

**Research & Epidemiological studies-1**  
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**Research is:**

- A systematic & organized scientific process to find answers to the questions
- Getting specific answer to specific question
- Involves data collection, analysis and interpretation.

**Research process:**

1. Problem selection
2. Literature review
3. Formulation of research objectives
4. Selection of variables
5. Selection of the appropriate study design
6. Sampling of population
7. Data collection
8. Data analysis
9. Presentation of finding

**The preparation of research design, involves the consideration of the following:**

1. Objectives of the research study.
2. Method of Data Collection to be adopted
3. Source of information—Sample Design
4. Tool for Data collection
5. Data Analysis-- qualitative and quantitative

***Epidemiology is:***

Study of the occurrence and distribution of health-related diseases or events in specified populations, including the study of the determinants influencing such states, and the application of this knowledge to control the health problem

(Porta M, Last J, Greenland S. A Dictionary of Epidemiology, 2008)

**Types of Epidemiologic study designs**

**I-Based on objective/focus/research question**

1. Descriptive studies

- Describe: who, when, where & how many
2. Analytic studies
    - Analyse: How and why

## **II- Based on the role of the investigator:**

1. Observational studies
  - The investigator observes nature
  - No intervention
2. Intervention/Experimental studies
  - Investigator intervenes
  - Has a control over the situation

## **III. Based on timing:**

1. One-time (one-spot) studies
  - Conducted at a point in time
  - An individual is observed at once
2. Longitudinal (Follow-up) studies
  - Conducted in a period of time
  - Individuals are followed over a period of time

## **IV. Based on direction of follow-up/data collection:**

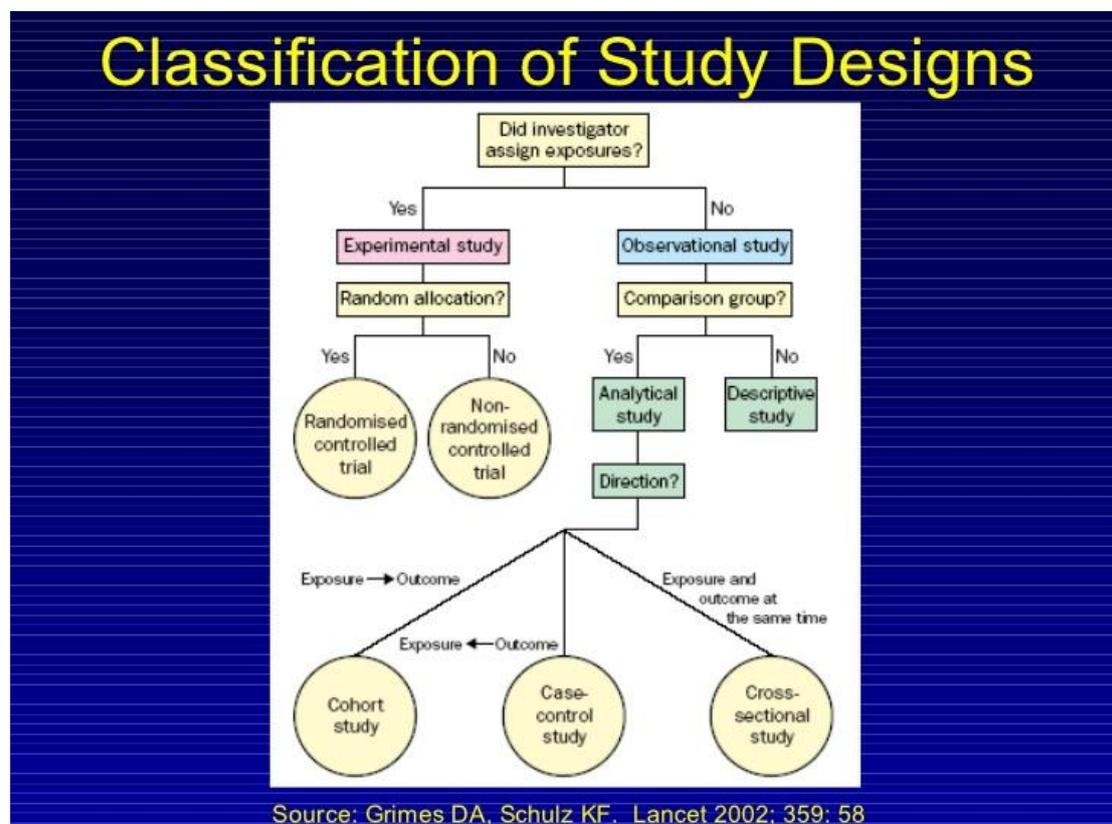
1. Prospective
  - Conducted forward in time
2. Retrospective
  - Conducted backward in time

## **V. Based on type of data they generate:**

1. Qualitative studies
  - Generate contextual data
  - Also called exploratory studies
2. Quantitative studies
  - Generate numerical data
  - Also called explanatory studies

## VI. Based on study setting:

1. Community-based studies
  - Conducted in communities
2. Institution-based studies
  - Conducted in communities
3. Laboratory-based studies
  - Conducted in major laboratories



The type of the study mainly depends on : 3 questions

### Q1: what is the aim of the study?

1. To describe the population : descriptive
2. To quantify the relation between factors: analytical, experimental

### Q2:, was intervention or investigator assign the exposure?,

- 1-Yes : experimental ,  
if there is randomly allocated: RCT  
If no randomization : non randomized trial
- 2- No : Observational study, analytical

### **Q3. when were the outcomes determined?**

1- Risk factor before, outcome later: cohort

Exposure —→ Outcome

2- At the same time as the exposure: cross-sectional

3- Outcome first, then risk factor : case control.

Outcome —→ Exposure

### **Descriptive epidemiology:**

It Study of the occurrence and distribution of disease.

Answers the four major questions: *how many, who, where, and when?*

#### **Uses of descriptive epidemiology:**

1- **Provides data for identifying the:**

- Magnitude (size) of the problem,(morbidity & mortality)
- Pattern of the disease and
- disease trend analysis.

2- **Giving clues for aetiology .**

3- **Provides the background for planning and evaluation**

4- **Contributes to research**

#### **Descriptive epidemiology Classically asks the following question about the disease:-**

- when it is occurring? -----time distribution
- where it is occurring?----- place distribution
- who is having the disease?----person distribution

#### **Procedures in Descriptive Studies:**

1. Defining the population to be studied
2. Defining the disease under study
3. Describing the disease by: person, place, time.
4. Measurement of disease
5. Comparing with known indices
6. Formulation of an aetiological hypothesis

#### **Descriptive studies type:**

■ **At level of Populations:**

➤ **Correlational studies**

■ **At level of Individual:**

- **Case report**
- **Case series**
- **Cross sectional studies**
- **Longitudinal studies**

**Case report:**

- it is the most basic type of descriptive study of individuals.
- It is a detailed report done by one or more clinicians covering the profile of single patient by taking history, clinical examination, investigations, ect...
- Case reports are the least publishable unit in the medical literature (medical journals), accounting for only third of all articles in literature review.
- Its important, because prompts further investigations.

**Cross-sectional (prevalence) studies:**

- It is simplest form of an observational study
- It based on a single examination of cross-section of population at one point in time.
- These studies provide a snapshot of the population at a particular time.
- It is known as a prevalence study
- It is more useful for chronic disease than acute.
- It provides very little information about natural history of disease
- Could be done in large population or smaller ones.
- They cut across the general population, not simply those seeking medical care

**Advantages of cross-sectional studies**

- Less time consuming
- Less expensive
- Provides more information
- Describes well
- Generates hypothesis
- Good for identifying prevalence of common outcomes

**Disadvantage of cross-sectional:**

- Least useful to establish causation
- More vulnerable to bias
- Cannot determine whether exposure preceded disease
- It considers prevalent rather than incident cases, results will be influenced by survival factors

**Longitudinal study:**

- Observations are repeated in the same population over a prolonged period of time by means of follow-up examinations.
- longitudinal study: at least two cross-sectional studies apart

**Longitudinal studies are useful:**

- to study the natural history of disease and its future outcome
- for identifying risk factors of disease, and
- for finding out incidence rate or rate of occurrence of new cases of disease

**Longitudinal studies are :**

- Difficult to organize
- More time-consuming