



Classification of research

1. Descriptive studies.

- A. Case reports and case series.
- B. Correlation studies.
- C. Cross-sectional studies.

2. Analytic studies:

- A. Observational studies:
 - i. Case-control study.
 - ii. Cohort study.
- B. Interventional (experimental) studies.

Second: Analytic studies

A. Observational studies:

i. Case-control study.

- ❖ The basic premise of analytical epidemiology is that disease does not occur randomly but rather undescrivable patterns that reflect the underlying etiology.
- ❖ Consider **two groups**: everyone has the disease of interest (**cases**) and a comparable one in which everyone is free of the disease (**controls**).

Strengths:

1. It is relatively **quick and inexpensive** compared with other analytic designs.
2. It is particularly well suited to evaluating disease with a **long latent period**.
3. It is optimal for the evaluation of **rare diseases**.
4. It Can examine **multiple** etiological factors for a single disease.

A limitation

- is inefficient for assessing occasional exposure
- cannot directly compute disease incidence rates in exposed and non-exposed individuals but can estimate the relative risk (odds ratio).

- The temporal relationship between exposure and disease may be challenging to establish in some situations.
- It is particularly prone to bias compared with other analytic designs, particularly selection and recall bias (In general, bias may affect the validity of the results by the possibility of exaggeration or underestimation).

Types of the case-control study

- **Retrospective case-control study:** if all the cases were already diagnosed at the time the investigator initiates the study.
- **Prospective case-control study:** if the study is begun and all the new cases that will be diagnosed within the next period of time will be included in the study.

How to conduct a case-control study

- Identify cases of disease of concern
- Identify appropriate non-diseased comparison group ("controls")
- Document exposures among cases and controls
- Calculate odds ratios (it measures the association between exposure and outcome).
- Perform statistical tests or calculate confidence intervals

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ii. Cohort study.

- In epidemiology, the term cohort is defined as a group of people who share common characteristics or experiences within a defined time period (e.g., age, occupation, exposure to drugs, and vaccine).
- It is an observational analytic design, and it is also called (follow-up, longitudinal, incidence, and forward-looking study).

The distinguishing features of cohort studies are:

- A. A cohort is identified before the appearance of the disease under investigation.
- B. The study groups are observed to determine the frequency of disease among them.
- C. The study proceeds forward from cause to effect.

Therefore, note that the framework of an observational study: **case-control** studies which proceed from ((**effect to cause**)) while **cohort** studies are to work from((**cause to effect**)).

B. Interventional (experimental) studies.

Aims:

1. To provide scientific **proof** of etiological or risk factors which may permit the modification or control of those diseases.
2. To provide a method of **measuring the effectiveness and efficiency of health services** to prevent, control, and treat disease and improve the community's health.

Types of Interventional (experimental) studies

1-Randomized controlled trials (i.e., those involving a random allocation process).

The basic steps in conducting the R.C.T. include the following:

- A. Drawing up a protocol.
- B. Selecting reference and experimental populations.
- C. Randomization.
- D. Manipulation or intervention.
- E. Follow-up.
- F. Assessment of outcome.

2-Non-randomized or non-experimental trial:

They are divided into three types:

- A. **Uncontrolled trials:** control groups are not used, such as the effectiveness of pap tests for cervical cancer.
- B. **Natural control** (natural experiments): Nature has separated the population into two groups; for example, with respect to cigarette smoking, people have divided themselves into two groups smokers and non-smokers.
- C. **Before and after comparison study**(pre-post clinical trial): this study center round compares the incidence of disease before and after introducing preventive measures.
 - A-without control
 - B-with control