



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**COURSE CODE: CHS421**

**COURSE TITLE: Research for Community Health**

**CHS 421:**

**RESEARCH FOR COMMUNITY HEALTH  
(ADAPTED FROM NSS 407: RESEARCH IN NURSING)**

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**COURSE GUIDE**

**COURSE GUIDE**

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**Introduction**

The Course Research Method in Community Health is designed to create awareness of and the need for research by all Community Health workers for improvement of health care. The course enables you to acquire the basic skills and knowledge required of a researcher, and to conduct simple research studies. Whatever discipline we belong to, it is an obligation to strive and extend the body of knowledge, and for community health, a lot can be gained through research. This course will also equip you with information on the evolution of research in community health, and further expose you to the collaborative nature of research among community health workers and other health care personnel for the benefits of patient's care.

### **The Course:**

This Course guide tells you briefly what to expect from reading this material.

Research Method in Community Health as a course is essential for continued improvement in patient's care. Community Health practitioners are being increasingly required to utilize research – based practice (evidence – based practice) to make decisions and take actions in respect of patient's care. Community health workers are accepting the need to base their community health actions and decisions on evidence to show that the actions are clinically appropriate, cost effective, and so more acceptable to the patients. With research, community health identity as a profession is assured. As at now, with the cost of health care, and the health care reforms to contain costs, research facilitates the relevance of Community health and the effectiveness of care not only to the profession, but also to the consumers (patients).

Research findings will help community health workers eliminate actions that do not achieve the desired results, and help them to identify those practices that can change outcomes.

Research is important so that community health workers can understand the profession fully, and be able to initiate activities that promote desired patient behaviours. It is only through research that community health workers can in the real sense improve their effectiveness, and enhance their professional lives. With research, the community health workers could attend research presentations at conferences, be in position to evaluate completed research work, and enable us to discuss implications and relevance of the findings. . Community health workers with research skills are better placed to make contributions to the profession and to the body of community health knowledge.

Historically, research method in community health like nursing began with Florence Nightingale. Based on her careful analysis of the factors influencing soldier mortality and morbidity during the Crimea war, she was able to effect some changes in nursing care. After her, and until much later, research in community health mainly was in education.

With the search for professional identity, research brought into focus who community health workers were, and how they were perceived. As we go through the concepts of research, we will look through the definition of research as a systematic and scientific approach towards the solution of problems.

### **Course Aims**

The aim of this course is to provide an understanding of the basic concepts in community health research and motivate you to determine how research contributes to the improvement of community health practice.

### **Course Objectives**

This course is set to achieve the following objectives.

After going through this course, you should be able to:

- Explain the basic concepts in community health research and the purpose for which research is conducted.
- Understand the research process as it relates to the various steps in the conduct of research.
- Appreciate the implications of ethics in research.
- Describe the role of research in health and social welfare.
- Identify the various types of research designs.
- Apply the principles of hypothesis formulation, data collection, analysis, and interpretation of research findings.

### **Working Through the Course**

This course requires that you spend some time to read. The course content available for this course is quite vast and you need to spend great time to study it. This explains why a great amount of effort and time was put into the development of this course, to make it more understandable and readable. I advise that you avail yourself the opportunity of attending tutorial sessions where you would have the opportunity to compare your knowledge with your peers.

### **The Course Material**

The major components of the course are:

1. Course Guide
2. Study Units
3. Assignment File
4. Presentation Schedule

**Study Units**

The following are the study units contained in this course.

Unit 1: Exploring Community Health Research

Unit 2: Research Problem

Unit 3: Literature review and theoretical frameworks

Unit 4: Hypotheses and Research questions

Unit 5: Research design

Unit 6: Population and Sample

Unit 7: Data collection

Unit 8: Measurement

Unit 9: Organization of data for analysis

Unit 10: Data Analysis

Unit 11: Interpretation of findings

Unit 12: Communication of findings

Unit 13: Ethics of Community Health Research

Unit 14: Utilization of research

Unit 15: Critiquing research studies

The first unit, Exploring Community Health research will expose you to the characteristics of the scientific methods, the basis of Community health research, types of research with definition of some key terminologies in community health research.

The second unit in the course materials discusses the research problem, including the criteria for researchable topics in community health. It further introduces you to the differences between research and problem solving, and enables you to formulate research problems as well as choose a research topic.

Unit 3 introduces Literature review and theoretical framework. In this unit, you will learn how to review literature – of the people who have conducted research, and what they found including the methods they used. This unit attempts to explain the relationship between your research and what other people did. You will also learn through the use of different research methods, including internet searches. You will also learn about theories that apply to research and how you can utilize already existing theories and relate them to your research.

In Unit 4, you will be exposed to research questions and hypothesis. In research, the investigator or researcher may not know the answer, and has to ask a question. If he thinks he knows the answer, he may make a statement or predict a relationship. This unit will enable you understand how to ask research questions, and state hypothesis.

Unit 5 is one of the most important aspects of the research, fundamental principles of research design. You will learn about the plan of the research – the test blue print of the research. This unit gives meaning to the research, by enabling you to understand the methods, and what you need to do to conduct research. You will study the different research designs – experimental and non – experimental designs, and others.

In Unit 6, you will learn that to conduct the research with any design, you work with population and samples. You will learn how to choose a sample from the population, through a method called sampling. You will also learn the various types of sampling, and the criteria for using them.

In Unit 7, you will learn about data collection, and what will be done with the sample in order to get the needed information (data). You will also study what to do with the information collected. Various methods: questionnaire, observation, interview and others will be studied including developing the instruments to be used to collect data.

Unit 8 will discuss measurement. You will learn about the levels of measurement and the methods of assigning numerical values to qualities of objects to designate the quantity. You will learn about reliability and validity of the measuring instruments and why they are important.

Unit 9 will introduce organization of data collected. You will learn how to organize data collected by different methods to enable the researcher extract meaning from them. You will learn how to draw up frequency distribution tables, bar graph, pie diagram and others.

Unit 10, you will be exposed to analysis of data. You will be able to understand why statistics are needed, and what tests might be appropriate in a given research situation. You will also learn what statistical information in a research report means, and how to present the results (findings) of the study using statistics.

In Unit 11 you will be taken through the interpretation/discussion of the findings from the research. You will learn how to discuss your findings by relating them to studies reviewed in your literature, and providing reasons for similar or different results. You will learn how to draw conclusions through hypothesis testing and make recommendations from the research. You will study implications that could arise based on the research.

In Unit 12, you will learn how to communicate research findings through the research report. You will study the major sections of a research report and learn how to prepare the report, including the abstract.

In Unit 13 the Ethics of community health research will be introduced to you. You will study the basic principles of ethical research and major requirements of ethical research; and the rights of human subjects. You will also learn the function of ethical research committees in institutions.

Unit 14 will expose you to the Utilization of research findings in community health practice. You will learn how research findings can be applied to real health care situations. You will also study the obstacles to research utilization and strategies that could facilitate utilization.

In Unit 15 you will learn how to appraise or critique research conducted or written by other people in research literature. You will learn the purpose of research critique and some tips on how to evaluate research reports.

### **Recommended Textbooks**

Most recent edition of these textbooks is recommended for further reading:



- Abdellah FG & Levine E (Latest Ed) Better patient care through nursing research. New York: Macmillan
- Horsley J, Crane J, Crabtree M & Wood D (1983) Using research to improve nursing practice: A guide. New York: Crune & Stratton.
- Notter LE (Latest Ed) Essentials of nursing research. New York: Springer.
- Polit DF, Beck CT & Hungler BP (2001) Essentials of nursing research, methods, appraisal and utilization. Philadelphia. Lippincott.

### **Assessment**

There are two components of assessment for this course. The Tutor Marked Assignment (TMA) and the end of course examination.

### **Tutor Marked Assignment**

The TMA is the continuous assessment component of your course. It accounts for 30% of the total score. You will be given 4 TMAs to answer. Three of these must be answered before you are allowed to sit for the end of course examination. The TMAs would be given to you by your Facilitator and returned after you have done the assignment.

### **End of Course Examination**

This examination concludes the assessment for the course. It accounts for 70% of the whole course. You will be informed of the time for the examination which may or may not coincide with the university semester examinations.

### **Summary**

This course intends to provide you with basic knowledge of research methods in community health. By the time you complete studying this course, you will be able to answer the following types of question:

- What is research and how is it different from problem solving?
- Describe the criteria for researchable topics in community health.
- Why is literature review helpful in conducting research?
- Identify the purpose of hypothesis
- Explain why research questions are necessary
- Describe the characteristics of different variables
- Identify major research designs
- Describe the purpose of the pilot study
- Distinguish between experimental, historical and survey designs
- Differentiate between a sample and population
- Describe the guideline for developing data collection instrument.

We wish you success in this course. We hope you will be able to appreciate the importance and relevance of research to the improvement of nursing practice.

We hope you enjoy the course.

Best Wishes.

## **Unit 1: Exploring Community Health Research**

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  - 3.2 Types of research
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- 4.0 Conclusion
- 5.0 Summary
- 6.0 Further Reading
- 7.0 Tutor Marked Assignments

### **1.0 Introduction**

Community health research is a process of finding out the solution to a problem. It is a sequence of activities which when followed enables the investigator to achieve his aim. Research follows the scientific method which is why it could stand the test of time. A scientific practice base for community health means that community health practice is guided by community health theory or empirical clinical research findings. Community health research involves scientific inquiry and so would require knowledge of the characteristics of the scientific methods.

### **2.0 Objectives**

At the end of this unit, you should be able to;

- a. Explain the characteristics of the scientific methods.
- b. Describe the types of research
- c. Define some key terms in research.

### **3.0 Main content**

#### **3.1 Characteristics of the scientific methods.**

1. **Order and Control:** Scientific methods follow a systematic approach to problem solving. The aspect of control concerns the effort made to reduce interference in the study situation. For example, in a study to explore the relationship between diet and heart disease, the researcher must take steps to control other possible causes of heart disease like stress, cigarette smoking, as well as age and sex.
2. **Empiricism:** The scientific method searches for evidence (empirical – real) through observations, verified through our sense organs – sight, taste, touch, smell, and hearing. E.g. the colour of a patient's eye, the presence or absence of skin inflammation. Sometimes, our senses may not record fully what is real and so, extensions of our senses are used to collect the empirical evidence in the form of instruments, equipments, tools e.g. weighing scale, thermometer, questionnaires, or other instruments that aid the senses to gather the necessary information.
3. **Generalization:** The goal of science is to understand phenomena or occurrences. Pursuit of knowledge is focused on more generalized understanding of relationships among events. The ability to go beyond the specifics at hand is an important aspect of the scientific method, and that is generalization. The generalizability of research findings is an important criteria for evaluating the quality of the research.
4. **Theory:** Scientific generalizations are enhanced by the development of theories. Theories represent a method of organizing integrating, and deriving abstract views about the manner of relationships that exist between phenomena or variables. They provide the opportunity for explaining how and why, phenomena are related to one another, and for predicting the occurrence of future events and relationships.

### 3.2 Types of Research

- i. *Basic or Pure research* is investigation or study carried out to satisfy a desire to increase the knowledge base in an area of interest. Basic or pure research provides the baseline information in the area of knowledge which could be necessary to undertake further research in that area. For example, a research to establish factors responsible for poor compliance to dietary regimen by diabetic patients will result in a list of many factors. Those factors could form the basis for more research in the future that could lead to certain important decisions in the care of diabetic patients.
- ii. *Applied research* is the research whose findings could have immediate practical utility. The result of research could be used to solve a problem, make a decision, develop new programme, product or procedure. Applied research could also be used to evaluate a programme, product or procedure.
- iii. *Experimental research* is research that requires manipulation of some of the variables after the research subjects have been divided into treatment groups. Explanatory studies come under this group and are able to provide a cause-effect relationship between variables under study.

iv. *Non experimental research* is one where the study subjects are studied as they are in the natural environment without any manipulation or active effort to control them. Exploratory and descriptive studies come under the non experimental research. Exploratory and descriptive researches seek to explore or identify the kinds of factors responsible for the variables under investigation. The final result is a list of factors as revealed by the respondents in the research.

#### **Definition of research terminology**

Variable: An entity or object that can take on different values. Examples include, age, weight, height, temperature, educational attainment, health status, economic status, weather etc. The pieces of information obtained or gathered in the course of a research study.

Operational definition: The specifications of the operations to be performed by the researcher in order to collect the required data. Operational definition removes ambiguity from the meaning of the variables, and enables others to replicate the study in future. Operational definitions are different from dictionary definitions.

#### **4.0 Conclusion**

The scientific method provides the basis for research in all fields including nursing. Knowledge of the types of research would enable researchers to establish the nature of research they are interested in.

#### **5.0 Summary**

In this unit, we have learnt that,

- Community Health research is conducted using the scientific method.
- The characteristics of science are order and control, empiricism, generalization and theory development.
- Basic or pure research is research that provides baseline information.
- Applied research findings could have immediate practical utility because they could be used to solve problem, make decisions or develop new products.
- Experimental research involves manipulation of variables while non experimental research is conducted in the natural environment without any manipulation of variables.

#### **6.0 Further Reading**

Castles MR (1987). Primer of nursing research. Philadelphia: W.B. Saunders Co.

Notter LE (1999). Essentials of nursing research. 6<sup>th</sup> Ed. New York: Springer.

## **7.0 Tutor Marked Assignment**

Distinguish between basic and applied research.

Describe the characteristics of the scientific methods.

## **Unit 2: The Research Problem**

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### **1.0 Introduction**

The motivating force in every research is the existence of a problem, and the interest to solve that problem. Research is an enterprise and is an important aspect of community health that encourages professional development. Problems existing in community health practice and education are amenable to research. Through research better methods of community health practice could lead to more cost effective patient care.

### **2.0 Objectives**

At the end of this unit, you should be able to:

- a. Understand why research is important in community health
- b. Identify the criteria for researchable topics in community health
- c. Describe the difference between research and problem solving
- d. Formulate research problems

### **3.0 Main Content**

#### **3.1 Definition of research and Importance of research in Community health**

Research is a planned and systematic application of the scientific method to the study of problems. In community health, the problems could be in the area of patient care.

Historically research in community health dates back to the founder of community health, Florence Nightingale, who through her own enquiries and findings at the Crimea war was able to establish a significant change in the death rate of wounded soldiers at her arrival and when she left.

#### **Importance of research in community health**

Research is important to nursing in the following ways,

- It is necessary for the improvement of patient care, through development of new products, procedures and methods of care.
- Research could promote better administrative methods in community health, and more effective use for staff of all cadres.
- Community health administrators find research useful particularly in the aspect of skill mix and staffing levels.
- As in all other fields, research could form the basis for extension of knowledge in nursing, and provision of scientific knowledge that could enhance the professional status.
- Research also contributes to better teaching methods, better curriculum, and enhances community health education.
- By continuing research and exposing community health students to clinical settings where research is conducted, community health educators help the students to become aware of the changing nature of knowledge and the importance of life-long learning, and inquiry.
- Research encourages scientific accountability in community health practice, and enables community health workers to evaluate the efficacy of their care, and modify/abandon those practices shown to have no effect on the health status of the patients.
- Nursing professionalism is also enhanced through research as more nurses with wide range of knowledge and intellectual ability add to the professional ideals. Practice oriented research is also a great avenue for improving professional practice in nursing.

#### **3.2 Criteria for researchable topics in Community health**

The following criteria enable the researcher to determine whether a problem is ripe for research.

These include:

- a. Frequency of occurrence of the problem - If the nature of the problem is such that it rarely occurs, then research is not advisable for that problem.
- b. The degree of discomfort caused by the problem – The problem may be causing harm to people, or even may have led to harm or risk to life, in which case it is expedient that research could lead to a solution.
- c. Amount of resources affected by the problem – a consideration is given to the nature of the problem, and whether a lot of financial or material resources are lost or jeopardized because of the problem. For example, Is the non availability of equipment in hospital affecting retention of trained nurses and patient flow?
- d. Researchability of the problem – What to consider is to establish that the problem actually merits research and that it is not one that could yield useful results, and which would attract responses.
- e. Genuine interest of the researcher - We should recognize that interest spurs people on for research; the researcher must be fully interested for any meaningful engagement in the research. Without interest the commitment in the research would be poor, and of non effect.

### 3.2 Differences between research and problem solving

You need to recognize that though research is aimed at solving existing problems, it is totally different from problem solving. The major differences are shown in Table 1.1.

**Table 1.1: Differences between research and problem-solving**

Research	Problem-Solving
1. Research is a systematic method using the scientific method	Problem solving is not systematic, and may or may not use the scientific method.
2. Research is characterized by patient and unhurried activity	Problem solving is characterized with hurriedness and immediate activity.
3. Research requires adequate planning, and follows a logical process.	Problem solving may not be planned as problems are sudden in nature and require immediate attention.
4. Research requires expertise	Anybody can be involved in problem solving.
5. Every step of the research process must be documented and reported.	Reporting is not mandatory in problem solving as only the results are often reported.

6. Operational definitions are important	Operational definitions not necessary
7. Formulation of hypotheses and research questions are part of this	Hypotheses and research questions not applicable.
8. Elaborate pains are taken to control factors that can influence research results.	Controls are not required in problem solving.
9. Data collection may occur at different intervals and details are usually mandatory.	Needed information for problem solving are gathered in the same setting and may not require detail.
10. Findings are generalizable in research	Solutions for one problem may not work for another problem even if similar.
11. Ethical considerations for privacy, confidentiality, informed consent etc are applicable	Ethical considerations are not mandatory for problem solving.
12. Research can be replicated	Replication is not possible.
13. Observations must be thorough and definite specifications detailed before carrying out a research.	Only the situation at hand needs any attention.
14. Literature review is very crucial to the research process	Literature is not applicable as it is a here and now situation.

### Self Assessment Questions

Having gone through the above content, you should assess your progress by attempting the following questions.

1. Mention two (2) reasons why research is important to community health.
2. List the criteria for determining researchable topics in community health.

### 3.4 Formulating Research problems

We could encounter problems for research in any setting or environment depending on our interests.

Problems are usually accompanied by a background that justifies the study and which facilitates understanding of the problem.

#### 3.4.1 Sources of Problems

You could identify problems from



- i. Community health practice - Situations may abound where certain aspects of practice have posed challenges and people complain but nobody seems to do anything. That may compel enquiry by an interested person.
- ii. From personal experience – based on our work experiences, interests may develop for research in an area of interest.
- iii. Literature - as we read through other peoples' works and reports in journals, we may recognize the relationships between the areas of focus and our own environment, and situations, and that may raise the urge to replicate or conduct similar study.
- iv. Theory – Community health theories and other theories relevant to community health could provide opportunities of research into their use and application to real community healthy care situations.

### 3.4.2 Formulating problem

Once a problem has been identified through any of the sources mentioned, it needs to be formulated and stated in such a way that the clear rationale for research would be revealed. The problem formulation and statement is the first step in the research process because without identifying and making known the problem, it will be futile to attempt research.

This step entails the researcher reflecting on a personally- experienced problem that has often presented questions. For example, a community health worker may have noticed in her practice that many diabetic patients on specific drugs have not been compliant to the drug regimen. That could raise questions of Why? What are the causes of non compliance? What can the community health worker do to alleviate the problem? The nurse may be interested, and now becomes the researcher. As a researcher, she/he may decide to check the literature, especially reported studies in the area of interest in order to be familiar with previous research methods and results obtained. This step requires the researcher to view the problem in its *widest form* so that everything, persons, situations, settings etc that have anything to do with the problem are brought into focus. Literature is also consulted to read what information is available concerning the problem. The criteria earlier listed could be applied to the problem in order to confirm the need for research in that area.

From the readings and the wide view of the problem, the researcher is able to narrow the scope of the problem to the actual aspect for emphasis in the study. Once the focus is established, the researcher would state the problem formally.

The problem statement should serve as a basis upon which the total research plan is based. The problem statement should identify the key variables in the study, specify the nature of the population being studied, and suggest the possibility of empirical testing.

The problem statement is followed by a clear definition of the concepts involved, the operational definitions. The statement of problem paves the way for the statement of the purpose, objectives, the scope and significance of the study.

### **3.4.3 Purpose, Objectives, Scope and Significance of Study**

- The purpose of the study explains the ‘why’/ reason for the research. It is the focus of the study, and we may then state our purpose as ‘to determine the factors that influence compliance to dietary regimen by diabetic patients in X hospital’; or ‘The purpose of the study is to identify the factors responsible for non compliance to dietary regimen by diabetic patients in X hospital’.
- The Objectives of the study represents the intent or ‘what?’ of the study, and details what the expectations of the researcher is at the completion of the study. The objectives must be focused, achievable and in line with the statement of problem and purpose. There may be up to four (4) or five (5) objectives in a study.
- The scope of the study sets a boundary for which the research intends to cover.
- The Significance of the study details the contributions expected of the study to the profession, the area of the study/practice. It is expected that whatever research is conducted should be able to impact on practice, education or the profession and could lead to decisions that could bring positive changes and solution to the original problem.

### **4.0 Conclusion**

The research problem is therefore the basis of any research activity and needs to be properly understood so that the other steps of the research process would be meaningful.

### **5.0 Summary**

In this unit we have learnt that;

- i. Research is a planned and systematic application of the scientific method to the study of problems.
- ii. Research is important to community health education, administration, community health practice and the professional status of community health workers.
- iii. There are criteria necessary to determine researchable problems in community health
- iv. Research can be distinguished from problem solving by a number of qualities that include the skill and expertise required nature of observation, documentation, literature review, data collection, replicability, use of hypotheses and research questions etc.
- v. In formulating a problem, the problem is explored in its broadest form, and then narrowed to the specific area of focus, and ends in problem statement, purpose of the study, objectives, scope and significance of the study.

### **6.0 Further Reading**

Notter LE (1999). Essentials of nursing research. 6<sup>th</sup> Ed. New York: Springer.

Wandelt MA (Latest Ed.). Guide for the beginning researcher. New York: Appleton-Century Crofts.

#### 7.0 Tutor Marked Assignment.

1. What are the different sources of research problems in community health?
2. Mention 3 reasons why research is important in community health
3. List 3 differences between research and problem solving.

### Unit 3: Literature Review and Theoretical Framework.

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#### 1.0 Introduction

Literature review is an essential step of the research process, and enables you to develop the skill of searching for materials that could prove relevant to your research and community health career. The literature review helps you give a context to your planned research.

#### 2.0 Objectives

By the end of this unit you should be able to

1. Describe the purposes of literature review.
2. List the sources of literature
3. Differentiate between primary and secondary sources of literature.
4. Conduct literature review using different data bases (print and electronic).

5. Utilize related theoretical frameworks in research.

### **3.0 Main Content**

#### **3.1 Definition of literature review**

Literature review is the reading and organization of material that represents current knowledge as available in previous studies for the direction of a research study.

#### **Purposes of Literature review**

Literature review is carried out to,

- a. Find out what has already been written about the chosen area of interest.
- b. Describe the characteristics of previous studies in the area.
- c. Identify gaps existing in the area of interest
- d. Establish whether it is feasible to conduct research in that area, or if it is duplication.
- e. Identify how other researchers connected their works to theories
- f. Reveal how previous researchers measured their variables and collected their data
- g. Identify deficiencies of methodology in previous studies in order to avoid them
- h. Relate findings of planned studies with the ones that have been done previously.

#### **3.2 Sources of Literature review**

These include primary and secondary sources. A primary source is the description of a research written by the original researcher. Journals are the best primary source for literature. They are also most current, and available in print and electronic forms.

A secondary source is a description of a study prepared by someone other than the original researcher. Secondary sources are often interpretations of the original work, and so may not serve all the needs of another researcher. For example, a research article cited by another person in a journal is a secondary source, but that author's own report in the same journal is a primary source. These literature materials could be held in libraries as hard copies, abstracts, indexes, or available as internet based literature.

The Librarians, particularly the reference librarians are key resource to researchers as they are of great assistance with literature. They could direct, provide guidance and even assist with procurement of the needed material.

You will be given a list of websites and internet data bases that are helpful for community health workers who need literature material later in this unit.

#### **3.3 Conducting literature review and recording literature**

As a beginning researcher, you need to plan for the review, by your statement of problem, selection of key words or phrases that would facilitate search for material, and evaluating the materials. It will be better for you to start from the recently published materials. Check with the

reference librarian, check textbooks for leads, and also abstracts (in print and online databases), and journals. Journal article references could lead you to more related reference material that meets your literature requirement.

Recording of exact references is encouraged on cards, in a note book, or on a computer data base. It is important to record the name of the author(s), and year of publication, for books – title, edition, chapter and the publisher. For journals, title of the article, name of journal, the volume, issue/number, and the page numbers are important. These enable you to have these at hand when you are writing up your literature review. The following questions may serve as a guide for literature review:

- Who is (are) the author(s)?
- What was the reason for the study or article?
- Is there evidence of wide reading by the author(s)?
- How was the information (data) gathered and analyzed?
- Were the research questions answered/ and were the hypotheses tested?
- What did the research conclude?
- Were there useful recommendations?

Applying these questions to each of the studies reviewed will enable the researcher to have all necessary information from the reviewed materials, and limit the need to go back to check or update on their notes.

### **3.4 Writing/ Summarizing literature review**

Having read through, the researcher should be able to come to conclusions regarding what has been read. At this stage it is necessary to draw comments and findings together and make statements about what was found. It is important that the researcher shows how the reviewed studies are related to the present study. What more still needs to be done in the area should be identified and suggestions made as to how the present study will provide for that.

The study problem, purpose and variables should be reflected in the written review, and the interpretations of the study findings also. The length of time spent in review could vary from days to weeks or months depending on the researcher and the type of search in use. The researcher would need to discuss any studies that form the theoretical framework in detail.

### **3.5 Theoretical/Conceptual Framework**

A theoretical framework is a method of organizing available concepts and phenomena to be able to explain and /or predict occurrences. It describes the basic structure of ideas within which the research will be conducted and the results interpreted. Theoretical framework is based on literature review and concerns to an existing theory that is related to the study. For example, in a study of job satisfaction among community health workers, the researcher would review related theories of motivation, Maslow's, Hertzberg's etc. Hypotheses often emanate from the theoretical frameworks.

Theoretical framework is essential in research and lends credibility to such studies that are explanatory or experimental in nature.

#### **Self Assessment Questions**

1. List the purposes of literature review.
2. What are key issues to be considered in writing literature review?

### **3.6 Data bases, Indexes and Internet resources for Community health workers and Healthcare Professionals**

Index Medicus, International Nursing Index, Nursing Research Index, British Nursing Index, Cumulative Index of Nursing and Allied Health Literature (CINAHL), [www.nursingcenter.com](http://www.nursingcenter.com), [www.altavista.com](http://www.altavista.com), [www.rddirect.org.uk](http://www.rddirect.org.uk), PubMed, Intute, Cochrane library, National Electronic Library of health (NELH), MEDLINE, Psychinfo, [www.who.ch](http://www.who.ch), [www.icn.ch](http://www.icn.ch), [www.rcn.org.uk](http://www.rcn.org.uk), [www.nursingcenter.com](http://www.nursingcenter.com), [www.nursingsociety.com](http://www.nursingsociety.com), [www.globalschoolhouse.org](http://www.globalschoolhouse.org), among others.

### **4.0 Conclusion**

Literature review and theoretical framework are vital steps in the research process. While literature review enables the researcher to know what has been done in the area of interest, and how they were done including findings, recommendations and implications, and it serves as a link with the present study, theoretical framework help the researcher to relate the study to existing theories and provide the basis for testing hypotheses or predicting relationships.

### **5.0 Summary**

In this unit, we have learnt that

1. Literature review and theoretical framework are important steps in the research process.
2. Literature review will help the researcher to identify what has been written about the area of interest.
3. There are primary and secondary sources of literature.
4. The search methods include print and electronic, examples of which are abstracts, indexes, computer based resources – internet etc.
5. Writing up review of literature requires organization and analysis to ensure that only the relevant and related material is included.
6. Clarity would facilitate understanding of presented literature.
7. Theoretical framework lends credibility to explanatory and experimental researches.
8. Some websites and other data bases that are useful to community health workers for literature.

### **6.0 Further Reading:**

Abdellah FG & Eugene LF (1979). Better patient care through nursing research.

Hendryc (1998) Reviewing the literature: a guide for students. Nursing Standard, Vol. 12: 14: 46 – 48.

Kirk- S M (1996). Finding, reading and documenting literature. Nursing Times, 92, 15: 34-34.

Treece EW and Treece JW. (Latest Ed) Elements of research in nursing. St Louis. CV Mosby.

**7.0 Tutor Marked Assignment.**

1. Why is literature review important in community health practice?
2. Differentiate between primary and secondary sources of data.

## **Unit 4: Hypotheses and Research Questions**

### **Table of Contents**

1. Introduction
2. Objectives
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  - 3.1 Definition and importance of hypothesis
  - 3.2 Characteristics of hypothesis
  - 3.3 Classification or types of hypothesis
  - 3.4 Research Questions
  - 3.5 Characteristics of research questions
  - 3.6 Examples of research questions
  - 3.7 Variables
  - 3.8 Types of variables
4. Conclusion
5. Summary
6. Further Reading
7. Tutor Marked Assignment

### **1.0 Introduction**

Hypotheses and research questions are vital parts of the research. Every study is expected to have either of them or both because they give direction to the type of data required in the study.

Hypotheses and research questions also enable the researcher to actualize the purpose and objectives of the research.

To further facilitate your understanding of hypotheses and research questions, the latter part of this unit will be presenting to you variables, which are the focus for hypotheses and research questions in any research. Your understanding of the key variables of interest in research will enable you identify, state and plan the relevant measures to observe and measure variables through data collection in research.

### **2.0 Objectives**



By the end of this unit you should be able to

- a) Define hypotheses, research questions and variables
- b) Differentiate between a hypothesis and research question
- c) Explain the importance of hypotheses in research
- d) List the characteristics of a hypothesis
- e) Describe the types of hypotheses
- f) State hypotheses and research questions
- g) Differentiate between independent and dependent variables

### **3.0 Main Content**

#### **3.1 Definition and importance of hypothesis**

A hypothesis is a scientific guess or predictive statement made by the researcher and which will be tested after data collection. It predicts or explains relationships between two or more variables.

##### **Importance of Hypotheses**

- Hypotheses can advance knowledge by confirming or refuting theoretical positions from which they were derived.
- They suggest new observations and uncover facts.
- They link formal systems of logical reasoning to science. Hypotheses enable the researcher to focus the research to one or two variables.
- Hypotheses provide a statement of relationship between variables in a manner that allows for empirical testing.
- Hypotheses provide data that are specific and facilitate their acceptance or rejection at the end of the study.

#### **3.2 Characteristics of a Hypothesis**

A good hypothesis should be clear and concise. It should contain a few variables under investigation, usually two or more. The hypothesis should clearly predict or infer a causal relationship between the variables. Hypotheses are more applicable to explanatory and experimental studies.

#### **3.3 Classification or Types of Hypotheses**

Hypotheses are classified into three major types – directional, non directional and null or statistical hypotheses.

- I. Directional hypothesis: it is the hypothesis that specifies the expected direction of the relationship between the variables under study. Example of a directional hypothesis using the earlier introduced problem is “diabetic patients who receive dietary counseling will comply better with dietary regimen than those who did not receive the dietary counseling”.

- II. Non directional hypothesis: This is the hypothesis that does not specify the direction of the relationship, but predicts that a relationship exists between the variables, and does not indicate the nature of the relationship. Example is “Dietary counseling of diabetic patients is related to their compliance with dietary regimen”.
- III. Null or statistical hypothesis is the hypothesis of no difference and no relationship. The researcher states that there is no difference in compliance to dietary regimen in those diabetics who received dietary counseling and those who did not receive the counseling. If your prediction was correct, then you would (usually) reject the null hypothesis and accept the alternative. If your original prediction was not supported in the data, then you will accept the null hypothesis and reject the alternative. The alternative hypothesis is also called the research hypothesis.

### **3.4 Research Questions**

A research question is a question that concerns the variables under study and the existence of relationships among them. Research questions like hypotheses are crucial to data collection and can only be answered after data collection and analysis.

### **3.5 Characteristics of research questions**

Research questions should be clear and specific in order to allow for choice of the appropriate methodology. They are interrogative, and usually stated in the present. Research questions must contain one or more variables. Research questions are more applicable to exploratory and descriptive studies. They should be realistic and meet the stated objectives of the study.

### **3.6 Examples of research Questions**

In the problem statement that we have been using, the researcher may be interested in finding out why the diabetic patients are not complying with their dietary regimen. The question may be descriptive, relational or causal. The following research questions may enable the researcher to collect data that would reveal the reasons for the non compliance.

1. Why are the diabetic patients refusing the dietary regimen of treatment?
2. What qualities do these patients have in common?
3. What type of foods is acceptable to the patients?
4. Is the non compliance behavior related to the time of the meals?
5. Is the non compliance due to absence of dietary counseling before the regimen?

The first three questions are descriptive because the responses from the research participants will describe the reasons for non compliance, while the fourth question is relational. The last question is set to establish whether the variable of dietary counseling is the cause of non compliance.

Whichever way question is asking, it can only be answered after data collection and analysis of the responses.

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#### **Self Assessment Questions**

Define hypothesis, and research question.

Identify the characteristics of a hypothesis.

Describe the use of research questions.

State 2 hypotheses and 2 research questions.

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### **3.7 Variables**

A variable is any entity that can take on different values. Variables are of interest in research because they are the main reasons for the research. Examples of variables include age, sex, weight, height, educational attainment/qualification, experience, weather, socioeconomic status, temperature, state of health etc.

The variables that are of importance in research can further be grouped into independent and dependent variables. Variables are not restricted to preexisting attributes of humans, organisms, events or environment. The researcher could in many situations create or design a variable that is applicable to the purpose of the research.

### **3.8 Types of Variables**

*Independent variable* – The independent variable is that variable in the research which the researcher manipulates, and could be equated to a cause or a stimulus or treatment in research that has to establish cause-effect relationship.

The *dependent variable* is that variable that is not manipulated by the researcher, but which the researcher expects will change once the independent variable is introduced. It can be equated to the effect, response or the result.

For example in a study to establish that student's performance in a Course of Human Biology is affected by the teaching method, the teaching method is the independent variable to be manipulated by the researcher. The students' result (performance) is the dependent variable.

*Extraneous variable:*

In research certain variables are also recognized that though they are not of much importance to the researcher could have negative effects on the results of the research if they are not controlled. These variables are called extraneous variables, and must be controlled in any research.

Other terms used by different authors to describe the extraneous variable include – confounding variable, interfering variable, intervening variable, contaminating variable. These must be controlled especially in experimental studies for them not to influence the results.

#### **4.0 Conclusion**

The research process is enhanced through the use of hypotheses, research questions and variables. Both hypotheses and research questions have to be stated with variables, and have to be tested and answered only at the end of the data collection and analysis.

#### **5.0 Summary**

In this unit we have learnt that

- i. Hypotheses, research questions and variables, are of importance in research.
- ii. Hypotheses are predictive statements about relationships between two or more variables which are tested after data collection.
- iii. Research questions are questions that the researcher asks based on the purpose and objectives of the research and which are answered after data collection.
- iv. Variables are entities that can take on different values and which are important in research. They are the focus of manipulations in experimental studies.
- v. Hypotheses should be clear and concise, and should have two or more variables for which there is a predicted relationship.
- vi. Research questions must be clear and specific, and meet the stated objectives of the research.
- vii. Hypotheses could be stated as directional, non directional, or in the null form.
- viii. The variables that are not of primary importance in the research and which may influence the research negatively are called extraneous variables.

These have to be controlled once identified in the research.

#### **6.0 Further Reading**

Kerlinger FN (1973). Foundations of behavioural research. New York: Holt, Rinehart and Winston.  
Castles MR (1987) Primer of research. Philadelphia: W.B.Saunders Company.

#### **7.0 Tutor Marked Assignment**

Define hypothesis,

Define research question.

Differentiate between directional and non directional hypotheses.

Differentiate between independent and dependent variables.

## **Unit 5: Research Design**

### **Table of Content**

1.0 Introduction

2.0 Objectives

3.0 Main Content

3.1 Definitions and overview of research design

3.2 Purposes of research design

3.3 Choice considerations in design.

3.4 Types of research design

3.5 Differences between experimental and non experimental designs.

4.0 Conclusion

5.0 Summary

6.0 Further Reading

7.0 Tutor Marked Assignment.

### **1.0 Introduction:**

Research design is the blue print of the research. It helps the researcher to collect the best evidence to support the study being conducted. The research design is connected with how the sample will be selected and the data collected. Some relevant questions at this stage include – What is the best method to get answers to my research questions? And to get data to test my hypotheses?

### **2.0 Objectives:**

At the end of this unit, you will be able to;

- a. Define and provide an overview of the research design
- b. Identify the purposes of research design

- c. Identify and describe the different types of research designs
- d. Explain the differences between experimental and non experimental designs.

### **3.0 Main Content:**

#### **3.1 Definitions and Overview of research design**

Research design is a strategy to get the information the researcher wants in a study. It is the overall plan for answering the research questions or testing the hypotheses. The research design incorporates the data collection plan, the sampling plan and the analysis plan. There is no hard rule for specific designs, but the decision of which one to use rests on the researcher and the nature of the research. Each researcher could choose the design deemed most suitable for the specific research. A wide variety of approaches are available to nurse researchers.

The research design, which could also be called methodology, may be described as qualitative when the data to be collected will be in words and quantitative, when the data would be in numbers (numeric). They could generally be grouped under experimental and non experimental designs, though in your reading, you may come across other classifications.

#### **3.2 Purposes of research design:**

The major purposes include;

- To enable the researcher focus on the key variables under investigation
- To facilitate adequate sampling methods
- To ensure that the appropriate data collection method is applied.
- It enhances the data analysis plan.

#### **3.3 Choice of research design:**

The type of design chosen by any researcher depends on:

- The research question
- The researcher's knowledge
- Time available for study
- Resources available,
- Availability and commitment of research participants,

#### **3.4. Types of Research designs:**

They could be grouped into

- Experimental
- Quasi experimental
- Ex post facto
- Non experimental

##### **3.4.1 Experimental designs:**

The true experimental design maintains maximum and rigorous control over the research subjects, uses the process of randomization and manipulation in the implementation of the

study. These constitute the characteristics of an experimental design. The experimental design provides a scientific way of determining whether or not the independent variable has any effect at all on the dependent variable.

*Control* implies the ability of the researcher to regulate and check all elements in the research. It is achieved through the process of *randomization*

that is the process of assigning subjects to the study on a random basis to make the groups equal, and *manipulation*. Manipulation is the process by which the researcher manages the independent variable in order to study its effect on the dependent variable. Something is done to a group of the subjects (experimental group) by the researcher, while the other group (the comparison group), does not receive anything.

The steps in experimental design are therefore as follows:

- Identify the study population
- Select a sample from the population by simple random sampling
- Randomly assign the sample to two subgroups, which you will name experimental and control groups
- Observe and record the characteristics of the two groups
- Introduce the independent variable to the experimental group, but not to the control group
- Later observe the dependent variable in both the experimental and control groups
- Compare the changes in experimental group with those in the control group and record the difference.
- Compare these values with statistically computed values to judge significance of the differences and indicate whether or not the observed difference could have occurred by chance.
- If the findings are significantly greater than would be expected to occur by chance alone, a causal relationship would have been established between the independent variable and the dependent variable under study.

#### **3.4.2 Quasi experimental design:**

The quasi experimental design resembles the experimental design to some extent, but lacks some of the characteristics of the true experiment. They involve the study of intact pre existing groups randomly drawn, and assigning the whole groups into experimental and control groups. There is loss of randomization and less control. This design does not allow the researcher to control assignments of subjects to conditions.

This design is considered weak when compared with the true experimental design, due to the threats to internal validity.

#### **3.4.3 Ex post facto design:**

This design literally means ‘after the fact’ design, and lacks randomization and control. There is no treatment either, but the researcher seeks to establish if a grouping seems to make a difference on some outcome. The ex post facto design is not applicable in cause/effect types of research questions or problem statement. There is also high risk of contaminating variables.

#### **3.4.4 Non experimental design:**

The non experimental design involves those studies without deliberate manipulation of the variables or control over the research setting. There may be random sampling of subjects, but the researcher does not employ randomization to assign subjects to groups.

The non experimental design includes those studies with the characteristic questions of “What is/ what are/ identify”. They include:

a. Descriptive studies – A non experimental research where the researcher may utilize self report measures that looks at many cases across a few variables, relates one to another but does not demonstrate causality. They are most often used for research that has to do with beliefs, attitudes, or emotions. The researcher is concerned with determining and reporting subjects or objects the way they are.

They could also take the form of exploratory studies, surveys, and case studies.

b. Historical research – A non experimental design that describes causes, effects or trends that may help explain present events and anticipate future events. They seek to answer why, and the data sources are original correspondences, diaries, artifacts, witnesses and paper accounts of events.

c. Cross sectional – The observations are taken at one time, like a snapshot of participants, especially where the aim is to determine prevalence. Cross sectional design has the advantage of being economical in time and cost.

d. Longitudinal – Longitudinal studies are the ones where one or more participants are studied at several points in time. The sample is followed over time to see how they change. All the variables are measured within a narrow span of time with data collected for each variable at each age level. The aim is to describe patterns of change, the direction and magnitude of causal relationships between the variables.

There are non experimental designs that are prospective, and some retrospective.

Prospective designs provide the researcher the opportunity to study a phenomenon over time as a developmental process unfolds. Retrospective designs are employed when an event or phenomenon in the present is linked to a previous event to determine the antecedents.

#### **3.4.5 Differences between Experimental and Non experimental designs:**



- Experimental designs are characterized by randomization, control and manipulation of subjects, while in non experimental designs subjects are studied as they are, with much less control, though there may be random selection of subjects.
- The experimental design is able to determine a cause and effect relationship, which is not possible by the non experimental design.
- In terms of cost, the experimental design is often more expensive, since the researcher may need to create conditions that may not be possible normally for the purpose of the study.
- Subject availability may be more with none experimental, but attrition rate is also higher.
- Experimental designs are not suitable for researches that have to do with emotions.
- Experimental studies are amenable to replication while it may not be possible with non experimental designs.
- Prediction of future occurrences is possible with only experimental design.

#### **4.0. Conclusion**

The research design is the blue print of research, and a crucial step in the entire research process. The implementation of the research depends on the design hence the need for every researcher to understand the different designs in order to effectively implement research.

#### **5.0. Summary:**

In this unit, we have learnt that,

- Research design, is the blue print of research.
- A major purpose of the design is to ensure that the adequate data collection method is applied.
- The experimental and non experimental designs were identified as two main types of research design.
- The experimental design varieties were mentioned as true experimental, quasi experimental and ex post facto designs.
- The non experimental designs described include the descriptive, under which were listed surveys, exploratory studies, cross sectional, longitudinal, retrospective, prospective and historical studies.

- Choice of research design by researchers is determined by the nature of the research, the researcher's knowledge, time and resources among others.
- Differences between experimental and non experimental designs involve the characteristics of control, randomization and manipulation applicable to the experimental but not the non experimental. The experimental design is able to establish causal relationship, and is much more replicable than the non experimental design.

### **6.0 Further Reading**

Hakim Catherine (1987) Research Design: strategies and choices in the design of social science Research. London: Routledge.

### **7.0 Tutor Marked Assignment**

Define and explain the purpose of research design.

Explain the characteristics of the experimental design.

What is the major difference between cross sectional and longitudinal studies?

## **Unit 6: Population and Sample**

### **Table of Content:**

- 1.0 Introduction
- 2.0 Objectives.
- 3.0 Main Content
  - 3.1 Definition of population and Sample
  - 3.2 Differences between population and sample
  - 3.3 Types of sampling
    - 3.3.1 Scientific sampling
    - 3.3.2 Non scientific sampling
  - 3.4 Differences between scientific and non scientific sampling.
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Further reading
- 7.0 Teacher Marked Assignment.

### **1.0 Introduction**

For the actual implementation of the research design, certain actions must be undertaken. The whole group or the entire universe on which the research would be conducted, and who will provide the data require special mention and understanding that would facilitate the research effort.

## 2.0 Objectives

At the end of this unit, you should be able to:

- a. Define Population and Sample
- b. Explain the difference between population and sample
- c. Describe the various sampling methods
- d. Distinguish between scientific and non scientific sampling

## 3.0 Main Content

### 3.1 Definition of population and sample.

Population is the total membership of a group, universe or objects in a state or geographical location. It can also be defined as the totality of the universe from which the subjects for a study could be selected, and to whom the results of the study would be generalized.

Sample is the subjects that you actually want to use in your study. It refers to the small section of the population which is selected and from whom data is collected in a research.

### 3.2 Difference between Population and sample

While population is about the generality of the universe or groups of people, sample refers to a fraction of persons from the population. It is from the sample that data is collected in the course of a study, and because that sample is representative of the population, the results can be generalized to the population in a scientific study.

### 3.3 Types of Sampling:

The types of sampling are also referred to as sampling procedures or methods of sampling.

They are broadly grouped as:

- Scientific or Probability sampling
- Non Scientific or Non probability sampling

**3.3.1 Scientific sampling or probability sampling method** is any sampling method where every member of the population has greater chance of being selected as a sample. With the simple random type under this, every member of the population has equal chance of being selected as a sample.

The different methods in scientific or probability sampling include:

- i. Simple random sampling – where every member or element of the population has equal chance of being selected. The steps involve identifying each member of the population by for example, listing with name or number, and then selecting the sample through any of table of random numbers, ballot method, or throw of the dice.

- ii. Systematic random sampling - The researcher starts randomly, that is at any point, having listed the population, and selects the 'nth' member until the sample size required is reached. A way of getting the interval is often by dividing the total population by the sample size required.
- iii. Stratified random sampling – The researcher starts by subdividing the population into homogenous subgroups or strata (stratum for singular), by some known unifying qualities for those groups, then draws a sample using simple random sampling or systematic sampling methods.
- iv. Cluster or area sampling – With the cluster sampling, instead of drawing individual members of the population, groups or clusters are selected from the population. The population is divided into clusters along geographical boundaries, and clusters randomly selected. All the members of selected clusters are studied.
- v. Table of random number- The researcher lists and numbers serially the members of the population and selects the sample required by picking numbers from a table of random numbers and including in the sample the members of the population corresponding to those numbers.

### **3.3.2 Non – scientific/Non probability sampling:**

Non probability or non scientific sampling method is the method of sampling where every member of the population is not given a chance to be part of the sample. Choice usually depends on the judgment of the researcher. The major types of non-scientific or non-probability sampling are:-

**I. Convenience (Accidental) sampling** – The researcher primary works with a group that is accessible and convenient, hence this method is prone to bias. There is no evidence that the sample is representative of the population of interest.

**II. Purposive (Judgmental) sampling** - Where the researcher uses personal decisions to determine the members of the population that suit the purposes/ requirements of the study.

**III. Quota (Proportional) sampling** – The researcher tries to match the proportion of subgroups in the sample as closely as possible to show that every group is represented.

### **3.4 Differences between Scientific and Non scientific sampling:**

The major difference is in the representativeness and validity of results from such studies. The scientific sampling methods offer every member of the population a chance to be part of the selected sample whereas the non probability method does not provide for all the members of the population.

The non scientific method is prone to contaminating variables, and the validity of research using them is often questioned.

#### **4.0 Conclusion**

Population and sampling are important steps in the methodology for all research, and would need to be undertaken before active collection of data in any such process. The sample that results from this step is the one that goes through the research to provide the researcher with data to answer the research questions and test the research hypotheses.

#### **5.0 Summary**

In this unit, we have learnt that,

- Population is the generality of the universe or members in a location from which you could select participants for study.
- A sample is a fraction or part of that population from which data is collected in a study.
- The types of sampling are the scientific or probability sampling and the non scientific or non probability sampling.
- The major difference between the two is that while the scientific sampling method allows every member of the population a chance of being selected as a sample, the non probability method depends more on the decisions of the researcher.

#### **6.0 Further reading**

Abbot P and Sapsford R (1998) Research methods for nurses and the caring professions. 2<sup>nd</sup> Ed.  
Buckingham: Open Univ. Press.

Polgar S and Thomas S (1988) Introduction to research in the health sciences, London: Churchill Livingstone.

#### **7.0 Tutor Marked Assignment**

Define population and sample.

List the major types of sampling

Explain three scientific and three non scientific sampling methods.

## **Unit 7: Data Collection.**

### **Table of content**

- 1.0 Introduction
- 2.0 Objectives
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  - 3.2 Methods of data collection/research instruments
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    - 3.2.2 Questionnaire
    - 3.2.3 Interview
    - 3.2.4 Mechanical instruments
    - 3.2.5 Paper and pencil tests
  - 3.3 Qualities of data collection instruments.
  - 3.4 Pilot study
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Further Reading
- 7.0 Tutor Marked Assignment

### **1.0 Introduction**

Data collection is the step of the research process where the researcher has contact with the sample selected, in order to collect the needed data from them to answer the research questions and test the hypotheses. Various methods are used to collect data and you will learn about them in this unit.

## **2.0 Objectives**

At the end of this unit, you will be able to,

- a. Define data collection, and give an overview of the process.
- b. Describe the five methods of data collection
- c. Mention the major qualities of data collection instruments
- d. Explain the importance of pilot study.

## **3.0 Main Content**

### **3.1 Definition and Overview of data collection**

Data collection is the process of getting the information (data) that is useful to the study, and which will enable the researcher to answer the research questions and/or test the hypotheses. It is an important step in the research process because those samples selected from the population will now have the opportunity of contributing to the research by providing the data. The research design often dictates the method of data collection. You will also learn that the researcher could develop the instrument, and collect data with assistants after their training. Data collection instruments have to meet the qualities of validity and reliability as measuring instruments. You will discuss these qualities in more detail in Unit 8, and we will only mention them in this unit.

### **3.2 Methods of data collection:**

Data collection could be achieved through different methods that are also called techniques that include observation, interview, questionnaire, mechanical instruments, and paper and pencil tests. A particular research may be able to use more than one data collection method

**3.2.1 Observation** - It is the method of data collection that involves watching and noting of behaviors or activities of the research subjects that are of interest to the researcher. It is the most applicable method in many researches that involve performance, as in nursing. With observation, the researcher has record what is observed in narrative form, or on a schedule that has some categories, or a checklist that shows the expected behaviours. Observation is planned, and all the behaviours of importance must be clearly identified, and stated on the observation schedule. Observation considers – What should be observed, how it should be recorded, how the accuracy will be ensured, and what relationship exist between the observer and the subjects.



Clear definitions of the kinds of behaviour to be observed will enhance the accuracy and objectivity of the data.

Observation could be participant where the researcher or observer is part of the group being observed, or non – participant where the researcher observes from outside. A participant observer participates in the group functioning, and tries to observe and record information at the same time.

In both types, several observers could be used in order to make more objective decisions about some behaviour types. In such situations the observers are carefully trained to sharpen their skills, and learn how to use the instruments according to the design of the study.

### **3.2.2 Interview**

Interview is the method that permits face to face contact of the researcher with the subject in order to collect data. The interview could be structured or un–structured.

a. Structured – where the researcher reads the questions to the subjects from a prepared interview guide and records the answers as they respond, on the guide, or with tapes etc, as permitted by the subjects.

b. Unstructured – where the researcher has outlines or areas of the content, but no ready questions as in the guide. The manner of questioning may vary as the researcher can modify, expand or probe more during the interview to obtain the appropriate data.

In the event of the researcher needing assistants with the data collection, they must be well trained. The interview requires interpersonally skilled researchers.

**3.2.3 Questionnaire** – A questionnaire is a set of questions aimed at eliciting data and is self administered. The questionnaire should be straightforward, in simple language and be brief. The questions should be relevant and clear. Questionnaires may be open or closed type.

Rating scales are often used to obtain definite ratings on obvious factors.

The questionnaires with appropriate control, records a high response rate. They are easy to process and easy to distribute. Questionnaires have the advantage of complete anonymity of the subjects, and are less costly to administer. A carefully worded introduction is important for both questionnaire and interview.

**3.2.4 Mechanical Instruments** – These are much applicable in health care research where data is collected through instruments like the weighing scale, thermometers, rulers, sphygmomanometer and stethoscope and other electronic patient monitoring devices. How valid the instruments are determined by the efficacy of the data (measurement they give).

**3.2.5 Paper and Pencil tests** – These include those that measure attributes e.g. attitudes, aptitudes, personality traits, intelligence, and achievement. Some of these data collection instruments may incorporate one or more scales but, the most commonly used scale is the Likert scale. The Likert scale provides for the subject to indicate the degree to which they are agreeable or not to the opinion expressed in the statement.

### **3.3. Qualities of data collection instruments.**

These are validity and reliability. Validity is the ability of the data collection instrument to measure what it is meant to measure. Types include face, content, criterion related and concurrent validity. Reliability is the ability of the instrument to give the same or similar results with repeated use. The reliability could be established using different correlation methods like split half, test retest, Cronbach's Alpha etc. These qualities are checked through pilot study of the instrument before the full data collection is undertaken.

The details of these qualities will be learnt in the next unit.

### **3.4. Pilot Study**

Pilot study is the trial run or piloting of the instrument of data collection usually undertaken on subjects that are similar to the real subjects for the study. The pilot study is important because it enables the researcher to correct and modify the instrument based on the responses from the field. The actual data collection should not begin until the pilot study has been completed, and all the necessary deficiencies corrected.

### **4.0. Conclusion**

Data collection is the step of the research process where the researcher has contact with the sample selected in order to collect the needed data from them to answer the research questions or and test the hypotheses. Various methods are used to collect data, and a clear explanation of how each instrument or data collection method relates to and answers to the study objectives demonstrates effectiveness of the research plan.

### **5.0 Summary.**

In this unit, we have learnt that,

- Data collection is the step in the research process where the researcher makes contact with the subjects in order to collect the relevant data.
- The data collection is very important because it is only with the data that the researcher can answer the research questions or test any hypotheses in the research.

- There are five major methods of data collection and they include observation, interview, questionnaire, mechanical instruments and paper and pencil tests.
- The observation method has two types, participant, where the observer is a member of the group being observed and non participant where the observer notes the behaviour/activities of interest from outside the group; while interview has the structured, where the researcher provides a guide with all the questions to be asked and unstructured, in which the researcher has an outline that enables questioning, clarifications and probing for more depth.
- The qualities expected of the data collection methods are validity and reliability.
- Before actual data collection the instrument is tried out through pilot study, and any deficiencies rectified.

## **6.0 Further Reading**

Castles, MR (1987). Primer of nursing research. London: WB Saunders Co.

Polit DF & Hungler BP (2001). Essentials of nursing research: methods, appraisal and utilization. New York: Lippincott.

## **7.0 Tutor Marked Assignment**

Define data collection.

Identify and describe three methods of data collection.

Differentiate between participant and non participant observation.

## **Unit 8: Measurement**

### **Table of Content**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
  - 3.1 Definition of measurement
  - 3.2 Importance of measurement in research
  - 3.3 Levels of measurement
  - 3.4 Reliability and validity.
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Further Reading
- 7.0 Teacher Marked Assignment

### **1.0 Introduction**

Measurement is all about assigning values to observations, objects and variables as studied in research. It is important and appropriate to assign numerical and other values to designate quantity, and also to assure the reliability and validity of the measures so designated. The two key qualities of good measurement are validity and reliability.

## 2.0 Objectives

At the end of this unit, you should be able to:

- Define measurement
- Explain the importance of measurement in research.
- Describe the four levels of measurement
- Discuss validity and reliability
- Explain the relationship between validity and reliability.

## 3.0 Main Content

### 3.1 Definition

Measurement is assigning values to what is measured, or attributes observed in a research situation. The assigned values are usually numerical.

### 3.2 Importance of measurement in research

Measurement is important in research because the variables in research may not be directly observable, like satisfaction, motivation, self esteem etc. It therefore becomes necessary to assign numbers that would enable the researcher to decide on that variable. Knowledge of measurement enables the researcher;

- i. decide how to interpret the data from that variable
- ii. decide what statistical analysis is appropriate on the values that were assigned.

### 3.3 Levels of measurement

There are typically four levels of measurement that are defined.

- Nominal
- Ordinal
- Interval
- Ratio

There is a hierarchy implied in the level of measurement idea. At lower levels of measurement, assumptions tend to be less restrictive and data analysis is less sensitive. At each level up the hierarchy, the current level includes all of the qualities of the one below it and adds something new. It is desirable to have a higher level of measurement than a lower one.

- Nominal level – It is the weakest level, and the attributes are only named. There is no ordering of the cases implied. Example 15, 10, 3, 20.

- Ordinal level – The attributes can be ordered according to rank. The distances between the attributes however do not have any meaning. For example, one could assign 0 in educational attainment to someone who has none, 1 to one with primary education, 2, to one with secondary, 3, to another with tertiary education, and so on and so forth. In this measure, higher numbers mean more education, but the interval between values cannot be interpreted, and the distance between them is not the same.
- Interval level – In interval measurement, the distance between the attributes is meaningful, and can be interpreted. For example, when we measure temperature in centigrade, the distance between 37.4 and 38.4 is the same as from 36.4 – 37.4. It is possible to compute an average of an interval variable, but it is not possible to do so with ordinal variable.
- Ratio level – The ratio level of measurement is the strongest, and has an absolute zero that is very meaningful. It means that it is possible to construct a meaningful fraction (or ratio) with a ratio variable. Weight is a ratio variable. 'Count' variables are ratio, like the number of patients seen in a clinic in the past five months. There may have been zero patients or twice as many patients in the past five months than was the case in the previous five months.

### 3.4 Validity and Reliability

The challenge in measurement is to collect data, or evidence, on good-enough observable manifestations. This has to do with the issue of credibility. Validity looks at whether we are measuring what we are. It is defined as the ability to measure what is supposed to be measured.

Reliability refers to how consistent, stable or predictable what we measure is. A clear example could be made with the bathroom scale. It could measure your weight (valid, that is what a scale measures), but should it give you 60kg at the first time, and 80kg the second time, you will question that value. It shows that the scale is not reliable, though valid. There types of validity crucial to measurement include, content validity, concurrent and construct validity.

There are four types of reliability – Inter rater or inter – observer reliability,

Test – retest reliability, parallel forms reliability and internal consistency reliability.

Let us discuss each of them and the types.

#### Validity

- Face – A method of deciding on the ability of the instrument to do what it should based on the face value. It is subjective.
- Content – It refers to the comprehensiveness of the instrument, the ability of the measuring instrument to cover all the relevant areas, and is usually determined by expert opinion.

- Concurrent – It shows how valid an instrument is by comparing it with an already valid instrument.
- Predictive – This implies the ability of the measure to predict expected outcomes. Correlation is used to compute this and the higher the correlation, the more evident the predictive validity.

### **Reliability**

- Inter rater or Inter observer reliability – This estimation is used to assess the degree to which different raters/observers give consistent estimates of the same event. For example in observing a student perform a task in the clinical setting, two observers using a checklist may rate the student. At the end the ratings of the two observers could be correlated to give an estimate of the reliability or consistency between the two raters.
- Test Retest reliability – This is used to assess the consistency of a measure from one time to another. The same test could be administered to the same sample on two different occasions. It is assumed that there is no substantial change in what is being measured in the two occasions. The interval between the two tests matters and the shorter the gap, the higher the correlation. Different estimates may therefore be obtained depending on the interval.
- Parallel form reliability – It is used to assess the consistency of results of two tests constructed in the same way from the same areas. The researcher constructs large number of test items from for example human biology course, Respiratory system, and randomly divides them into two equal halves. Both tests are administered to the same group, and the scores correlated to estimate the reliability.
- Internal Consistency reliability – it is used to assess the consistency of results across items within a test. A single measurement is used to estimate how the items yield similar results. The most commonly used is the split half method, where the total items are divided into two sets. The entire instrument is then administered to a group of people, and the total score for each randomly divided half is calculated. The split half reliability will be the correlation between the total scores. This is often called the odd-even method due to the way the split is made for the two halves.  
Another measure to assess internal consistency is the Cronbach's Alpha or Coefficient Alpha. You can get more information on this method and others in any standard statistics book.

### **3.5 Relationship between validity and reliability**

The validity and reliability indices of measuring instruments in research give credibility to the research. An instrument that is valid most often is reliable, but an instrument may be reliable without being valid. It is therefore very important that researchers pay attention to these qualities to ensure that the data collected in research is not only adequate, but useful and amenable to data analysis procedures.

#### **4.0 Conclusion**

Measurement is therefore a very important aspect of the research process, and enables the researcher to decide how to interpret the data from the variable, and ensures the selection of the appropriate statistical analysis. The criteria expected of instruments are those of validity and reliability. Knowledge of measurement levels and validity and reliability would facilitate the work of every researcher.

#### **5.0 Summary**

In this unit, we have learnt that;

- Measurement is the assignment of values to observations, objects or events.
- There are four levels of measurement, which are, nominal, ordinal, interval and ratio. The lower level s less restrictive, and the higher level usually includes the qualities of the lower in addition to something new.
- The ratio scale is the highest of the levels and has an absolute zero.
- We learnt that measurement instruments or measures need to be valid and reliable.
- Validity is the ability of the instrument to measure what it purports to measure.
- The types of validity are face, content, concurrent, predictive validity.
- Reliability is the ability of the instrument to provide consistent or similar results with repeated measurements.
- The reliability types include, inter – rater, test – retest, parallel – forms, and internal consistency reliability.
- Correlation method is used to estimate the reliability of items in the tests.

#### **6.0 Further Reading**

Kerlinger FN (1973). Foundations of behavioural research. New York: Holt, Rinehart and Winston.

Polit DF & Hungler BP (2001). Essentials of nursing research: methods, appraisal, and utilization. New York: Lippincott.

#### **7.0 Tutor Marked Assignment**

1. Define measurement, validity and reliability.
2. List the levels of measurement.
3. Differentiate between the nominal and ratio levels of measurement.



4. List the types of validity and reliability.
5. Explain content validity and test – retest method of reliability.

## **Unit 9: Organization of Data**

### **Table of Content**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Steps of data collection
  - 3.2 Frequency distribution table
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Further Reading
- 7.0 Teacher Marked Assignment

### **1.0 Introduction**

Organization of data is the short step of data analysis in research. It describes those activities to be performed by the researcher before analyzing the data. The researcher would need to check the data collection instruments, note the responses and arrange them in such a way that they can be summarized, and relevant procedures for analysis performed. Data are usually yielded at various levels of measurement

2.0 Objectives

- At the end of this unit, you should be able to,
- a. Explain steps in organization of data
  - b. Develop frequency distribution table for data

3.0 Main Content

3.1 Steps of data organization

The steps include,

- Editing the data for completeness – where the researcher checks through the data collection instruments to see the ones that are properly completed, which are the basis of the analysis. All the incomplete and irrelevant ones are dropped at this point.
- Coding the data – that is translating the data collected into categories or numerical form, from tallying.
- Summary measures may then be computed after these.

The step may end with frequency distribution table which details the number of times data or subjects belonging to each category occur in a table.

3.2 Frequency distribution table

The frequency distribution table is a systematic arrangement of numerical values from the least to the highest together with a count of the number of times each value was obtained. It has the advantage that in a glance, the data distribution can be seen.

The following illustrates the frequency distribution table.

**Example:** Frequency distribution of test scores for 40 students.

<u>Score (X)</u>	<u>Frequency (fx)</u>
26	2
30	3
	50

34	4
44	5
48	6
50	10
55	2
57	1
65	2
76	5

It is possible to display the above information graphically through the use of histogram or frequency polygon. A histogram is a vertical bar graph of the frequency distribution while a frequency polygon employs dots connected by straight lines to show data frequency.

Once organized, the researcher can go on to do data analysis by applying descriptive and inferential statistical methods as required. Details of that aspect of data analysis will be presented in the next unit.

#### **4.0 Conclusion**

Organization of data for analysis is a very short step in the research process, and could actually be discussed alongside data analysis as you can see in many research text books. It involves editing the raw data, removing the ones that are not properly completed, using tallying to code the data, and categorizing the data into numerical values. All these are undertaken in order to summarize and arrange the data for analysis.

#### **5.0 Summary**

In this unit, we have learnt that,

- Organization of data is a short step of the research process where data is edited, coded and put in a form for analysis to continue
- Frequency distribution table could be drawn up to show the number of times each data or subjects belonging to each category occur in the table.
- Organization enables the researcher to compute summary measures and go on with descriptive and inferential statistical procedures of analysis.

#### **6.0 Tutor Marked Assignment**

1. Explain the steps in organization of data for analysis.
2. What is a frequency distribution table?

#### **7.0 Further Reading**

## **Unit 10: Data Analysis**

### Table of Content

#### 1.0 Introduction

#### 2.0 Objectives

#### 3.0 Main content

##### 3.1 Definition and overview of data analysis

##### 3.2 Descriptive and inferential statistical methods

##### 3.3 Level of significance/confidence interval

#### 4.0 Conclusion

#### 5.0 Summary

#### 6.0 Further Reading

#### 7.0 Teacher Marked Assignment

### **1.0 Introduction**

Data analysis involves the processing of the coded data into some orderly and summarized pattern in order to recognize relationships and meet the objectives of the study.

Statistical methods are used to facilitate the interpretation of results obtained from data. Pocket calculators and computer packages provide ready methods available to researchers for data analysis. It is however important for each researcher to know what to do with the data, even if the plan is to use a computer package. For this unit, our earlier discussion in Unit 8, measurement is very important.

## 2.0 Objectives

At the end of this unit, you will be able to,

1. Define and provide a brief overview of data analysis
2. Identify and describe the descriptive and inferential statistical methods of analysis
3. Explain levels of significance/confidence intervals in relation to testing hypothesis

## Main Content

**Definition and overview of data analysis** – data analysis is the process of summarizing, presenting and describing the data collected from research in such a way that relationships can be established and inferences drawn. Analysis of data is often categorized into descriptive and inferential based on the statistical methods used. The two major statistical methods used are the descriptive and inferential statistics.

### The descriptive and inferential statistical methods

The descriptive statistics are those measures that enable the researcher to describe the data or facts as contained in them. Examples include the simple arithmetic mean or average, while the inferential statistics are those that enable the researcher to make inferences or draw conclusions. Examples include the t test.

**3.2.1 The Descriptive statistical method** – The descriptive statistical methods comprise two major groupings - the measures of central tendency and measures of dispersion.

- Measures of Central tendency: These are those measures that indicate or best represent the whole distribution of data or observations. When the researcher wants to use one score as the typical score, the average score is used, which is the arithmetic average or the mean. The measures of central tendency are the mean, median and the mode.

**The mean** is the typical score and is computed when the greatest reliability is required. It is like the centre of gravity of a sample. The mean is computed by totaling all the individual scores in a distribution and dividing by the number of

observations or subjects. For example in Unit 9, we had a frequency distribution table of a set of scores for 40 students. The total individual scores was 1963, and when divided by the N – number of students, 40, the mean or arithmetic average is 49.08.

**The median** - looks at how the scores are ranked. It is the point in the distribution above and below which 50% of the frequencies lie. In order to calculate the median, the scores or observations have to be arranged in ascending or descending order. For odd numbered set of scores e.g. 1, 2, 3, 4, 5, the number 3 represents the media. For even number, the median would be calculated using the total of the two middle values divided by 2; e.g. 1, 2, 3, 4 – median will be  $2 + 3$  divided by  $2 = 2.5$ .

**The mode** is the score that occurs most frequently, the popular score. In the example we had in the frequency distribution, score 50 occurred most with a frequency of 10. For that set of score the mode is 50.

- **Measures of Dispersion:** The measures of dispersion or variation refer to the spread or dispersion of the data. The range, variance and standard deviation are the measures used for this purpose.

**The range** is the difference between the highest and the lowest score in a set of observations. In the test scores of 40 students that we are using, the range is the difference between 76 (highest) and 26(lowest), i.e. 50. The range gives limited information as a measure of dispersion.

**The variance** is the standard deviation squared ofr the value of the standard deviation before the square root is taken. It shows the dispersion from the mean in both the negative and positive directions. It is denoted as  $s^2$ .

- **The standard deviation (SD)** is an estimate of how much all the individual values deviate from the group mean (a summary measure of the differences of each values from the mean). When summed, the negative and positive values balance each other, and their sum is zero. The formula for calculating standard deviation is:

$$SD = \sqrt{\frac{\sum(s)^2}{N}}$$

Where SD = standard deviation,

$s^2$ = deviation score

N = Number of observations

$\sum$ = Sum of

$\sqrt{\phantom{x}}$  = square root of

The standard deviation is the most dependable measure of dispersion and could be used for further computations.

The steps for computing the standard deviation are:

1. Find the mean of the observations
2. Subtract the mean from each raw score to obtain a deviation score
3. Square each deviation score (  $x^2$  )
4. Sum the squared deviation  $\sum x^2$
5. Obtain the SD by finding the square root of the sum of the squared deviations divided by N i.e.  $\sqrt{\frac{\sum x^2}{N}}$ .

A reference to the statistical tables will show you more on calculating these measures.

### 3.2.2 Inferential statistical method

Inferential statistics are the statistics that enables inferences or conclusions to be made in a study about a population or given data from a sample. Inferential statistics are based on the laws of probability. Statistical inferences consist mainly of estimating parameters and testing hypothesis. Examples of inferential statistics include – t test, Analysis of Variance ( ANOVA), Chi square test, Analysis of Covariance ( ANCOVA); to mention but a few.

The correlation coefficient mentioned under Measurement in the earlier unit is often called a bi-variate statistics because it can be used as an inferential and descriptive statistics.

The t test is the statistic most commonly used for the testing of hypotheses that applies to differences between two groups, while the Analysis of Variance procedure can handle three or more groups as well as more than one independent variable.

The Chi square is most frequently used in connection with hypothesis relating to differences in proportions. Details of the computation of these can be obtained from any standard statistics textbook. You will be provided with some of them in the reading references at the end of this unit.

### 3.3 Hypothesis testing and levels of significance:

The Null hypothesis is a statement that no relationship exists between the variables under study, and that any observed relationships are due to chance or sampling fluctuations. It is the null hypothesis that is often used in hypothesis testing.

The level of significance is always specified for statistical tests once testing of hypothesis is involved. The level of significance attaches a probability error to the rejection of the null hypothesis. The level often adopted in most studies is 0.05 or 5% level. Rejecting the null hypothesis of no difference means that there is less than 5% chance of observing the data if null hypothesis is true. Two types of errors are possible with the rejection and/or acceptance of the Null Hypothesis.

Type 1 Error: This error refers to rejection of the null hypothesis when it is true. The researcher in this situation concludes falsely that a difference is there when in fact, there is no difference.

Type 11 Error: It is to accept the null hypothesis when it is false; to conclude wrongly that a difference does not exist when in reality, there is a difference.

One strategy to avoid both errors is to ensure that the sample size is increased in the study.

**4.0 Conclusion:** Data analysis is a very important step of the research process. It involves the processing of coded data into some orderly and summarized pattern that enables the researcher to recognize and explain relationships in order to meet the objectives of the study. Statistical methods are used to facilitate the interpretation of results obtained from the data.

**5.0 Summary:** In this unit we have learnt that,

- Data analysis is the process of summarizing; presenting and describing the data collected from research in such a way that relationships can be established and inferences draw.
- The descriptive statistics are those measures that enable the researcher to describe the data or facts as contained in them. Examples include the simple arithmetic mean or average.
- The inferential statistics are those that enable the researcher to make inferences or draw conclusions.
- Measures of central tendency and measures of dispersion are descriptive statistics and provide means of expressing how close and how wide apart the observations in a distribution are respectively. The mean and the standard deviation are the most useful of the measures respectively.
- Inferential statistics are used for hypothesis testing, and the level of significance used is usually 0.05 or 5%.
- Type 1 and Type 2 errors could occur when the null hypothesis is rejected wrongly and when it is accepted where it should be rejected respectively.
- 

**6.0 Further Reading:**

- McCall RB 1997 Fundamental Statistics for behavioural sciences. 7<sup>th</sup> Ed. Pacific Grove, CA: Brooks – Cole
- Polit DF 1996 data analysis and statistics for nursing research, Stamford, CT: Appleton & Lange.

**7.0 Tutor Marked Assignment:**

1. Explain the concept of data analysis.
2. List the measures of central tendency and the measures of dispersion.
3. What is the difference between descriptive and inferential statistics?.



## **Unit 11: Interpretation and Discussion of Findings**

### **Table of Content**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
  - 3.1 Overview of results interpretation and discussion of findings
  - 3.2 Discussion of findings in relation to research questions and hypothesis
  - 3.3 Explain results of study
  - 3.4 Conclusions and recommendations
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Further Reading
- 7.0 Tutor Marked Assignment

### **1.0 Introduction**

The unit on interpretation and discussion of findings counts a lot to the researcher. This is where the language, the ability to communicate and actually present what was done, and what was found would greatly impact the reader, and depending on the expertise of the researcher, the implications of the study must be uppermost. The research findings are discussed in relation to the purpose, objectives research questions and hypotheses of the study, and relevance made with similar studies in literature.

### **2.0 Objectives**

At the end of this unit, you will be able to,

4. Provide a brief overview of results interpretation and discussion of findings
5. Discuss the findings of different studies in relation to the purpose, hypothesis and research questions.
6. Explain the results of the study
7. Describe the significance of the study, including conclusions and recommendations.

### 3.0 Main Content

**3.1. The interpretation of results of a study, and discussion** that follow must be focused on the purpose, research questions and hypotheses of the study. The researcher is the most suitable to give meaning to the results based on the methods of analysis. The descriptive and inferential statistical results need to be explained, and should be presented in tables, graphs or figures as appropriate.

**3.2. Discussion of findings** is usually in as simple a language as possible, drawing out all the significant findings in the study, and trying to justify or explain why the result is useful or not. Every research question is stated, and the results related to it presented and discussed. For the hypothesis, each is stated, and then the findings discussed depending on what statistical test was used in the analysis.

Efforts are made not to commit the type 1 or type 2 error mentioned in the earlier unit.

The level of significance accepted for the study is also used to describe the nature of the results and enhance acceptability of the research.

**3.3. With the discussion, the researcher explains the results of the study** in terms of relationship of the variables studied in experimental studies, or in relation to the occurrences of phenomena under study. Each finding is explained and related to any existing finding that is similar or that has produced different result, and possible explanation given as to why the results differ. The discussion must point out whatever significant contributions the result has to the body of knowledge or practice. Any new results should be explained fully.

The researcher also acknowledges any limitations while explaining and emphasizing on the strengths of the research.

**3.4 Every research apart from results, is expected to yield some implications to the field of study**, in this case nursing, and should have some conclusions that are drawn from the findings of the research. The conclusions should be such that would be convincing for any reader of the research. In the course of the study, and with the analysis and findings, there may have been influences or situations that would require modification or special treatments in order to study aspects of the problem. These are called recommendations or suggestions that emanate from the study. The recommendations should be focused, and indicate specifically what is being suggested. Suggestions for further studies are also encouraged.

A short summary is usually encouraged to end the discussion.

**4.0 Conclusion:** Interpretation and discussion of findings is a very important step of the research. It affords the researcher the opportunity of explaining the results obtained in the study and how they relate to the purpose of the study, the research questions and the hypothesis. It also enables the researcher makes association between the current research and others available in literature. The discussion highlights the major areas of success and weakness of the research especially the data collection instrument. It also provides alternative explanations to results.

**5.0 Summary:** In this unit we have learnt that,

- Interpretation and discussion of findings is an important step in the research process.
- Only the researcher can give meaning to the research data that was analyzed, and that is done in the discussion with all the expertise available.
- The discussion of findings must emphasize what was the major finding, and how the variables are related, drawing out implications of the findings, and how they could contribute positively or negatively.

- The research questions and hypothesis of the study are presented and discussed one by one in relation to the objectives and purpose of the study.
- Charts, graphs and tables could be utilized to present results being discussed.
- It is from the interpretations that the researcher draws the relevant conclusions for the study.
- The researcher also makes some recommendations based on the conclusions, and recommendations for further studies are made so that future research could be made based on the findings. One may speculate about future directions that research could take to further explore the question of the research.
- Study limitations are also highlighted.

#### **6.0 Further Reading:**

Creswell, JW (1998) Qualitative inquiry and research. Choosing among five traditions. Thousand Oaks, CA: Sage.

#### **7.0 Teacher Marked Assignment:**

- 1.Explain what is meant by interpretation and discussion of findings
2. What are the major features of the discussion area of research?

### **Unit 12: Communicating Research Findings**

#### Table of Content

##### 1.0 Introduction

##### 2.0 Objectives

##### 3.0 Main content

###### 3.1. Purpose of research reports

###### 3.2. Methods of communicating research findings

###### 3.3. References and Appendices.

##### 4.0 Conclusion

##### 5.0 Summary

##### 6.0 Further Reading

##### 7.0 Teacher Marked Assignment

#### **1.0 Introduction**

This unit will introduce you to writing and communicating research findings. One of the major expectations in research is that the findings or results need to be shared with others. The process of sharing the findings of a research is called communicating the findings. Research findings could be communicated in various ways, to different groups or audience depending on why that research was conducted. The report must be comprehensive, and convey the relevant information so that other people can utilize the work or conduct further studies based on the findings. The reports are usually written in an orderly form

## 2.0 Objectives

At the end of this unit, you will be able to:

- Describe the concept of communication of research findings
- Explain the nature of research reports
- Appreciate and utilize references and appendices as appropriate

## 3.0 Main Content

### 3.1 Definition and concept of communicating findings of research

Communicating results of research implies the researcher providing in depth information on what was done, who it was done with, how, where it was done, the results and conclusions. It is also called the research report, and could take on different forms depending on the audience. Research could be communicated in an educational institution, to an academic audience, in partial fulfillment of the requirements for a degree, or diploma etc; or for publication in a journal; or could be communicated to a live audience at conferences, workshops etc. For each of these there are guidelines usually provided by such bodies, and which must be adhered to for the work to be accepted.

### 3.2 The nature of research reports

Research reports are given to reveal that the researcher has a reasonable grasp of what went on, how the subjects provided that data, the extent to which the researcher interacted with the data and the interpretation of the data. The report should have an introduction which details what was investigated, and why; a methods section, which explains how the research was done, the results that shows what was found, and discussion which explains what the result means, including the conclusions and recommendations. There should be an abstract which is a summary of the research that summarizes the study's scope and findings including the purpose, results, conclusions, and recommendations. It should not be longer than a half page (or 200 words). You will receive reading references at the end of this unit for details of a research report. All the relevant information must be conveyed and at the end, there should be references to acknowledge all the other authors consulted or referred to in the literature review and other aspects of the study. There is also an appendix that shows all the correspondences and instruments of the research. The major areas of the research report therefore include: Title page; Abstract; Introduction; Literature review; Method; Results; Discussion; Conclusions and recommendations; References and Appendix.

### 3.3 References and appendices

References are important because they allow others to build on your research, and also reveal those you consulted in the process of your own research. The readers are able to know that your work is credible when the references are there. Only references cited in the work should be included. Reference styles differ and you should always use the style approved by your institution or the people you want to submit your research study to. The most commonly used reference style is the American Psychological Association (APA) format. The reading references you have at the end of each unit of this course are examples from the APA style, and show the Author, year of publication, title of book, city of publication, publisher; while for journal, it shows author, year, article title, journal name, volume, number, and page. Appendices (x) on the other hand refer to all the materials that were used for the study and could include the letters of permission, and replies; the data collection instruments and any other materials mentioned in the research report. It may also include tables, figures and forms.

**4.0 Conclusion:** Communicating research reports are important because that is the only way other people will know that a research has been conducted. It is only the researcher that would

be in a position to provide the details of a report in a way that will convince the readers of the credibility of the research. The research report should be written in simple and clear language to ensure that the substance of the research is effectively communicated.

**5.0 Summary:** In this unit we have learnt that,

- Communicating research findings is an important step in the research process that reveals what was done to others.
  - Only the researcher could provide meaning to the research and so is in a position to communicate the findings.
- The reports follow particular guidelines depending on the readers or audience. For academic thesis and dissertations, there are guidelines usually in chapters that the report would comply with. For articles to be published in journals, the guidelines are also provided. For reports that have to be presented at conferences, the guidelines are given and the researcher adheres strictly to those for the work to be accepted.
  - The parts of a research report include, title, abstract, introduction, method, results, discussion conclusions, recommendations, and references/appendix.
  - Research reports should be written in simple and clear language.

**6.0 Further Reading:**

Beck, CT (1999) Facilitating the work of a meta-analyst. Research in Nursing and Health, 22,523 – 530.

American Psychological Association (2001) Publication Manual of the American Psychological Association (5th ed). Washington, DC: Author

A guide for writing research paper, APA – style <http://Webster.commnet.edu/apa/>

**7.0 Teacher Marked Assignment:**

1. Explain why research should be communicated
2. Describe the parts of a research report.

## **Unit 13 Ethics of Community Health Research**

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## **1.0 Introduction**

Ethics of community health research has to do with the practices that concern research, and application of ethical rules. Your lecture on ethics in community health will enable you appreciate this unit better. Some of the major issues in research involving human subjects include safety of the subjects, informed consent, respecting the privacy and confidentiality of individual subjects, and determining what to do with the subjects of research. Every researcher is expected to work honestly, and not fabricate data, or plagiarize other people's work etc. Institutions and organizations have ethical review boards and ethical policies on research with human beings which are protective of the subjects, and provide scientific basis for the researcher. One must recognize that every research has potential to harm.

## **2.0 Objectives**

At the end of this unit, you will be able to:

- Define and provide a brief overview ethics in community health research.
- Explain the principles of ethics applicable to research
- Explain the Nuremberg code and Helsinki declaration in relation to research
- Describe how human rights is protected in research

## **3.0 Main Content**

### **3.1 Definition and overview**

Research ethics is the process of critically examining what researchers face in their capacity as researchers. Some of them have to do with questions that the researcher must consider in order to continue with the research. For example, will I force people to respond to my questionnaire? Do I bring all my subjects to one place to get my data? Should I protect their identity? etc. All researchers are encouraged to adhere to the highest possible ethical standards, ensuring that subjects are protected, and their rights to privacy and confidentiality assured, as well as their voluntary participation in research. Researchers have the responsibility for carrying out their studies ethically. Institutions with ethical review committees or boards provide guidelines on conduct of research. There are also some founding principles recognized in research and we are going to learn about some of them in this unit. They include the Belmont report, with the three major ethical principles, the Nuremberg code and Helsinki declaration. You will be given references to read them in more detail later.

### **3.2 Principles of ethics applicable to research:**

**3.2.1. Principle of autonomy:** – This principle presupposes that the subject is capable of making an informed decision on whether to participate in a research study or not having received all the relevant information/disclosure about the nature of the study and the risks involved. The researcher therefore has a responsibility of ensuring that all the relevant information is provided for the subjects to enable the subject make that decision. Participation in research should be voluntary. Informed consent is an aspect of autonomy that will be discussed later.

**3.2.2 Principle of beneficence:** - This principle emphasizes the researcher striving to treat the subjects in such a way that risks and harm is minimized. The research is expected to treat the subjects respectfully, safely and ensuring that their lives are not in any way endangered.

**3.2.3. Principle of justice:** -That is equitable selection of research participants. Subjects for research have to be selected in such a way that all the participants who meet the criteria are giving equal opportunity of being selected.

### **3.3 The Nuremberg code and Helsinki declaration:**

**3.3.1 The Nuremberg Code** – This Code provides the directives on human experimentation. It talks about voluntary consent of the subjects, their welfare, and other actions that the researcher

must take, especially in research that involves experiments, to maintain the safety, dignity and rights of human subjects. A full reference of the national Institute of Health (NIH) document containing these will be given to you under further reading for this unit.

**3.3 The Helsinki declaration** – This was a policy statement by the World Medical

Association which has formed the basis of medical research, and which also is applicable to all health including community health research. It was first adopted by the 18th WMA General Assembly, Helsinki, Finland, June 1964, and amended by the 29th WMA General Assembly, Tokyo, Japan, October 1975

35th WMA General Assembly, Venice, Italy, October 1983

41st WMA General Assembly, Hong Kong, September 1989

48th WMA General Assembly, Somerset West, Republic of South Africa, October 1996 and the 52nd WMA General Assembly, Edinburgh, Scotland, October 2000 Note of Clarification on Paragraph 29 added by the WMA General Assembly, Washington 2002 Note of Clarification on Paragraph 30 added by the WMA General Assembly, Tokyo 2004.

It serves as a guide to physicians and other participants in medical research involving human subjects, and emphasizes safeguard of the health of the people, and that the wellbeing of the human subject in research should take precedence over the research interest of science and society.

The Belmont report mentioned earlier, the Nuremberg code and the Helsinki declaration, all relate to medical ethics, and nursing ethics, and have provided the basic foundation for all ethical principles of research in all fields.

The fact the nursing and other health research have human beings as subjects therefore highlights the importance of ensuring that the fundamental human rights of those individuals are not compromised in research.

**3.4 Protecting human rights in research:**

From the principles listed earlier, the Nuremberg code and the Helsinki declaration, the major ethical issues that are highlighted include:

- **Consent and honesty:** The subjects of research should know their roles and responsibilities before the research, and be able to give their voluntary consent to participate. The information provided may involve the use of a written form, consent form, which must contain details of the study, the risks and benefits, so that the subject could make the decision (informed consent). They deserve to know the truth about their participation. The subjects in any research have the right to withdraw at any time without suffering any penalty for doing so.
- **Confidentiality:** All information obtained in the course of research should not be disclosed, and the subjects should not be exposed through details of the data obtained from them. Most researchers try to ensure this by assuring the subjects of anonymity. A related issue is privacy. Names and identifying information are always excluded from research so that the subjects do not feel exposed or threatened.
- **Dignity and welfare of subjects:** Subjects of research must have their dignity, rights and welfare protected. They should be protected from harm, unnecessary risks, mental or physical discomforts, and any situation that could compromise their human rights. Wherever necessary, and available, the researcher should apply to the institution's ethical committee for any research involving patients in hospitals, and even in educational settings. Permissions are also obtained from employers/institutions whenever applicable for any research.

**4.0 Conclusion:** Ethics in community health research, as in other research is very important because of the expectations on the respect for human life and dignity. There are principles already available that are applicable and which every researcher would need to know, understand and apply in research.

**5.0 Summary:** In this unit we have learnt that,

- Ethics of community health research concerns the application of ethical rules of what is right and wrong in research.
- There are three basic principles emanating from the Belmont report that are of importance in ethics of research. They are the principles of autonomy (informed consent); beneficence (doing good and avoiding harm); and justice (fairness to all subjects irrespective of status, race or ethnic origin).
- The Nuremberg code and the Helsinki declaration set out guidelines for conduct of research with human subjects in medicine and other health professions.
- The protection of the Human rights of subjects in research include the concepts of Consent and honesty; dignity, rights and welfare, confidentiality and privacy.
- Permissions should always be sought for research that involves human subjects in whatever settings.
- Institutions that have ethical committees or ethical review boards may require researchers to apply to them for approval of their work.

#### **6.0 Further Reading:**

- Emanuel, EJ et al (2000). What makes clinical research ethical? JAMA, May 24 -31; 283 (20): 2701 – 11
- National Institutes of Health, Office of Human Subjects Research for the Belmont report, the Nuremberg code, and the World Medical Association Helsinki declaration; Regulations and Ethical Guidelines <http://ohsr.od.nih.gov/index.html>
- The Nuremberg Code, <http://ohsr.od.nih.gov/nuremberg.php3>
- The Belmont Report, <http://ohrp.osophs.dhhs.gov/humansubjects/guidance/belmont.htm>

#### **7.0 Teacher Marked Assignment:**

1. Explain the concept of ethics in community health research
2. List the three ethical principles in research with human subjects.
3. Explain how the rights of subjects could be protected in research.

## **Unit 14. Utilization of Research Findings**

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## 1.0 Introduction

Utilization of research findings is a major aspect of research in any field. It is the proceeds of research that give rise to new information, new methods, procedures and the basis for progression of any profession. Research is the only way to provide evidence or proof of what works and what does not. Many organizations spend a lot of funds on research in order to improve their work situations and make a difference in peoples' lives. Utilization of findings is often not easy, because many are not enthusiastic to try new methods. They would rather continue as they are, but part of the responsibility of the researcher is to share the information about the research and its contribution in such a way that interests will enable other people to adopt or replicate the studies in order to make use of the findings. Where the problems studied do not relate to practice, it will be difficult for practitioners to utilize them, hence the importance we emphasized in unit 1 to ensure that the problem is one that is crucial and whose results would contribute to the field.

## 2.0 Objectives

At the end of this unit, you will be able to,

- Describe the benefits of research to nursing practice
- Explain how research findings can be utilized in community health
- Describe the barriers and facilitators to research utilization

## 3.0 Main Content

**3.1 Benefits of research findings to practice** – The findings of research should apply to the area of interest for that finding to be of use. It is expected that research should provide the basis for the practice and education of any professional group. In community health research ensures the development of theories applicable to practice, the development of new procedures that would benefit patients better; and better ways of providing quality care to patients. Research enables the profession to work at par with other professions and to update and maintain the competency of community health professionals. These could only be possible if after communicating the results of research, the findings and recommendations can be put in use.

**3.2 Utilization of research findings in practice** – The utilization of research findings in practice would depend on certain factors that include the relevance of the research to the needs of the field or facility; the involvement of the practitioners in the research; the cost of implementing the findings; and the benefits of the research to the consumers. Where the needs are not relevant, the practitioners would not be willing to utilize the findings. Access to information about research may also be a factor, and some nurses may argue, they do not have time to read research and so are not able to utilize the findings. In some situations, the managers or employers may not be willing to give additional time for training in order to implement and use research findings. For research findings to be utilized therefore, a lot of considerations need to be given from the inception of the research so that support and collaboration of practitioners are obtained to facilitate utilization of the findings

**3.3 Barriers and facilitators to research utilization** – Barriers to utilization include: Inadequate facilities for implementation; lack of competency in reading and interpreting research by practitioners; relevance of research findings to practice; lack of knowledge as to how to implement the findings; inability of researchers to explain the value of the research. These are some of the barriers, and they would need to be addressed for research findings to be effectively utilized. The facilitators to utilization include research findings that address the problems of practitioners; nurses knowledgeable in research and who are able to read and interpret research results; access to information; participation of the research personnel in the implementation process. Such participation would instill confidence in the practitioners; cost of implementation also could determine how readily the managers or policy makers would be willing to utilize findings. The other major facilitator is constant continuing professional development and education of nurses on research and research utilization for evidence based practice.

#### **4.0 Conclusion:**

Utilization of research findings in practice not only benefits community health practice, but is of use to education where new methods of teaching and learning are ensured; community health administration where staffing and quality care issues could be enhanced through the application of research findings.

#### **5.0 Summary:** In this unit we have learnt that:

- Utilization of research findings is important to update practice in all aspects of community health – education, clinical practice, home care, community etc.
- Utilization of research findings depends on the relevance of the findings to the needs and problems of the practitioners.
- The participation of the research personnel would be seen as facilitator for utilization of findings
- There is need for support from managers and employers to give time for training and costs for the application of research findings in practice to ensure evidence based practice.
- Barriers to research utilization include lack of knowledge of research by community health workers, lack of facilities needed to implement findings, lack of time to read research, poor access to research information/reports, and lack of competency to read and interpret research findings.
- A major strength to ensure utilization would be continued professional development and in service education programmes for practitioners and involvement of research personnel in the utilization of findings.

#### **6.0 Further Reading:**

Jackle M. (1989). Presenting research in clinical practice. *Applied Nursing Research*, 2, 4: 189 – 193.

Treece EW and Treece JW. (Latest Ed) *Elements of research in nursing*. St Louis. CV Mosby.

#### **7.0 Tutor Marked Assignment:**

1. Explain how research finding could be utilized in community health practice.
2. List the barriers to utilization of research in community health practice.

### **Unit 15: Critiquing Research Report**

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## 7.0 Teacher Marked Assignment

### 1.0 Introduction:

The aim of critiquing of research reports is to establish how well the research was conducted, and the credibility, and value of the findings. The critique is performed by going through the research report step by step and checking on what and what the report contains and how complete, relevant and adequate they are.

### 2.0 Objectives:

At the end of this unit, you will be able to,

1. Define critiquing of a research report
2. List the areas of emphasis in research reports
3. Explain the factors to consider with interpretation of findings
4. Understand and utilize the guidelines for critiquing research reports

### 3.0 Main Content:

#### 3.1 Definition:

Critiquing of research report means reading a research report critically to note its compliance with the rules of research and to review the conduct of the research to establish the credibility and value of the findings.

#### 3.2 Major areas of emphasis:

The major areas include the title, abstract, the author credentials, the style of presentation, the purpose/objectives of the study, problem, literature, method, data collection and analysis, discussion, recommendations, conclusions and references and appendix. They are really scrutinized to note their compliance with accepted research guidelines and ethics of research.

#### 3.3 Factors to consider with interpretation of findings

They include the whether the results evaluated the research questions, the clarity of the data and completeness of the results. Others are the appropriateness of the statistical analyses used and if the level of significance was stated.

**3.4 Guidelines for critiquing research reports:** The guideline is usually presented in the form of questions that anybody reading the research could answer through the report and from that arrives at a decision on the research report.

The following guideline could be used or you may find more in literature, but generally the content is often emphasizing the same areas.

### A. General Questions

- Does the title accurately reflect the content of the report? Is the style of presentation acceptable? Is the presentation well organized? Is the study within the field of study?

### B. Introduction and Literature Review

- Has related research been adequately evaluated and critiqued?
- Is literature review relevant and up to date?
- Is the review comprehensive?
- Does it contain irrelevant sources?
- Is the purpose of the study clear and explicit?

### C. Research questions and hypothesis

Is the research question well formulated? Are the aims, objectives and hypothesis related?

### D. Methods

- Is the study design appropriate? Can it be replicated?

- Is the sample appropriate? Is the sampling method adequately described? Is the sample size quiet representative?
- What ethical considerations were addressed? Was access properly negotiated?
- Was data collection appropriately carried out?
- Are instruments valid, reliable, and appropriate?
- What statistical procedures for data analysis were used? Are they clearly described?

#### **E. Results**

- Is the results section well organized? Are results complete? Is the data clear?
- Does the analysis relate to the study objectives? Do the findings support the researcher's predictions?

#### **F. Discussion**

- Does the discussion follow logically from the results?
- Are the results reliable and valid?
- Have the study objectives been met?
- Are conclusions neatly and clearly expressed?
- Is the researcher aware of the study limitations?
- Are suggestions for further research provided?

#### **G. References**

- Are the references in the correct format?
- Are they complete, accurate, and current?
- Do they correspond with the text?

### **4.0 Conclusion**

The critiquing of research report must be balanced, identifying both strengths and weaknesses. It should be done carefully following all the steps of the research process. The skills to do a good critique are developed through reading research works in journals, and attending scientific conferences where research works are presented.

**5.0 Summary:** In this unit we have learnt that,

- Critiquing research report is critically reading through the report to identify the strengths and weaknesses of the research as presented by the author.
- The areas emphasized are all the steps of the research process so that a comprehensive view is obtained and the credibility of the work established. Every health worker should be able to critique a research report, because that way they could establish the use of the work in practice.
- The factors considered in the interpretation of findings which just emphasized what we did in Unit 11.
- Finally the guideline for critiquing a research report was outlined for you to apply in reading research reports.

You are to note that some authors refer to critiquing as evaluating research reports.

### **6.0 Further Reading:**

Abbot P and Sapsford R (1998) Research methods for nurses and the caring professions. 2<sup>nd</sup> Ed. Buckingham: Open Univ. Press.

Creswell, JW (1998) Qualitative inquiry and research. Choosing among five traditions. Thousand Oaks, CA: Sage.

### **7.0 Tutor Marked Assignment:**

1. Define Critiquing of research report
2. Outline the guideline for critiquing a research report.

