. Descriptive studies: Describe pattern of disease as person, place, time.

A.1. Population:

- **A.1.1: Correlation studies: Describe the disease in the entire population in relation to factor of interest, it describe the relation as linear association, but sometime may be U shape or J shape. It uses the correlation coefficient, which is measure of association and lies between (1-,1+) which means strong association, but (0) means no association.**

- *Advantage:
- .Quick.
- . Not expensive.
- . It is the first step in searching for exposure-disease relationship.
- * Limitation:
- . The true in population (correlation between disease and exposure) may be not true on individuals.

A.2. Individuals:

- **A.2.1: Case report and case series: Describe the experience of a single patient or small group of patients with a similar diagnosis, it reflecting unusual representation of a disease(unusual cases e.g. polyvinyl chloride factory that cause liver angiosarcoma).**

- *Advantage:
- . Formulate hypothesis.
- *Limitation:
- . Not population based that means not represent population (no generalization).

A.2. Individuals:

- 1:A.2. Cross sectional (prevalence-transverse): Most important
- The presence of disease and factor (exposure) are assessed among individuals in our sample at same present time.
- Advantage:
- 1. Measure prevalence.
- 2. Rapid, easy, inexpensive.
- Limitation:
- . Do not know which come first disease or exposure.

B. Analytic studies:

B.1.Observational:

- B.1.1. Case control (retrospective, trohoc): Begin with group of patient (cases) and comparable group without diseases

- *Advantage:
- 1. Easy, not expensive.
- 2.Used in a rare disease.
- 3. Proves association.

- ***Limitation:**
- **1. Selective survival.**
- **2. Bias: recall (person not remember)**
- **3. Difficult to select control (control must be has the same sociodemographic and other characteristic with the case to minimize bias)**
- **4. Direct measures of risk is not possible, but odds ratio is used as indirect risk measures. Odd ratio=(a/c)/(d/b)=a/c X d/b=ad/cb**
- **Odd ratio= Percentage of event among cases**
- **Percentage of same event among control group**

B.1.Observational:

- **B.1.2.Cohort (longitudinal, incidence): These are observational analytic studies where group(s) of individuals are defined on the basis of presence or absence of exposure to a suspected risk factor o a disease, then followed for a period of time to assess the occurrence of a disease. Start with free from disease individuals.**

- Types of cohort:
- 1. Retrospective cohort: .
- 2. Prospective cohort.
- 3.Ambidirectional cohort: Combination of both retrospective and prospective cohort.

Cohort

- RR=Ie/Io
- RR=a/a+b
  - c/c+d
- AR=Ie-Io
- RR= relative risk, risk ratio.
- AR= attributable risk, risk reduction.
- Ie= No. of cases in exposed (a)
  - Total population exposed (a+b)
- Io= No. of cases in non exposed (c)
  - Total population in non exposed (c+d)
- Attributable Risk %={(Ie-Io)/Ie } X100

Cohort

- Advantage:
- 1. Measures incidence.
- 2. Risk is directly measured by relative risk and attributable risk.
- 3. Proves causation.

- Limitation:
- 1. Long time and costly.
- 2. Not for rare disease but for rare exposure.
- 3. Loss to follow up (migration, or death).

B.2: Interventional studies:

- Like cohort studies but investigators themselves allocate the exposure.
- 2:A. Lab animal: Infect animal or give a carcinogen or new drugs.
- 2:B. Clinical trial: On human, either therapeutic on a diseased people as evaluating the effect of a certain drugs , or preventive on a healthy people as giving a vaccine (prophylactic).

- * Advantage:
- . It is a golden type of the epidemiological studies.

- *Limitation:
- 1.Expensive, long time.
- 2. Ethical problem.

* Confounding factor: It is a third factor which is associated with the exposure and affect the outcome. Confounder can lead to over and under estimation of the true association and can change the direction of the observation effect.

* Generalization: The relation between exposure and outcome among individual true in a population, in other word we can generalize the results on a population.

In a sample of 150 persons, there were 100 persons had angina from those with angina 80 persons had history of smoking. While 50 persons didn`t have angina and from those 30 persons not smokers.

A. What is the type of study?

B. Calculate epidemiological measurements in this type of study.

C. What are the advantages and limitation of this type of study?

An epidemiological study started with 50 patients of renal failure and 50 persons were healthy, but they had multiple similar socio-demographic characteristics with diseased group, to study the relation between recurrent urinary tract infection (U.T.I) and renal failure. There were 35 diseased and 5 persons free from disease both of them had recurrent U.T.I..

Cohort study is conducted to evaluate the relation between family history of breast cancer among 1000 women and occurrence of breast cancer among them. 500 women with positive family history, and 500 women without. Both groups start at age 35 years and followed for 15 years during the follow up period, 50 women in positive family history group diagnosed as breast cancer, and 20 women in negative family history group develop breast cancer.

From information above:

1. Construct a 2x2 table for above information.

2. Calculate the risk measures of developing breast cancer among above groups.