



# University of Tikrit

## College of Nursing



# *Introduction to Scientific Research*

*Third year*

**2020 - 2021**

# **STUDENT GUIDELINE**

## **Introduction**

Welcome to the Third Year-Semester One in the General Nursing Program:

**Course:** Nursing Research is one of the nursing course for the general nursing curriculum. The syllabus attached is designed to provide each student with an explanation to the course content., unite objective are required reading materials for the course.

## **Instructions for use of Student's Course Books**

- Each Class Session identifies the content that will be covered in that class and the activities expected by the students.
- During the Class Session, ask for explanations of term that are not clear.
- You are advised to participate in class room discussion.
- You are advised to complete the study Questions given at the end of each unit that will help you to fully understand the course material.
- You are advised to complete the laboratory requirements for this course.
- You are advised to complete the clinical requirements for this course.

# Research Method

## Course Overview

- 1. Course Title:** Research Methods
- 2. Course Number:** (403)
- 3. Credit Hours:** (2) credits.
- 4. Course Calendar:** (2) hours weekly of (15) weeks.
- 5. Placement:** Fourth year / first semester.
- 6. Instructors:** Allied faculties.

### 7. Course Descriptive:

The course is designed to provide the nursing students with knowledge related to basic concepts & principles of scientific research process. It is contributed to increase their knowledge, awareness, understanding & recognition on areas of priorities for nursing research.

### 8. Course Goals:

**At the end of this course the students will be able to:**

- Identify research concepts, purposes, and characteristics of scientific research.
- Search for nursing problem statement.
- list sources of nursing research problem.
- Discuss initial & secondary sources of review of literature.
- Describe types of variables used in nursing research.
- Discuss the types of research design.
- Define the population, sampling & sample.
- Discuss types of sampling techniques (probability & non probability sample).
- Identify the various methods used in data collection.
- Explain the types of statistical procedures (descriptive & inferential tests).
- Analyze, represent & interpret the results.
- Write a study project.

## **9. Course outline:**

### **Unit 1: Introduction to scientific research: (2) hrs.**

- Basic concepts.
- Purposes of scientific research.
- Characteristics of scientific research & research hypothesis.

### **Unit 2: Major steps in Scientific Research. (2) hrs.**

### **Unit 3: Research Problem & Research Questions. (2) hrs.**

### **Unit 4: Review of literature: (4) hrs.**

- Purposes of review of literature.
- Types of information.
- Writing review of literature.

### **Unit 5: Sample & Sampling: (4) hrs.**

- Population.
- Sample.
- Types of sample.

### **Unit 6: Research Design: (4) hrs.**

- Experimental design.
- Quasi Experimental design.
- Non- Experimental design ( Descriptive & correlation design).
- Survey.

### **Unit 7: Measurement & Data Collection: (4) hrs.**

- Observational methods.
- Types of questionnaire & interviews.
- Scales.

### **Unit 8: Tabulation & analysis of data. (4) hrs.**

### **Unit 9: Discussion the findings of the study (2) hrs.**

### **Unit 10: Methods of writing research reports or study. (2) hrs.**

**10. Learning Resources:**

Blackboard, Calculators, Overhead Projector, and Handout.

**11. Teaching / Learning Strategies:**

Lecture, discussion, Groups work and daily assignments.

**12. Student Evaluation:**

1 <sup>st</sup> theory exam.	20%
2 <sup>nd</sup> theory exam.	20%
Assignments	10%
Final exam.	50%
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Total	100%

**Project ( written paper)**

Choose one of the following topics for the following topics for the subject of the paper:

- 1.
- 2.
- 3.
- 4.
- 5.

### **Guidelines for writing the paper**

- Write a 150- 200 word paper explaining one of the above concept. Give illustration where required.
- Contents of the student course book is not allowed to used.
- Use at least three references from the library.
- You are free to use any other resources for completion of this paper.
- A list of references should be provided as policy.
- Type the report, Font style: Time New Roman, size,14.
- Use A4 Plain paper to print the report.
- Copy- paste strategy will never accepted.
- The paper is due as per the teacher's request.

### **Criteria for evaluation of Written Paper**

<b>SN</b>	<b>Criteria</b>	<b>Marks</b>
1.	Introduction	1
2.	Contents with illustration	5
3.	Conclusion	1
4.	Title page	1
5.	References/Resources used	1
6.	Organization ,Neatness, Language	1
Total		10

### **Curriculum Committee Members**

- Ass .Prof: Dr. Radhwan Hussain Ibrahim .Dean, Chairperson
- Mr. Mohammed Yahiya Ahmed, MSC. Nursing Education.
- Mr. Ramy Ramadhan MSC. Fundamentals of Nursing

**Prepared by:**

1. Mr. Mahmoud, MSC. Community Health Nursing.
2. Mr. Mohammed Yahiya Ahmed, MSC. Nursing Education.

**Date prepared:** May,2013

**13. References:**

1. Massey, V., Nursing Research: A Study And Learning Tool, Pennsylvania, Springhouse, 1999.
2. Nieswiadomy, R., Foundation of Nursing Research, 3<sup>rd</sup> ed., Stam & Appleton & Lange, 1998.
3. Polit, Denise F and Cheryl Tatano Beck, Essentials of Nursing Research Methods, Appraised, and Utilization, 6<sup>th</sup> ed., New York Lippincott Williams & Wilkins, 2005.
4. Polit, Denise F. and Cheryl Tatano Beck, Nursing Research Principles and Methods, 7<sup>th</sup> ed., New York Lippincott Williams & Wilkins, 2004.

**Chapter I: Introduction to Scientific Research**

**Lecture outlines:**

- The Origin of Nursing Research
- Purpose of scientific research
- Nursing research
- The specific purposes of scientific research
- Goal of the nursing research
- Characteristics of the scientific research

- Variables and hypotheses

### **Learning objectives**

**At the end of this chapter, the student will be able to:**

1. To identify the scientific research and the purpose of it.
2. Describe the goal of nursing research.
3. To identify the variables and hypotheses.
4. Discuss the types of variables.

## **Nursing Research**

### **The Origin of Nursing Research**

Florence Nightingale is viewed as the person who first elevated nursing to the status of a profession, as presented in her first book *Notes on Nursing* (1859). Nightingale is also credited with introducing research to the profession. Nightingale believed in the importance of “naming nursing” by the use of observed data to support the need for health-care reforms, including those related to nursing education. Nightingale recognized the impact of combining strong logical thinking and empirical research in developing a sound scientific base upon which to build the practices of the profession of nursing.

### **Definitions of research**

- **Research** is systematic inquiry that uses disciplined methods to answer questions or solve problems. The ultimate goal of research is to develop, refine, and expand a body of knowledge.
- **Scientific research** is a systematic and objective attempt to provide answers to certain questions.
- **Nursing research** is defined as the application of scientific inquiry to the phenomena of concern to nursing. The systematic investigation of patients and their health experience is the primary concern of nursing.

The ability to conduct research is becoming an ever important skill. The ultimate purpose of nursing is to provide high-quality patient care. Clinical practice without research is practice based on tradition without validation. Research is needed to evaluate the effectiveness of nursing treatment modalities, to determine the impact of nursing care on the health of the

patients or to test out theory. Nursing practice is undergoing tremendous changes and challenges. In order to meet social challenges and needs, nursing practice must be research based.

Research in nursing evolved predominantly when nursing education became a part of higher education and was seeking its own body of knowledge, different from that of medicine. Nursing's first researchers were being prepared in fields other than nursing and have brought to nursing the various paradigms from those fields.

Nursing research refers to the use of systematic, controlled, empirical, and critical investigation in attempting to discover or confirm facts that relate to specific problem or question about the practice of nursing.

### **Characteristics of Research**

A scientific research has some characteristics (Singh, 2002)

1. Research is always directed towards the solution of a problem.
2. Research is always based on empirical and observational evidence.
3. Research involves precise observation and accurate description.
4. Research emphasize to the development of theories, principles, and generalizations.
5. Research is characterized by systematic, objective and logical procedures.
6. Research is marked by patience, courage and unhurried activities.
7. Research requires that the researcher has full experience of the problem being studied.
8. Research is replicable.
9. Research uses systematic method of problem-solving.
10. In research the factors which are not under study are controlled.
11. Research requires full skill of writing report

## **Purpose of Scientific Research**

1. It helps to answer questions, solve problems and make decisions.
2. It enables us to see and understand how and why a situation or a problem exists.
3. It helps to discover new things and ideas.
4. It allows us to validate existing theories or generate new ones.
5. It helps us identify and understand the causes and effects of a situation or a phenomenon.
6. To bring out the truth.

**Nursing Research:** is systematic inquiry designed to develop knowledge about issues of importance to the nursing profession, including nursing practice, education, administration, and informatics.

## **Purposes of Nursing Research**

The general purpose of nursing research is to answer questions or solve problems of relevance to the nursing profession.

**The specific purposes of scientific research include:-**

identification, description, exploration, explanation, prediction, and control.

## **Identification**

Identification – naming an unknown phenomenon in relation to nursing. in quantitative research, identification typically precedes the inquiry.

## **Description**

Description of phenomena is another important purpose of research. In a descriptive study, researchers observe, count, delineate, and classify. The major purpose of description research focus on the prevalence, incidence, size, and measurable attributes of phenomena.

## **Explanation**

The goals of explanatory research are to understand the underpinnings of specific natural phenomena, and to explain systematic relationships among phenomena. Explanatory research is often linked to theories, which represent a method of deriving, organizing, and integrating ideas about the manner in which phenomena are interrelated.

## **Exploration**

Like descriptive research, exploratory research begins with a phenomenon of interest; but rather than simply observing and describing it, exploratory research investigates the full nature of the phenomenon, the manner in which it is manifested, and the other factors to which it is related.

## **Prediction**

estimating the effects of a given situation or prevailing condition.

## **Control**

Specifying psychological and physiological reactions possible to nursing intervention.

## **Goal of the Nursing Research**

1. Developing and testing nursing theories.
2. Providing an understanding of phenomena related to nursing.
3. Fostering nurses to make informed decision in the delivery of patient care.
4. Validating effectiveness of particular nursing measures.
5. Helping to document nursing's unique role in the health care delivery system.
6. Improving the quality of care and care delivery.
7. Providing a link between theory and practice.
8. Advancing nursing as a profession.

## **Importance of Research in Nursing**

### **1. Improve the nursing practice.**

Research is an important means to generate a knowledge base for nursing, for nurses to become scientifically accountable, and to enable nurses to make decisions in nursing practice.

Nursing research can enhance quality of care and promote health by serving as a mechanism for meeting demands for evidence-based practice.

### **2. Generate a knowledge base.**

Nursing research is aimed to develop a scientific knowledge base for nursing practice.

### **3. Become scientifically accountable.**

This means that nurses are responsible to the public for carrying out nursing actions that have been tested to determine that they do what they say, and these actions are the best approach for a given problem.

Scientific accountability is essential for the nurse practitioner in dealing with the clients or patients, for the nurse administrator in dealing with clients, patients, or professionals in the health care delivery system.

#### **4. Make decision in Nursing Practice.**

Many nurses use the nursing process both:

- As their method of clinical practice, and
- To evaluate the quality of their nursing care.

The findings from research aid nurses in making more informed decisions in the delivery of nursing care and help explain the unique role of nursing in the health care system.

**5.** Research can help professional nurses develop strategies to improve the health outcomes of their patients

**6.** Research can help professional nurses have more influence in health care policy debates about issues such as scope of practice.

**7.** Can help individual nurse justify the need for their role and the boundaries of that role.( number and types of patients seen....)

**8.** **Nurse practitioners** who remain abreast of current research will practice with greater confidence.

#### **Characteristics of the Scientific Research**

1. Control of the variables and biases.
2. Use of the empirical evidence to generate knowledge.
3. Generalizable results.

**The scientific method is based on the following assumption:**

1. Objective reality exists independent from person perceptions.
2. Nature has order, regularity, and consistency.
3. All phenomena have causes that can be discovered.

## **Hypotheses**

The term hypothesis is derived from the ancient Greek, „hypotithenai“ meaning “to put under” or “to suppose”.

A hypothesis is a specific statement of predication. It describes in concrete (rather than theoretical) terms what you expect will happen in your study.

An hypothesis is the formal statement of the expected relationship(s) between two or more variables. The hypothesis translates the research problem and purpose into a clear explanation or prediction of the expected results or outcomes of the study.

## **Source of hypotheses**

1. Conceptual or theoretical framework.
2. Personal experience.
3. The literature review.

## **Characteristics of hypotheses**

1. Written as declarative sentences, commonly using a present-tense verb (the content of the sentence should be similar to that of the problem statement).
2. Identifies the population to be studied ( should be specifically stated and congruous with the population identified in the problem statement)
3. Identified at least on independent variable and one dependent variable (the variables, which are linked by the hypotheses, should be congruous with the variables identified in the problem statement).
4. Is empirically testable and therefore cannot focus on moral or ethical issues.

## Types of hypothesis

1. **The Null Hypothesis** : is a statement that no difference exists between the populations being compared. ( $H_0$ ).
2. **The Alternative or Research Hypothesis**: Is a statement that there is a difference between the population being compared, hypothesis that would support researchers' prediction. ( $H_A$ ).
3. **Directional Hypothesis**

In this type of hypothesis the investigator suspects that one variable will have an influence upon another variable.

Investigator suspects that there will be either a direct or inverse relationship between two variables.

4. **Non-directional Hypothesis**

In this type the investigator suspects there is a difference but does not state what it is , and in which way. It could be either direct or inverse.

### *Example*

Suppose that you are studying a new drug treatment for depression – You believed (based on theory and the previous research) that the drug will have an effect., but you are say the drug will reduce depression. In this case, you state the two hypothesis like this:

The null hypothesis for this study is:

$H_0$  : As a result of 300mg/day of the X drug, there will be no significant difference in depression.

### *Example*

Let's suppose that you are investigating the effects of a new employee training program and that you believe one of the outcomes will be that there will be less employee absenteeism.

You might state the two hypothesis like this.

$H_0$  : As a result of the X company employee training program, there will either be no significant difference in employee absenteeism or there will be a significant increase.

**HA:** As a result of the X company employee training program, there will be a significant decrease in employee absenteeism.

### **Types of error**

“ **Type I Error**” when we reject the null when the null is in fact true.

“ **Type II Error**” when we fail reject the null when the null is in fact false.

### **Formulating Hypotheses**

- Once the research question has been stated, the next step is to define testable hypotheses.
- Usually a research question is a broad statement, that is not directly measurable by a research study.
- The research question needs to be broken down into smaller units, called hypotheses, that can be studied.

**A hypothesis is a statement that expresses the probable relationship between variables.**

- **Descriptive hypotheses** ask a specific question regarding some phenomenon. For example, we might want to study this research question: what are the social and economic characteristics of patients who have high blood pressure? A descriptive hypotheses that would test a part of the above research question is: what is the distribution of hypertensive patients by income level? Descriptive hypotheses are always phrased in the form of a question regarding some aspect of the research question. Usually a descriptive hypothesis does not include an active independent variable. When we use an independent variable, a directional hypothesis is usually needed.
- **Directional hypothesis.** Directional hypotheses are never phrased as a question, but always as a statement. Directional hypotheses always express

the effect of an independent on a dependent variable. For example, hypotheses drawn from the anxiety and dying research question would be:

1. A client who is at the "acceptance" stage will exhibit less anxiety.

IV - stage of client (attribute)

DV - anxiety level

2. Client anxiety levels will be lower at the end of any state (denial, anger, bargaining, depression, acceptance) than at the beginning.

IV - client at beginning, middle, or end of stage (attribute)

DV - anxiety level

3. Some clients will reach their lowest anxiety levels, as measured by GSR recordings, after progressing through only one stage. Others will require two or more stages before achieving their lowest anxiety levels.

IV - number of stages client has gone through since learning of their condition (attribute).

DV - anxiety level

4. A planned program of counseling interventions will enable clients to achieve low anxiety levels more rapidly than clients who receive normal nursing and medical care.

IV - presence or absence of counseling (active)

DV - time taken to reach a low anxiety level

5. Clients who achieve and maintain low levels of anxiety when discussing their pending death will be more responsive to pain medication.

IV - anxiety level (attribute)

DV - effectiveness of pain medication

## **Variables**

Variables are qualities, properties and / or characteristics of persons, things or situations that are studied in research. Variables are concepts that have been concretely defined to help in observation or measurement within a study.

### **Characteristics of variables:-**

1. Identify the concepts to be studied
2. Are measurable.
3. Are usually narrow and specific in focus.

## **Types of variables**

### **1. Dependent variables**

- The **dependent variable** is the variable that is measured by the experimenter. In our previous example, the scores on the test performance measure would be the dependent variable.
- Is the response, behavior or outcome that the researcher wants to predict or explain. changes in the dependent variables are presumed to be caused by the independent variables.
- This is the variable that is affected by the independent variable.
- The dependent variable is dependent on the independent variable.

e.g. If I praise you, you will probably feel good, but if I am critical of you, you will probably feel angry. My response to you is the independent variable, and your response to me is the dependent variable, because what I say influences how you respond.

## 2. Independent variables

- Is a stimulus or activity that is manipulated or varied by the researcher to create an effect on the dependent variable. It is also known as a treatment or experimental variables.
- The **independent variable** is the variable that is controlled and manipulated by the experimenter. For example, in an experiment on the impact of sleep deprivation on test performance, sleep deprivation would be the independent variable.
- There are two types of independent variables: **Active and attribute**.
- a. If the independent variable is an active variable then we manipulate the values of the variable to study its effect on another variable, e.g. we alter anxiety level to see if responsiveness to pain reduction medication is enhanced. Anxiety level is the active independent variable.
- b. An attribute variable is a variable where we do not alter the variable during the study. For example, we might want to study the effect of age on weight. We cannot change a person's age, but we can study people of different ages and weights.

## 3. Control variable

Are quantities that a research wants to remain constant, and he must observe them as carefully as the dependent variables.

A control variable is a variable that effects the dependent variable. When we "control a variable" we wish to balance its effect across subjects and groups so that we can ignore it, and just study the relationship between the independent and the dependent variables. Researcher control for a variable by holding it constant, e.g., keep humidity the same, and vary temperature, to study comfort levels.

## 4. Attribute variables

Attribute variables are characteristics or elements of the human subject that are collected to describe the sample.

Some common attribute variables are:

Age.

Gender.

Educational level.

Income.

Race.

Socioeconomic status.

Job classification.

**5. An environmental variable:** is a factors that is part of the setting in which the study is conducted, it also may be independent, dependent, extraneous, or confounding.

**6. Extraneous variable:** This is a variable that probably does influence the relationship between the independent and dependent variables, but it is one that we do not control or manipulate. For example, barometric pressure may effect pain thresholds in some clients but we do not know how this operates or how to control for it. Thus, we note that this variable might affect our results, and then ignore it. Often research studies do not find evidence to support the hypotheses because of unnoticed extraneous variables that influenced the results. Extraneous variables which influence the study in a negative manner are often called **confounding variables**.

**7. Participant Variables:** These extraneous variables are related to individual characteristics of each participant that may impact how he or she responds. These factors can include background differences, mood, anxiety, intelligence, awareness and other characteristics that are unique to each person.

**8. Situational Variables:** These extraneous variables are related to things in the environment that may impact how each participant responds. For example, if a participant is taking a test in a chilly room, the temperature would be considered an extraneous variable. Some participants may not be affected by

the cold, but others might be distracted or annoyed by the temperature of the room.

### **Example 1**

“Oxygen Inhalation by nasal canula of up to 6LPM does not affect oral Temperature measurement taken with an electronic thermometer.

**The independent variable is:** oxygen inhalation by nasal canula.

**The dependent variables is:** oral temperature.

**The controlled variables:** oxygen administered at three levels: 2LPM, 4LMP, 6LPM.

### **Example 2**

Factors contributing to the incidence of urinary tract infection among adult male patients on continuous bladder drainage.

**Independent variable:** bladder drainage.

**Dependent variable:** urinary tract infect.

**Controlled variable:** daily ,day between ,twice a day

**Attribute Variable:** Adult Male.

## **Chapter II: Major steps in Scientific Research**

### **Lecture outlines:**

1. Research problem
2. Literature review
3. Conceptual and theoretical frameworks
4. Variables and hypotheses.
5. Research design
6. Population and sample.
7. Data collection.
8. Results and findings.

### **Learning objectives :**

#### **At the end of this chapter, the student will be able to:**

1. Discuss the major steps of nursing research
  - Research problem.
  - Literature review
  - Conceptual and theoretical frameworks.
  - Variables and hypotheses.
  - Research design
  - Population and sample.
  - Data collection
  - Results and findings.

### **Major Steps of Research in Nursing**

- A research study typically follows a sequence of steps. At each step, the researcher makes important decision that affect the quality of the study.
- Before conducting a major research study, the researcher may carry a pilot study to minimize the possibility of having significant difficulties occur in

the major study and obtain to information for improving the major study.

- After conducting a pilot study, the researcher may make revisions before beginning the major study.

### **1. Research problem**

The researcher selects a problem that clarifies the focus of the study.

- The focus moves from a general topic to specific problem.
- This movement clarifies the study exact purpose.
- The researcher culminates the process by formulating a problem statement.

### **2. Literature review**

- the researcher uses related literature to examine knowledge to data.
- The literature must be relevant to the concepts (variables) identified in the problem statement.
- The review helps direct the researcher in designing the study and interpreting the results.

### **3. Conceptual and theoretical frameworks**

They provide structure and link components together.

They provide a context within which the researcher can interpret the study results.

### **4. Variables and hypotheses.**

- The researcher predicts the study outcome based on the relationship among the variables.
- The researcher must specify how the variables are viewed and how they will be measured.

### **5. Research design**

- The design provides guidelines with which the researcher tests the hypotheses.

- It directs the selection of the population, sampling technique, and plan for the researchers data collection and analysis.

## **6. Population and sample.**

- These establish the criteria that the researcher uses to include subjects in the study.
- They outline how the subjects will be selected.

## **7. Data collection.**

- The collected data provides the researcher with the information needed to answer the research question.
- How the data are collected can influence the study's outcome.
- Data should be included and measured or evaluated according to specific techniques and standards.

## **8. Results and findings.**

- The researcher draws conclusions from the data and makes recommendations for action or further study.
- The researcher relates the findings to previous research and to the conceptual or theoretical framework.
- The researcher disseminates the study's findings

## **Chapter III: Research Problem & Research Questions**

### **Lecture outlines:**

1. Research problem & research questions
2. Sources of research questions
3. Factors to consider when selecting a research problem
4. Research questions
5. Characteristics of research questions

### **Learning objectives**

#### **At the end of this chapter, the student will be able to:**

1. Identify how nurse researcher select and formulate research problems.
2. Describe the information found in the purpose of a study.
3. List four sources for nursing research problems.
4. Describe the factors to consider when selecting a research problem.

### **Research Problem and Research Question**

One of the most important steps in research is selecting the problem and formulating the problem statement and purpose.

The development of a research problem is a creative process that depends on imagination creativity and insight. In the early stages, when research ideas are being generated, it is wise not to be critical of them immediately. It is better to begin by relaxing and jotting down general areas of interest as they come to mind.

The researcher selects a general topic and narrows it into a specific problem. The problem identified and state clearly before it can be solved

**The purpose of the study, which typically generates from the research problem, clarifies:-**

1. The extent of the problem.
2. The significant of the problem.
3. The rational for the study.
4. The researchers intentions.
5. The clinical context of the study.
6. The ways in which finding will be used.

(The purpose typically concludes with the problem statement)

## **SOURCES OF RESEARCH PROBLEMS**

**1. Experience and Clinical Fieldwork:-** Potential source of research problems in nursing practice:-

- a. Question about patient care posed during private conversations or staff meetings.
- b. Observation of patient and nurse behaviors
- c. Patient care conferences.
- d. Complaints and expressions of dissatisfaction from patients and staff.
- e. Chart review.
- f. Nurse care plans.
- g. Logs, diaries, and personal journals.

**2. Literature sources:-** Ideas for research projects often come from reading the nursing literature, its includes:-

- a. Research journals.
- b. Clinical practice journals.
- c. Abstracts.

- d. Textbooks.
- e. Theses and dissertations.
- f. Popular and trade publications.

### **3. Theory sources**

- a. The work of nursing theorists.
- b. Theories development in other disciplines, such as psychology, sociology, management, or education.
- c. Personal theories involving the researchers view of the world and how knowledge should be organized.

### **4. Source involving interactions with peers and researchers.**

- a. Formal educations experiences.
- b. Staff development education and orientation program.
- c. Policy and procedure committee meeting.
- d. Journal clubs.
- e. Mentor relationships.
- f. Ideas from workshops and conferences.
- g. Informal discussions.

### **Factors to be considered when selecting a research problem:-**

The most important factors to consider are the:

- Problems significance.
- Researchability.
- Feasibility.
- Interest to the researcher.

**1. Significance:-** the researcher need to determine whether conducting the study will :-

- Expanding nursing knowledge base.
- Improve nursing practice or policy.
- Be benefit to the patient, nurse, or society.

**2. Researchability:-** the researcher should ensure that :-

- The problem does not involve ethical or moral issue, such as issue are typical controversial and vague.
- All variables can be defined and measured.
- The problem is specific enough to be manageable.

**3. Feasibility:-** the researcher needs to ensure that:-

- The study can be adequately completed within the allotted time.
- Willing subjects are available to participant in the study.
- Sufficient funding, facilities, and equipment are available to complete the study.
- The researcher has the expertise required for investigating the particular research problem.
- Co-workers are available and willing to cooperate with the study .
- No unfair or unethical demand are imposed on the participants.

**Research questions:** are the specific queries researchers want to answer in addressing the research problem.

Research questions guide the types of data to be collected in a study. Researchers who make specific predictions regarding answers to the research question pose hypotheses that are tested empirically.

The researchers may use a research question when knowledge is insufficient to formulate a hypotheses.

**Characteristics of research questions:-**

1. Written as an interrogative sentence, using a present-tense verb.
2. Identify the population.
3. Contain one or more variables.
4. Reflect the problem statement.
5. May or may be empirically testable.
6. Focuses on the variables and their possible relationships.

## **Chapter IV: Literature review**

### **Lecture outlines:**

#### Review of Literature

The purpose of the literature review

Type of information to review

#### Writing review of literature

### **Learning objectives :**

#### **At the end of this chapter, the student will be able to:**

1. Explain why a researcher conducts a literature review.
2. Explain research finding, theoretical information, methodological information, opinion articles, and anecdotal descriptions.
3. Describe methods for organizing the information and the mechanics of writing the review.

### **Review of Literature**

The “Literature” is all the written sources relevant to your topic A literature review, essential to all types of nursing research, lays the foundation for the research project. The researcher conducts the review by thoroughly examining all available scientific and theoretical information related to the research problem.

**The main purpose of the review** helps the researcher to gauge what is known and unknown about the research problem.

## **The purpose of the literature review that may includes:-**

### **1. Identifying or refining the research problem.:-**

- a. The researcher may not have a clearly defined research problem in mind before conducting the literature review.
- b. Reading clinically related literature may help the researcher to recognize areas that need further research and study.
- c. Further reading may help the researcher pinpoint the problem and formulate the problem statement.
- d. Refining the research problem may occur during the literature review.

### **2. Strengthening the rational for the research**

- a. A lack of literature related to the problem may indicate that the problem need further study.
- b. The researcher may learn that the available literature contains information gaps, suggesting the need for a new study.
- c. Conversely, the researcher may find that the problem has been extensively researched, indicating that another study is unnecessary.

### **3. Developing a conceptual framework for the study:**

- a. In reviewing the literature, the researcher may discover a nursing theory or a theory from related discipline that can serve as an approach to the study.
- b. The review may lead the researcher to formulate idea about how the research problem and concepts are linked.

### **4. Providing a useful approach to conducting the research**

- a. The literature review may reveal specific research strategies and procedure used in previous studies.
- b. The researcher may be able to adapt an approach used in previous study or develop a new approach to conducting the research.

## **Type of information to review**

Research findings from previous related studies conducting in nursing and others disciplines.

1. Theoretical information concerning the broader issue related to the problem: such as information include theories from nursing and others disciplines.
2. Methodological information on research methods used in previous studies including measurement techniques, data analysis procedure, and control methods.
3. Opinion articles discussing specific viewpoint or attitudes about the problem, the researcher should keep in mind the such articles are subjective and therefore of limited use in a scientific review.
4. Anecdotal descriptions of others experiences with related studies, the researcher should keep in mind that, although such descriptions may broaden the researchers understanding of the problem, their use in a scientific review is limited.

## **Writing review of literature.**

- The researcher typically writes the literature review when compiling the finding for a research article at the end of the study. Before writing the review, the researcher selects appropriate sources from the listing of related literature compiled at the start of the study and develops an outline.
- The researcher typically selects sources based on their relevance to the problem statement and the study's purpose and organizes them according to concept, theoretical or research classification, ability to support the study framework, and presentation in the written review, all sources cited in the review should build a case for proposed study.
- The researcher typically develops an outline as a guide for writing the introduction, body, and summary of the literature review.

- The introduction typically describes the organization and purpose of the review.
- The body, which contains a detailed analysis of relevant studies, typically focuses on research and theoretical information.
- In the body, the researcher compare and contrasts studies with similar methodology or results, pointing out consistencies and contradictions while striving for objectivity, the researcher should try to present the studies logically, remembering to relate each study to others and to paraphrase material whenever possible.
- The summary typically discusses the quality of the literature reviewed, identified gaps in knowledge, and demonstrations the need for the study.

## **Chapter V: Sample and sampling**

### **Lecture outlines:**

The term are commonly used in sampling.

Steps of sampling

The researcher should consider several factors when selecting a sample

Types of sample

Probability sampling

Non-probability samples

### **Learning objectives :**

**At the end of this chapter, the student will be able to:**

1. Identify a population,.
2. Describe the term are commonly used in sampling .
3. Identify the factors to consider when selecting a sample.
4. Outline the steps used in selecting a sample.
5. Discuss the four types of probability sampling techniques.
6. Describe the types of non-probability sampling techniques.
7. Compare and contrast probability and nonprobability sampling techniques.

## **Sample and sampling**

**The following terms are commonly used in sampling:**

**Population:-** entire group of elements that meets a well-defined set of eligibility criteria, population may consist of people, animals, objects, words, or events.

**Accessible population:-** group of elements conforming to the eligibility criteria that is available to the researcher for use in a study.

**Sampling :** is the process of selecting a portion of the population to represent the entire population. Sampling is used by researchers because it is an economical and efficient means of collecting data and because collecting data from the entire population usually is not necessary or feasible.

**A sample:** is a subset of population elements. An element is the most basic unit about which information is collected. In nursing research, the elements are usually humans.

**Representative sample:** group of elements whose characteristics closely match those of the target population.

**Target population:** entire group of elements meeting the eligibility criteria, about which the researcher hopes to generalize findings.

**Sampling bias:** is the systematic overrepresentation or underrepresentation of some segment of the population in terms of a characteristic relevant to the research question.

**Sampling frame:** list of all the elements in the accessible population.

**Sampling error:** difference between population values and sample values (such as the difference between the populations median income and the samples median income), the larger sampling error, the less representative the sample is of the population.

### **Steps of sampling .**

2. Identifying and defining the target population.
3. delineating the accessible portion of the target population.
4. Deciding how to choose the sample.
5. Determining the sample size human subjects committee or institutional review board to conduct the study.
6. Recruiting the subjects and obtaining informed consent.
7. Estimating the representativeness of the sample.

### **The factors that should be take into consideration when selecting a sample:**

1. Type of sampling.
2. Heterogeneity of the variables being investigated.
3. Frequency occurrence of the variables of interest.
4. Cost.

### **Types of sample**

The two basic sampling techniques used in nursing research are probability (random) and non probability (nonrandom) sampling.

1. **Probability sampling:-** involves random selection in choosing the elements. The hallmark of a probability sample is that researchers can

specify the probability that each element of the population will be included in the sample..

### **Characteristics of probability sampling technique:-**

1. Probability sampling is only method of obtaining a representative sample because the use of random technique eliminates the possibility of researcher bias, both on a conscious and an unconscious level.
2. When using probability sampling, the researcher can estimate the degree of sampling error.
3. Probability sampling is important to the use of the most statistical tests.
4. Although probability sampling is preferred by most researchers, it has certain drawbacks: it's expensive and it may be impractical or unnecessary for certain studies, and the researcher has no guarantee that all randomly chosen subjects will participant in the study.

### **Probability sampling can be classified into four types includes:-**

2. **Simple random sampling:-** the most basic probability sampling technique, allows the researcher to select elements form a sampling frame. Typically the researcher lists all of the elements of the accessible population, numbers the elements consecutively, then uses a table of randomly selected numbers to draw the sample.

### **Disadvantage of simple random sampling**

- a. Using this technique eliminates the possibility of researcher bias and guarantees that differences in sampling characteristics are attributable to chance.
- b. Using this technique does not necessarily guarantee that the sample will be representative, however, the probability of choosing a nonrepresentative sample decreases as the sample size increases.

c. Researcher rarely use this technique because it is time consuming and inefficient and because obtaining complete listing of every elements in a population may be impossible.

**2. Stratified random sampling:-** In stratified random sampling, the population is first divided into two or more strata. As with quota sampling, the aim of stratified sampling is to enhance representativeness. Stratified sampling designs subdivide the population into homogeneous subsets from which an appropriate number of elements are selected at random. Stratification is often based on such demographic attributes as age, gender, and income level.

**Characteristics of stratified random sampling technique:-**

- a. Using this technique guarantees the representation of different segments of the population .
- b. allows the researcher to oversample from a small stratum to adjust for its underrepresentation in the population.
- c. time consuming, and the,
- d. researcher may have difficulty establishing a stratified sampling frame that include all the necessary elements.

**3. Cluster sampling (multi-stage):-** In large-scale surveys, when the population represents broad geographic areas or large numbers of people, simple random samples and stratified samples can be very expensive.

- The cluster sample method is also called multistage sampling because the process of sampling moves through stages until the final sample has been selected.
- Typically, the researcher proceed from the largest cluster (such as U.S. states) to progressively smaller clusters (such as counties, voting districts,

and households) to arrive at the smallest element possible (such as male head of households).

- The researcher may select clusters using simple or stratified random techniques.
  - Cluster sampling is more economical and practical than simple or stratified random techniques, but it typically results in more sampling errors.
3. **Systemic sampling:-** involves the random selection of subjects from the population based on fixed sampling interval ( such as every 10<sup>th</sup> person in the sampling frame).
- Most researchers prefer systematic sampling over simple random sampling because they can obtain the same results more efficiently and conveniently.
  - Use of this technique may results in problems or questionable finding if the sampling frame is arranged so that a particular characteristic coincides with the sampling interval(for example, if every 10<sup>th</sup> person listed in the sampling frame is male).

## **B. Non-probability samples**

**In Non-probability samples,** elements are selected by nonrandom methods. There is no way to estimate the probability that each element has of being included in a non-probability sample, and every element usually does not have a chance for inclusion.

Non-probability sampling technique are typically less rigorous than probability sampling techniques and results in less representative samples.

### **Characteristics of non-probability sampling techniques:-**

- Most research samples are based on non-bribability sampling because of this techniques feasibility, practically, and relative inexpensiveness and

because the selection of a truly representative sample using random sampling is nearly impossible.

- The major advantage to using non-probability sampling is the researchers limited ability to generalize from the findings.

**Non-probability sampling can be classified into three types:-**

4. **Accidental sampling:-** involves the nonrandom selection of subjects based on their availability or convenient accessibility. Although samples based on accidental sampling are easy to obtain, they are considered the weakest type of samples.

The use of volunteers is also commonly used convenience sampling methods because of its expedience.

**Characteristics of this technique:-**

- With accidental sampling, the risk of researcher bias is greater and external validity is compromised.
- The major limitation of this method, however, is the potential bias of self selection. It is not possible to know what attributes are present in those who offer themselves as subjects, as compared with those who do not, and it is unclear how those attributes may affect the ability to generalize experimental outcomes .
- Those volunteer may be quite typical of the target population in terms of such characteristics as age, motivation, activity level, and others correlates of health consciousness.

## **2. Quota sampling:-**

- Quota sampling involves the nonrandom selection of elements based on the identification of specific characteristics to increase the samples representativeness.
- Similar to stratified random sampling, quota sampling is based on the identification of certain strata within the population and the proportional representation of each those strata in the sample.
- This technique contains as unknown degree of bias that affects external validity.

## **3. Purposive sampling (judgmental sampling):-**

- Involves the nonrandom selection of elements based on the researchers judgment and knowledge about the population.
- This technique is based on the assumption that any errors of judgment will be balanced.
- Purposive sampling is useful when a group of subjects is needed to participants in a pretest of newly developed instruments or when group of experts is desirable to validate research information.
- This approach has the same limitations to generalize as convenience sample, in that it can result in a biased sample.
- Purposive samples are commonly used in qualitative research to assure that subjects have the appropriate knowledge and will a good information for the study.

## Sample Selection

<b>Probability Sampling</b>	<b>Non probably Sampling</b>
<p><b>Assumptions</b></p> <p>A complete list of all members of the target population is available. The researcher knows the probability of each subject being in the sample.</p>	<p>No list of all members of the target population is available, or availability is expected to be sequential. There is no way to estimate that all members of the population have some chance of being in the sample.</p>
<p><b>Systematic Sampling with Random Start</b></p> <p>Obtain a list of the population. Begin sampling with CI random start. Select every <i>n</i>th subject from the list until a predetermined number has been reached.</p>	<p><b>Nonprobability Systematic Sampling</b></p> <p>No list of the population is available. Begin with the first available subject. Select every <i>n</i>th subject until enough subjects have been obtained.</p>
<p><b>Simple Random Sampling</b></p> <p>A specified percentage or number from the population is determined in advance. All members of the population are assigned a number (such as a Social Security number). From a table of random numbers, select from the population until the sample size is reached. Each member of the population has a known chance of being selected.</p>	<p><b>Convenience Sampling</b></p> <p>A minimum number of subjects (or time frame) is determined in advance. Every person who meets the criteria is asked to participate. The researcher goes to the setting and selects the sample from persons who meet the sample criteria. The actual population is unknown; other terms for convenience sample are available sample, accidental sample! deliberate sample, and chance sample.</p>
<p><b>Stratified Random Sampling</b></p>	<p><b>Quota Sampling</b></p>

<p>Divide the population into strata based on the sample criteria. Draw a predetermined number from each group using a simple random sampling technique.</p>	<p>Make up a list of the criteria needed to divide the sample into groups (such as age, gender, education). Decide on the number from each group you want in the sample, then go to the setting and select a convenience sample until you have filled your quota in each group.</p>
<p><b>Cluster (Multistage) Sampling</b></p> <p>List the relevant geographic locations of the populations (states, counties, cities). Draw a simple random sample from that list until your predetermined number is reached. List the sample according to the next relevant criterion (such as schools or healthcare facilities). Draw a simple random sample from the new list until the predetermined number is reached. Repeat the previous steps until all relevant criteria have been exhausted. At the last stage, list all members of the population and draw a simple random sample to the predetermined number.</p>	<p><b>Network Sampling</b></p> <p>Locate an individual or group that meets the sample criteria who agrees to be in the study (or a person known by persons who meet the sample criteria). Obtain from the first and each subsequent member of the sample the names of (or a method of contacting) other individuals who meet the sample criteria. Continue the previous steps until the predetermined number has been reached or until all contacts are exhausted.</p>

## **Chapter VI: Research Design**

### **Lecture outlines:**

Definition of research design

Most research designs are categorized as either quantitative or qualitative.

Quantitative research design.

Factors other than the independent variable that affects the study results are referred to as threats.

Common technique used to control internal factors.

Experimental design.

Non-Experimental design.

### **Learning objectives :**

**At the end of this chapter, the student will be able to:**

1. Define qualitative research and quantitative research.
2. Identify the threats to internal and external validity related to research design.
3. Discuss each types of quantitative research design.
4. Compare and contrast qualitative and quantitative research design.

## **Research Design**

**Research design:-** is the logical plan used by the researcher to address the problem statement in the research study.

The research design, which follows an organized progression, takes the researcher from the research idea to the final step of the study. Specific strategies for obtaining subjects, collection data, analyzing data, and interpreting results are determined by research design.

Choosing a research design is a major research decision.

### **The basic elements of research design:**

1. The setting in which the research outcome.
2. The subjects to include in the research
3. The sample size or number of subjects in the study.
4. The condition under which data are collected.

**Most research designs are categorized as either quantitative or qualitative.**

**Quantitative research:-** which is based on reductionism, uses variables that analyzed as numbers.

**Qualitative research:-** which is based on holism, uses ideas that are analyzed as words to identify the relationship among variables.

Many researchers think that qualitative research is more consistent with nursing's philosophy basis, other think that quantitative research is more rigorous and scientific.

- Quantitative research design usually are best suited to studies that focus on determining causes and effects, quality research design, to studies that focus on discovery or exploration.
- Other research design that can be used in conjunction with quantitative or qualitative design help the researcher clarify strategies for collecting and analyzed data.

## **Quantitative Research Design**

The main purpose of quantitative research design are **to help the researcher fined solution to the research problem and maintain control over all variables**. Quantitative design differ according to the degree of control the researcher has over the variables, the degree of control directly affects the internal and external validity of the study- two areas that help to determine whether the study results are credible and dependable.

**Internal validity:** Is the extent to which the effects detected in the study are a reflection of reality, depends on whether the independent variable affects the dependent variable in some way.

**External validity:** Is the extent to which the findings can be generalized beyond the sample used in the study, dependent on whether the relationship between the independent and dependent variables can be applied to other populations or situations.

**Factors other than the independent variable that affects the study results are referred to as threats.**

### **Threats to internal validity:-**

**History:-** another event external to the independent variable that may be affect the dependent variable.

**Maturation:-** processes operating within the subject over time that may affect the dependent variable.

**Testing:-** the degree to which a pretest may affect a post-test score.

**Instrumentation:-** change in the measurement device or observation technique that may account for changes in the obtained score.

**Mortality or attrition:-** loss of subjects during the study that may affect the sample size and thus representativeness of the finding.

**Selection bias:-** subject distortion that may occur when a representative sample is not chosen or individuals are not assigned randomly to groups.

**Threats to external validity:-**

**Sample inadequacy:-** use of sample not representative of the population, which may diminish the generalizableness of results.

**Environmental influences:-** the effects of environmental factors on the independent variable that may prohibit the generalizableness of results

**Common technique used to control internal factors include:-**

- 1. Randomization:-** the random assignment of subjects to a group, with each individual in the population having an equal chance to be selected for the group, this elements the researchers need to decide which variables are extraneous and need to be controlled.
- 2. Homogeneity:-** the selection for participation in a study of only those subjects who share an extraneous variables, for example: the selection only man or only adults over age 65 years.
- 3. Blocking:-** the purposeful addition of an extraneous variables, for example, age, sex, and health status.
- 4. Analysis of covariance:-** the control of extraneous variables through statistical procedures.
- 5. consistent data collection methods:-** such as using the same measurement tool throughout the study.

**Quantitative research design can be classified as**

**A. True experimental design:-** which offers the greatest amount of control and minimal threat to internal validity, allows the researcher to become actively involved in the study.

**Common characteristics of a true experimental design include:-**

**Manipulation:-** the researcher manipulates the independent variable so that some of the subjects are affected.

**Control:-** the researcher uses one or more measures to control the experiment, including the use of an un-manipulated control group that is compared with an experimental group.

**Randomization:-** the researcher assigns subjects to groups by chance, such as by flipping a coin, pulling names from a hat, or using a computer or table of random members.

True experimental design are the most effective method of testing cause-and-effect relationships, in most cases, imposing controls elements the need for alternative explanations for casual effects.

**True experimental design can be classified as:**

**1. Pre-test-Post-test control group.**

**In pre-test-post-test control group design,** the researcher randomly assigns each subjects to either a control group or experimental group, both groups are given a pre-test, after which only the experimental group receives a specific intervention(an independent variable or factors, such as a treatment, that is manipulated by the researcher to achieve a desired effect), both are then given a post-test, the researcher examines the performance of both groups for changes in score that may have resulted from intervention.

## **2. Post-test only control group.**

**In post-test only control group design,** the researcher randomly assigns each subjects to either a control group or experimental group, after the experimental group receives a specific intervention, both groups are given a post-test, the researcher then examines the performance of both groups for differences in scores that may have resulted from the intervention.

## **3. Solomon four group, and factorial**

**In a Solomon four group design,** the researcher randomly assigns each subject to one of two control groups or one of two experimental groups, only one control group or experimental group are given the pre-test, and both experimental groups receives a specific intervention, all groups are given a post-test, and the researcher examines the performances of all the groups for the effect of the pos-test on post-test scores and for any other differences among the groups.

### **Limitation.**

- Use of experimental design is limiting because certain variables (such as age, sex, and height) cannot be physically manipulated, other variables (such as disease or unhealthy habits ) cannot be ethically manipulated,
- True experimentation may be impossible in particular settings, the Hawthorne effect may interfere with the study's outcome, and some researchers consider true experiments artificial.

**B. Quasi-experimental design:-** which is used to test cause- effect relationship when true experimentation is impossible, is more conducive to a natural setting, it allows the researcher to become actively involved in the study to generalize the finding to an extent.

Unlike a true experimental design, a quasi-experimental design :

- does not depend on randomization or control, however,
- this type of design does allow for manipulation of the independent variable and enables them to introduce other factors to compensate for the lack of randomization or evaluate a control group.

**Quasi-experimental design can be classified according to types:-**

- **A nonequivalent control group design** is identical to the pre-test-post test control group of a true-experimental design except that the subjects are not randomly assigned to groups, in this type of design, the researcher can not assume that both groups are equal and therefore must rely on the results of pretest to determine if groups are initially similar with respect the dependent variable.
- **A time series design** involves the collection of information from on group of subjects at several points over an extended period, the researcher introduces an intervention at a specific time during the course of data collection and evaluates the results based on information collected before and after the intervention, although subjects are not randomly assigned, this design allows the researcher to manipulate factors to control the study.

**Limitations of the quasi-experimental design:-**

5. The researcher cannot draw inferences about cause and effects relationships to the same degree as in true experimental design and,

6. because the researcher has limited control over variables, which may necessitate formulating alternative explanation for the effect detected in the study

**C. Non-experimental design:- can be classified according to three types:-**

**Correlation, ex post facto, and descriptive.**

1. **Correlation design** is typically used to examine the relationship between two variables to see if, when one variable changes, the other variable also changes.
2. **An ex post facto:-** is typically used to investigate the effect on the dependent variable of a change in the independent variable, the researcher may use comparison groups in this type of design.
3. **Descriptive design:-** is typically used to observe, describe, or document aspects of a situation, this type of design does not concern the relationship between variables.

### **Dimensions of Quantitative Research Design**

<b>Dimension</b>	<b>Design</b>	<b>Major features</b>
<b>Control over independent variable</b>	Experimental Quasi-experimental Preexperimental Nonexperimental	Manipulation of independent variable; control group; randomization. Manipulation of independent variable; no randomization and/or no comparison group; but efforts to compensate for this lack Manipulation of independent variable; no randomization or no comparison group; limited control

		<p>over extraneous variables .</p> <p>No manipulation of independent variable</p>
<b>Type of group comparison</b>	<p>Between-subjects</p> <p>Within-subjects</p>	<p>Subjects in groups being compared are different people.</p> <p>Subjects in groups being compared are the same people at different times or in different conditions</p>
<b>Timeframes</b>	<p>Cross-sectional</p> <p>Longitudinal</p>	<p>Data are collected at a single point in time .</p> <p>Data are collected at two or more points in time over an extended period .</p>
<b>Observance of independent and dependent variables</b>	<p>Retrospective</p> <p>Prospective</p>	<p>Study begins with dependent variable and looks backward for cause or influence .</p> <p>Study begins with independent variable and looks forward for the effect</p>
<b>setting</b>	<p>Naturalistic setting</p> <p>laboratory</p>	<p>Data collected in real-world setting .</p> <p>Data collected in contrived laboratory setting .</p>

## **Chapter VIII: Tabulation & analysis of data.**

### **Learning Objectives**

**At the end of this chapter, the student should be able to:**

1. Define concepts
2. Discuss the Seven steps are involved in the process of data tabulation
3. Describe the construction of useful table.
4. Identify the general guidelines for construction of useful table.
5. List the specific guidelines for construction of useful table.
6. Describe the construction of figures( line, Bar, and, Pie figures)
7. Discuss the specific guidelines for construction of figures.
8. Describe the measures of central tendency and two measures of dispersion
  - a. Measures of central tendency: Mode, Median, Mean
  - b. Measures of Dispersion ( Range, Standard deviation)

### **Tabulation & analysis of data.**

#### **Tabulation**

Identifying appropriate categories for the information desired, sorting the data into them, making the initial counts of responses, and using summarizing measures to provide economy of description and so facilitate understanding.

It is important to present data in a manner that can be easily understood by the reader. There are a variety of ways that data can be presented visually so that it is better understood. Computer graphics have greatly increased the options that researchers have for presenting their data. The most common methods of presenting data visually are tables and figures.

Line graphs, bar graphs, and Pie graphs are all special types of figures.

Tables usually present quantitative data. Occasionally, however, a table that consists of words is used to present qualitative comparisons. Tables that communicate the quantitative aspects of data are effective only when the data are arranged so that their significance is obvious at a glance. The preparation of a good table makes the difference between a table that confuses and one that informs the reader.

**Seven steps are involved in the process of data tabulation:**

- 1. Categorize:** Define appropriate categories for coding the information collected.
- 2. Code:** Assign codes to the respondent's answers.
- 3. Create Data File:** Enter the data into the computer and create a data file.
- 4. Error Checking:** Check the data file for errors by performing a simple tabulation analysis to identify errors in coding or data entry. Once errors are identified, data may be recoded to collapse categories or combine or delete responses.
- 5. Generate New Variables:** New variables may be computed by data manipulations that multiply, sum, or otherwise transform variables.
- 6. Weight Data Subclasses:** Weights are often used to adjust the representation of sample subgroups so that they match the proportions found in the population.
- 7. Tabulate:** Summarize the responses to each variable included in the analysis.

**General Guidelines for Construction of Useful Tablets**

1. Rounded of values may display patterns and expectations more clearly than precise values.
2. A reader can compare numbers down a column more easily than across a row.

3. Column and row averages can provide a visual focus that allows the reader to inspect the data easily.
4. Ample spacing between rows and columns can improve a table because white space creates a perceptual order to the table.

### **Specific Guidelines for Construction of Useful Tables**

#### **Every table should**

1. Be identified by a number as: Table I.
2. Have an explanatory, but brief, title
3. Have headings for each column.
4. Explain all abbreviation and special symbols.
5. Be explained in the accompanying text of the article or book.

#### **Figure**

Any illustration other than a table is called a figure. A figure may be a chart, graph, photograph, or drawing. A good figure is a simple and clear.

### **Specific Guidelines for Construction of Useful Tables**

#### **Every figure should:**

1. Supplement rather than duplicate the text.
2. Convey only essential facts.
3. Omit visually distracting materials.
4. Be easily understood.
5. The purposes should be readily apparent.
6. Be clearly and appropriately labeled.

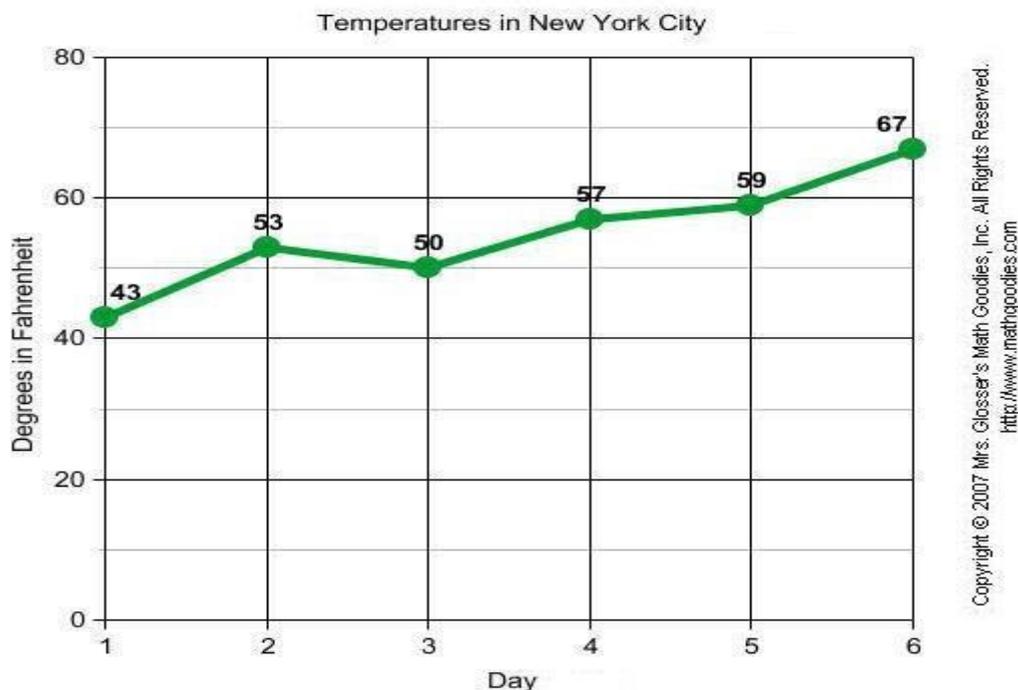
#### **Line graphs**

Line graphs are most often used to show continuous changes. The point of the datum is plotted on the graph and a line is drawn from one dot to the other. The independent variable is plotted on the horizontal axis and the dependent variable is plotted on the vertical axis.

**Example 1:** The table below shows daily temperatures for New York City, recorded for 6 days, in degrees Fahrenheit.

Temperatures In NY City	
Day	Temperature
1	43° F
2	53° F
3	50° F
4	57° F
5	59° F
6	67° F

The data from the table above has been summarized in the line graph below.

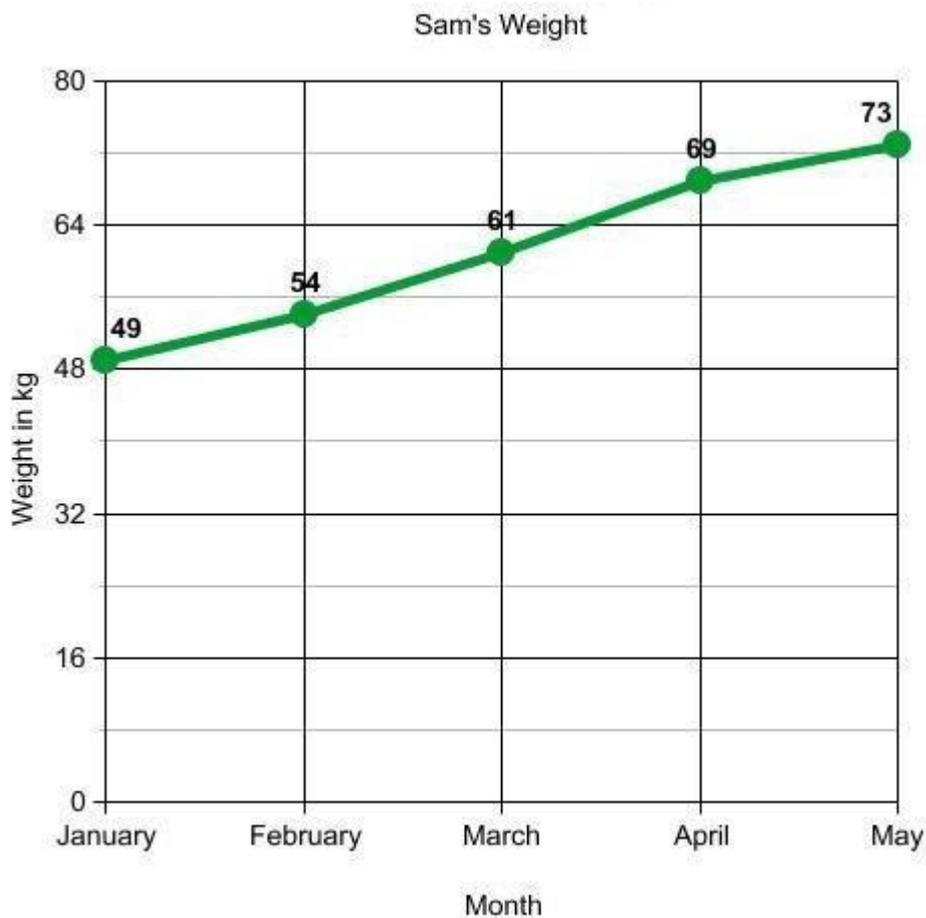


**Example 2:** The table below shows Sam's weight in kilograms for 5 months.

Sam's Weight	
Month	Weight in kg

January	49
February	54
March	61
April	69
May	73

The data from the table above has been summarized in the line graph below.

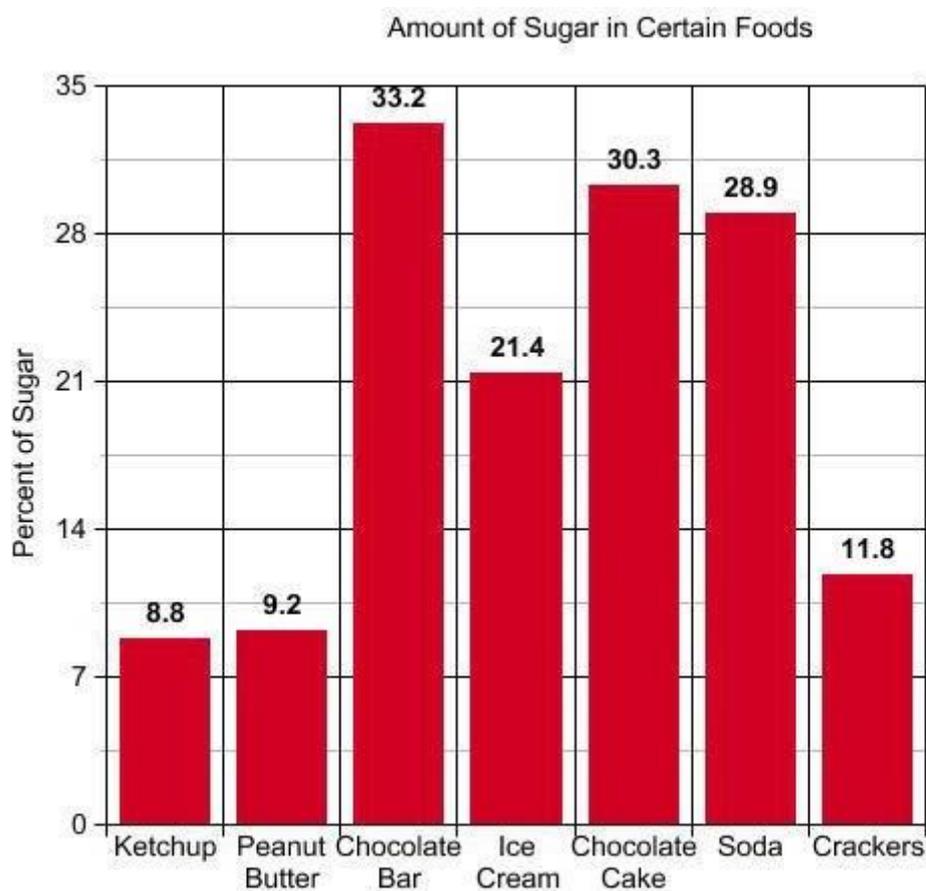


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## Bar Graphs

Bar graphs are simple, adaptable and easily understood, Solid horizontal or vertical bars each represent one kind of datum. Some bar graphs use multiple bars to different kinds of data.

**Example 1:** The amount of sugar in 7 different foods was measured as a percent. The data is summarized in the bar graph below.



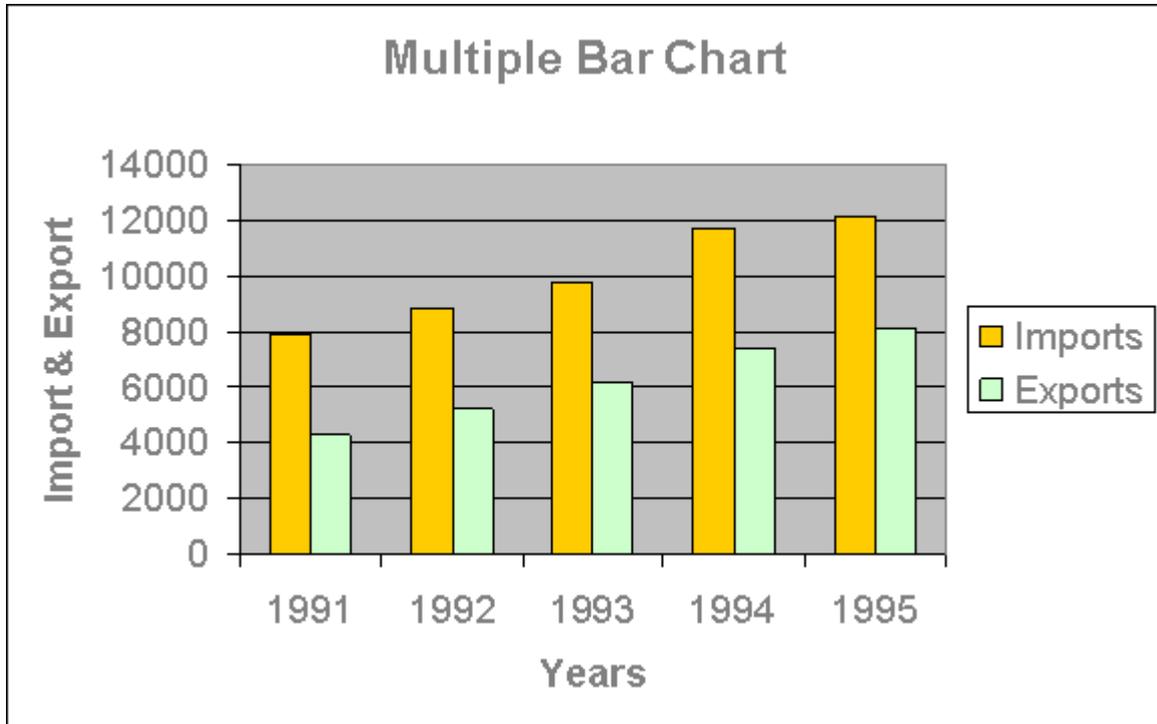
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<http://www.mathgoodies.com>

### The Multiple Bar Graph

The Multiple Bar Graph applets allow the user to graphically display several data frequencies using multiple bar graph. This particular applet allows the user to enter his/her own data as well as manipulate the y-axis values. The ability to manipulate the

y-axis values allows the creation of potentially misleading graphs.

Simple bar chart showing the import and export of Iraq from 1991 – 1995.



## Pie( Circle) Graphs

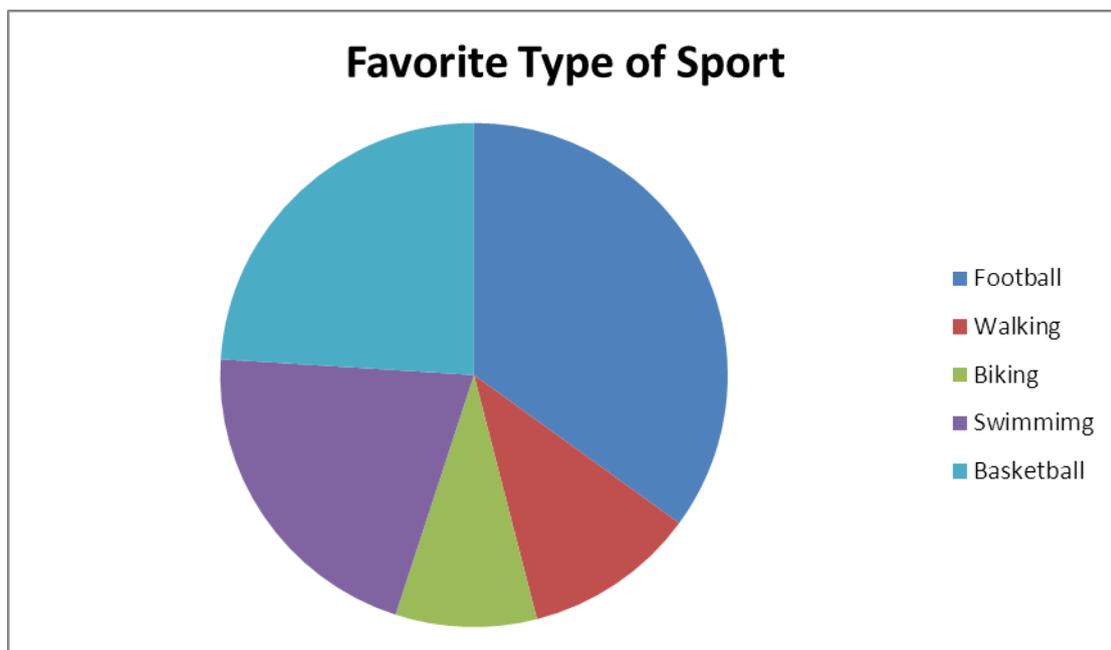
Circle or Pie graphs are used to show percentages or proportions. The number of items compared should be kept to five or fewer. Order are segments from large to small, beginning the largest segment at 12.00 o'clock.

**Example I:** Imagine you just did a survey of your friends to find which kind of sport they liked best.

**Here are the results:**

Table: Favorite Type of Sport				
Football	Walking	Biking	Swimming	Basketball
35	11	9	21	24

**You could show that by this pie chart:**



## **Analysis of data**

### **Measures of Central Tendency**

Measures of central tendency, numbers that represent commonly used kinds of averages, are the best way to summarize a group's characteristics.

Frequency distributions are an important means of imposing order on a set of raw data and for clarifying group patterns. For many purposes, however, a group pattern is of less interest to a researcher than an overall summary of a group's characteristics.

#### **The nurse researcher usually asks such questions as:**

What is the advantage blood pressure reading of hypertensive patients during relaxation therapy?.

How much information does the average first time mother have about nutrition?.

Such questions seek a single number that best represents a whole distribution of measures.

The measurement of central tendency are the most concise summary of the raw data.

The three measures of central tendency commonly used in statistical analyses are the : Mode, the Median, and the Mean.

### **Mode**

It is one of the simplest measures of central tendency is the mode.

The mode can be determined by examination of an ungrouped frequency distribution of the data. The mode is the numerical value or Score that occurs with the greatest frequency.

### **Example of a Cumulative Frequency Table of Scores of 50 Patients on Nutrition Knowledge**

<b>Score</b>	<b>Frequency</b>	<b>Per Cent</b>	<b>Cumulative frequency( f)</b>	<b>Cumulative Per Cent</b>
1	4	8	4	8
3	6	12	10	20
4	8	16	18	36
5	14	28	32	64
7	8	16	40	80
8	6	12	46	92
9	4	8	50	100

In above table the mode of that data set is the score of 5 which occurs 14 times in the dataset.

## **Median**

The median is the score at that exactly center of the ungrouped frequency distribution. The median is obtained by rank ordering the Scores.

If there are uneven( odd) number of scores, exactly 50 Per Cent of the Scores are above the median, and 50 Per Cent are below the median.

If there are an even number of Scores, the median is the average of the two middle Scores.

The median is the most appropriate measures of central tendency for ordinal data and is frequently used in nonparametric analyses.

## **Mean**

The most commonly used measures of central tendency is the mean. The mean is the sum of the Scores divided by the number of Scores being

summed. The mean is often called the **average**, however, this is a layman's term and is not used by researchers.

The mean is the appropriate measures of central tendency for interval and ratio level data.

**The formula for calculating the mean is listed below:**

$$\bar{X} = \frac{\sum X}{N}$$

Where:

$\bar{X}$  = the mean

$\sum$  = Sigma ( the statistical symbol for the process of summation)

X = a single raw Score

N = number of scores being entered in the calculation.

### **Example**

Calculation of the mean for the data in the above table is as follow:

$$X = 4+18+32+70+56+48+36$$

$$\frac{264}{50} = 264 / 50 = 5.28$$

### **Measure of Dispersion**

Measures of dispersion, or variability, give some indication of how scores in a sample are dispersed around the mean. These measures provide information about the data not available from measures of central tendency. They indicate how different the Scores are, the extent to which individual scores deviate from one another.

If individual scores are similar, measures of variability are small and the sample is relatively homogenous in terms of those Scores.

The measures most commonly used are : Modal percentage, Range, Deviation Scores, and Sum of Squares, Variance and the Standard deviation. However

for the purpose of this chapter, only the Range and Standard deviation will be discussed.

**Range** : the simplest measures of dispersion is the range. The range is obtained by subtracting the lowest score from the highest score. The range is a different Score, which uses only the two extreme Scores for the comparison.

**Example**

The range for the Score in above table is as follow:

$$9 - 1 = 8$$

**Standard Deviation Definition:**

Standard deviation is a statistical measure of spread or variability. The standard

deviation is the root mean square (RMS) deviation of the values from their arithmetic mean.

$$s = \sqrt{\frac{\sum(X-M)^2}{n-1}}$$

**Example:**

Find the Standard deviation of 1, 2,3,4,5.

**The answer:**

**Step 1: Calculate the mean and deviation.**

X	M	(X-M)	(X-M) <sup>2</sup>
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1	3	-2	4
2	3	-1	1
3	3	0	0
4	3	1	1
5	3	2	4

**Step 2: Find the sum of  $(X-M)^2$**

$$4+1+0+1+4 = 10$$

**Step 3:  $N = 5$ , the total number of values. Find  $N-1$ .**

$$5-1 = 4$$

**Step 4: Now find Standard Deviation using the formula.**

$$\sqrt{10/4} = 1.58113$$

## **Chapter IX : Discussion the findings of the study**

### **Learning Objectives**

**At the end of this chapter, the student should be able to:**

1. Describe the factors that can contradict or support the validity of the results.
2. Discuss the research findings, Conclusions ,and Implications.
3. Discuss the meaning of recommendations for further research.
4. Describe the Terminology Related to Final Steps of the Research Process.

### **Discussion the findings of the study**

#### **Examine Result**

The first step in interpretation is to consider all the factors that support or contradict the validity or results related to the research Sub problems. The following lists states the factors( listed first and underlined) and the questions that should be asked to determine whether the factors support or contradict the results.

- 1. The research Plan:** Do the problem statement ,framework, Sub problems, variables, design, methods of observation, method of measurement and types of analyses all link together so that the results of the data analysis can be said to be a true answer to the research Sub problems?.
- 2. Measurement of study variables:** Did the data collection methods really measure the variables?
- 3. Data collection Process:** Did any activities occur during the data collection process that could affect the meaning of the results?.
- 4. Data analysis process:** Were the data accurate and complete? Were the statistical tests used appropriate to the data?.
- 5. Data analysis results:** if the results are what the researcher expected, are there any other reasons that these results occurred? If the results are not what

the researcher expected ( negative results), are they a true reflection of reality or due to inappropriate

Methodology, a deviant sample, a small sample, use of weak statistical measure of faulty analysis.

**6. Result of Previous Studies:** are the results of the research consistent with other researcher that has been done on this problem?

## **Finding**

Results in a study are interpreted and then they become findings. Findings are a consequence of evaluation evidence. Although much of the process of developing findings from results occurs in the mind of the researcher, evidence of the thinking can be found in the published research report.

## **Conclusions**

Conclusions are derived from the findings and are a synthesis of findings. Forming these conclusions requires a combination of logical reasoning and creative formation of a meaningful whole from pieces of information obtained through data analysis.

In forming conclusions, it is important to remember the research never proves anything, rather, research offers support for a position. Proof is a logical part of deductive reasoning but not of the research process. Because of this, making causal statements is risky. Causal statements are statements that say one thing definitely caused another. It is more accurate to state conclusions in the form of probabilities that are qualified.

**For example**, in a study on preoperative teaching ,one could say that if preoperative teaching were given, postoperative anxiety was lowered as long as pain was controlled, complications did not occur and family contacts were high. The researcher could not say that preoperative teaching lowered postoperative anxiety.

## **Implications**

Implications are the meanings of conclusions for the body of knowledge, for theory and for practice. Implications are based on the conclusions and are more specific than conclusions. They provide specific suggestions for implementing the findings.

The researcher must consider the areas of nursing for which the study findings would be useful. For example, suggestions could be made about how nursing practice should be modified. If a study indicated that a specific solution was effective in decreasing stomatitis, the implications would state that the findings had implications for caring for patients with stomatitis. It would not be sufficient to state that the study had implications for nurses practicing in oncology.

## **Recommendations for Further Research**

The completion of a study and the examination of implications should culminate in the consideration of future studies that logically emerge from the present study and from previous studies in the same area of interest.

Suggested studies or recommendations for further study may include replications or repeating the design with a different or large sample. In every study, the researcher gains knowledge and experience that can be used to design a "better study next time".

This section of the study allows that thinking to become more specific and stimulates the researcher to more clearly define how to make the study "better". From a logic or theoretical point of view, the findings should lead directly to more hypotheses to further test the framework in use. The suggestions made in this section of planning the next research endeavor.

## **Terminology Related to Final Steps of the Research Process**

<b>Research Step ( Action)</b>	<b>Name of Outcome</b>
Collect Data	Raw Data
Analyze Raw data	Results
Interpret Results ( Data)	Findings
Synthesize Findings	Conclusions
Give Meaning to Conclusions	Implications

## **Chapter X: Methods of Writing Research Reports or Study.**

### **Learning Objectives**

**At the end of this chapter, the student should be able to:**

1. Identify the steps of organizing research.
2. Discuss the different methods in writing research paper
3. Describe the mechanism of Writing a Research Report.
4. Discuss the contents for each step of research writing.
5. Identify the Ethical Issues in conducting research

### **Organizing the Research Paper**

**The following steps should be used to complete the assignment.**

1. Select a topic.
2. Find sources.
3. Take notes on colored index cards.
4. Arrange your notes by topic.
5. Write an outline.
6. Write a first draft.
7. Revise and re-write.
8. Proofread.

### **Research Reports**

The first step in writing any research report is to identify the intended readers. This is an important decision because the organization, style, and even the mode of presentation depend on the target audience.

In mass media research, there are typically two types of audiences and two types of research reports:

Reports aimed at colleagues and intended for publication in scholarly and professional journals or for presentation at a convention.

Reports aimed at decision makers and intended for in-house use only.

The format, length, style, and organization of a published report will have to

conform to the guidelines of the journal in which it appears.

Since colleagues are the target audience for such reports and papers, the writer must pay close attention to the theory underlying the research, the methods used, and the techniques of analysis.

In the second instance, there is more flexibility. Some decision makers

prefer to be briefed orally by the researcher. In such cases the verbal presentation might be supplemented by a written summary, handouts, visual aids, and, on request, a detailed report. In other circumstances, the researcher might prepare a written report with a short executive summary, confining most of the technical material to appendixes. No matter what the situation or audience, the primary goal in all research reports is accuracy.

### **The Need for Accurate Reporting Procedures**

Researchers need to report research accurately for two reasons.

**First**, a clear explanation of the investigator's methods provides an opportunity for readers to more completely understand the project.

Researchers should keep in mind that in most cases, a reader's knowledge of a given project is based solely on the information contained in the report.

Since readers do not instinctively understand each procedure used in a study, these details must be supplied.

**Second**, an accurate report provides the necessary information for those who wish to replicate the study. Enough information must be included or filed somewhere in public archives to enable reproduction of the study without the necessity of personal contact with the investigator. This is to ensure that a study is always respectable regardless of the decades or generations that may pass.

### **3. The Mechanics of Writing a Research Report**

Beginning researchers may find the writing style used for research reports awkward or unaesthetic, but there is a definite purpose behind the rules governing scientific writing: clarity. Every effort must be made to avoid ambiguity.

Given the wide variety of approaches to research, it stands to reason that the

approaches to writing a research report are equally varied. Most research reports, however, include only five basic sections or chapters: introduction, literature review, methods, results, and discussion.

## **Introduction**

The introduction should alert the reader to what is to follow. Most introductions usually contain the following:

**Statement of the problem.** The first job of the report writer is to provide some information about the background and the nature of the problem under investigation. If the research topic has a long history, then a short summary is in order. This section should also discuss any relevant theoretical background that pertains to the research topic.

**Justification.** Another important area to be covered in this initial section is the rationale and justification for the project. This section should address the question of why it is important for us to spend time and energy researching this particular problem. Research can be important because it deals with a crucial theoretical issue, because it has practical value, or because it has methodological value.

**Aims of the current study.** Most introductory sections conclude with an unequivocal statement of the hypothesis or research question to be answered by the study.

## **3.2 Literature Review**

The second major section is the review of the literature. In some formats, the literature review is incorporated into the introduction. As the name suggests, the literature review section briefly recapitulates the work done in the field. This review need not be exhaustive; the writer should summarize only those studies most relevant to the current project. All literature reviews should be accurate and relevant.

## **Accuracy**

A concise and accurate distillation of each study in your review is a prerequisite for any literature review. The main points of each study hypotheses that were tested, sample, method, findings, and implications should be briefly summarized. The review should be selective but thorough.

## **Relevance**

A literature review should be more than a rote recitation of research studies. It must also contain analysis and synthesis. The writer is obligated to discuss the relevance of the past work to the current study. What theoretic development can be seen in past work? What major conclusions have recurred? What were some common problems? How do the answers to these questions relate to the current study? The ultimate aim of the review is to show how your study evolved out of past efforts and how the prior research provides a justification for your study.

## **3.3 Methods**

The methods section describes the approach used to confront the research problem. Some of the topics that are usually mentioned in this section are as follows.

### **1. Variables used in the analysis**

This includes a description of both independent and dependent variables, explaining how the variables were selected for the study, what marker variables, if any, were included, and how extraneous variables were controlled. Each variable also requires some justification for its use variables cannot be added without reason. The mean and the standard deviation for each variable should be reported when necessary.

### **2. Sample size**

The researcher should state the number of subjects or units of study and also explain how these entities were selected. Additionally, any departure from normal randomization must be described in detail.

### **3. Sample characteristics**

The sample should also be described in terms of its demographic, lifestyle, or other descriptor characteristics. When human subjects are used, at least their age and sex should be indicated.

### **4. Methodology**

Every research report requires a description of the methods used to collect and analyze data. The amount of methodological description to be included depends on the audience; articles written for journals, for instance, must contain more detailed information than reports prepared in private sector research.

### **5. Data manipulation**

Often the collected data are not normally distributed, and researchers must use data transformation to achieve an approximation of normality. If such a procedure is used, a full explanation should be given.

## **3.4 Results**

The results section contains the findings of the research. It typically contains the following:

### **1. Description of the analysis**

The statistical techniques used to analyze the data should be mentioned. If

the analysis used common or easily recognized statistics, a one-sentence description might be all that is needed, such as "Chi-square analyses were performed on the data" or "Analysis of variance was performed....." If appropriate, the particular statistical program used by the researcher should be identified. Finally, this part should include an overview of what is to follow: "This section is divided into two parts. We will first report the results of the analysis of variance and then the results of the regression analysis."

## **2. Description of findings**

The findings should be tied to the statement of the hypotheses or research questions mentioned in the introduction. The author should clearly state whether the results supported the hypotheses or whether the research questions were answered. Next, any peripheral findings can be reported. Many researchers and journal editors suggest that interpretation and discussion of findings be omitted from this section and that the writer should stick solely to the bare facts. Others think that this section should contain more than numbers, suggesting the implications of the findings as well. In fact, for some short research articles, this section is sometimes called "Findings and Discussion." The choice of what model to follow depends upon the purpose of the report and the avenue of publication.

## **3. Tables**

Tables, charts, graphs, and other data displays should be presented parsimoniously and, if the article is being submitted to a journal, in the proper format. Remember that many readers turn first to the tables and may not read the accompanying text; consequently, tables should be explicit and easily understood by themselves.

## **3.5 Discussion**

The last section of a research report is the discussion. The contents of this section are highly variable but the following elements are common.

### **1. Summary**

A synopsis of the main findings of the study often leads off this section.

### **2. Implications/discussion/interpretations**

This is the part of the report that discusses the meaning of the findings. If the findings are in line with current theory and research, the writer should include a statement of how they correspond with what was done in the past. If the findings contradict or do not support current theory, then some explanation for the current pattern of results is provided.

### **3. Limitations**

The conclusions of the study should be tempered by a report of some of its constraints. Perhaps the sample was limited or the response rate was low or the experimental manipulation was not as clean as it could have been. In any case, the researcher should list some of the potential weaknesses of the research.

### **4. Suggestions for future research**

In addition to answering questions, most research projects uncover new questions to be investigated. The suggestions for research should be relevant and practical.

### **Ethical Issues in conducting research**

1. Do not involve people in research without their knowledge or consent.
2. Do not coerce people to participate.
3. Do not withhold from the participant the true nature of the research.
4. Do not actively lie to the participant about the nature of the research.
5. Do not lead the participant to commit acts that diminish his or her self- respect.
6. Do not violate the right to self-determination.
7. Do not expose the participant to physical or mental stress.
8. Do not invade the privacy of the participant.
9. Do not withhold benefits from participants in control groups.
10. Do not fail to treat research participants fairly and to show them consideration and respect.

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