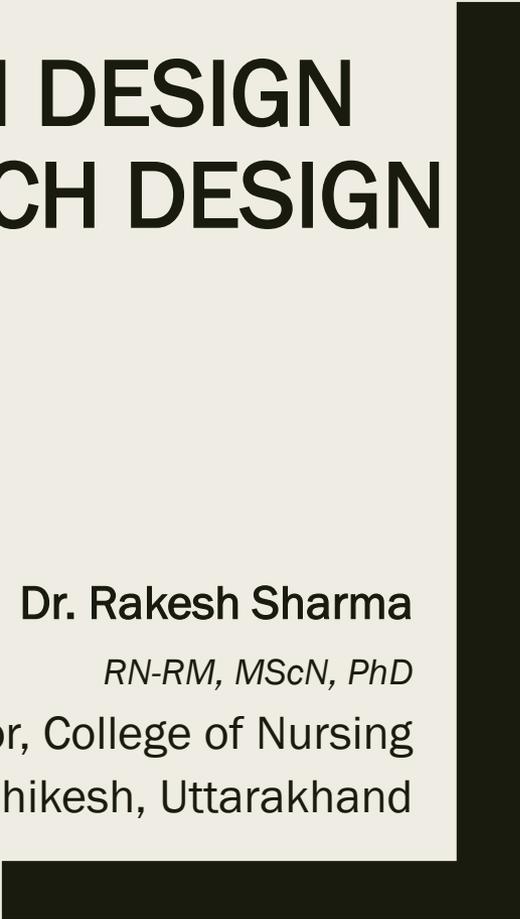


- 1. PREPARING RESEARCH DESIGN**
- 2. QUANTITATIVE RESEARCH DESIGN**

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AIM

- The aim of this talk is to help you to gain a greater understanding of quantitative research designs as they apply to the research process, to use this information to critique this aspect of research publications and to choose the most appropriate research design for your research proposal.

Introduction: Quantitative research

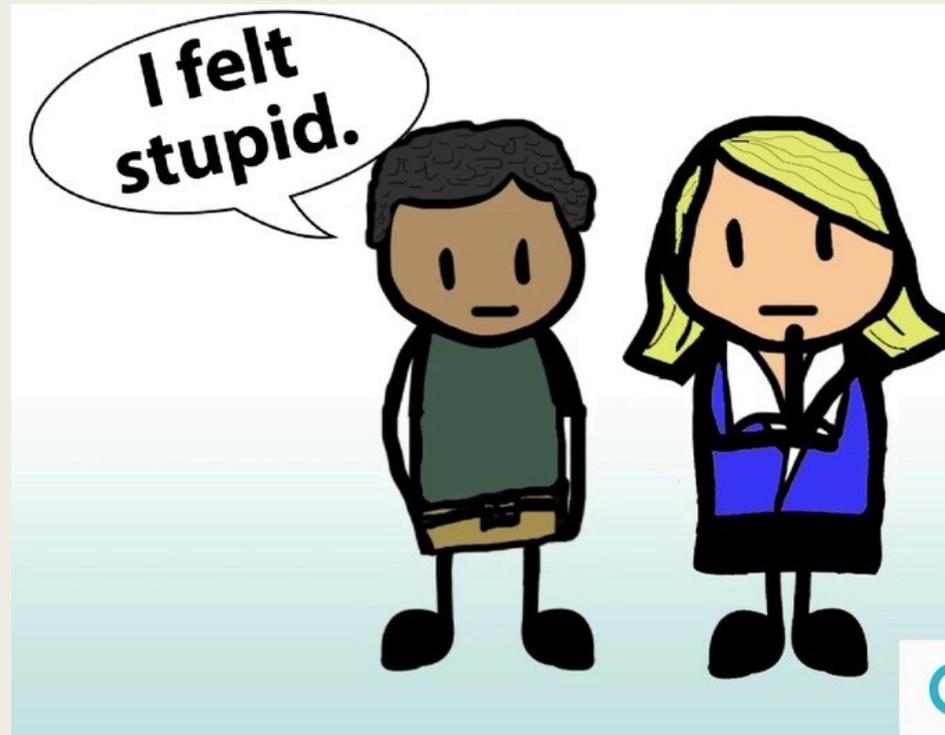
- Quantitative research is a formal, objective, systematic process in which numerical data are used to obtain information about the world.
- It is the systematic empirical investigation of observable phenomena via statistical, mathematical, or computational techniques



Introduction:

Qualitative research

- Qualitative research is a systematic, interactive, subjective approach used to describe life experiences and give them meaning



Definition: Research Design

- “The research design is the **master plan** specifying the **methods and procedures** for collecting and analyzing the needed information in a research study”.
- A research design is a blueprint for conducting the study that maximizes control over factors that could interfere with the validity of the finding.



development of research design:

- Prepare Gajar Halwa



Finding answers to the following questions lead to development of research design:

1. What is the primary purpose of the study to **describe variables** and group in the study, to study **relationship**, or to study **causality** within the study situation?
2. Will a **treatment / intervention** be used in the study?
3. If intervention is used, it will be **controlled** by researcher?
4. Is there is a **pre-test** before treatment?

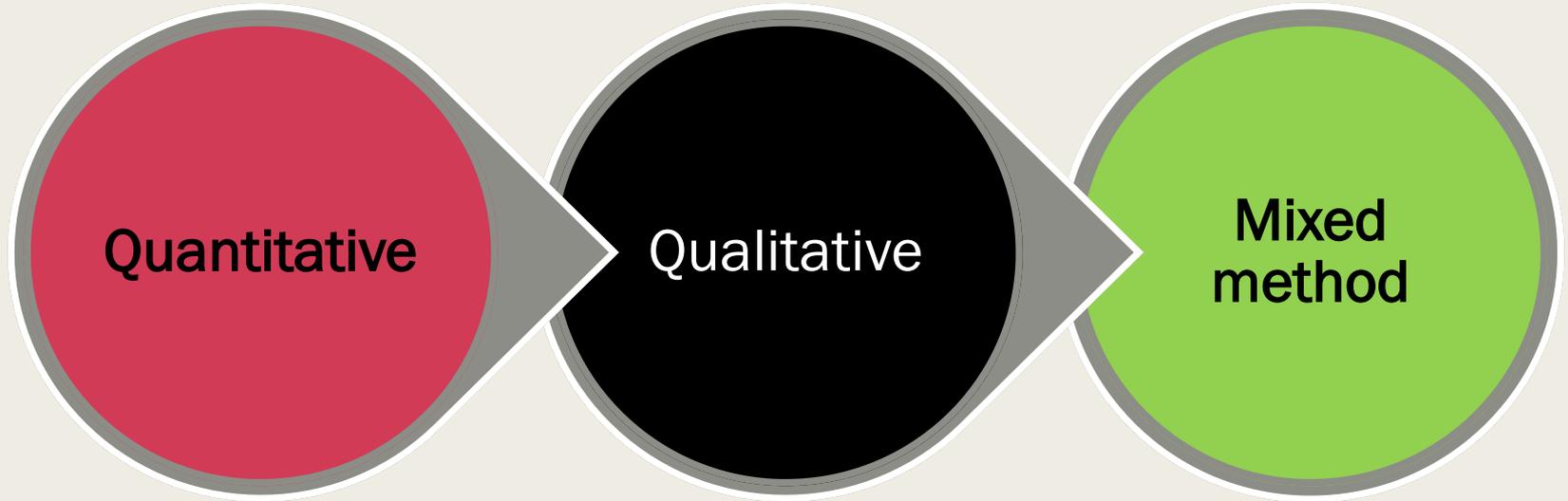
Finding answers to the following questions lead to development of research design:

5. Will the sample be randomly selected?
6. Will the sample be studied as a single group or divided into groups?
7. How many groups will there be?
8. What will be the size of each group?
9. Will there be a control group?
10. Will group be randomly assigned ?
11. Will there be repeated measures of variables?

Finding answers to the following questions lead to development of research design:

12. Will the data be collected cross-sectionally or over time?
13. Have extraneous variables been identified?
14. Are data being collected on extraneous variables?
15. What strategies are being used to control for extraneous variables?
16. What strategies are being used for comparison of variables or groups?
17. Will data be collected at single site or at multiple sites?

Types of Research Design



Quantitative research design

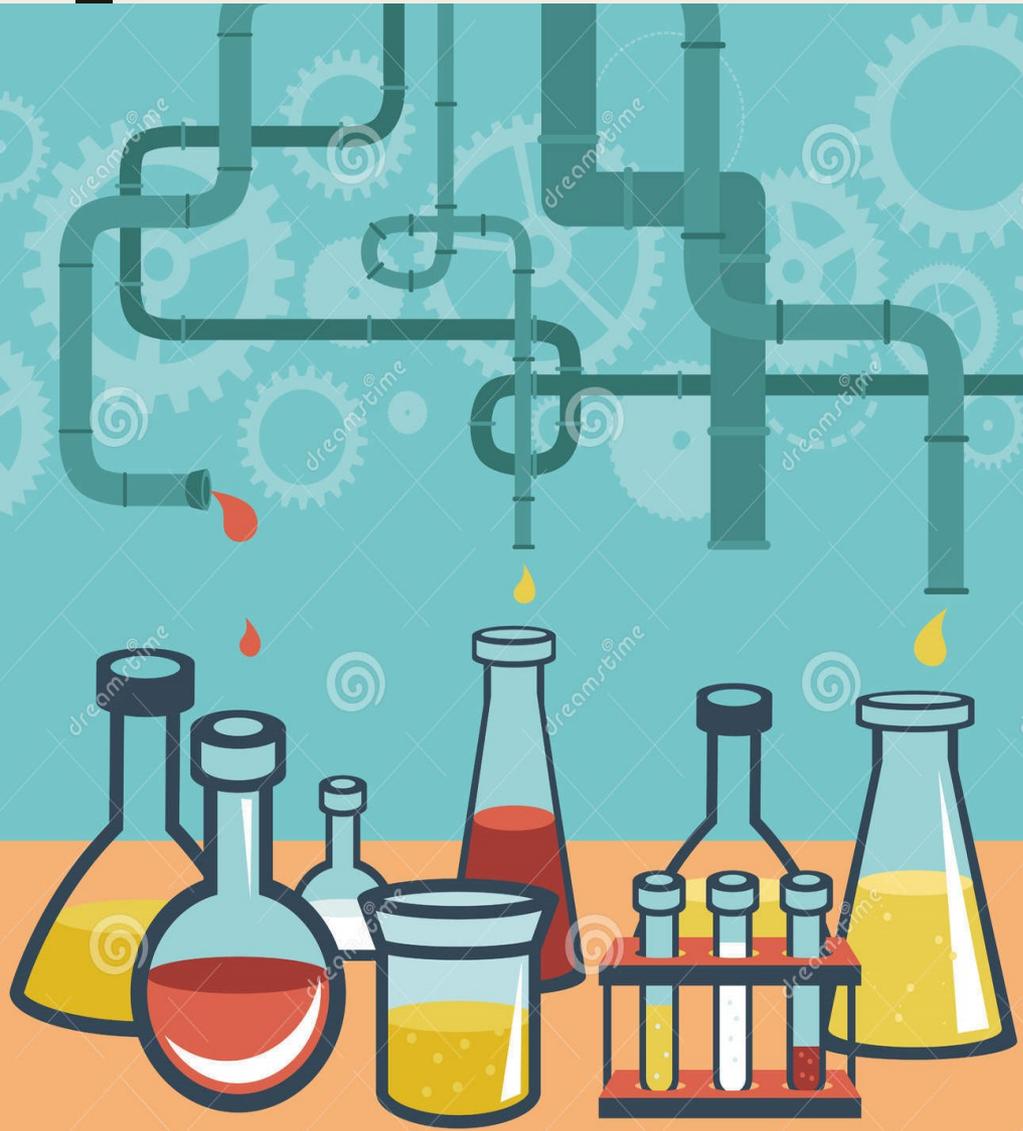
Types of Quantitative Research Design

I. Experimental

II. Non-experimental

III. Other research design

Experimental Research Design



Experimental Research Designs

- Most scientifically sophisticated research method.
- Empirical research method used to examine a hypothesized causal relationship between dependent and independent variables.

Eg. Effects of selected aerobic exercise on obesity among adolescent girls studying in AIIMS Rishikesh



Types of Experimental Research Designs

True experimental design

Quasi-experimental design

Pre-experimental designs

True Experimental Design

- Characterized by:



Type of True Experimental Designs

Pretest - posttest control group

Post test – only control group

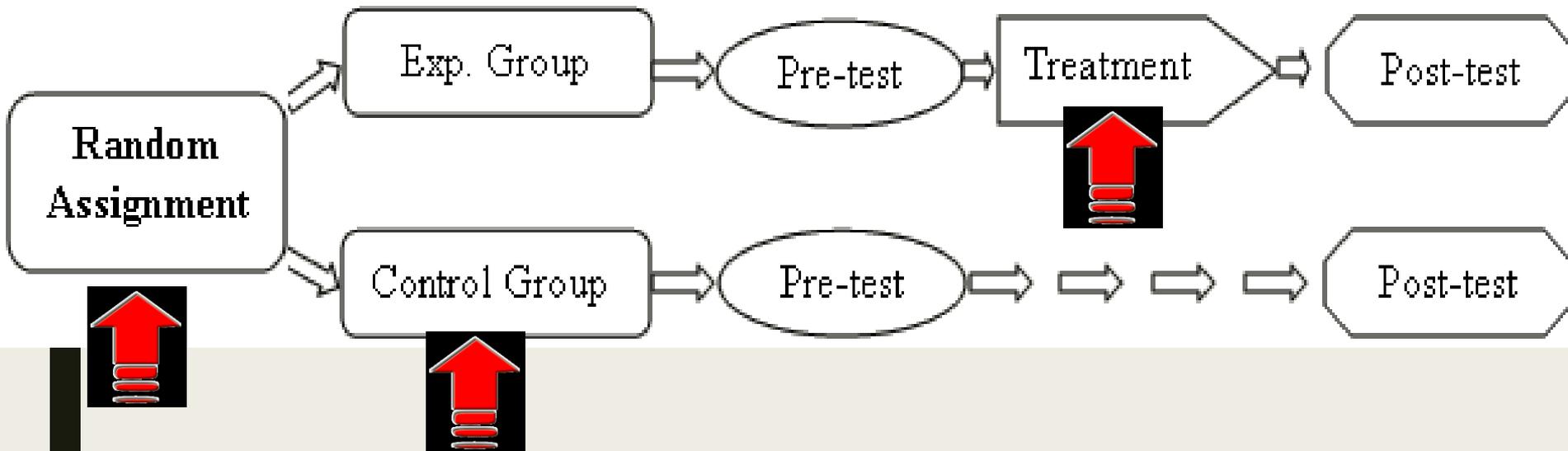
Randomized block design

Factorial design

Solomon four group

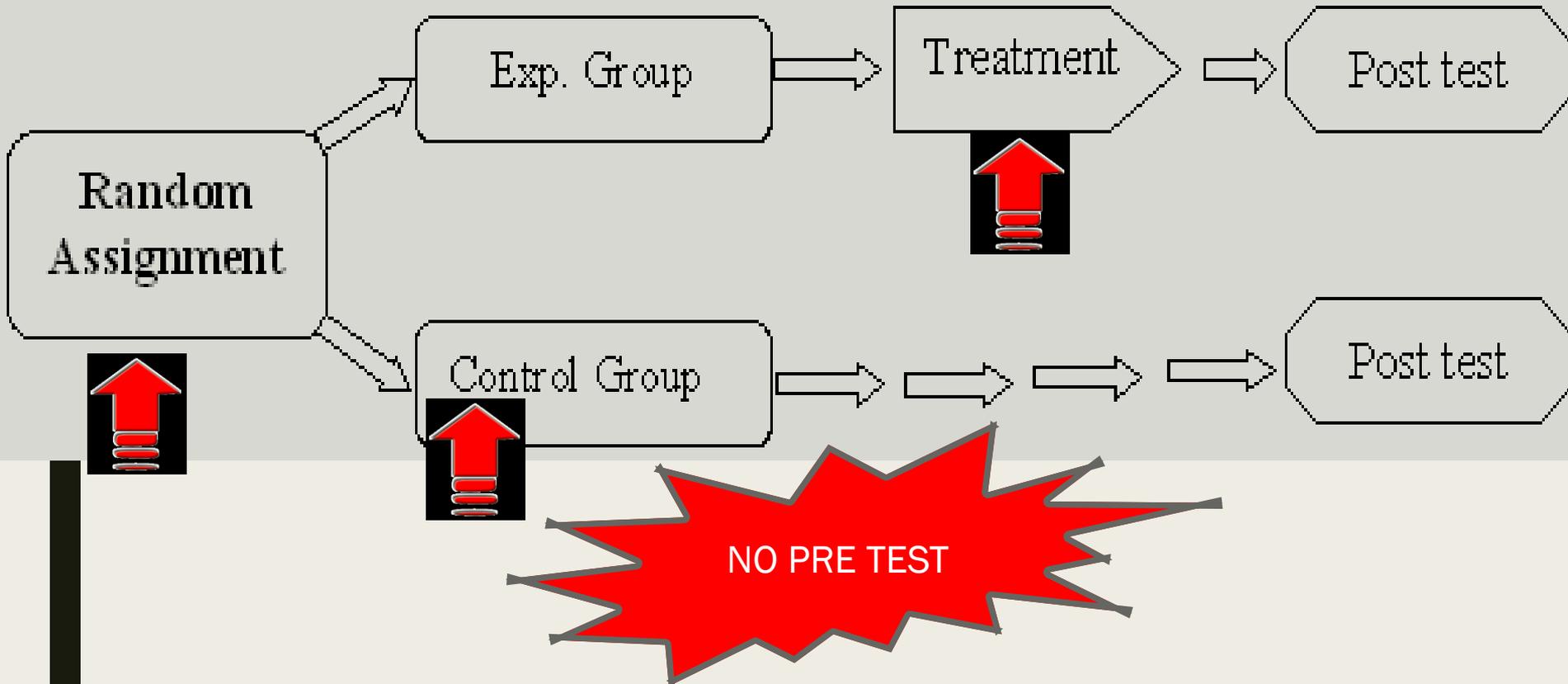
Crossover measures / counterbalance design

1. Pretest - posttest control group



- For example, “An **experimental study** to assess the effectiveness of cognitive behavioral therapy interventions for patients with breast cancer”.

2. Post-test only control design

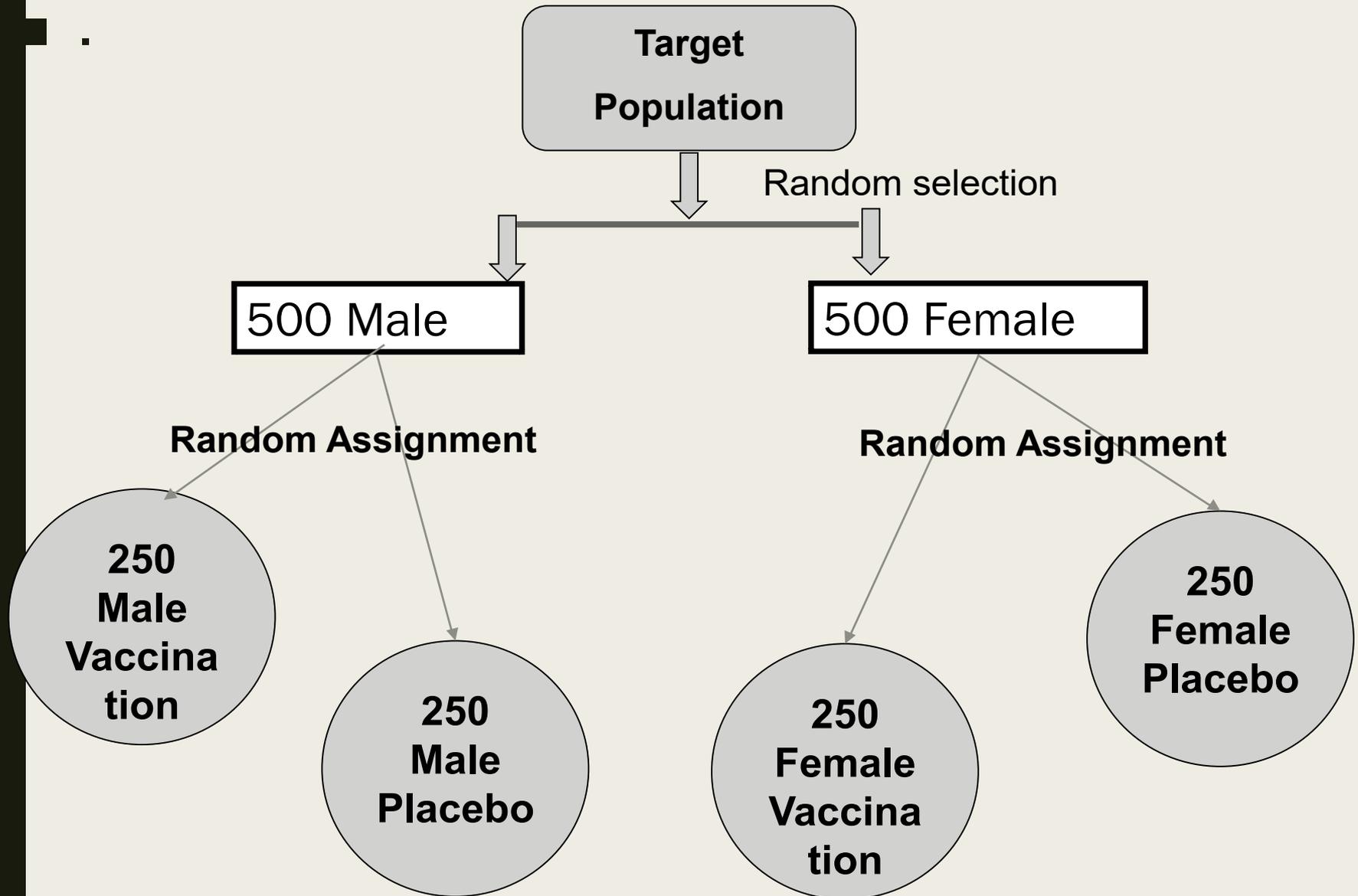


- *For example,* to study the effect of an educational intervention related to urinary incontinence on the subsequent help seeking behavior of older adults.

3. Randomized block design

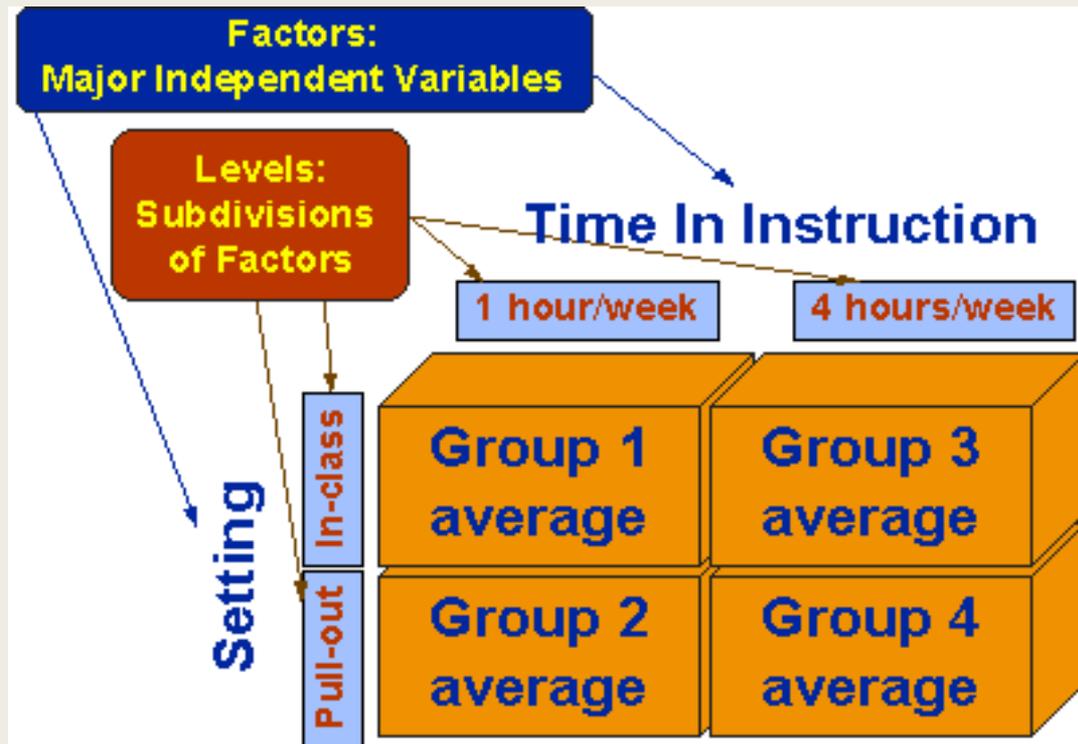
- Subjects are assigned to blocks, based on gender. Then, within each block, subjects are randomly assigned to treatments (either a placebo or a cold vaccine).
- Eg. For this design, 250 men get the placebo, 250 men get the vaccine, 250 women get the placebo, and 250 women get the vaccine.

3. Randomized block design

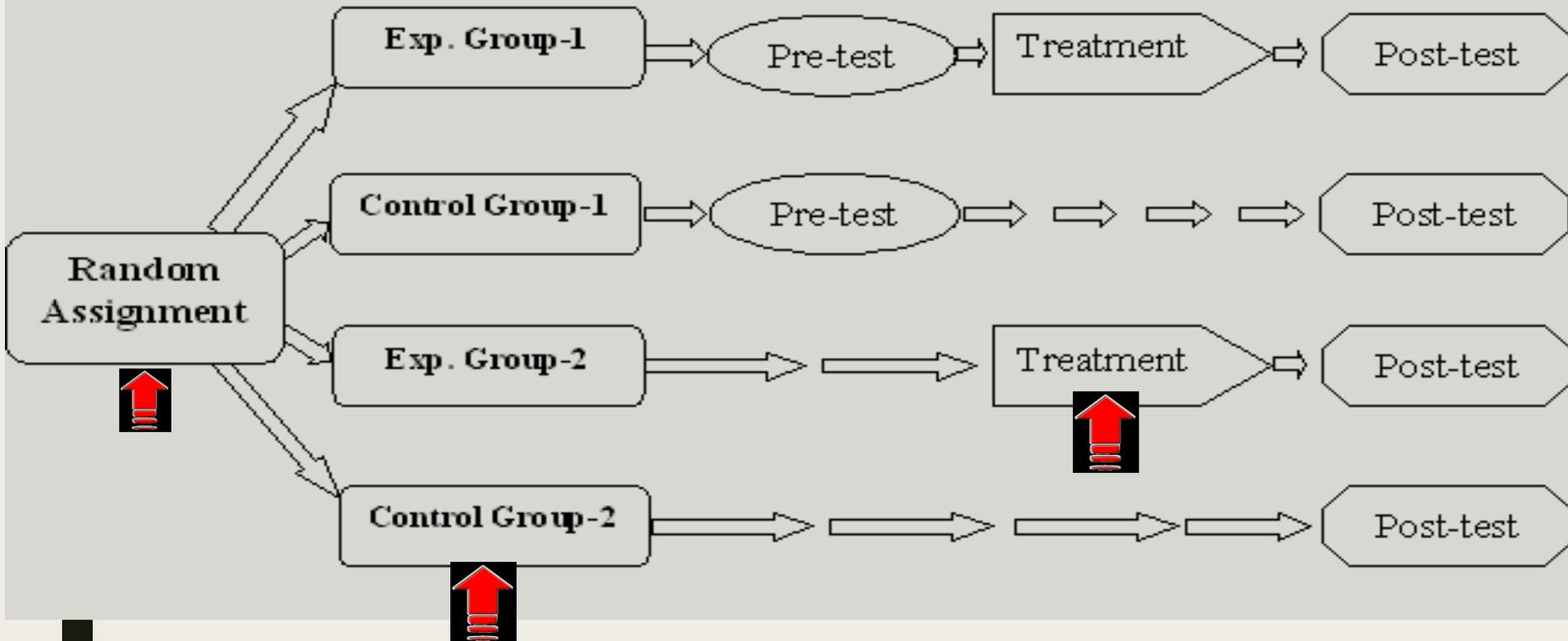


4. Factorial design:

- Researcher manipulates two or more independent variables simultaneously to observe their effects on the dependent variables.
- This design is useful when there are more than two independent variables, called as factors to be tested.



5. Solomon four group design:



- For example, “Effectiveness of workshop on management of HIV to improve the nurses attitude toward patients with AIDS admitted in selected hospitals”.

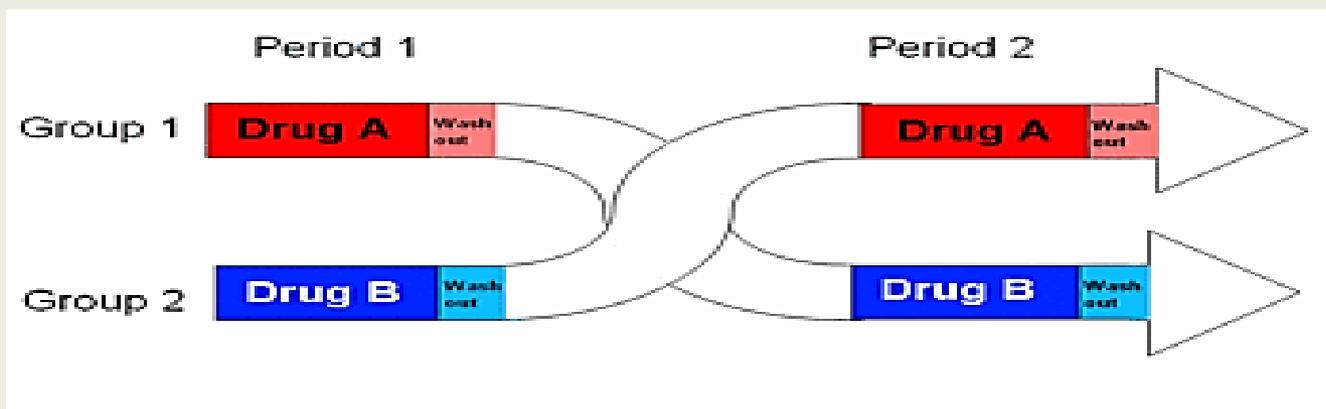
6. Crossover design (Repeated Measure) / counterbalance design

- It involves the exposure of the same subject with more than one experimental treatment.

- *Example:*

6. Crossover design (Repeated Measure) / counterbalance design

Group	1-3 months	Washout period 1-Month	5-7 Month
Group-I	Drug A	no drug	Drug B
Group-II	Drug B	no drug	Drug A



Types of Experimental Research Designs

True experimental design

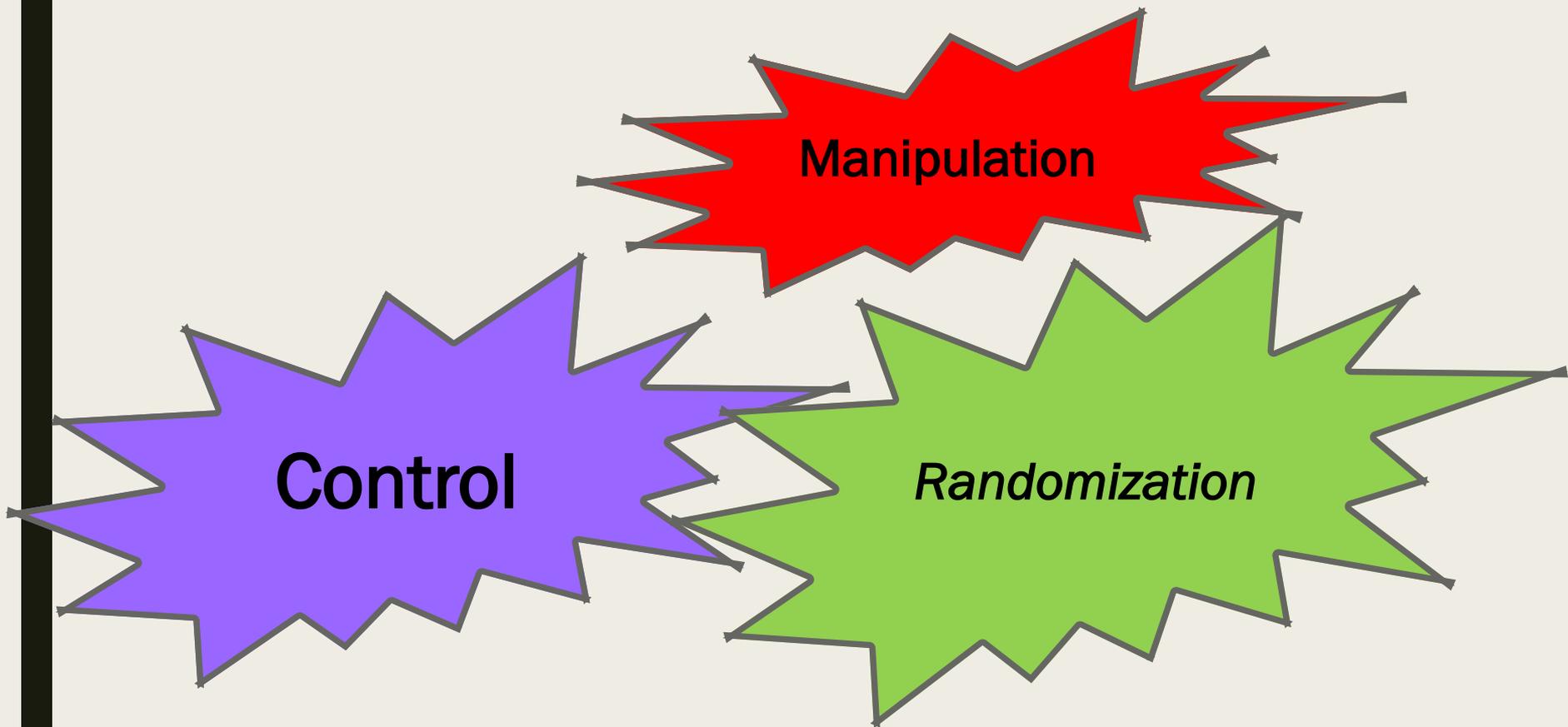


B. Quasi-experimental design

Pre-experimental designs

Quasi Experimental Research Design

Researcher initiates an experimental treatment but some characteristics of true experiment are lacking.



Types of Quasi Experimental Research Design

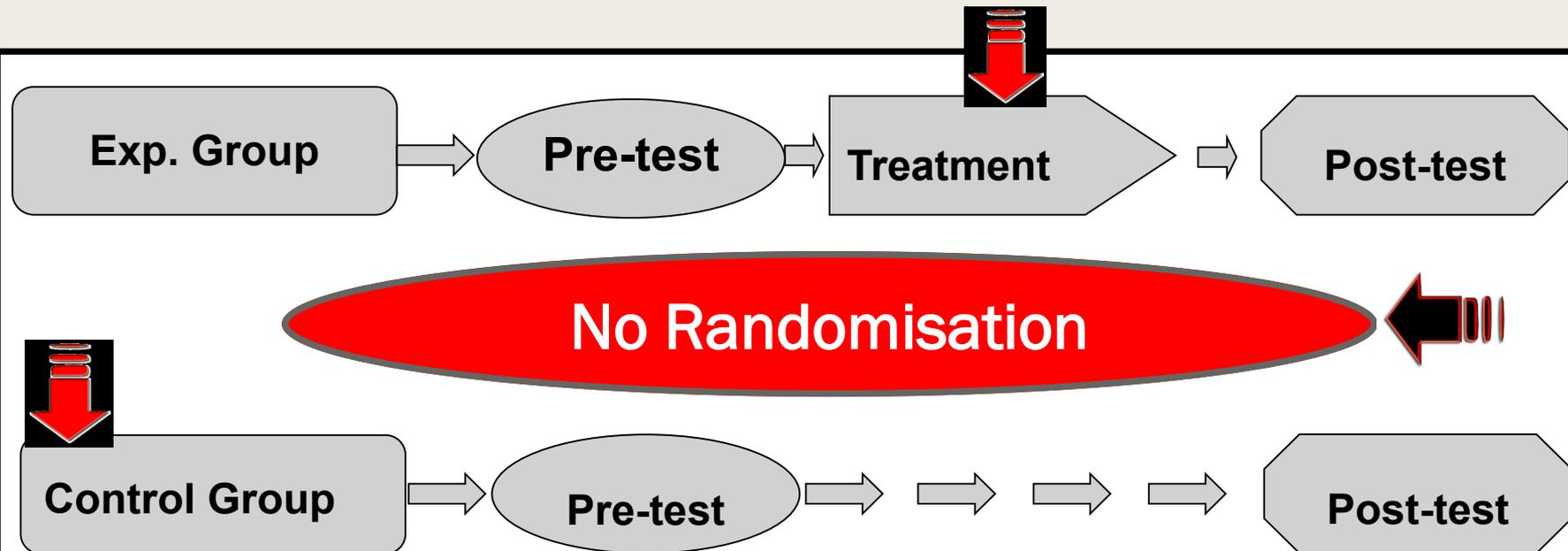
```
graph TD; A[Types of Quasi Experimental Research Design] --> B[1. Non-equivalent Control Group design]; A --> C[2. Time series design];
```

*1. Non-equivalent
Control Group design*

*2. Time series
design*

1. Non-equivalent Control Group design

- Also known as non-equivalent control group design.
- Identical to the pre-test post-test control group design, except there is no random assignment of subjects in experimental and control group



2. Time Series Design

It is useful when researcher wants to measure the effects of a treatment over a long period of time.



No Randomisation
No control group

O=Observation

Types of Experimental Research Designs

 *True experimental design*

 *Quasi-experimental design*

 *C. Pre-experimental designs*

Pre-experimental Research Design

- This research design is considered **as very weak**, because researcher has very little control over the research.
- **Manipulation of independent variables** but limited control over extraneous variables, **no randomization and control group.**



Types of Pre Experimental Research Design

1. One-shot case design

2. One group pre-test /post-test design

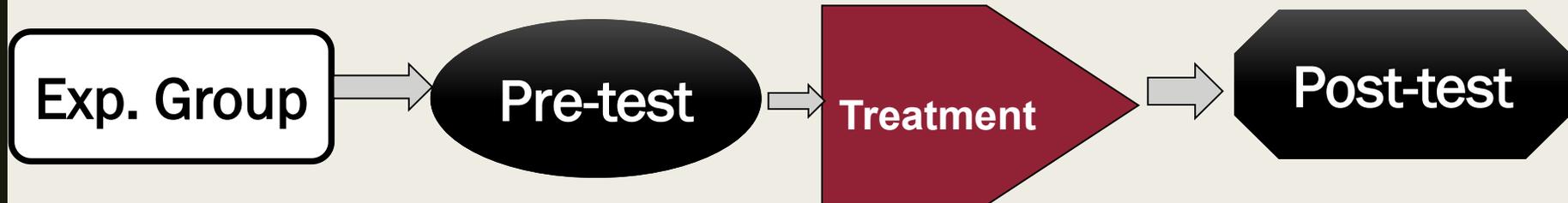
1. One-shot Case Design

- Single experimental group is exposed to an experimental treatment and observations are made after the implementation of treatment.



2. One group pre-test /post-test design

- Only one group of study subjects is selected as an experimental group.



NON EXPERIMENTAL RESEARCH DESIGN

Non Experimental Research Design

- Variables are not deliberately manipulated, nor the setting is controlled.
- Researchers collect data without making changes or introducing treatments.
- Data obtained are analyzed and the results may lead to the formation of hypothesis that can then be tested experimentally.

Types of Non Experimental Research Design

1. Descriptive design

2. Correlational / Ex post facto

3. Developmental research

4. Epidemiological

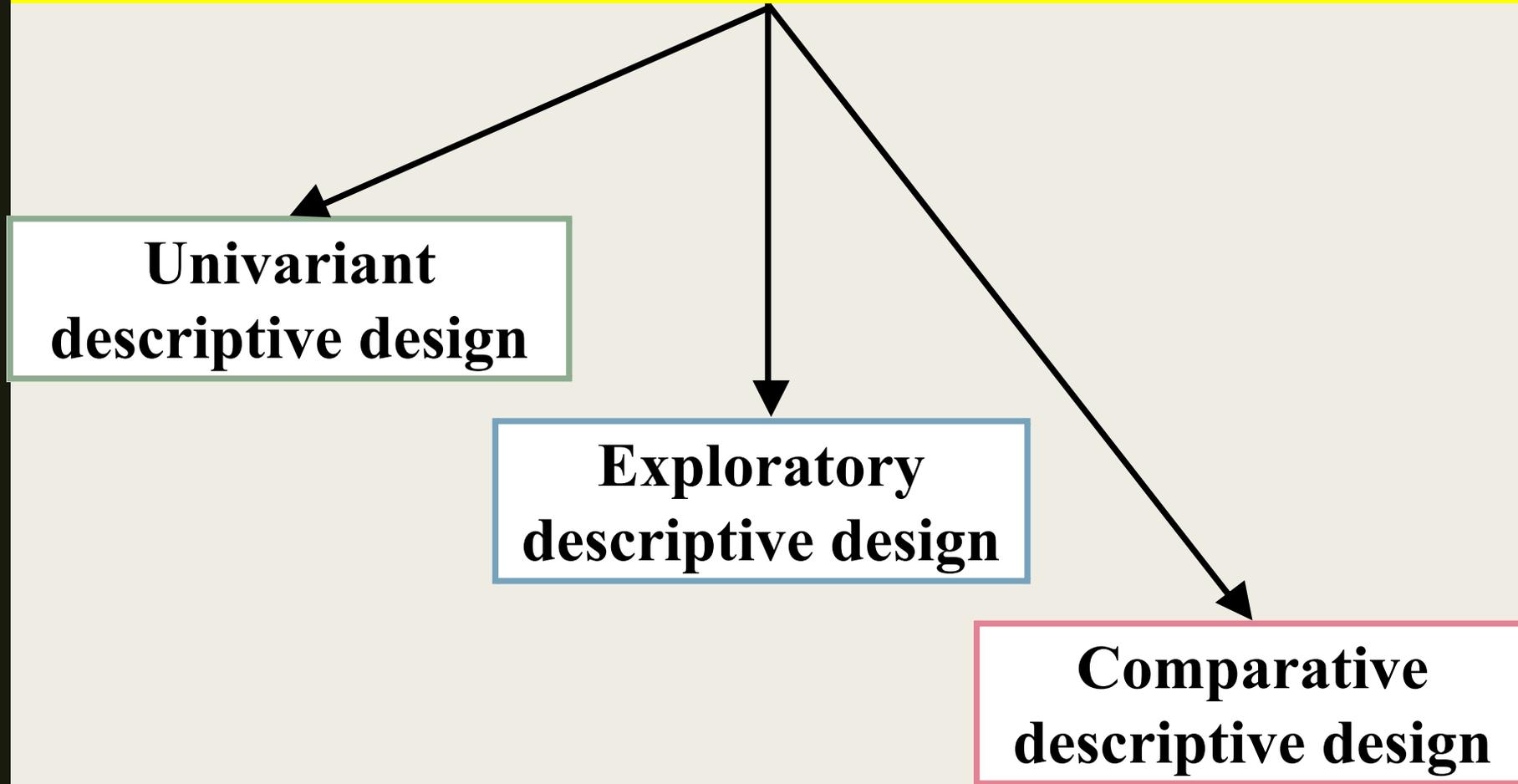
5. Survey research

1. Descriptive Research Designs

- Phenomenon occurs in natural setting without imposing any control or manipulation.
- Used to develop theories, identify problems with current practices, justify current practices, make judgments or determine what practices are doing in similar situations.



Types of Descriptive Research Designs



Univariant Descriptive Design

- Studies undertaken to describe the frequency of occurrence of a phenomenon rather than to study relationship.
- For example, a researcher is interested in assessing the experiences of patients suffering with rheumatoid arthritis.

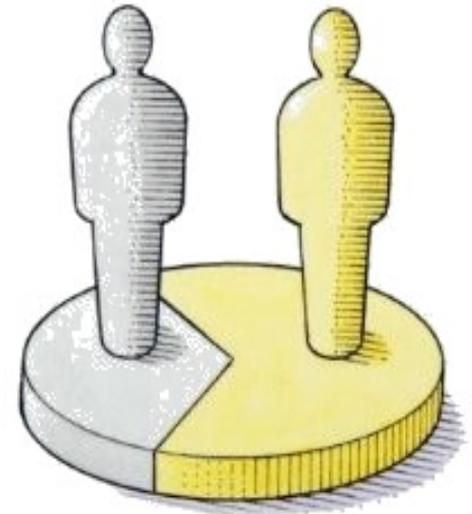
Exploratory Descriptive Design

- Investigating the phenomenon and its related factors about which is not much known.
- For example, an exploratory study to assess the multifactorial dimensions of fall and home safety measures for elderly people living in selected communities in city Ludhiana



Comparative Descriptive Design

- Comparing occurrence of a phenomenon in two or more groups.
- For example, A comparative study on health problems among rural and urban older people in district Bikaner, Rajasthan.



Types of Non Experimental Research Design

1. Descriptive design



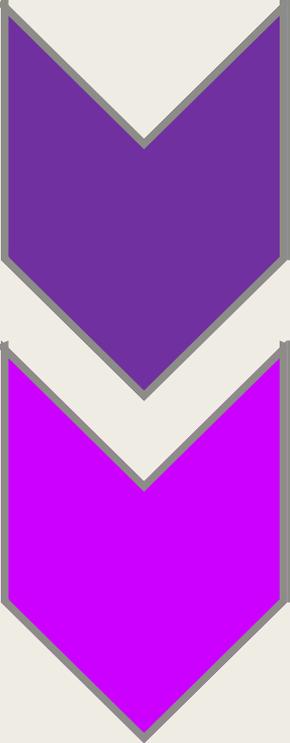
2. Correlational / Ex post facto

3. Developmental research

4. Epidemiological

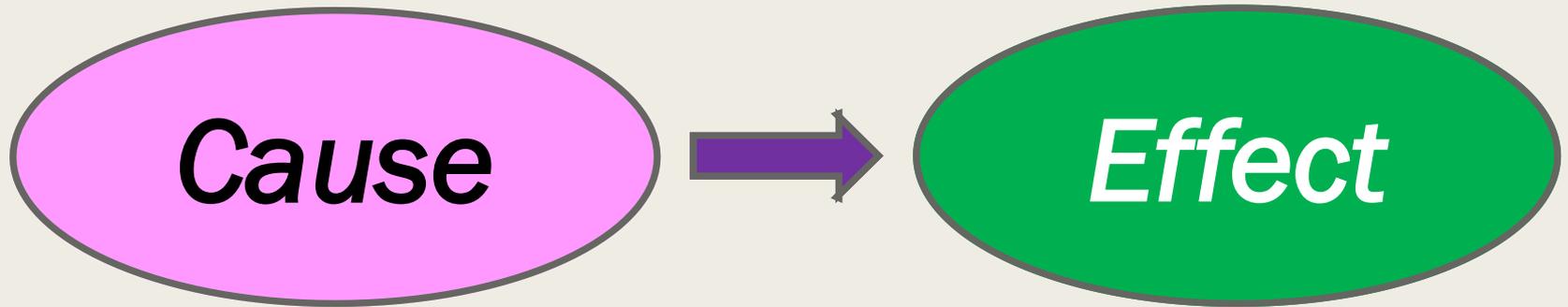
5. Survey research

Types of Correlational/ Ex post facto

- 
- *Prospective design*

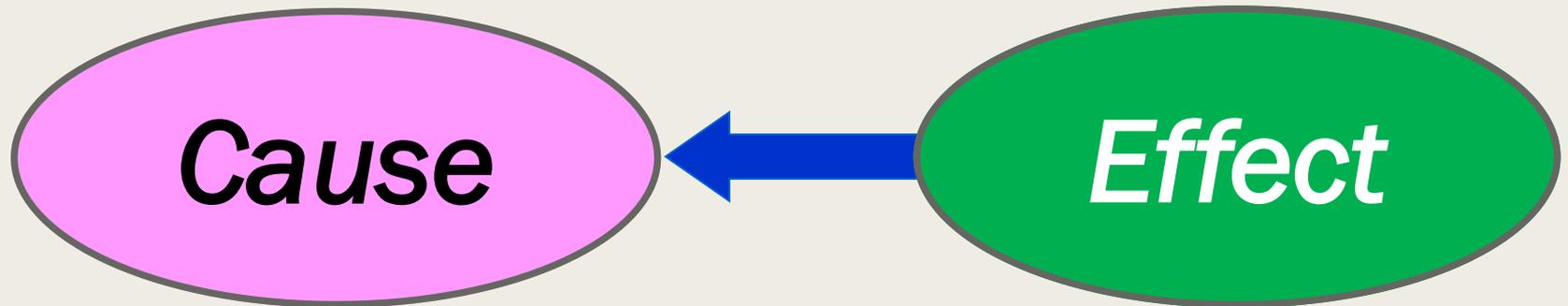
- *Retrospective design*

Prospective Design



- For example, a researcher is conducting ‘a prospective correlational study on effect of maternal infection during pregnancy on fetal development and pregnancy outcome.’

Retrospective Design



- For example,
a retrospective correlational study on substance abuse related high risk factors among traumatic head injury patients admitted in Neurosurgery ICU of AIIMS Rishikesh.

Types of Non Experimental Research Design

1. Descriptive design

2. Correlational / Ex post facto



3. Developmental research

4. Epidemiological

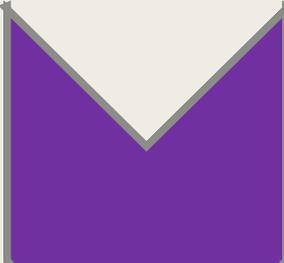
5. Survey research

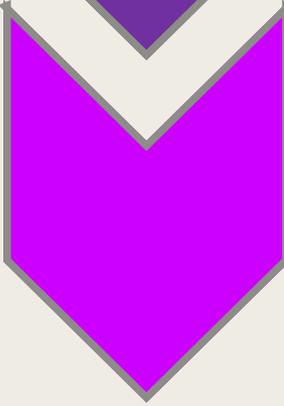
Developmental Research

- Examines the phenomenon in respect to the time.



Types of Developmental Research

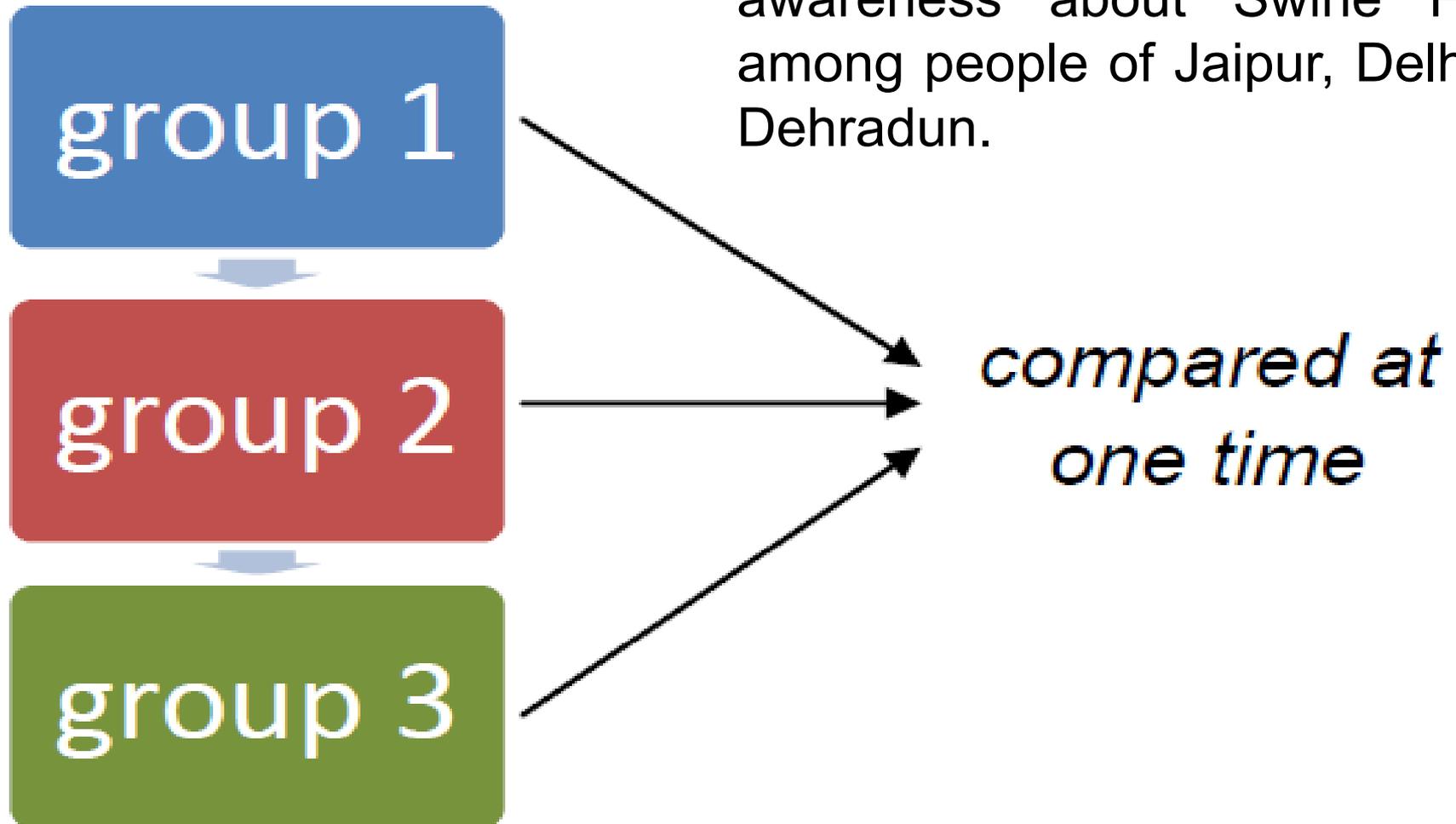
- 
- *Cross-sectional design*

- 
- *Longitudinal design*

Cross-Sectional Research Study:

different groups

For example, a researcher is interested in assessing the awareness about Swine Flu among people of Jaipur, Delhi & Dehradun.



Longitudinal Design

- Examining the phenomenon more than one point in time
- For example, a researcher is interested in perception of nursing students towards nursing profession from beginning of nursing program to the end of the nursing program.



Types of Non Experimental Research Design

1. Descriptive design

2. Correlational / Ex post facto

3. Developmental research

✓ **4. Epidemiological**

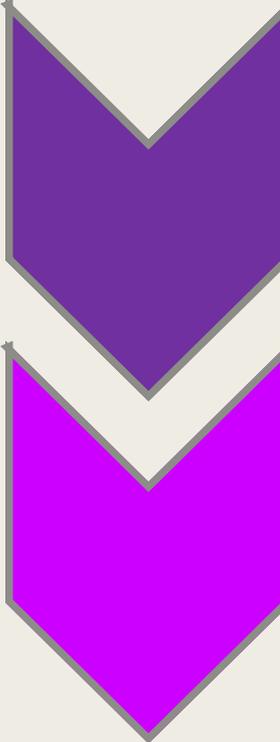
5. Survey research

Epidemiological Research Designs

- Epidemiological is the investigation of the distribution and causes of diseases in a population either prospectively (causes to effect) or retrospectively (effect to cause).



Types of Epidemiological Research Design



- Case control studies

- Cohort studies

Case Control Studies

- Causes of a disease are investigated after the occurrence of a disease.
- For example, a researcher investigates the history of smoking in patients diagnosed with lung cancer.



Cohort studies

- Longitudinal approach is used to investigate the occurrence of a disease in existing presumed causes.
- For example, a researcher longitudinally observes the smokers for developmental of lung cancer.



Types of Non Experimental Research Design

1. Descriptive design

2. Correlational / Ex post facto

3. Developmental research

4. Epidemiological



5. Survey research

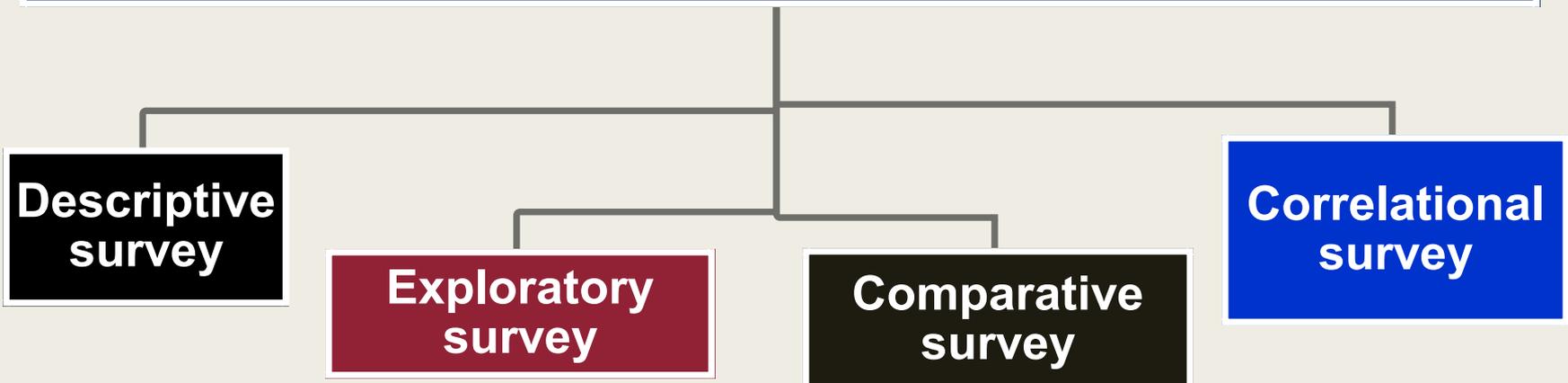
Survey Research Design

- Investigation in which self-reported data are collected from sample with the purpose of describing population on some variables of interest.



Types of Survey

Based on nature of phenomenon under study



Types of Survey



Based on methods of data collection

Written
survey

Oral survey

Electronic
survey

III. Other Additional Research Designs

**Methodological
studies**

Meta-analysis

**Secondary
data analysis**

**Outcome
research**

**Evaluation
studies**

**Operational
research**

1. Methodological Studies

- Conducted to develop, validate, test and evaluate the research instruments and methods.
- Example: A methodological study to develop a pressure sore risk assessment tool for patients admitted in orthopedic wards.

Steps of Methodological Studies

Defining the behaviour or construct to measure.



Formulating the items for tool.



Developing instrument for user and respondent.



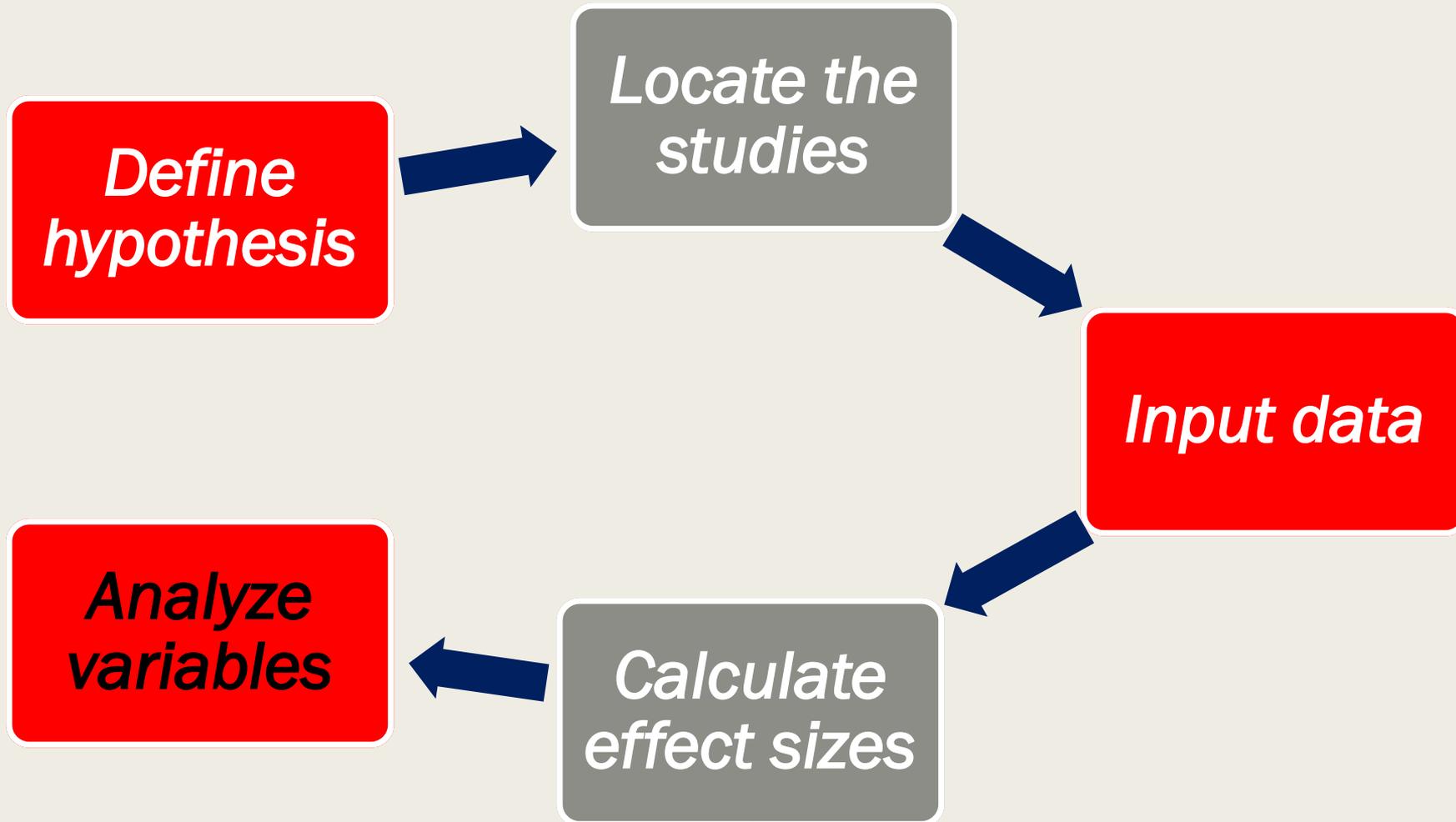
Testing the reliability and validity of research tool.

2. Meta-analysis



- Combines the results of several studies that address a shared research hypothesis.
- It starts with selecting studies with similar variables and population followed by identifying and coding study characteristics and statistically analyzing and reporting of the analyzed findings.

3. Steps in Conducting Meta-analysis



Secondary Data Analysis

- A research design in which the data collected by one researcher are reanalyzed by another researcher, usually to test new hypotheses.



Secondary Data Analysis



- A secondary analysis can be performed with both quantitative and qualitative data.
- Example of quantitative study: “As a researcher used data from a previous study of patients with chronic obstructive pulmonary disease to test an explanatory model of factors affecting functional status in this disorder.”
- Example of qualitative study: “A researcher did a secondary analysis of data from a qualitative study of clients with end stage renal disease.

4. Outcome Research

- It is planned to assess or record the end result of health care services.
- Used in nursing to develop evidence based practice and improve nursing actions.



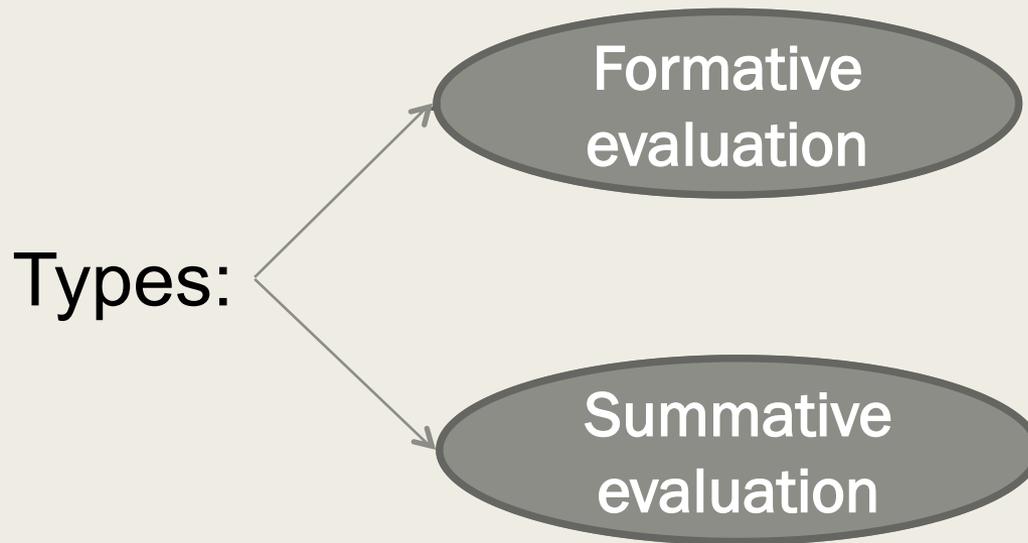
Outcome Research

- *Example, ‘An outcome research on the effectiveness of Quality Assurance Program (QAP) implemented in Nehru hospital, PGIMER, Chandigarh and Safdarjung hospital New Delhi.*



5. Evaluation Studies

- Determine the effectiveness or value of processes, programmes, policies, personnel, equipment and the material used in a particular setting.



6. Operational Research

- Involves study of **complex human organizations** and services to develop new knowledge about institutions, programs, use of facilities, and personnel in order to improve working efficiency of an organization.
- *Example*, “An operational research study on patient’s comfort and perception with single and double corridor ward designs in selected hospitals at New Delhi”



*Any
Questions?*

dreamstime



Keep Smiling!

