

Major steps in scientific research

unit 2

**Foundation of nursing research fifth edition by Rose Marie
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**Basic Concepts and Methods in Epidemiology and
Demography for Medical students. First Edition, by Habib OS**

Objectives

At the end of this lecture the students will be able to understand the following :

- 1- The major steps in scientific research
- 2- Definition and purposes of pilot study

Steps in quantitative research(ch3)

1- Identifying the problem

Generally a broad topic area is selected and then the topic is narrowed down to a specific **one –sentence statement of the problem** .

The problem can be identified from :

- personal experiences,
- literature sources ,
- previous researches or
- through the testing of theories.

The problem should be of interest to the researcher and be significant to nursing

The problem of the study is best stated as question .
Questions demand answers. The problem statement should specify the population and the variables that are been studied.

A variable: is a characteristic or attribute that differs among the persons , objects, events that are being studied (e.g blood type. age)

Examples:

- **Is** there a correlation between body image and self-esteem levels of women who have experienced mastectomy?
- **what are the adjustment behaviors of family members when the father has experience myocardial infarction?**

2-Determine the purpose of the study

The problem statement addresses what will be studied ; the purpose explaining why the study is being done.

Example :

Consider the problem statement concerning body image and self –esteem level of women who have mastectomy .

A study to examine these variables might have the following purpose:

to develop better understanding of the difficulties experienced by women after loss of body part that is closely associated with their feminine identity

3- Review the literature

Research should build on previous knowledge, before beginning a quantitative study, it is important to determine what knowledge exists of the study topic.

literature sources can be located through the library card catalog, indexes, abstracts ,and computer- assisted searches.

Also help to develop theoretical frame work for the study.

Finally, the review of literature can help the researcher to plan study methods. Instruments or tools may be discovered that can be used to measure the study variables.

The researcher will be able to profit of successes and failures of other researchers.

literature review should be continued during the course of investigation until the time of data collection. This ensure the researcher has as much information as possible and the most up- to- date information on the study topic.

Occasionally , the initial review of literature may actually precede the identification of the problem.

The problem area may be determined from the suggestions or recommendations of researchers who have conducted previous studies in the area of interest

4- Develop a theoretical /conceptual framework

The goal of research is to develop scientific knowledge. Research can test theories as well as help develop and refine theories.

The theoretical framework assists in selection of the study variables and in defining them **also** it direct the hypothesis and interpretation of the findings.

Some researches of purely descriptive nature may not require a theoretical framework

5- Identify the study assumption (المعتقد)

Assumptions are beliefs that are held to be true but have not necessarily been proven.

Each scientific research based on assumptions.

Types of assumptions:

1- Universal assumption (beliefs that are assumed true by a large percentage of society for example all human beings need love)

2-Assumption based on research findings

3- Common sense assumptions that are necessary to carry out a study for example when studying the behavior of fathers toward their children it would be necessary to assume that the men in the study were actually the fathers of children in the study.

6- Acknowledge the limitation of the study.

the researcher should try to identify study limitations or weakness.

Limitations are uncontrolled variables that may affect study results and limit the generalizability of the findings.

The limitations must be taken into consideration when conclusions of a study are formulated and when recommendations are made for future research.

7-Formulate the hypothesis(الفرضية) or research question

Research expectation about the results of the study is expressed in a hypothesis.

(Experimental, comparative, and correlational studies call for hypothesis).

In qualitative studies and some descriptive studies , a hypothesis is not needed, and the research is guided by research questions that are further elaboration of the problem statement.

For example , the problem statement

” what are the adjustment behaviors of family members when the father has experience myocardial infarction?”

the research question might be

“Do family members become closer or more distant in their interpersonal relationships with each other?”

” Do different families report similar adjustment problems?”

8- Identify the population

- Population

a complete set of individuals or objects that possess some common characteristic of interest to the researcher

- Accessible population

Group actually available to study by researcher

- Target population

Group to which the researcher wishes to generalize the study findings

9- Select the sample

Sample is subgroup chosen to represent population

10- conduct a pilot study

It is advisable to conduct a pilot study before the study subjects are approached and the actual study is carried out .

Pilot (المرشد) study

Is a small-scale study carried out on a small number of individuals under conditions similar to those of the final study. The size of the pilot study is a matter of convenience, time and money.

The purposes of the pilot study are to have an idea about the followings :

- a. The time required for the study as a whole.
- b. The cost of the final study
- c. The skills required by the investigators and whether the instructions given to them are efficient and adequate.
- d. The adequacy of the questionnaire, the ease of handling, the efficiency of its layout, the clarity of the definitions and the adequacy of the questions themselves. Any problems with the questionnaire contents should be detected and can be resolved prior to the main study.
- e. The extent of non-response.(refusals and non contacts).

11- Data collection

Data collection should be systematic process.

These questions must be answered:

- what data will be collected?
- How will the data be collected?
- Who will collect the data?
- Where will the data be collected ?
- When will the data be collected?

12- Organize the data for analysis

this step should have been planned long before the data were collected . Statistician should be consulted in the early phase of research process, as well as in the data analysis phase of the study.

13-Analyze the data

The data analysis is carried out either manually, by pocket calculator or by computers. The medium of analysis is decided by the size of the study and the required details and sophistication of analysis.

The results are displayed in the form of tables and diagrams.

14-Interprting the findings

After the data are analyzed , the findings should be interpreted in the light of the study hypothesis or research questions.

The researcher should discuss any problems occured in the course of the study or any limitations of the design that may have influenced the study results.

The results of this study are compared with those of previous studies that investigated the same or similar variables; the researcher thus is able to contribute to the existing body of knowledge on the study topic

Finally recommendations for future research are proposed

15- The writing of an article, a report, a dissertation or thesis.

As a general rule, a scientific document consists of the following parts.

- **Title**
- **Author** names and titles
- **Summary.**
- **Introduction/** literature review.
- **Methodology**
- **Results.**
- **Discussion.**
- **Conclusions and recommendations**
- **References.**
- **Appendices.**

16- Communicate the finding

Research finding can be communicated through many different mediums ,the best method of reaching a large number of nurses is through publication in research journals, other methods research seminars ,poster sessions

17-Utilize the findings

focuses on the implementation of findings.

MCQ

1- one of the main purposes of conducting a review of the literature before carrying out research project is to

- A. Determine existing knowledge on the topic
- B. Helping select an optimum sample size
- C. Discover an instrument for data collection that has been used many times
- D. Prevent duplication of the results

2- the plan for how a study will be conducted is called the

- A. Design
- B. Hypothesis
- C. Data-collection
- D. Research process

3- At what point in the research process should a statistician be consulted initially

- A. Early in the research project
- B. Immediately before the data are collected
- C. After data have been collected
- D. Before the data have been analyzed

4- the final step of the research process , for the researcher, is to

- A. Analyze the data
- B. Interpret the findings
- C. Communicate the findings
- D. Utilize the findings

5- Which of the followings is true concerning assumptions?

- A. beliefs that are thought to be true but have not necessarily been proven
- B. False beliefs held by researcher
- C. Expectation for study results
- D. None of the above

6- Which of the following answers is true concerning quantitative research?

- A. The steps always proceed in the same way in each study
- B. There may be some shifting back and forth between steps
- C. The most important step is to identify the study hypothesis
- D. The steps are never carried out in an orderly fashion

7- All authors agree on the following Number of steps in conducting quantitative research:

- A. 10
- B. 15
- C. 18
- D. There is no set number of steps .

8- Which of the following is true concerning assumptions?

- A. Assumptions are beliefs that have been found to be true.
- B. Researchers' false beliefs are often called assumptions.
- C. Expectations for study results are presented in the form of assumptions .
- D. All studies are based on assumptions

9-The small group selected from a larger group to participate in a study is known as the:

- A. study population
- B. sample population
- C. sample
- D. element

10- Which of the following communication mediums is the most efficient means of presenting research findings?

- A. Books
- B. Journals
- C. Research seminars
- D. Poster sessions

11-The final step in the research process (for the researcher) is to:

- A. analyze the data
- B. interpret the findings
- C. communicate the findings
- D. utilize the findings