

# Introduction to Research Methodology (RM)

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Additional references:

- Designing Clinical Research. 4<sup>th</sup> edition. Stephen B. Hulley, MD, MPH.
- Research methodology. Step by step guide for beginners. 3<sup>rd</sup> edition.

# Learning Objectives

**By the end of this presentation you will be able to:**

- 1- Define research and related terms.
- 2- Explain the roles of research in development
- 3- Identify the different types of research
- 4- Enumerate Characteristics of good research and researcher.

# Basic Concepts and Terms

## MEANING OF RESEARCH

- Is a purposely and methodically search for new knowledge in the form of answers to questions formulated beforehand.
- The inquisitiveness is the mother of all knowledge and method, man employs for answering the questions.
- It is actually a voyage of discovery to establish new facts TO .. extend, correct or verify knowledge, and poses new questions for future research .. for its advancement.
- The new knowledge means it leads to innovations and development. **HOW?**

# As such the term 'research' define as the

- Research is a scientific inquiry aimed at learning new facts, testing ideas, etc. It is the systematic method of enunciating the problem, formulating a hypothesis, collection, analysis and interpretation of data to generate new knowledge to answer a certain question or solve a problem.

# Research is not a solitary activity, why?

you are building on the knowledge that others have acquired before, and providing a road map for those who come after you. You are adding to a body of work that will never complete (many references).

# MOTIVATIONS IN RESEARCH

- 1. A research degree;
- 2. Serve society;
- 3. Solving the unsolved problems,
- 4. Intellectual joy;
- 5. Respectability.
- 6. OR ... directives of government, employment conditions .....

# What Is The Main Aim Of doing a Research?

## Objectives Of doing a Research:

1. To gain familiarity with a phenomenon or to achieve new insights into it (*exploratory research studies, qualitative research*)
2. To portray accurately the characteristics of a particular individual, situation or a group (*descriptive research studies*); (*hypothesis forming studies*);
3. To test a hypothesis of any relationship between variables (*hypothesis-testing research studies,, quantitative research*).
4. To determine validity of a test, or the frequency with which something occurs with associated issues as CERCARDIAN STUDIES (*diagnostic research studies*);

# So Research Methodology is

- **How a researcher systematically designs a study to solve the research problem and to ensure valid and reliable results that address the research aim and objectives.**



# Why it is important to know about RM?

- In writing your research,,,
- The methodology piece explain:
  - ✓ why you did what you did. Justify your design.
  - ✓ write about what you did not do and why,
  - ✓ Write about the weaknesses or limitations of your project as well as its strengths.
  - ✓ Every research has a limitation, it is perfectly acceptable to identify it before .....
- In writing your proposals.

# procedure of the research

- It demands a clear statement of the research problem
- It requires a plan (it is not aimlessly “ looking” for something in the hope that you will come across a solution) builds on existing data, using both positive and negative findings
- New data should be collected as required and be organized in such a way that they answer the research question(s)

# Whether a problem requires research depends on *three* conditions:

- I) There should be a perceived difference or *discrepancy between what it is and what it should be*;
- II) The reason(s) for this difference should be *unclear* (so that it makes sense to develop a research question); and
- III) There should be more than one possible and plausible answer to the question (or solution to the problem).

SO... **Choosing a research problem** .. DEPEND ON EXPERIENCE, READINGS, ORIGINALITY.

# a “good research topic, title”

A good research topic should be: A Concrete statement. Why?

## Criteria for selecting a research topic

- Feasible (can be done),
- Interesting,
- Novel,
- Ethical
- Relevant ( a priority problem).

 collectively called the

✓ F.I.N.E.R

# Feasibility

- The subjects,
- The research facilities,
- The required expertise,
- The cost.

## ● Interest

- YOU
- OTHERS

## Novelty:

- ***Avoidance of duplication:*** Investigate whether the topic has been researched.
- **If the topic has been researched, explore whether major questions remain unanswered completely.**
- **If not, another topic should be chosen.**
  - up to-date literatures.
- Novel research... necessary ???
- Re"search" ..... new information
- The progress of science is incremental ....

# Ethics

- From Early stage of research .. TOPIC
- In planning the research.
- If TESTING a new therapy or procedure,
  - “Superior to the available”.
- Adequate data from animal, human tissue results and a small No. of human studies.
- Available Therapies
- The research should not conflict with the society’s cultural, moral, religious and legal values.

# Relevance

- This criterion can be called:  
the “so-what?” test.

*How large or widespread is the problem?*

*How severe is the problem?*

- For the research to be considered relevant it must have:
  - The potential to advance scientific knowledge,
  - Influence clinical management,
  - Influence health policy,Or guide further research



## ● **Characteristics of Good Research**

- Objectives clearly defined (PURPOSIVE)
- CONTROLLED Carefully planned design, Variables are identified & controlled, Complete frankness; flaws avoided, control the variables that affect the relation.
- RIGOROUS .. Relevant , appropriate and justified procedure.
- Adequate and appropriate analysis of data.
- Carefully checked data for validity & reliability
- Conclusions confined to those justified by the data

## characteristics of Good Research contd..

- SYSTEMATIC- fixed methods and procedure Reject the use of guessing & intuition.
- LOGICAL - Guided by rules of logical reasoning
- REPLICABLE - Verified by replicating the study
- Confidence, competence/ reputation, experience, honesty & integrity of researcher

# • Types of research

- **Pure/ Basic research:** Involves developing and testing theories and hypotheses that are intellectually challenging in order to add to the existing body of research knowledge. (how the nerve cell work)
- **Applied research:** is done to solve specific, practical questions; for policy formulation, administration and understanding of a phenomenon. It can be exploratory, but is usually descriptive.

# Types of research

**Quantitative:** investigating things which we could observe and measure in some way. Such observations and measurements can be made objectively and repeated by other researchers, is more concerned with

- questions about: how much? How many? How often? To what extent? etc.

**Qualitative researches:** Research which attempts to increase our understanding of behaviour and social world.

- to understand the social aspect for world. and seeks to answer questions why? How? In what way?
- **Note: In many studies you have to combine both qualitative and quantitative approaches..... MIXED RESEARCH**
- **Which is better research ????**