

DIPLOMA IN REGISTERED NURSING- ELEARNING

Course Code: NR 032.

Course Title: Nursing Research Part I

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COURSE INTRODUCTION

Welcome to the eLearning course on Nursing Research Part 1. We are living in a dynamic world where nurses are expected to manage patients using evidence based practice. Evidence based practice can only be possible if new knowledge is generated through carrying out research whose findings will be the basis for providing quality nursing care to our patients/clients. This course will prepare you to take part in contributing to the body of knowledge in the health sector. This course is aimed at equipping you with knowledge and skills in identifying research problems, conducting research and utilizing the findings to enhance quality health care. The course is a requirement for the partial fulfilment of the Diploma in Registered Nursing.

COURSE AIM

To equip students with knowledge and skills in identifying, conducting research and utilising the findings to enhance the provision of quality health care.

COURSE OBJECTIVES

By the end of this course, you should be able to:

1. Demonstrate an understanding of the research process and importance of research in nursing
2. Discuss ethical issues in research
3. Develop a research proposal and conduct a systematic investigation using the knowledge and skills gained
4. Produce a comprehensive research report

Course Duration

Nursing Research is a full course divided as follows:

Part I

Course hours: 106

Theory: 36 hours

Practical: 70 hours

Part II

Course hours: 100

Theory: 30 hours

Practical: 70 hours

STRUCTURE OF THE COURSE

The course is structured in units. Each unit has several sections indicating: the introduction, the objectives (which are the main sub-topics), and the activities, mode of assessment activities, summary and suggestion for further readings. Each of these sections is explained here below.

(a) Units

This course has two main units as follows:

Unit 1: introduction to research: In this unit you will learn the concepts used in research. You will also appreciate the various types of research and their importance in nursing and types of research. This section also enlightens you on the various kinds of dilemmas that nurses encounter while carrying out research in nursing and how application of the relevant ethical and legal issues can help handle such situations.

Unit 2: Preliminary Research Steps and Proposal Development: This unit will help you understand how research fits in the overall health care system. It will provide you with the knowledge and skill on how to identify and formulate a research problem and the relevant methodology to apply. The unit will provide you with skills in developing a work plan and budgeting for data collection activity. You will be expected to carry out a pilot study through active data collection in the field. You will also be required to analyse the data collected during the pilot study using the knowledge of data analysis that you would have acquired in the unit. In addition, you will learn how to develop a research proposal and how to plan for effective dissemination of findings or results.

An experienced research supervisor will be allocated to you and will guide you throughout your research project. You will need a personal scientific calculator and constant access to a computer for both Part 1 and 2 of this course. The college will organize for an orientation in basic computer skills for all nursing students at the beginning of the training programme to enable you operate and use the computer to conduct your nursing research activity.

(b) ASSESSMENT

Your work in this course will be assessed as follows:

Part 1

Continuous assessments

- | | |
|--------------------------|-----|
| 1. Tests- 2 | 20% |
| 2. Proposal development- | 20% |

A written research proposal document, on the identified research topic of your choice should be submitted to your supervisor for marking at the end of the second academic year (constituting 20% of the total marks). Nursing research requires you to spend some time studying the course, doing the course activities as well as attending to self-help questions and tasks. Please note that the units are not all of the same length, so ensure that you plan and space your work to give yourself enough time to complete all of them. For example, Unit 2 part -1 and Unit 1 part-2 have a heavy reading schedule and activities.

(c) Activities, self-help questions and case studies

You will find activities, self-help questions and case studies in this course. These are part of a planned distance education programme. They are intended to help you make your learning more active and effective, as you process and apply what you read. They will help you to engage your ideas and check your understanding of the topic. It is vital that you take time to complete them in the order that they occur in your course. Make sure you write full answers to the activities, or take notes of the discussions.

(d) Introductions, objectives and summaries

- Introduction section of each unit provides you with the purpose of the unit. it highlight the main topic and sub-topics.
- Objectives section provides you with the focus of each sub-topic to be covered in the unit
- Summaries highlights the main points covered in the unit. It helps to have a quick glance of what has been covered in the unit. You are expected to check for this section when you want to remind yourself what you have covered in the unit.

(e) Suggestion for further readings

There is a list of suggested further readings at the end of this course. This includes books and articles referred to in the course in case you wish to explore the topics further. You are encouraged to read as widely as possible during and after the course, though you are not expected to read all the books on this list. Although there is no set requirement, you should do some follow-up reading to get alternative viewpoints.

UNIT 1: INTRODUCTION TO RESEARCH

1.1 Introduction

Welcome to Unit 1 – “Introduction to Research”. This is the first unit in the nursing research course. You may find it helpful to reflect on your practical experience on the wards during your previous ward allocation. What were the sources of knowledge you based your practice on? Your answer may be “from the modules and assignments that I was given”. The Unit introduces you to the concept of research, the types of research used in nursing and the ethical and legal standards you are expected to uphold while conducting research.

Well, Unit 1 will enable you achieve the following objectives:

1.2 Unit Objectives

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

1. Define concepts used in Research
2. Explain the importance of research
3. Describe types of research
4. Explain ethical and legal issues in research

It is important for you to understand the various concepts used in research, the importance of research to you as a nurse; the types of research. Ethical and legal issues will enable you to get round some of the difficult situations you may encounter as well as how to protect your clients/research participants.

1.3 Definition of concepts used in research

Take Note:

This topic will help you understand the concepts used in research. There are several concepts that may keep on recurring in this Unit and you need to understand their meaning. These crucial concepts will also be explained to help you understand the unit. The definitions are also outlined in the glossary section at the end of the module.

Research: “Research is the systematic collection, analysis, and interpretation of data to answer a certain question or solve a problem”.

Science: “Science can be defined as the building of knowledge obtained by use of a particular well defined methodology, the scientific one”.

Plagiarism: The substantial, unacknowledged incorporation into a student's work of material derived from the work (published or unpublished) of another person without their permission. "Work" includes internet sources.

Bias: is a distortion of the available information (in the literature or in a review of the literature) in such a way that it reflects opinions or conclusions that do not represent the real situation.

Objective of a research project is a summary of what is to be achieved by the study.

A hypothesis; This is a prediction of a relationship between one or more factors and the problem under study, which can be tested.

Variable: A variable is a characteristic of a person, object, or phenomenon that can take on different values.

Sampling: Sampling is the selection of a number of study units from a defined study population.

A representative sample: This is a sample that has all the important characteristics of the population from which it is drawn.

Sampling Frame: It is a list of all the units that comprise the study population.

Deductive reasoning: Deductive reasoning is the process of developing specific predictions from general principles, or deriving logical answers or conclusions from reliable premises e.g. the emotional reaction of surgical patients to their illness and treatment may influence their post-operative recovery.

Induction reasoning: Inductive reasoning is the process of developing generalizations from specific observations, for example, by obtaining facts through observation and making generalizations based upon facts, e.g. post-operative vomiting in surgical patients can be related to their pre-operative emotional condition".

1.3.1 Definitio research

Take a minute to think about it and then complete the following activity.

Activity 1

Using your own words, write down the definition of research in your note book

Well done! Now compare your definition with the one in the discussion below.

You may have heard or come across different definitions of research. You may even have attempted to write a research project during your high school. You will now understand more of what research is all about.

Research is defined as “the systematic collection, analysis, and interpretation of data to answer a certain question or solve a problem”. Therefore, research follows a prescribed step by step way of generating knowledge and that is why it is systematic.

To understand ‘research’, you need to understand the sources of knowledge and how knowledge is acquired. Think of the situations below:

- What kind of attitude do nurses have towards their patients?
- How often should vital signs be taken on a patient in 24 hours?
- Does fire inflict pain or does it burn when touched with bare hands?
- Who created man?
- In which category of people is coronary heart disease more prevalent?

You may have answers to all or some of the questions above.

How and where did you acquire this knowledge?

1.3.2 Sources of Knowledge

There are basically two sources of knowledge. These are:

1. Non scientific methods
 - a. Intuitive knowledge
 - b. Authoritative knowledge
 - c. Experimental knowledge
 - d. Rational knowledge
 - e. Knowledge from divine revelation
 - f. Acquisition of knowledge from role models
2. Scientific methods
 - a. Description
 - b. Explanation
 - c. Prediction
 - d. Intervention

We shall now explain the types of sources of knowledge one at a time.

1. Non-scientific sources or methods of acquiring knowledge

There is no established process to acquire knowledge through the non-scientific method.

Below are examples of non-scientific sources of acquiring knowledge:

- a. Intuitive knowledge: According to Shepard (2002), intuition is quick and ready insight that is not based on rational thought. To intuit is to have the feeling of immediately understanding something because of insight from an unknown inner source. For example, the decision against dating a particular person because it feels wrong is a decision based on intuition (Shepard, 2002: 38). Intuition is

based on personal judgment, which might take place when one understands something because of insight from an inner source. Therefore, intuition is not based on rational thought in that the thought and idea is based on rationality and logic is something that is objective and verifiable (zwaipongolo.blogspot.com). The basis of this type of knowledge is experience or sensitivity. There is no concrete evidence. For example, you may have been admitted for an illness in the ward and you received very good care from the nurses, based on your experience, you concluded that nurses are a very caring people.

- b. **Authoritative knowledge:** According to Shepard (2002), authority is someone who is supposed to have special knowledge that other people do not have. A king who is believed to be ruling by divine right is an example of an authority. Reliance on authority is often appropriate because people tend to believe something from someone with authority than made up information (ibid). This is the kind of knowledge obtained from people in authority which should be accepted without demand for any explanation. During the introductory module to Fundamentals of Nursing, you probably learnt that the nurse should check the patients' vital signs twice a day unless their temperature is spiking. Your clinical supervisor may also have had emphasised the point of taking vital signs twice a day. The author of your module and your clinical supervisor are viewed as experts in their fields. So, you believed the information and started practicing without demand for verification of the information. Nevertheless, Williamson (1999) as cited in Shepard (2002) is reflecting the other side of the authority, he says that, "in other instances, however, authority can obscure the truth. Astrologers who advise people to guide their lives by the stars are an example of a misleading authority. This kind of an approach in generating knowledge is very dangerous because it is biased and skewed in nature; therefore it disqualifies it from being considered as a scientific source of knowledge (source?).
- c. **Experiential knowledge:** This source of knowledge is derived through sensory perception. When you touch fire with your bare hands, you risk being burnt. Probably you were burnt before and you learnt that fire inflicts pain. Therefore, such knowledge is influenced by personal experience.
- d. **Rational knowledge:** Rationality is the ability to recognise and accept reason as one's only judgment of value and the only guide to one's action. It is based on logic. Logic involves inductive and deductive reasoning.
 - **Deductive:** When using this process of reasoning, you reason from general statement(s) to a logical conclusion i.e. make specific prediction (conclusion) from general principles (premises). For example: Lack of knowledge on causes and prevention of cross infection among post operative patients (premises) may contribute to wound infections among patients who undergo surgery (conclusion).
 - **Inductive:** Inductive reasoning is the process of arriving at conclusions (generalizations) from specific observations. For example: the presence of post operative wound infections among patients in ward X (specific observation), can be associated with the patient's lack of knowledge on the causes and prevention of cross infection (generalization).

- e. **Knowledge from divine revelation:** This is knowledge that is based on faith. Such knowledge cannot be proved scientifically. For example: God created man.

Acquisition of knowledge from role models: This is knowledge acquired through imitation. Some people's actions are based on the people they perceive as their role models. For example: a student's values, attitudes and behaviour may be adopted from their mentor.

Intext question

*Is there anything common about the sources of non-scientific methods of acquiring knowledge above?
Of course yes, they all lack scientific evidence!*

Let us now review the scientific method of acquiring knowledge.

1. Scientific method of acquiring knowledge: This method involves validation of the non scientific knowledge. Validation forms the basis for planning, predicting, improving and controlling the nursing profession. Scientific method of acquiring knowledge involves a process using the following stages:

- a. **Description:** This involves giving an accurate depiction of the object, of the relationship or of the phenomenon. For example: give a description of the information that is included in the health education given to patients and their significant others on the wards in Y hospital. Also give a description of the hygienic practices of patients and post operative wounds on ward Y (magnitude, type of patients affected, number of days post operatively etc).
- b. **Explanation:** This is expressing the relationship between the described facts. The explanation of the relationship should be such that a prediction of events under well defined conditions can be made. Rationalistic knowledge is utilized in this stage. For example: give a statement of relationship between the kind of health education given, the hygienic behaviours of the patients and the outcome of post operative wounds.
- c. **Prediction:** Further events that are predicted under well-defined conditions should enable one to tell some future occurrences.
What will be your prediction that next year will be a rainy?
- d. **Intervention:** An accurate description will lead to a correct explanation. A correct explanation leads to the ability of foretelling events leading to intelligent intervention which enables changes to occur in order to improve a situation.

The scientific process described above uses a systematic approach. It is an organized way of acquiring knowledge. It involves collection of facts, analysing those facts and interpreting them in order to find the answer to the original question or to solve a problem. In this regard, research is therefore a science.

Science can be defined as a building of knowledge obtained by use of a particular methodology, the scientific one.

The scientific method of acquiring knowledge, also called scientific research is the systematic collection, analysis, and interpretation of data to answer a certain question or solve a problem.

A good research therefore has some characteristics.

Activity 1.1

Take your note book and write down what you think are the characteristics of a good research.

Job well done! Now turn to the next page and find out how much you understood the concept of research.

1.3.3 Characteristics of a good research

The following are the main characteristics of good research:

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

Checkpoint questions

Write true or false to answer the question below.

1. Research is not a scientific method of acquiring knowledge. T/F
2. Sources of knowledge can either be scientific or non scientific. T/F

Well done! Now go back to the text and check how you have performed. You now know the meaning of research, the sources of knowledge and characteristics of a good research. You are now ready to move to the next sub topic to learn the Importance of research

1.4 Importance of Research

1.4.1 Purposes of research in nursing

Research serves two (2) major purposes:

1. It serves to generate new knowledge and technologies that can be used to solve most of the unresolved health problems (Basic research)
 2. It also helps to identify priority problems, to design and evaluate policies and programs that will ensure the enormous health benefit, making optimal use of available resources (Applied research).
- Importance of Research in Nursing**

1.4.2: Need for nursing research

Nursing Research is needed for many reasons:

1. Through research, new knowledge is developed which can be used to improve nursing practice and education. The evidence based practice can benefit the patients, clients, families, community and even nurses themselves. It helps to improve practice and solve many problems affecting the nursing practice.
2. It provides answers to questions. Therefore it satisfies curiosity.
3. It improves the quality of nursing care. Nurses update their information and broaden their knowledge through research.
4. Nurse managers rely on research findings for effective planning and implementation.
5. Research enables nurses to be autonomous in the sense that they can use information obtained from their environment rather than depending on borrowed ideas.

Checkpoint:

Why is research important in nursing?

1. It improves the quality of nursing care.....T/F
2. It provides answers to questions.....T/F
3. It provides nursing care to chronically ill patients.....T/F

Answers

1. T, 2. T, 3. F

This leads us to the next question. What are the types of research? Let us consider this next.

1.5 Types of Research

The types of research depend on the aim of the research. There are basically two types of research namely:

1. Basic research, and
2. Applied research

Before we discuss the two types of research, do the following activity.

Activity 3

Write down the difference between basic and applied research in your notebook

Well done. Now check the differences between the two types of research in the following discussion

1. Basic research

Basic research is also referred to as pure research or fundamental research. Basic research is carried out to generate new knowledge and technologies, to increase understanding of fundamental principles and to test theories. Basic research has no intentions of addressing any specific problems or real world application of knowledge. It basically arises out of curiosity. However, it is the basis for applied research. Examples of basic research are the classical and operant conditioning principles done on animals that you learnt in psychology last academic year. Another example of basic research is the Knowledge, Attitude and Practice (KAP) studies.

2. Applied research

This is the type of research that involves practical application of science. It also helps to identify priority problems, to design and evaluate policies and programs that will ensure the enormous health benefit, making optimal use of available resources. It seeks to solve practical problems. Example: “A study to evaluate the effectiveness of using Lifebuoy soap in the management of burn wounds”.

Let us now look at the ethical and legal issues affecting research.

1.6 Ethical and legal Issues in research

Every profession has a code of ethics or code of conduct to be followed. In “Professional Practice” you learnt about the nurses’ code of conduct of which nurses should observe. We hope that being a nursing student you are already abiding by the nurses’ code of conduct.

Researchers are also guided or regulated by the code of ethics. There are also legal issues that researchers must observe when conducting research. These ethical and legal issues are meant to protect the human rights of research participants and also to protect the rights of other researchers. You being a student undertaking research course, you are expected to abide by the research code of ethics and the legal issues that go with it.

As you undertake research, you may encounter situations in which some ethical principles are violated unintentionally. For example: research problems where there is need for discovery of more knowledge that will in the long run be potentially life-saving or beneficial to the patients or the community. In these situations, usually the human rights of the participants, the study demand and the professional ethics may be put in direct conflict, resulting in ethical dilemmas for the researcher.

Let us review some of the dilemmas that may be encountered by the researcher.

Examples of ethical dilemmas in conducting research

1. *Research question:* How empathetic are nurses in their treatment of critically ill patients in high dependency areas?

Ethical dilemma: to obtain valid and reliable findings, the researcher may want to observe the nurses' behaviour as they care for critically ill patients in the high dependence areas. Ethically, the researcher is required to explain the study to the participants and obtain their consent to participate. However, the nurses will become aware of the researcher's intention and change their behaviour towards the patients under their care. Will the study findings be valid and/or reliable?

2. *Research question:* What are the feelings and coping mechanisms of siblings whose parents have a terminal illness?

Ethical dilemma: for this question to be answered fully, the researcher would want to probe into the psychological state of the siblings at a time when they are highly vulnerable. Such an action could be painful and even traumatic. However, knowledge of the siblings' coping mechanisms could help to design more effective ways of dealing with siblings during the grieving process.

3. *Research question:* What is the process by which adolescents adapt to the day-to-day stresses of caring for a terminally ill parent?

Ethical dilemma: in this situation, the researcher may win the participants' confidence to the point that participants (adolescents) provide privileged information. For example: suppose the participant disclosed to the researcher that they pinch their terminally ill parents, how should the researcher handle this information without breaching the pledge of "confidentiality"? Will the other participants trust this researcher with their privileged information in future?

What lessons have you learnt from the examples given on ethical dilemmas in conducting research?

I am sure you have learnt that researchers involved with human participants are sometimes bound; they are obliged to advance knowledge, using the best methods available, but they must also adhere to the ethical rules that have been developed to protect human rights.

As a nurse, you will also encounter conflict-of-interest dilemmas, in which your expected behaviour comes into conflict with the expected behaviour of researchers (e.g., deviating from a standard research protocol to give needed assistance to a patient). It is for this reason that the code of ethics in research was developed.

1.6.1 Code of ethics

Basically, there are three primary ethical principles on which standards of ethical conduct in research are based. These are:

1. Beneficence and Non-maleficence
2. Respect for human dignity
3. Justice

These principles and their corresponding standards of ethical conduct are explained below one at a time.

(a) The principle of beneficence and non-maleficence

- **Freedom from harm:** do no harm. Research should only be conducted by qualified people, especially if potentially dangerous technical equipment or specialized procedures are used. The researcher must be prepared at any time during the study to terminate the research if there is reason to suspect that continuation would result in injury, disability, undue distress, or death to study participants. When a new medical procedure or drug is being tested, it is almost always advisable to experiment with animals or tissue cultures before proceeding to tests with humans. Researchers should avoid inflicting psychological harm by carefully considering the phrasing of questions, by having debriefing sessions that permit participants to ask questions after their participation, and by providing participants with written information on how they may later contact the researchers.
- **Freedom from exploitation:** involvement in a research study should not place people at a disadvantage or expose them to situations for which they have not been explicitly prepared. Participants need to be assured that their participation, or the information they might provide to the researcher, will not be used against them in any way. The study participant enters into a special relationship with the researcher, and it is critical that this relationship be not exploited in any way.
- **Benefits from research:** people agree to participate in research investigations for a number of reasons. They may perceive that there are some direct personal benefits. Quite often, the benefits from the research accrue to society in general or to other individuals. Many individuals may participate in a study out of desire to help. The researcher should maximize benefits and communicate candidly the potential risks and benefits to study participants.
- **The risk/benefit ratio:** when deciding to conduct a study, the researcher must carefully assess the risks and benefits that would be incurred. The assessment should weigh the risks and benefits that individual participants might experience, and the assessment should be shared with them so that they can evaluate whether it is in their best interest to participate.

(b) The principle of respect for humanity

- **The right to self-determination:** prospective participants have the right to decide voluntarily whether to participate in a study, without the risk of incurring any penalties or prejudicial treatment. It also means that people have the right to decide at any point to terminate their participation, to refuse to give information, or to ask for clarification about the purpose of the study or specific study procedures. A person's right to self-determination includes freedom from coercion of any type.
- **The right to full disclosure:** means that the researcher should fully describe the nature of the study, the participant's right to refuse participation, the researcher's responsibilities, and the likely risks and benefits that would be incurred.
- **Issues relating to the principle of respect:** certain circumstances make it difficult to adhere to the principles of humanity. Some participants may not be in a position to make well informed judgments about costs and benefits associated with participation e.g. children and the mentally ill. Other circumstances occur in

which the researcher may feel that the right to full disclosure and self-determination must be violated for the research to yield meaningful information. Researchers concerned with the validity of the study findings are sometimes worried that full disclosure might result in two types of biases: (1) the bias resulting from subjects giving inaccurate information, and (2) the bias resulting from failure to recruit a good sample.

(c) The principle of justice

The right to fair treatment: the study participants have the right to fair and equitable treatment before, during, and after their participation in the study. Fair treatment includes the following features:

- The fair and non discriminatory selection of participants such that any risks and benefits will be equitably shared; participant selection should be based on research requirements and not on the convenience, gullibility, or compromised (or favoured) position of certain types of people.
- The non prejudicial treatment of individuals who decline to participate or who withdraw from the study after agreeing to participate
- The honouring of all agreements made between the researcher and the participant, including adherence to the procedures outlined in advance and the payment of any promised stipends.
- Participants' access to research personnel at any point in the study to clarify information
- Participants' access to appropriate professional assistance if there is any physical or psychological damage
- Debriefing, if necessary, to divulge information that was withheld before the study or to clarify issues that arose during the study
- Respectful and courteous treatment at all times.

The right to privacy: this can occur either through anonymity or through other confidentiality procedures. Researchers can take a number of steps to safeguard the confidentiality of participants, including the following:

- Obtain identifying information (e.g., name, address) from participants only when it is essential to do so.
- Assign an identification (ID) number to each participant and attach the ID number rather than other identifiers to the actual research information
- Maintain any identifying information and lists of ID numbers with corresponding identifying information in a locked file
- Restrict access to identifying information to a small number of individuals on a need-to-know basis
- Enter no identifying information onto computer files
- Destroy identifying information as quickly as is feasible
- Have all research personnel who have contact with the research information or identifiers sign pledges of confidentiality

- Report research information in the aggregate; if information for a specific participant is reported, take steps to disguise the person's identity, such as through the use of a fictitious name together with sparing use of descriptors of the individual.

Summary of Code of Ethics

The code of ethics helps you to:

- Ensure minimal physical and psychological risks to subjects.
- Ensure that physical and psychological risks to subjects are reasonable in relation to anticipated benefits to those subjects and to the importance of the general knowledge that may reasonably be expected to result.
- Ensure that selection of participants is equitable
- Obtain informed consent , including at least the following items being communicated to potential participants or their authorised surrogates:
 - ✓ Purposes of the research, its expected duration, and the nature of any interventions/experiments;
 - ✓ anticipated risks and benefits of participation and the reasonable alternatives to participation in the research protocol;
 - ✓ confidentiality provisions relating to the research records;
 - ✓ any compensation and/or treatment available for research related injuries;
 - ✓ The right to and not to participate and the right to discontinue participation at any time without penalty.
- Ensure that informed consent will be appropriately documented
- Ensure adequate provision is made for monitoring the research to ensure the safety of participants.
- Ensure that appropriate provisions are made to protect the privacy of participants and the confidentiality of data
- Ensure that appropriate additional safeguards are included to protect the rights and welfare of vulnerable subjects when they are involved.

Checkpoint:

What are the main ethical and legal considerations applicable to research? Write your answer in your note book.

- *Check your answers against the text.*

1.7 SUMMARY

You have so far learned the concepts used in research. You also learned the importance of research in nursing, the types of research and the ethical and legal issues applicable to research.

- Research is defined as “the systematic collection, analysis, and interpretation of data to answer a certain question or solve a problem”.
- There are basically two sources of knowledge. The non- scientific methods which includes; Intuitive knowledge; authoritative knowledge; experimental knowledge; rational knowledge; knowledge from divine revelation; acquisition of knowledge from role models and the scientific method which includes: description; explanation; prediction and Intervention
- There are two types of research: Basic research is also referred to as pure research or fundamental research. Basic research is carried out to generate new knowledge and technologies, to increase understanding of fundamental principles and to test theories. Applied research on the other hand is the type of research that involves practical application of science
- Researchers are also guided or regulated by the code of ethics. There are also legal issues that researchers must observe when conducting research. These ethical and legal issues are meant to protect the human rights of research participants and also to protect the rights of other researchers

In the next unit, you will learn about the steps you should follow to develop a research proposal. But then, find out how much you still remember from Unit 1 by completing the following self test.

1.8 SELF TEST

Answer the following questions by inserting true (T) or false (F) against each statement below:

1. In non scientific sources of knowledge, intuitive knowledge means knowledge acquired from experts._____
2. Deductive reasoning moves from general principles to specific prediction._____
3. Scientific method of acquiring knowledge involves validation of non scientific knowledge._____
4. A good research builds on existing data, using both positive and negative findings._____
5. Research is important because it provides answers to questions._____
6. Applied research helps to generate new knowledge and technologies._____
7. The code of ethics in research is aimed to protecting the rights of participants._____

ANSWERS TO THE SELF-TEST GIVEN ABOVE

1. F 2.T 3F. 4. T 5.T 6.F 7.T

1.9 References

UNIT 2: PRELIMINARY RESEARCH STEPS AND PROPOSAL DEVELOPMENT

2.1 Introduction

Welcome to Unit 2 of the Nursing Research course. Congratulations on your successful completion of Unit 1 of the course. In the previous unit, you learnt the broad concepts of research. You also appreciated the importance of research in nursing. The types of research were described and examples of some dilemmas encountered by researchers were also discussed. Ethical and legal issues that provide protection of the research participants' human rights were also fully explained.

By the end of the course, you should be able to develop a research proposal using the knowledge and skills gained. You will encounter a number of activities to help you gain knowledge, understand and develop the skill required to develop a research proposal. You will need to draw on the knowledge you gained in Unit 1 and also integrate the knowledge gained from other courses. This Unit will introduce you on how to identify and select a research problem, how to formulate a research problem statement, how to conduct relevant literature for your study, how to formulate objectives and hypothesis and how to select a research methodology for a specific study.

2.2 Unit objectives

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

1. Identify and select a research problem
2. Formulate a problem statement
3. Discuss literature review
4. Formulate research objectives and hypothesis
5. Outline the research methodology

These steps will be tackled one at a time.

2.3 Selection of a research problem

In this section , you will cover the following sub- topics:

- Identification of a research problem
- Sources of research problem
- Development and refining of research problem
- Characteristics of a research problem or phenomenon.
- Characteristics of good research questions.
- Prioritisation of a research topic

Before you create a research proposal, let alone conducting your research, you will need to identify a problem to address, then, create a question or questions regarding your targeted problem. This lesson focuses on the nature of a research problem, where you might get ideas for a problem to investigate, narrowing down or focusing on a particular problem to address, and writing good research questions. You will also learn how to prioritise a research topic from a list of researchable topics.

2, 3.1 Identification of a research problem

Activity 2.1

What do you think is a “research problem”?

A research problem is a situation involving perplexing, or troubling condition. It is the topic you would like to address, investigate, or study using an appropriate study design. It can also be defined as an area of concern where there is a gap in the knowledge base needed for nursing practice (Burns and Grove, 2006).

(a) Sources of research problems

Research problems can be found from various sources. These sources may include:

- **Clinical experience:** As you carry on with your practical work in the ward, you may make some observations or encounter puzzling situations for which you do not have a definite solution or answers. Clinical practice is an important source for research problems.
- **Existing literature:** You may be reading some literature and discover that some gaps or portions are not fairly covered. Your efforts to find answers to the gaps through further literature search or consultations prove futile. This will give you an impetus for further research.
- **Social issues:** This includes some of the occurrences in the community. For example, you may observe or hear from radio that children as young as 6 months old are being sexually abused.
- **Theories:** you may have reservations about the use of some nursing theories developed some decades ago and would like to test their validity.
- **Replication of Studies:** This involves reproducing or repeating a study to determine whether similar findings will be obtained. This is identified after literature review.

(b) Development and refinement of a research problem

Now that you have identified a research problem, you need to carefully select the research topic and refine it. Selection of a research topic needs creativity, imagination, insight, and ingenuity (quality of being clever, original, and inventive). You also need to refine your research topic. Without adequately defining the problem, you may find yourself going off “chasing the wind” to tackle a vague situation, trying to deal with symptoms rather than root causes, and wasting time, becoming frustrated, or even making the actual problem worse

Refining a research topic means narrowing it so that it is clear and only has one meaning. This can lead to a researchable problem. You can achieve this by asking questions such as:

- What causes.....?
- What is the extent of.....?

- Why do.....?
- When do.....?
- What influences.....?
- What characteristics are associated with.....?
- What are the consequences of.....?
- What is the relationship between.....?
- How effective is.....?
- What differences exist between.....?
- What factors contribute to.....?

How to tell whether a problem is researchable or not

If the answer to a problem is obvious, then you are NOT dealing with a research problem. It may be a management problem.

For example:

The surgical ward in which you were allocated during the previous clinical placement had run out of surgical gloves for three weeks consecutively. The gloves were available in the stores but the sister-in-charge did not order some.

Would you conduct a research to establish the reason(s) for non-availability of the gloves on the ward?

Of course not, the answer is obvious! The Sister-in-Charge did not order some gloves. This is a management problem and not a research problem.

What qualifies a problem to be researchable?

Characteristics of a good Research Question

The following are characteristics of a researchable problem. Three conditions should be satisfied:

1. There should be a perceived difference or discrepancy between what exists and the ideal or planned situation;
2. The reason(s) for this difference should be unclear (so that it makes sense to develop a research question); and
3. There should be more than one possible answer to the question or solution to the problem.

2.3.2 Identifying a possible research question

After you have narrowed down your topic or problem, searching and reviewing existing literature may further clarify your research approach (*literature review will be explained*

later in the module). By identifying where the conclusions of previous research are unclear or where gaps may exist in the literature, you will be in a better position to write good research questions.

(a) Formulating a research question

A research question is a way of expressing your interest in a problem or phenomenon. It guides and focuses your research.

You may have more than one research question for a study, depending on the complexity and breadth of your proposed work. Each question should be clear and specific, refer to the problem or phenomenon, reflect an intervention in experimental work, and note the target population or participants. Identifying a research question will provide greater focus to your research or clarify the direction of your investigation, whether the research is descriptive or experimental.

A well-written research question will also shed light on appropriate research methods (*research methods will be discussed later in the module*).

(b) Characteristics of a good research question

A good research question must be:

- Specific.
- Clear.
- Refer to the problem or phenomenon.
- Reflect the intervention in experimental research.
- Note the target group of participants.

For example:

- Do environmental conditions have an impact on the intelligence level of primary school going children?

Here is another example to facilitate your understanding of characteristics of a researchable problem

Example: Characteristics of a researchable problem

Problem scenario

In Surgical Ward X consisting of 40 patients, a number (about 5 wounds) of patients' wounds become infected on about the 3rd post operatively-. The Departmental Nursing Officer ensures that all the medical/surgical supplies are procured in the right quantities and are available at all times in the stores department. The ward in charge ensures availability of medical/surgical supplies in surgical ward X. The central sterilizing department that caters for the entire hospital purchased and installed new equipment and was fully operational. All the nurses were trained in infection prevention. On the 6th day, the ward in charge discovered that the number of patients with infected wounds had increased to 20.

Discrepancy

The number of patients with infected wounds has increased from 38% to 50% in surgical ward X despite measures put in place.

Research question

What factors contribute to wound infection in surgical Ward X?

Possible answers

1. **Service related factors**, poor infection prevention practices, inadequate knowledge of infection prevention by health personnel, bad attitudes by health personnel, poor quality of detergents and solutions ordered by stores and pharmacy department.
2. **Patient related factors**, such as poor hygiene practices, lack of knowledge on infection prevention.

Checkpoint- A good research question should have certain characteristics. What are they? Write the answer in your notebook.

(c) Criteria for prioritizing problems for research

Sometimes as a researcher, you may be confronted with a number of research topics that are of interest to you, your manager or other stakeholders. In such a situation, there is need to select a research topic that is based on priority. Each of the proposed research problems must be compared with the other options using certain guidelines or criteria.

(d) Criteria for selecting a priority research topic

The following is the criteria you should use when selecting your research topic:

1. Relevance
2. Avoidance of duplication
3. Feasibility
4. Political acceptability
5. Applicability
6. Urgency of data needed
7. Ethical acceptability

These criteria have a rating scale against which the level of importance or priority can be measured (*The rating scale is written at the end of the criterion*).

These guidelines/criteria are outlined as follows:

Relevance

The topic you choose should be a priority problem. Questions to be asked include:

- How large or widespread is the problem?
- Who is affected?
- How severe is the problem?

Try to think if the health problem is severe, affects a number of people and who it affects. Also think of who else perceives the problem to be important. Define the problem in such a way that all parties involved will have an interest in solving it.

If the problem is not considered to be relevant, then drop it at this stage.

Avoidance of duplication

Many health problems have been studied before and therefore you need to find out whether your research topic has been investigated before, either locally or outside your area. If the topic has been studied before, find that study and review whether all the major questions/areas about the topic have been studied. If all areas of the problem have been studied, drop it and choose another topic.

Feasibility

Evaluate the problem at hand and decide whether you have the resources that it takes to start and complete it. Resources to be considered are funds, time, equipment and personnel that are locally available. Also consider if resources can be mobilised from outside. If the problem needs a lot of resources that are not available, consider reducing the project to a manageable size. If not manageable, drop it and consider another topic.

Political acceptability

In order to increase chances of study results being implemented, consider whether your topic will have the support and interest of the authorities. Take an effort to involve the major stake holders at an early stage. If the topic will have no support of the authorities, there is no need of undertaking it.

Applicability of possible results and recommendations

Is it likely that the recommendations from the study will be applied? This will depend not only on the blessing of the authorities but also on the availability of resources for implementing the recommendations. The opinion of the potential clients and of responsible staff will influence the implementation of recommendations as well.

Urgency of data needed

Are the results needed urgently for making a decision? Which of the research topics should be done first and which can be done later?

Ethical acceptability

Consider the possibility of inflicting harm on others while carrying out research and avoid it. Therefore, review the study you are proposing and consider important ethical issues such as:

- The acceptability of the research to those who will be studied
- Whether the informed consent will be obtained from the research subjects
- Whether the conditions of the subjects will be taken into account. For example, if individuals are identified during the study will they require treatment, and will this treatment be given? What if such treatment interferes with your study results?

The following rating scales can measure these criteria:

Scales for rating research topics

Relevance

1. = Not relevant
2. = Relevant
3. = Very relevant

Avoidance of duplication

1. = Sufficient information already available
2. = Some information available but major issues not covered
3. = No sound information available on which to base problem-solving

Feasibility

1. = Study not feasible considering available resources
2. = Study feasible considering available resources
3. = Study very feasible considering available resources

Political acceptability

1. = Topic not acceptable to high level policy makers
2. = Topic more or less acceptable
3. = Topic fully acceptable

Applicability

1. = No chance of recommendations being implemented
2. = Some chance of recommendations being implemented
3. = Good chance of recommendations being implemented

Urgency

1. = Information not urgently needed
2. = Information could be used right away but a delay of some months would be acceptable
3. = Data very urgently needed for decision making

Ethical acceptability

- 1. = Major ethical problems
- 2. = Minor ethical problems
- 3. = No ethical problems

Enter each of the identified topics on the rating sheet below. Total up the points. The topic with the largest number of points is the priority.

Rating sheet for research topics

Proposed topic	Criterion							Total points
	Relevance	Avoidance of duplication	Feasibility	Political acceptability	Applicability	Urgency of data needed	Ethical acceptability	
1. A study to establish factors contributing to malnutrition among under-five children living in low density area.	3	3	3	2	2	3	2	18
2. An evaluative study of.....	2	1	2	1	2	3	2	13
3. A cross sectional study.....	2	1	2	1	1	1	2	11

Rating scale: 1. = Low 2 = medium, 3 = high

In the example above, the topic “A study to establish factors contributing to malnutrition among under-five children living in low density area” has the highest rate of 18, and therefore the priority topic to be studied.

SELF ASSESSMENT 2.1

Answer the following questions indicating True or False

1. A research problem is a situation involving perplexing or troubling conditions.
2. A research problem can be found from various sources.

Well done! Compare now with our answers below.

1. T
2. T

We will now proceed to analysis and formulation of statement of the problem

2.4 Formulation of statement of the problem

Dialogue.....

2.4.1 Analyzing the problem

A systematic analysis of the problem, completed jointly by stake holders is a very crucial step in designing the research because it:

1. Enables those concerned to pool their knowledge of the problem.
2. Clarifies the problem and the possible factors that may be contributing to it, and
3. Facilitates decisions concerning the focus and scope of the research.

Pose and think of people who may have the knowledge in the area of the problem you intend to research into. Once you have identified them, approach them so that they can also pool in their knowledge. You can also search literature to help you understand the problem better.

Steps in analyzing the problem

1. Identification of the core problem and describing it
2. Identification of possible contributing factors
3. Determine relationship between the problem and contributing factors (problem analysis diagram)
4. Regroup the contributing factors into broad categories where appropriate
5. Decide on the focus and scope of the research

Step 1: Identification of the core problem and describing it

In the previous example of wound infections in Surgical Ward X, the core problem can be termed as Wound Infections.

Next describe the core problem more elaborately by stating:

- The **nature** of the problem; the discrepancy between “what is” and what you prefer the situation to be.
- The **distribution** of the problem – who is affected, when, and where;
- The **size** and **intensity** of the problem - is it widespread, how severe is it, what are its consequences (such as disability, death, and waste of resources).

Step 2: Identify possible contributing factors

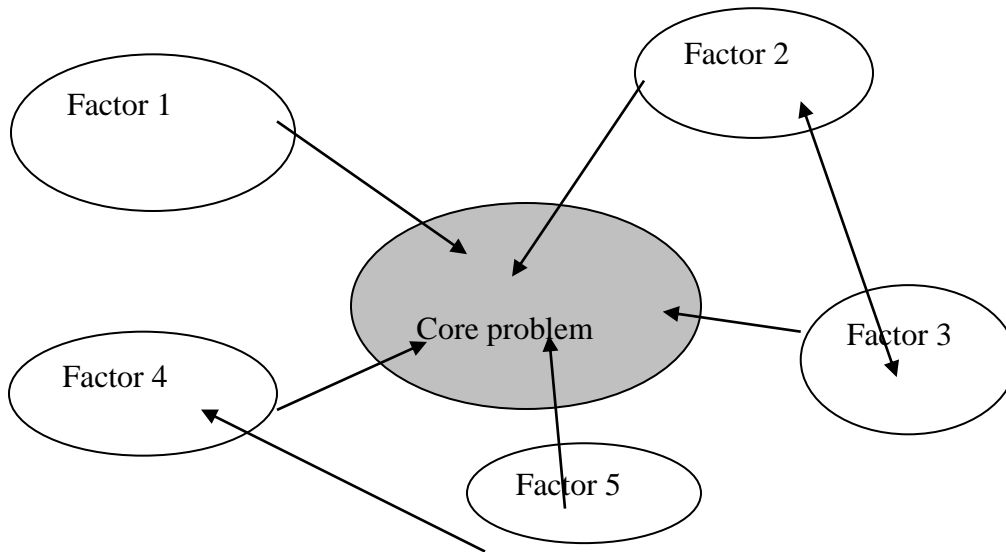
Activity2.2

What factors were identified as possible contributing factors to wound infections in Surgical Ward X?

Write them on a piece of paper and compare with factors that were mentioned in the example above on characteristics of a researchable problem.

Step 3: Determine relationship between the problem and contributing factors by drawing the problem analysis diagram

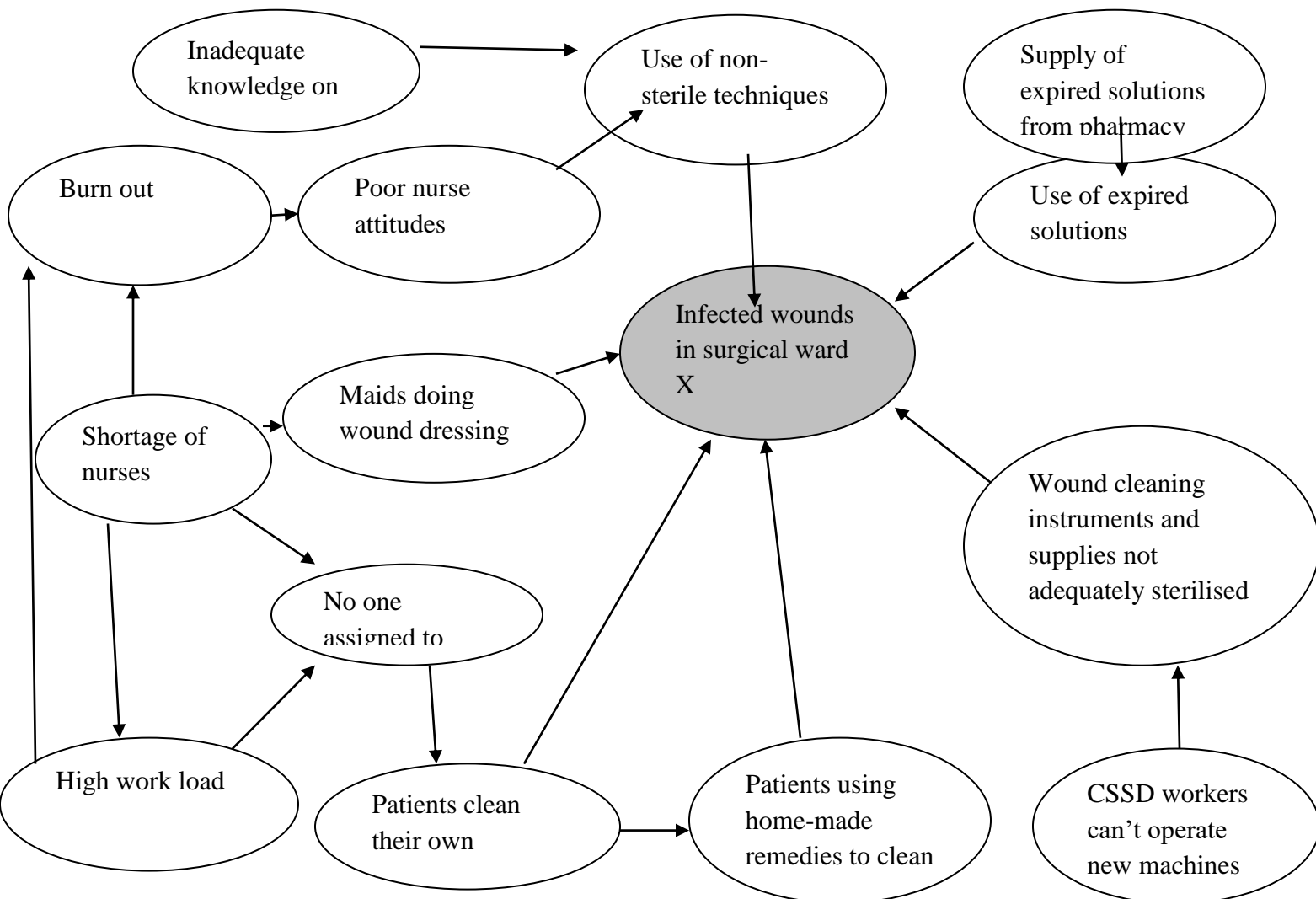
Example: Problem Analysis Diagram



Perceived problems and factors contributing to these problems may be placed in “balloons”. The relationships between them can be indicated by arrows that can be either one-way arrows (for cause-effect relationships) or two-way arrows (for mutual relationships). The dark coloured balloon indicates the core problem.

Now get a piece of paper and a pencil. Using the example above on “Characteristics of a researchable problem”, Identify the core problem and the contributing factors to wound infection in Surgical Ward X. Draw a problem analysis diagram. The core problem should be in the middle (shaded differently from the factors). Demonstrate the relationship between the core problem and the contributing factors. Note that you can identify more problems than illustrated in the example.

Well done! Now compare your diagram with ours below:



Regroup the contributing factors into broad categories where appropriate

This initial diagram suggests that further development of the analysis could proceed in at least two directions, i.e., analysis of factors related to:

- Quality of the services provided (service related)
- The patient and family (patient related)

The service related factors and patient and family related factors are usually intertwined. One factor affects or influences the other.

Step 4: Decide on the focus and scope of the research

After you have a detailed analysis of the problem, reconsider the focus and scope of your research. Think of the issues below seriously:

- 1. Usefulness of the information.** Will the information to be collected on this problem help improve health and health care? How will the findings be used?
- 2. Feasibility.** Is it feasible to analyze all the factors related to the problem in the time available for research?
- 3. Duplication.** Is some of the information related to factors in the diagram already available? What aspects of the problem need further research?

Review your problem analysis diagram with these issues in mind. If your problem is complex and has many possible contributing factors, identify and demarcate the boundaries of possible smaller topics. If there is more than one possible topic, use the selection criteria and ranking method that were described earlier to assist you in your final decision concerning the focus and scope of your research.

Now you are ready to formulate a statement of your research problem.

2.4.2 Formulation of statement of the problem

Having analysed your research problem and decided on the focus and scope of your research, you are now going to write a narrative statement of your research problem. A statement of the problem should be very well defined.

The “statement of the problem” is the first major section in a research proposal development.

Importance of stating and defining the problem well

Why it is important to state and define the problem well?

Because a clear statement of the problem:

- Is the foundation for the further development of the research proposal (research objectives, methodology, work plan, budget, etc)
- Makes it easier to find information and reports of similar studies from which your own study design can benefit.
- Enables you to systematically point out why the proposed research on the problem should be undertaken and what you hope to achieve with the study results. This is important to highlight when you present your project to community members, health staff, the relevant ministry, and donor agencies that need to support your study or give their consent.

Information to be included in the statement of the problem

1. A brief description of socioeconomic and cultural characteristics and an overview of health status and the health-care system in the country or district **in as far as these are relevant to the problem**. Include a few illustrative statistics, if available, to help describe the context in which the problem occurs.
2. A concise description of the nature of the problem (the discrepancy between what is and what should be) and of its size, distribution, and severity (who is affected, where, since when, and what are the consequences for those affected and for the services).
3. An analysis of the major factors that may influence the problem and a convincing argument that available knowledge is insufficient to solve it.
4. A brief description of any solutions that have been tried in the past, how well they have worked, and why further research is needed.
5. A description of the type of information expected to result from the project and how this information will be used to help solve the problem.
6. If necessary, a short list of definitions of crucial concepts used in the statement of the problem.

A list of abbreviations may be annexed to the proposal, but each abbreviation has to be written out in full when introduced in the text for the first time.

SELF ASSESSMENT2.2

1. In analysing a research problem, deciding on the focus and scope of the research involves the following **except**:
 - a) Feasibility
 - b) Stating the nature of the problem
 - c) Usefulness of the information
 - d) Duplication
2. A clear statement of the problem underpins further development of the research proposal. T/F

Well done! Now compare your answers with the ones below.

1. B
2. T

2.5 Literature review

So far, you have identified and selected your research problem. You ably analysed, stated your research problem in clear terms and ensured that it is well defined. You also focused and decided the scope of your research. Since you defined the statement of your research problem so well, you are aware of the types of information that you want to review.

You will need to review literature through-out your research project. You will need information for your introduction and background, statement of the problem, literature review sections of your research proposal. Literature review continues when

contemplating on the methodology and discussion of the study results. Basically, you need to review literature through-out your research study.

To successfully review the literature, you need to utilise the knowledge and skills that you gained from the study skills module. You need to be a critical reader, be able to reflect on what you have read and be able to evaluate.

In this section, you will learn:

1. The importance of reviewing already available information when preparing a research proposal
2. The possible sources of information
3. How to locate these sources
4. Strategies to gain access to these sources and obtain information in a more productive manner
5. How to document a review of literature, and
6. How to acknowledge sources of information used through citation, quotes and referencing

2.5.1 Importance of literature review

Why is it important to review already available information when preparing a research proposal?

- It prevents you from duplicating work that has been done before.
- It helps you to find out what others have learned and reported on the problem you want to study. This may assist you in refining your statement of the problem.
- It helps you to become more familiar with the various types of methodology that might be used in your study.
- It should provide you with convincing arguments why your particular research project is needed.

2.5.2 Sources of information for literature review

Different sources of information can be consulted and reviewed at various levels of the administrative system within the country and internationally.

The possible sources of information are:

- Individuals, groups, and organizations
- Published information (books, articles, indexes, and abstract journals)
- Unpublished information (other research proposals in related fields, reports, records, and computer data base)

2.5.3 Locations of literature review sources

Where to find these sources

1. Community, district and provincial levels

- Clinic and hospital based data from routine statistics, registers
- Opinions, beliefs of key figures (through interviews)
- Clinical observations, reports of critical incidents etc
- Councils, associations etc
- Local surveys, annual reports
- Statistics issued at provincial, and district levels
- Books, articles, newspapers, etc

2. National level

- Articles from national journals, books identified during literature searches in libraries
- Documentation, reports, and raw data from:
 - a. Ministry of health, education etc
 - b. Central statistics offices
 - c. Non-governmental organizations

3. International level

- USAID,
- UNICEF,
- WHO
- UNFPA etc

2.5.4 Strategies to access information from identified sources

You need to develop a strategy to gain access to each source and to obtain information in the most productive manner. Your strategy may vary according to where you are and the topic under study. It may include the following steps:

1. Identifying a key person (researcher or decision maker) who is knowledgeable on the topic and asking if he or she can give you a few good references or the names of other people whom you could contact for further information;
2. Looking up the names of speakers (key note speakers) on your topic at conferences who may be useful to contact;
3. Contacting librarians in universities, research institutions, the ministry of health, and newspaper offices and requesting relevant references;
4. Examining the bibliographies and reference list in key paper and books to identify relevant references;
5. Looking for references in indexes (e.g., *index medicus*,) and abstract journals
6. Requesting a computerized literature search (e.g. Medline)

Some agencies will assist with your literature search if requested by telephone or in writing. The request, however, should be very specific. Otherwise you will receive a long list of references, most of which will not be relevant to your topic. If you are requesting a computerized search it is useful to suggest key words that can be used in locating the relevant references.

What to do with the references that I have obtained

References that you have identified:

1. Should first be skimmed or read
2. Then summaries of the important information in each of the references should be recorded on separate index cards or as computer entries. These should then be classified so that the information can easily be retrieved.
3. Finally a literature review should be written

2.5.5 Writing a literature review

How to write a review of literature

There are a number of steps you should take when preparing a review of available literature and information:

- First, organize your index cards in groups of related statements according to which aspect of the problem they touch upon.
- Then, decide in which order you want to discuss the various issues. If you discover you have not yet found literature or information on some aspects of your problem that you suspect are important, make a special effort to find this literature.
- Finally, write a coherent discussion of one or two pages **in your own words**, using all relevant references.
- The relationship of the problem to other research should be clear
- There should be a range of opinions and varying points of view about the problem
- The review should identify important gaps in the literature
- The organization of the review is logical
- The review concludes with a brief summary of the literature and its implications for the problem

2.5.6 Citation, quotes and referencing

When developing your research proposal, you will use other people's information to build on yours. Remember that you are not the originator of the information you are using and therefore, you need to acknowledge the owners of such information through the use of citations, quotes, and full references.

To ensure uniformity in this module, you are required to use Harvard style of referencing.

Harvard style of referencing is one of the widely used referencing methods. Harvard style is a method of referencing that requires you to write the author/s and date of publication within the text and **all** references should be listed in **alphabetical** order at the end of the piece of work. The publications are not split into books, journals and websites, just one list in alphabetical order.

You should organize the Information on an index card in such a way that you can easily find all data you will need for your report.

Examples of citations in the text

(a) One author

- The number of under 18 year olds that patronised alcohol drinking places has increased from 5% in 2012 to 40% in 2013 (Department of Health, 2013)
Or
- Kaunda (2012) stated that many students did not know what services were available to them at the start of their studies.

(b) Two authors

- Mudala and Mulenga (2011) established that people living on the streets of Lusaka are five times more likely to die prematurely compared with the general population.

(c) More than two authors

- If there are more than 2 authors in the reference you should list the first author followed by *et al.* You should always italicize Latin names and words.
- The greater the amount of high-density lipoprotein in the blood cholesterol, the lower the risk of cardiovascular disease (Gordon *et al.*, 2004).
- In a study by Gleaves *et al.* (2003), fear of fatness was the best predictor of restrictive eating practices.

Examples of direct quotes

You should use direct quotes sparingly. When quoting:

- Gather key points as quotes
- Copy every word and all punctuations exactly
- Cite quotations correctly
- Put direct quotes in quotation marks.

When quoting authors directly, you should give the author/s name, year of publication, the page number on which the quote appears e.g.

- “Majority of motor accidents are caused by careless driving” (Kamanga, 2012, p. 10)

2.5.7 Primary and secondary referencing

Primary sources are the original sources of information i.e. from the actual author. Secondary sources are sources of information not from the original author. Secondary sources are information that someone reads from another source other than the primary source.

Example: You are reading a textbook by Mulenga (2008) and within the book it refers to work by Williams who wrote that the incidence of malaria in Lusaka has declined over the past two years as a result of collaborative multi-sectorial efforts from stakeholders. If you were referencing this work it would be cited as:

Multisectorial collaborative approach by different stakeholders has led to reduction of new malaria cases in the past two years in Lusaka (Williams (2006) cited in Mulenga 2008).

You should put in your reference as:

Williams, J. (2006) ***Malaria Prevention in Zambia***. Lookwell Scientific Publications. Cited in Mulenga, P. (2008) ***Tropical Medicine*** 2nd Edition, Zambia. P 10.

(a) Citing Web Sites

Always use high quality sites only.

Citation in the text

- Differences in the understanding of patients' readiness for discharge existed between hospital and home care nurses (Helleso, 2010)
- This should appear in your reference list as:- Helleso, R. (2010) *Cultural diversity between hospital and community nurses: implications for continuity of care* [internet] Available at http://www.ncbi.nlm.gov/pmc/articles/PMC2858515/#_ffn_sectitle (accessed on 03 August 2013)

(b) Compiling a reference list

- You will be required to write a reference list at the end of your text on a separate page and is arranged in alphabetical order of author.
- A reference list contains all the details of references you have used or quoted within the text of your work.
- A bibliography is a list of references that you have used in preparing your work but not actually cited in the text.
- You should only use a reference list, and not a bibliography.

(c) Books and reports

- The author/s' surname, initial. (year) *Title of book* Edition. (If not the first) place of publication: Name of the publisher.
- Hart, E. and Bond, M. (1995) ***Action Research for Health and Social Care***. Buckingham: Open University Press.

(d) Authored book chapters

- Doyal, L. (1997) *Engendering Health: Men, Women and Well-being*. In: Sidell, M., Jones, L. Katz, J. and Peberdy, A. (Ed.) *debates and Silemmas in Health Promotion*. 333-343. Bashingstoke : Macmillan.
- The Chapter author/s surname, initials. (year) Title of the chapter In Editor/s name and initials (Ed.) Edition. (if not the first) *Title of book*. Place of Publication: Name of the Publisher.

(e)Journals

- The author/s surname, initials. (year) Title of article. *Title of Journal*, **volume** (issue number) page numbers.
- Karlsen, S., and Nazroo, J.Y. (2002) Relation between racial discrimination, social class and health among ethnic minority groups. *American Journal of Public Health*, **92** (4) 624-631

(f)Electronic Journals

- The author/s surname, initials. (year) Title of article. *Title of Journal*, **Volume** (issue number) page numbers. Available from: < internet address> [accessed on date]
- DeBell, D and Carter, R. (2005) Impact of transition on public health in Ukraine: case study of the HIV/AIDS epidemic. *British Medical Journal* 7510 (331) 216-219 Available from: < <http://bmj.cp./cgo/content/full/331/7510/216>> [Accessed on 27 September 2005]

2.5.8 Plagiarism: Cheating

When conducting research, you will be required to review and use some information from other authors. You are mandated to strictly observe guidelines when using other people's information.

What is plagiarism?

The substantial, unacknowledged incorporation into a student's work of material derived from the work (published or unpublished) of another. "Work" includes internet sources.

Here are some examples of plagiarism:

- If you include in your work extracts from another person's work without using quotation marks and/or acknowledgement of source(s);
- If you summarize another person's work without acknowledgement;
- If you use substantial and unauthorized ideas of another person without acknowledgement;
- If you copy or print the work of another student with or without the student's knowledge or agreement
- If you buy and/or download work from an internet site or bank and submit it as your work.
- If you use other people's results and work in your dissertation.

How to avoid plagiarism

Below are some tips on how to treat information from other authors.

- Make sure that you use correct referencing technique and acknowledgement of all sources
- You should use several sources
- You should not copy chunks but rephrase in your own words and give the source
- You should acknowledge direct quotes. (“...” pg 5)
- You should not use a bibliography. Use a reference list
- You should not quote lecturers notes, read around the subject
- You should prepare for your assessments in time.

It is important to avoid being bias during literature search. Below are some tips on possible bias and how to avoid it during your literature search. You may find them helpful.

2.5.8 Possible bias in literature review

Bias in the literature or in a review of the literature is a distortion of the available information in such a way that it reflects opinions or conclusions that do not represent the real situation.

Being aware of the different types of bias will help you to be critical of the existing literature. If you have reservations about some references, or if you find conflicting opinions in the literature, discuss these openly and critically. Having a critical attitude may also help you to avoid biases in your own study. Common types of bias in literature review include:

- If you play down controversies and differences in your own study results.
- If you restrict references to those that only support your point of view.
- If you draw far reaching conclusions from preliminary or shaky research results or makes sweeping generalizations from just one case or small study.

2.5.9 Ethical considerations in literature review

When bias mentioned above is not observed, the scientific integrity of the researcher will be put in question. If data is carelessly presented and interpreted, readers who want to use your study’s findings will be put on the wrong track leading to loss of resources and wrong decisions affecting people’s health.

One other serious act, for which you as a researcher can be taken to court, is if you present other people’s research results or scientific publications without quoting the author. You should therefore, always ensure that you follow appropriate referencing procedures in your research proposal as well as in your research reports.

Now that you have done your literature search, and you have decided the scope of your research, it is time to decide what you want to achieve in your research study. The next sub unit will help you formulate objectives and/or hypothesis for your study and also help you select variables.

SELF ASSESSMENT2.3

1. In literature review secondary sources are sources of information from the original author. True or False?

2. The following are ways in which to avoid plagiarism **except**:
 - a. Use correct referencing technique and acknowledgement of all sources
 - b. You should acknowledge direct quotes
 - c. You should not use a reference list but a bibliography.
 - d. You should use several sources

Well done for the responses! Compare with the answers below.

SELF ASSESSMENT ANSWERS

1. FALSE
2. C

We will now look at the formulation of research objectives and hypothesis

2.6 Formulating research objectives and hypothesis

In the previous sub unit, you learnt what literature search is all about. You also learnt the need to conduct an organised literature search, how to document literature and avoidance of plagiarism.

In this sub unit, you will learn how to formulate research objectives. You will be required to actually formulate the research objectives for your study!

2.6.1 Research Objectives

The **objective** of a research project is a summary of what is to be achieved by the study.

Whenever you write research objectives, be sure that they are closely related to the statement of the problem. For example, if the problem identified is infected post-operative wounds in surgical ward X, the general objective of the study can be to identify the factors contributing to post-operative infection of wounds in surgical ward x.

Your research study should have two types of objectives. These are:

- General Objective, and
- Specific Objectives.

The **general objective** of a study states what is expected to be achieved by the study in general terms.

You are advised to break down your general objective into smaller, logically connected parts. These smaller, logically but connected parts are normally referred to as **specific objectives**.

Specific objectives should systematically address the various aspects of the problem as defined under “statement of the problem” and the key factors that are assumed to influence or cause the problem. They should specify **what** you will do in your study, **where**, and **for what purpose**.

The general objective “To identify factors contributing to post-operative wound infection in surgical ward x”. For example, this can be broken down into the following specific objectives:

1. To establish the magnitude of post-operative wound infection in surgical ward x
2. To determine the nurse patient ratio in surgical ward X as compared to the target ratio.
3. To determine the knowledge levels of nurses working in surgical ward x on infection prevention.
4. To establish the infection prevention practices among nurses working in surgical ward x
5. To establish the infection prevention practices among patients on surgical ward x
6. To make recommendations to appropriate stakeholders on the prevention of post-operative wound infections.

Reasons for developing research objectives

The formulation of objectives will help you to:

- **Focus** the study (narrowing it down to essentials)
- **Avoid** collection of data that are not strictly necessary for understanding and solving the problem you have identified
- **Organize** the study in clearly defined parts or phases.

Properly formulated, specific objectives will facilitate the development of your research methodology and will help to orient the collection, analysis, interpretation, and utilization of data.

How to state your objectives

Take care that the objectives of your study:

- Cover the different aspects of the problem and its contributing factors in a **coherent** way and in a **logical sequence**
- Are **clearly phrased** in **operational terms**, specifying exactly what you are going to do, when and for what purpose
- Are **realistic** considering local conditions
- **Use action verbs** that are specific enough to be evaluated.

Examples of action verbs are: to determine, to compare, to verify, to calculate, to describe, and to establish.

Avoid the use of vague non action verbs such as: to appreciate, to understand, or to study.

Keep in mind when the project is evaluated, the results will be compared to the objectives. If the objectives have not been spelled out clearly, the project cannot be evaluated.

Using the previous example on post- operative wound infections in surgical ward x, we may develop more specific objectives such as:

- To compare the magnitude of post-operative wound infections in surgical ward x with other surgical wards in the hospital
- To describe the characteristics of patients whose post-operative wounds get infected
- To evaluate infection prevention activities conducted by the hospital infection prevention steering committee.

A research study can have both the objectives and hypothesis depending on the level of knowledge and experience of your study problem. You will now learn about hypothesis.

2.6.2 Hypotheses

Based on your experience with the study problem, it might be possible to develop explanations for the problem that can then be tested. If so, you can formulate hypotheses in addition to the study objectives.

A hypothesis is a prediction of a relationship between one or more factors and the problem under study, which can be tested.

For example, a study designed to look at the relationship between sleep deprivation and test performance might have a hypothesis that states, "This study is designed to assess the hypothesis that sleep deprived people will perform worse on a test than individuals who are not sleep deprived."

2.6.2.1 Elements of a good hypothesis

When trying to come up with a good hypothesis for your own psychology research or experiments, ask yourself the following questions:

- Is your hypothesis based on your research topic?
- Can your hypothesis be tested?
- Does your hypothesis include independent and dependent variables?

Before you come up with a specific hypothesis, spend some time doing background research on your topic. Once you have completed a literature review, start thinking of potential questions you still have.

2.6.2.2 Title of the study

Now, you can finalize the title of your study. The title should be in line with your general objective. Make sure that it is specific enough to tell the reader what your study is about.

Take Note:

Instead of: "A study of factors that contribute to post-operative infection of wounds in surgical ward X"

It should be: "A study to identify factors that contribute to post-operative wound infections in patients admitted to surgical ward X."

2.6.3 Selection of Variables

Information to be collected in our study to meet our objectives

In most studies, you first have to describe the problem in a more precise manner. **For example:** You may want to investigate why clients default from taking their under five children to the well child's clinic. You will need to know the defaulter rate. Is it 10%, 20%, or 60%? To obtain the defaulter rate you need a clear definition of what you mean by defaulting (how many times the service was missed).

You also want to know whether certain factors indeed influence the problem, and to what extent. If you know the extent to which a certain factor influences the problem, you are much more likely to be able to convince your-self and others to take action.

For example, if we find that defaulting well child's clinic is strongly associated with:

1. Lack of knowledge concerning the type and importance of services being offered
2. Living more than 8 km away from the clinic where the services are being provided
3. Being a young mother

Then you have clues as to what will help to solve the problem.

Thus, it is important that the problem itself, as well as each of the factors you identified when analyzing the problem is carefully defined. To do this we must select variables.

2.6.3.1 Definition of a variable

A variable is a characteristic of a person, object, or phenomenon that can take on different values (e.g. weight, distance). It can also be defined as an attribute or characteristic that can have more than one value (e.g. height, weight, BP, color).

(a) Types of variables

There are various types of variables. For your level, you will learn six types of variables as follows:

1. Numerical variable
2. Categorical variable
3. Dependent variable
4. Independent variable
5. Confounding variable
6. Background variable

Numerical variable: This is a variable whose values are expressed in numbers or numerals. In the example of well child clinic, young age of mother is one of the factors assumed to have contributed to defaulting the well child clinic services. You may have defined a young mother as a woman from age 12 to 18 years who has a biological child. Take note that each of these mothers will not have the same age e.g. one may be 14 years old, another 16 years old and yet another 18 years old. The values of age are

different for each person. Therefore “age” is a characteristic of a person. Since age is expressed in “numerals or numbers”, it is called a **numerical variable**.

Categorical variable: This is a variable whose values are expressed in categories e.g. the variable “sex” has two values namely male and female, which are distinct from each other. Other examples of categorical variables are:

Outcome of illness	Recovery
	Disability
	Death
Residence	High density
	Medium density
	Low density

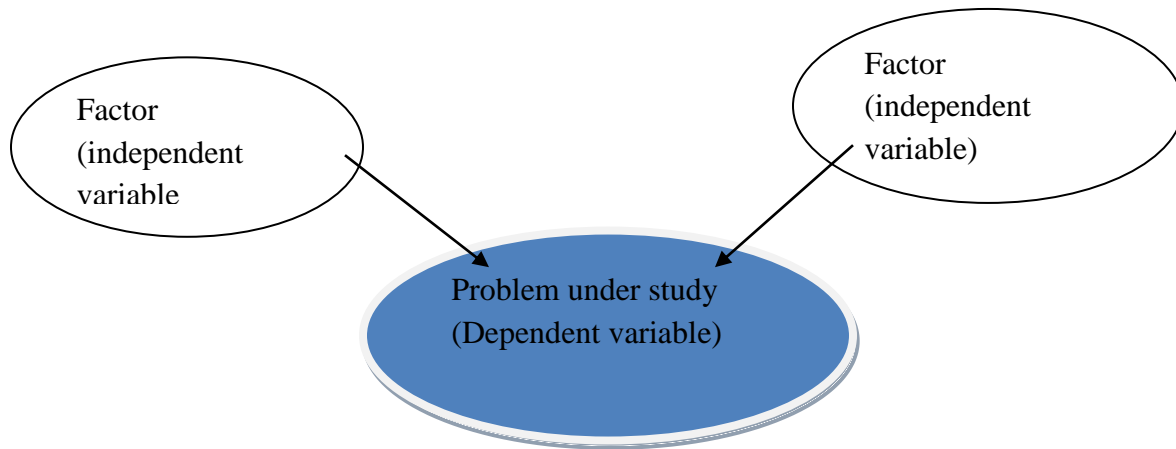
Dependent and Independent variables:

Sometimes, research may seek to explain the cause of the problem i.e. cause-effect relationship. One variable will be used to describe or measure the problem under study while the other will be assumed to cause or influence the problem.

The variable that is used to describe or measure the problem under study is called the **dependent variable**.

The variables that are used to describe or measure the factors that are assumed to cause or at least to influence the problem are called the **independent variables**. **For example**, in a study to identify the factors that contribute to postoperative wound infections in patients (refer to the problem analysis diagram), infected wounds is the problem under study (dependent variable). It is assumed that inadequately sterilised equipment contribute to infection of wounds (independent variable). Note that for the problem (infected wounds) to exist, it depends on the factor (inadequately sterilised equipment) while the “factor” is not dependent on the “problem”. Therefore, infected wounds are the dependent variable, while inadequately sterilised equipment is an independent variable.

Diagram illustrating the relationship between dependent and independent variables



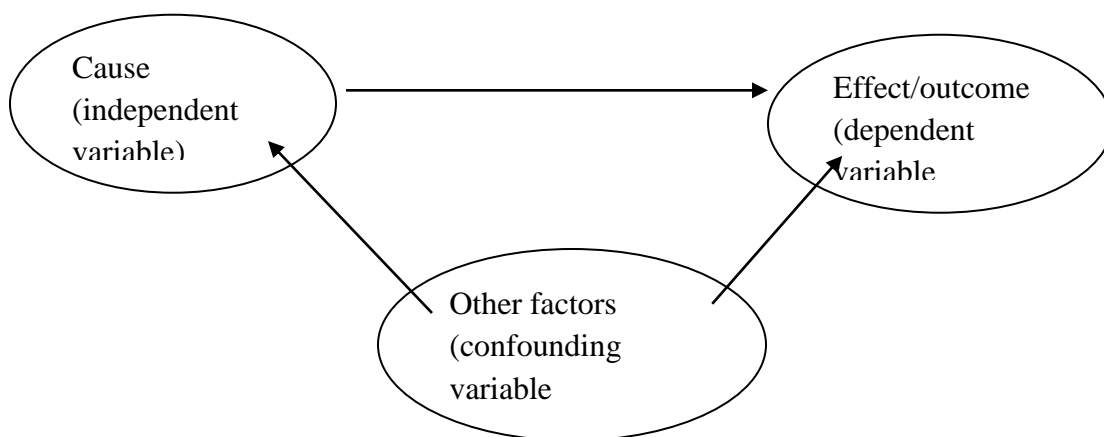
The direction of the arrow indicates the causal/association relationship

Whether a variable is dependent or independent is determined by the statement of the problem and the objectives of the study. It is, therefore, important when designing a study to clearly state which variable is dependent and which is independent.

Confounding variable: A variable that is associated with the problem and with a possible cause of the problem is a potential **confounding variable**.

A confounding variable may either strengthen or weaken the apparent relationship between the problem and a possible cause.

Diagram illustrating confounding factors



Check your understanding of confounding factors by doing the following activity

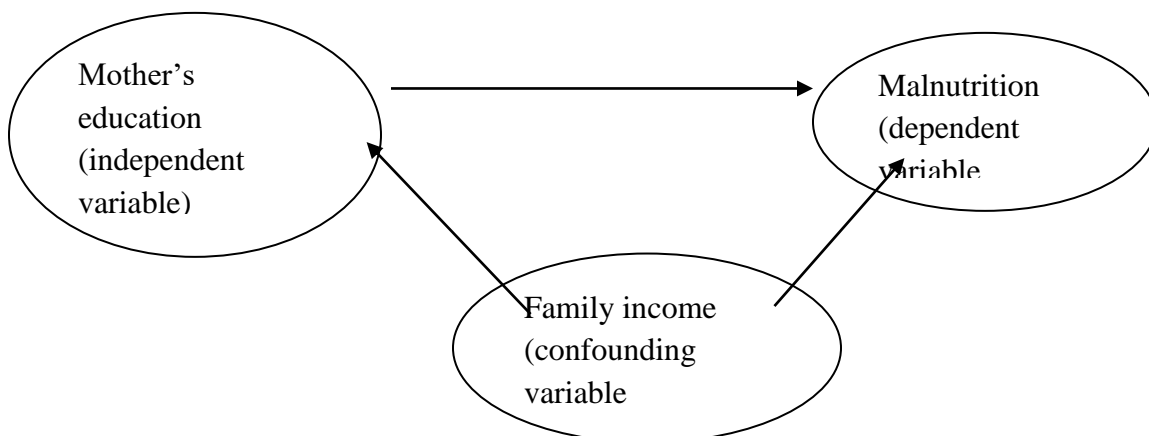
Activity 2.3

Using the scenario below, draw a causal/effect diagram to illustrate the independent variable, the confounding variable and the dependent variable.

Scenario: In a study that seek to establish the contributing factors to malnutrition among under five children admitted to malnutrition ward, a researcher presumes the following factors could have led to the problem.

- Mother's level of education
- Family income

Well done, now compare your diagram with ours.



A relationship is shown between the low level of the mother's education and malnutrition in under-5s. However, family income may be related to the mother's education as well as to malnutrition.

Family income is therefore a potential confounding variable. To give a true picture of the relationship between mother's education and malnutrition, family income should also be considered and measured. This could either be incorporated into the research design, for example by selecting only mothers with a specific level of family income, or it can be taken into account in the analysis of the findings, with mother's education and malnutrition among their children being analyzed for families with different categories of income.

Therefore, to give a true picture of cause and effect, the confounding variables must be considered, either at planning stage or while doing data analysis.

Background variables: Are explanatory variables that can affect other (dependent) variables but cannot be affected by them, examples of background variables such as age, sex, educational level, socioeconomic status, marital status, and religion. These background variables are often related to a number of independent variables, so that they influence the problem indirectly. (Hence they are called background variables). If the background variables are important to the study, they should be measured. However, try to keep the number of background variables measured as few as possible, in the interest of economy. Background variables are notorious “confounders.”

Factors rephrased as variables

Check your analysis diagram again. You will notice that most of what we called “factors” (for convenience sake) are in fact variables which have negative values. As we conduct our study and try to determine to what extent these variables play a role, we have to formulate the variables in a neutral way, so that they can take on positive as well as negative values. The table below presents examples of negative “factors” and how they can be rephrased as “variables”

Factors rephrased as variables

Factors as presented in the analysis diagram	Variables
<ul style="list-style-type: none"> • Inadequate sterilisation of equipment • Use of expired solutions • Inadequate knowledge of infection prevention 	<ul style="list-style-type: none"> • Adequacy of sterilised equipment • Potency of solutions • Knowledge of infection prevention

Activity2.4

Selection of variables

Take your analysis diagram for the research problem that you intend to research on as a starting point and do the following:

- Verify whether each factor in the problem analysis diagram has been addressed in the specific objective
- Select these factors from the analysis diagram and turn them into variables

- Determine which of these variables are the independent, dependent, confounding and background variables
- Write down the values for each variable
- Determine which variables need further information to be defined adequately.

Activity2.5

Formulate a general objective and specific objective for your research problem.

You can find a colleague or person who has knowledge in research to review your objective to make sure you are on the right track. You can identify other eLearning students in your area and form a student support (discussion) group to support each other during your studies.

Send your write up so far to your research supervisor (i.e. Introduction, background information, statement of the problem, problem analysis diagram, definitions of crucial terms used in your write up, literature review and research objectives). Please include a list of all references used on a separate page.

Your research supervisor will read through and together, you will make arrangements on how the supervision will proceed. A supervision form should be filled in by both the supervisor and the student each time supervision takes place (see copy of supervision sheet in the appendix).

SELF ASSESSMENT 2.4

1. A variable that is associated with the problem and with a possible cause of the problem is a.....
 A) Independent Variable
 b) Confounding Variable.
 c) Background Variable
 D) Dependent Variable
2. The following are good characteristics of a research question: Specificity, clarity, reference to the problem. **T/F**

Well done for the answers you wrote. You can now compare your responses with the answers provided below

ANSWERS TO SELF ASSESSMENT

3. B
4. T

2.7 Research Methodology

In the previous subunit, you formulated research objectives and/or research hypothesis. Remember that the objectives that you formulated are statements of what you want to achieve by undertaking your research study.

Under research methodology, you will cover the following sub topics:

- i. Study Design
- ii. Sampling
- iii. Sample selection
- iv. Sample size
- v. Data collection techniques and tools
- vi. Validity and reliability
- vii. Ethical Consideration
 1. Pilot study
 2. Plan for data processing and analysis
 3. Plan for dissemination of findings or results
- ii. Work plan
- iii. Budget

2.7.1 Selection of the Study Designs

So far, you decided on the type of information that you will need to collect by selecting variables. You rephrased the factors from your problem analysis diagram to variables. Now you need to consider how you will collect this information through selecting the appropriate study design. A research design is a strategy that a researcher uses to design the research project.

(a) Type of Research Designs

Type of research design chosen depends on:

- The nature of the problem
- The level of knowledge that is already available about the problem
- The resources which are available for the study

Ask yourself this question: How will I collect this information?

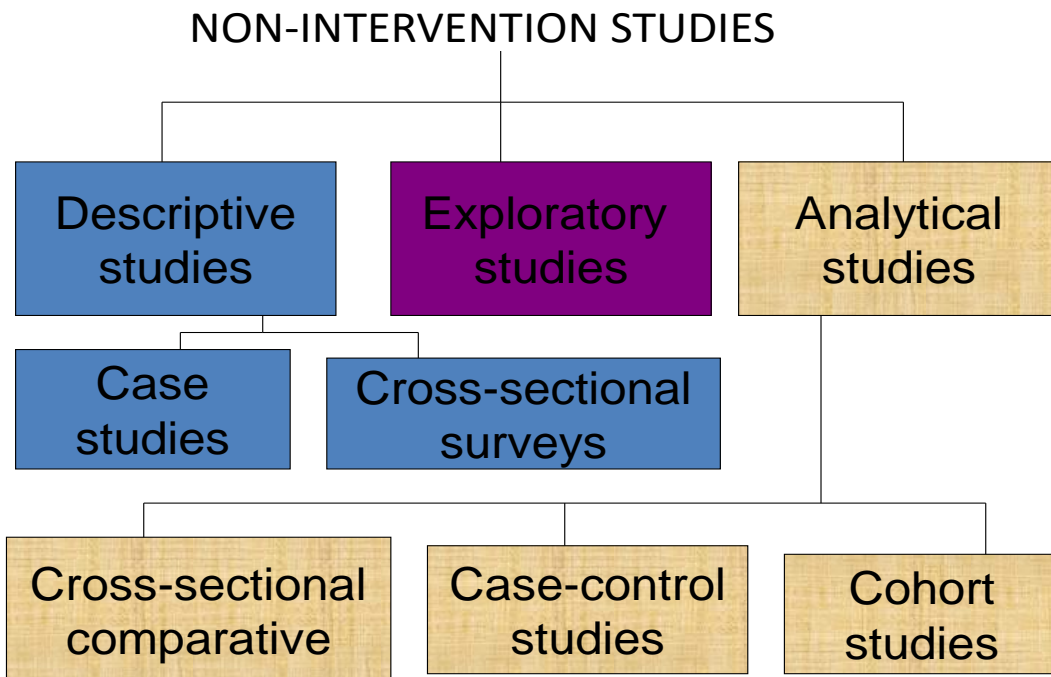
How to collect the information

There are basically two study designs that you can use to help collect the data using the variables you selected earlier on. The two study designs are:

1. **Intervention studies:** This has two study designs as outlined below. In this study design, the researcher is required to manipulate the situation to obtain the results. For your purpose, you are not encouraged to undertake this kind of study in the interest of period of time you are required to carry out the study.
 - a. Experimental studies
 - b. Quasi experimental studies

2. **Non-Intervention studies:** This comprises three major designs. These are also called observational studies where the researcher is not expected to intervene. You are encouraged to undertake your research project using any one of these study designs.
- Exploratory studies
 - Descriptive studies
 - Comparative (analytical) studies

The following diagram illustrates the non-interventional study designs.



Descriptive Study Design: this comprises case studies and cross sectional surveys. These aim at describing situations. Descriptive surveys can either be quantitative or qualitative. They do not make predictions or cause and effect situations.

- Case study:** in this type of study, the researcher selects a case. These studies involve in-depth study of an individual or a group of people. A case may be a patient with a certain condition or a family with a particular situation.

The major disadvantage of using case study is that the findings cannot be generalised to the wider population. This can affect the external validity of the research findings.

- Cross sectional surveys:** This is an observational study that aims at quantifying the distribution of certain variables in a study population at one point in time. The variables include:

- Physical characteristics of people, materials or environment.
- The socioeconomic characteristics of people e.g. sex, age, educational status, marital status, residence, family income etc.
- Knowledge, attitudes, practices of people
- Other events such as mortality, morbidity, migration, fertility etc.

If the total population is covered by a survey, it is called a census.

The participants answer questions either from a questionnaire or an interview which the researcher will analyse, interpret and describe.

Exploratory study design: This type of study is undertaken when there is very little knowledge that exists concerning the problem. Exploratory studies can either be done on a small scale or a large scale depending on the resources that are available to the researcher. Exploratory studies help development of theories.

Analytical study designs: There are three main types of analytical study designs. These studies seek associations among and between groups through comparison. These are:

- a) Cross sectional comparative (analytical) studies
- b) Case-control (retrospective) studies, and
- c) Cohort studies (prospective) studies.

These will be explained one at a time.

a) **Cross sectional or comparative (analytical) studies:** This type of study seeks to explain causes or risk factors for certain health problems. It requires comparison of two or more groups i.e. the cases (those with the health problem) and the controls (those without the health problem) after which an explanation of the situation or health problem is done in form of a causal relationship(s). Cross sectional comparative studies can either be quantitative or qualitative.

b) **Case-control (retrospective) studies:** In this type of study, a researcher compares two groups, one in which the problem exists (cases) and the other in which the problem does not exist (control or comparative group). The researcher looks backwards from the past to the present. For this reason, case-control studies are also called retrospective studies.

For example: Two groups of people are recruited, one group with the health problem present and the other with no health problem. Find out from each group those who were exposed to the risk factor and those who were not exposed to it.

- Then compare the number and characteristics of those who have the problem and were exposed to the risk factor with the number and characteristics of those who have the problem but were not exposed to the risk factor.
 - Next compare the number and characteristics of those who do not have the problem but were exposed to the risk factor with the number and characteristics of those who do not have the problem and were not exposed to the risk factor
 - Finally, compare the number and characteristics of the cases with the controls
- c) **Cohort studies:** In these studies, two groups are compared: one group that is exposed to the risk factor (study group) and the other group not exposed to the risk factor (control group). The researcher will have the two groups screened to ensure that the health problem in question is not yet present. Then the two groups will be followed periodically to assess the development of the problem and compare the two groups. The purpose of this type of study is to establish whether indeed a certain risk factor causes the development of a particular health problem e.g. smoking causing cancer of the lungs.

This type of study requires adequate time and resources as the groups can be followed up even up to 5 to 10 years depending on the nature of the problem in question.

Advantages and disadvantages of analytical study designs

- Cross-sectional comparative studies and case-control studies take less time to undertake and are inexpensive.
- With cross-sectional comparative studies the results cannot be generalised. They are only true to the persons that were studied.
- Selection of appropriate control groups are a major problem in case-control studies.
- The matching of cases and controls has to be done with care.
- Cohort studies take longer than case-control studies, labour intensive and expensive.
- Identification of all cases in the study population is a big problem. Also a number of study participants may drop out over the years, therefore, compromising the study results.
- Identification of exposure or non-exposure to a certain risk factor may be self-reported. This may affect the validity of the study.

2.7.2 Sampling

Welcome to this session. In the last session, you learnt about the different types of data collection techniques and tools. You also learnt how to construct a questionnaire. Now that you have successfully selected and constructed the appropriate data collection tool (s), you will ask yourself the following questions:

- From whom should I collect the information?
- How many subjects will I include?

- How will I select these subjects?

To do this, you will need to select a sample from your study population.

In this lesson, you will learn the following:

1. Definition of sampling
2. Types of sampling
3. How to select a sample using different types of sampling
4. The ethical considerations in sampling

2.7.2.1 Definition of sampling: Sampling is the selection of a number of study units from a defined study population.

There are four main aspects you will need to consider before going ahead with sampling by asking yourself the following questions:

- a. What is the group of people (study population) from which we want to draw a sample?
- b. How many people do we need in our sample? (sample size)
- c. How will these people be selected? (sampling method)

To what extent will my sample represent the study population? (Representativeness)

2.7.2.2 Study population

This is a population from which you will select your sample. If you are carrying out “***a study to describe the attitude of third year student nurses pursuing registered nursing programme towards their studies in Lusaka,***” your study population will be all the third year student nurses who are studying registered nursing within Lusaka. This is a group from which you will draw your sample.

When deciding on your study population, consider the following:

- Your study population has to be clearly defined. For example, it has been defined according to age, gender, residence, economic status, education status or ethnicity. In the above example, your study population has been defined according to year of study, programme being pursued and residence. How study population and units are defined depends on the problem.
- A study population can be a village, household, institutions records, etc.
- Each study population consists of **study units**.
- In the above example, each of the third year student nurses is a study unit.

Representativeness: A representative sample has all the important characteristics of the population from which it is drawn. If the research findings will be generalised, the sample has to be representative of the study population.

2.7.2.3 Sampling methods

Availability of the sampling frame is a major factor that influences the choice of the most appropriate sampling method.

Sampling frame is a list of all the units that compose the study population. In the example of the study to describe the attitude of third year student nurses pursuing registered nursing programme towards their studies in Lusaka, the sampling frame will be a list of all third year student nurses pursuing registered nursing programme in Lusaka.

Each of the third year student nurses pursuing registered nursing in Lusaka constitutes a ***study unit***.

If a sampling frame is not available, it is not possible to sample the study units in such a way that the probability for the different units to be selected in the sample is known.

2.7.2.4 Types of sampling methods

There are two (2) classifications of sampling methods:

1. **Non-probability sampling methods**, namely:
 - a. Convenience Sampling
 - b. Quota Sampling
 - c. Purposeful sampling
 - d. Snowball sampling
2. **Probability sampling methods**
 - a. Simple Random Sampling
 - b. Systematic Sampling
 - c. Stratified Sampling
 - d. Cluster Sampling
 - e. Multistage Sampling

2.7.2.5 Non-Probability Sampling Methods

If you have no sampling frame, then the sampling method that you will use is a non-probability method. In non-probability sampling method, the probability (chance) of

selecting each study unit to participate in the research is not known i.e. it cannot be calculated.

1. **Convenience Sampling:** Is a method in which the study units that happen to be available at the time of data collection are selected in the sample for convenience's sake.

The limitation of this method is that the sample may not be representative of the population you want to study. Some units may be over selected, others under selected or missed altogether.

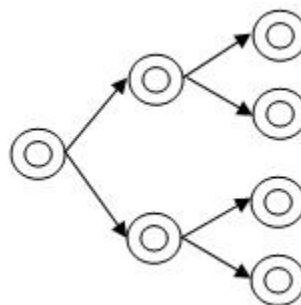
2. **Quota Sampling:** Is a method that ensures that a certain number of sample units from different categories with specific characteristics appear in the sample so that all these characteristics are represented.

The advantage quota Sampling is useful when researchers feel that a convenience sample would not provide the desired balance of study units.

3. **Purposeful Sampling:** Also called judgemental sampling. This method is based on the belief that the researcher has adequate knowledge of the study population enough to "hand pick" the units to be included in the sample. The researcher may on purpose decide to select the widest possible variety of respondents or subjects believed to be typical of the study population

4. **Snowball Sampling**

In the technique the researcher identifies a small number of individuals who have the required characteristics. These people are then used as informants to identify others who qualify for inclusion in the sample. The second subjects also identify others hence snowball. Snowball Sampling is used most when respondents are difficult to identify and can best be located through referred networks. Snowball gathers subjects for the sample as it rolls, along. The sampling has been used to study drug cultures, teenage where respondents are difficult to identify or contact.



2.7.2.6 Probability Sampling Methods

These are sampling methods that require random selection procedures to ensure that each sample unit is chosen on the basis of chance. All units of the study population should have an equal or at least a known chance of being included in the sample. Probability sampling methods require a sampling frame.

The probability sampling methods will be explained one at a time as follows:

Simple Random Sampling: This is the simplest form of probability sampling. To select a sample using a simple random sample method;

- a. Make a numbered list of all the units in the population from which you want to draw a sample (sampling frame).
- b. Decide on the size of the sample
- c. Select the required number of sample units, using a 'lottery' method or table of random numbers (refer to table of random numbers in the appendix).

The simple random sampling method does not ensure that the proportions of individuals with certain characteristics in the sample will be the same as those in the whole study population.

How to use Random Number Table Numbers

1. First decide how large a number you need is. Next, count if it is a one, two, or larger digit number. For example, if your sampling frame consists of 10 units, you must choose from numbers 1 – 10, (10 inclusive). You must use two digits to ensure that the number 10 has an equal chance of being included.

You also use two digits for a sampling frame consisting of 0 – 99 units.

If however, your sampling frame has 0 – 999 units, then you obviously need to choose from three digits. In this case you take an extra digit from the table to make up the required three digits. For example, the number in columns 10, 11, row 27: 43 would become 431; going down, the next numbers would be 107, 365, etc.

You can do the same if you needed a four-digit number, for a sampling frame 0 – 9999 units. In our example of the number on columns 10, 11 12, row 27 of the table: 431, this would now become 4316, the next down 1075, and so on.

2. Decide beforehand whether you are going to go across the page to the right, down the page, across the page to the left, or up the page.
3. Without looking at the table, and using a pencil, pen, stick or even your finger pinpoint a number.

4. If this number is within the range you need take it. If not, continue to the next number in the direction you chose beforehand, (across, up or down the page), until you find a number that is within the range you need.

For example, if you need a number between 0 – 50 and you began at column 21, 22, row 21 you get 74 which is obviously too big. So you go down (having decided before hand to go down) to 97, also too big, to 42, which is acceptable, and select it.

Systematic Sampling: Individuals are chosen at regular intervals (e.g. every 5th) from the sampling frame. Randomly select a number to tell you where to start selecting individuals from the list.

Example: A systematic sample is to be selected from 1000 third year student nurses. The sample size is 100. The sampling fraction is:

$$\frac{100 \text{ (sample size)}}{1000 \text{ (study population)}} = \frac{1}{10}$$

Therefore, the sampling interval is 10

The number of the 1st student to be included in the sample is chosen randomly e.g. by blindly picking one out of 10 pieces of paper numbered 1 to 10. If number 4 is picked then every 10th student will be included in the sample, starting with student number 4, until 100 students are selected: the numbers would be 4, 14, 24, 34 etc.

Systematic sampling method is less time consuming and easier to perform than simple random sampling.

The major limitation is a risk of bias as the sampling interval may coincide with a systematic variation in the sampling frame.

Stratified Sampling: Divide the sampling frame into strata, and a simple random or systematic sample of a predetermined size will then have to be obtained from each group (stratum). For example, you are carrying out a study concerning all the student nurses in a college of nursing. There are a total of 250 students divided as follows:

- 1st years 100
- 2nd years 60
- 3rd years 90

The year of study is the strata.

Stratified sampling is only possible when we know what proportion of the study population belongs to each group we are interested in.

Cluster Sampling: This is the selection of groups of study units (clusters) instead of the selection of study units individually.

When a list of groupings of study is available (e.g. health centres, colleges of nursing) or can be easily compiled, a number of these groupings can be randomly selected.

Clusters are often geographic units (e.g. districts, compounds, provinces).

Multistage Sampling: A multistage sampling procedure is carried out in phases and usually involves more than one sampling method. Sampling may be done in two or more stages when dealing with very large and diverse populations.

Example: You are carrying out an evaluative study on use of treated mosquito nets in malaria prevention in Zambia. You intend to interview women who were pregnant in the last 5 years and those with children under the age of five years in individual households. Zambia is divided into provinces and districts. Districts are divided into wards then households. You may carry out your sampling as follows:

- a) Select five provinces out of 10 using simple random sampling method
- b) For each province, select three districts by simple random sampling method (15 districts in total)
- c) From each district, select three wards using stratified sampling method (45 wards in total)
- d) From each cluster, select 20 households using systematic random Sampling Method (900 Households).

2.7.2.7 Bias in Sampling

A systematic error in sampling procedures that leads to a distortion in the results of the study is called **bias**.

What are the possible sources of bias in sampling?

The following are the sources of bias in sampling:

- Non response
- Improper sampling procedures e.g. studying volunteers only, sampling registered patients only
- Missing cases of short duration
- Tarmac bias
- Seasonal bias

Non response – is mainly encountered in studies where people are being interviewed or asked to fill in a questionnaire. They may refuse to be interviewed or forget to fill in the questionnaire. The non-respondents in a sample may exhibit characteristics that differ systematically from the characteristics of respondents.

How to deal with the problem of non-response

Data collection tools (including written introductions for the interviewers to use with potential respondents) have to be pre-tested. Make adjustments to ensure better cooperation if necessary. Where non-response is due to absence of the subjects, follow-up of non-respondents may be considered. If non-response is due to refusal to cooperate, consider an extra separate study of non-respondents to discover to what extent they differ from respondents. Another strategy is to include additional people in the sample, so that non-respondents who were absent during data collection can be replaced. However, this can only be justified if their absence was very unlikely to be related to the topic being studied.

Note: The bigger the non-response rate, the more necessary it becomes to take remedial action. It is important in any study to mention the non-response rate and to honestly discuss whether and how it might have influenced the results.

Improper sampling procedures: such as:

- a. Studying volunteers only – The fact that volunteers are motivated to participate in the study may mean that they are also different from the study population on the factors being studied. It is better to avoid non-random procedures that introduce the element of choice.
- b. Sampling of registered patients only – Patients reporting to a clinic are likely to differ systematically from people seeking treatment at home.

Missing cases of short duration: In studies of the prevalence of disease, cases of short duration are more likely to be missed. This may often mean missing fatal cases, cases with short episodes, and mild cases.

Seasonal bias: The problem under study exhibits different characteristics in different seasons of the year. For this reason, data on the prevalence and distribution of malnutrition in a community, for example, should be collected during all seasons rather than just at one time.

Tarmac bias: Selecting study areas that are easily accessible. These areas are likely to be systematically different from more inaccessible areas.

When investigating health services' performance, for example, consideration should be made of the fact that toward the end of the financial year shortages may occur in certain budget items which may affect the quality of services delivered

2.7.3 Data collection techniques and tools

In the previous lesson, you learnt the different types of study designs and when to use them. The study designs helped you to strategise how you will carry on with your research project. Now that you know how your data will be collected, it is time to think of what type of tools and techniques you will use to collect the identified information. In this section you will cover the following sub-topics:

- Different types of data collection techniques and tools
- Bias in data collection
- How to administer a questionnaire
- Ethical consideration in data collection
- How to design an interview schedule or a questionnaire, and
- Steps to follow in designing a questionnaire

Data collection techniques will systematically allow you to collect information about the object or your study. These could be people, actual objects or the situation. If your data collection is haphazard, your research question will not be conclusively answered.

2.7.3.1 Tools for Collecting Data

To answer the question as to what tools you need to collect data, you need to know the characteristics of the participants, type of information needed, sources of information and your study design. There are various data collection techniques and tools that can be used to collect data. These are listed below:

- Use of available information
- Observing
- Interviewing (face-to-face)
- Administering written questionnaires
- Focus group discussions (FGD) and
- Other data collection techniques

(a) Use of Available Information

Depending on the type of information that is needed, a researcher can use the already available information. For example, if the researcher needs information on the prevalence of malaria from a particular geographical area during a certain period of time, he can simply request for the hospital and health centre record books and retrieve the information. Or if the information is readily available from Management Health Information System, the researcher can simply request for a print out. Another example is the birth registration records kept by the registration office.

All the researcher needs is to locate the information required and access it using one or two of the strategies discussed under literature review. In order to retrieve the information in its original state, the researcher may need to design a checklist or a compilation sheet/form.

(b) Observing

When using this technique, the researcher need to systematically select, watch and record the behaviours and characteristics of the people, objects or situations. Observation of human behavior can be done in two ways:

- **Participant observation:** This is when the observer takes part in the situation he or she observes.
- **Non-participant observation:** This is when the observer watches the situation, openly or concealed, but does not participate.

Observations are important because they give additional, more accurate information on behaviour of people than interviews or questionnaires. Observations can be used to check on information collected especially on sensitive topics such as alcohol or drug use, or stigmatization of leprosy, tuberculosis, epilepsy, or AIDS patients. Or they may be a primary source of information.

Information can be obtained using tools such as scale, thermometer, eyes, tape measures, microscopes etc. Information obtained through observations can be recorded using either a checklist, or compilation sheets. Checklist and data compilation sheets are also called data collection tools.

(c) Interviewing

An interview is a data-collection technique that involves the researcher asking questions to the respondents while the respondent provides answers. Interviewing should be carried out in a conversation manner.

The answer - question session during interviews can be recorded either by writing down the responses or using a tape recorder.

Interviews can be conducted with varying degrees of flexibility such as high and low degrees. The degrees of flexibility are outlined below:

- **High degree of flexibility:** These use loosely structured methods of asking questions. There are no restrictions as to what or how the respondent should answer. Data collection tools such as unstructured questionnaires or interview schedules can be used. The interviewer is allowed to ask additional questions to clarify issues.
Loosely structured methods are used when there is little knowledge of the problem or situation for example in exploratory studies or in case studies.
- **Low grade flexibility:** This method uses questionnaires that have a fixed list of questions with fixed or pre-categorized answers. The methods are used when the researcher has less knowledge about the expected answers and when the number of participants to be interviewed is large.

(d) Administering written questionnaires

A written questionnaire is a data collection tool that the respondent has to answer by writing in the questionnaire according to the instructions given. A written questionnaire is also called a self-administered questionnaire.

How to administer a questionnaire

- It can be sent by mail. Clear instructions should be given to respondent on how to answer and where to post the filled in questionnaire.
- Respondents can be gathered in one area at the same time. Oral or written instructions are given to them and respondents fill in the questionnaire. The questionnaires are then collected from the respondents.

- The questionnaires can also be delivered to the respondents by hand and then collected later on.

Types of Questions Used in Questionnaires

There are two types of questions that can be used in the questionnaire:

- Open-ended questions
- Closed questions (with pre-categorized answers).

Open-ended type of questions allows the respondent to express themselves freely. The kind of data collected from open-ended type of questions is called **qualitative data**. Open-ended questions allow flexibility in the sense that the respondents are not restricted or the degree of restriction is minimal.

Closed-ended questions do not allow the respondent or the interviewer to express themselves or seek clarification respectively. They are used to collect **quantitative data**.

Both types of questions can be used in a questionnaire.

Use of both flexible (qualitative methods) and non - flexible (quantitative methods) is helpful in that they complement each other.

The data collection techniques that use flexible or less flexible method help collect qualitative data. These are:

- Loosely structured interviews using open-ended questions
- Focus group discussions, and
- Participant observation

2.7.3.2 Bias in Collection of Data

Bias in collection of data can happen in various ways leading to distortion of results that are not representative of the true situation. Some of the possible sources of bias during data collection are as follows:

1. Defective Instruments

- Use of fixed or closed questions on topics that the researcher has little knowledge.
- Use of open-ended questions without guidelines on how to ask (or to answer) them;
- Vaguely phrased questions; or
- Questions placed in an illogical order.
- Weighing scales that are not standardized.

These sources of bias can be prevented by carefully planning the data-collection process and by pre-testing the data-collection.

2. Observer Bias

This type of bias can happen when using observation methods or loosely structured interviews. The risk is that the data collector will only see or hear things which he or she is interested in and miss the information that is important to the research. To prevent this bias, observation protocols and guidelines for

conducting loosely structured interviews should be prepared, and training and practice should provide data collectors in using both these tools. Data collectors can also work in pairs when using flexible research method/techniques. Immediately after data collection, the two data collectors should discuss and interpret the data obtained.

3. Effect of the Interview on the Informant

This effect is possible in all interview situations especially if the informant does not trust the intentions of the interview. The interviewee may dodge certain question or give misleading answers. The data collector can reduce such bias by adequately introducing him/herself and the purpose of the study to the respondent, by taking sufficient time for the interview, and by assuring informants that the data collected will be confidential. A careful selection of interviewers is also useful.

2.7.3.3 Ethical Considerations

As you develop your data-collection techniques, you need to consider whether your research procedures are likely to cause any physical or emotional harm. Harm may be caused, for example, by:

- Violating informants' right to privacy by posing sensitive questions or by gaining access to records that may contain personal data;
- Observing the behaviour of informants without their being aware ; or
- Failing to observe or respect certain cultural values, traditions, or taboos.

How to prevent ethical issues from

These ethical issues can be prevented by:

- Obtaining informed consent before the study or interview begins.
- Not exploring sensitive issues before a good relationship has been established with the informant; and
- Ensuring the confidentiality of the data obtained.

If sensitive questions are asked, for example, it may be advisable to omit names and addresses from the questionnaires.

2.7.3.5 Design of Interview Schedule and Questionnaires

The most commonly used data collection techniques are interviews and self-administered questionnaires. Designing good “questioning tools” forms an important but time-consuming phase in the development of most research proposals.

Considerations before Designing a Questionnaire or an Interview Schedule

You should consider the following:

- The information that you want to know according to the objectives and variables you identified earlier. Consider if questioning is the right technique to obtain all answers, or whether you need additional techniques, such as observations or analysis of records.
- Who the right person to question is and the type of technique that is appropriate. Consider how much knowledge you have on the problem being researched on. Whether the questions should be loosely structured or not.
- Whether your informants are mainly literate or illiterate. If illiterate, the use of self-administered questionnaires is not an option.
- The sample size. You will need highly structured questionnaires if your sample size is large, whereas smaller studies allow more flexibility and may use questionnaires with a number of open-ended questions.

Types of Questions

Can you remember the type of questions that can be used in a questionnaire?

Take a piece of paper and write the two types of questions that are found in a questionnaire.

Well done! Now compare your answers with ours:

Depending on how questions are asked and recorded you can distinguish two major possibilities:

- Open-ended questions, and
- Closed-ended questions

Open-ended questions

Open-ended questions permit free responses that should be recorded in the respondent's own words. The respondent is not given any possible answers to choose from.

Open-ended questions are useful to obtain information on:

- Facts with which the researcher is not very familiar,
- Opinions, attitudes, and suggestions of informants, or
- Sensitive issues.

For example:

"Can you describe exactly how circumcision is done during the Mukanda (traditional male circumcision) ceremony of the Luvale people?"

"What do you think are the reasons for low utilisation of under-five clinics by community members at your local health centre?"

"What would you do if you noticed that your daughter (school girl) had a relationship with a teacher who is also HIV positive?"

Closed-ended Questions

Closed-ended questions offer a list of possible options or answers from which the respondents must choose.

When designing closed-ended questions you should try to:

- Offer a list of options that are exhaustive and mutually exclusive, and
- Keep the number of options as few as possible

Closed questions are useful if the range of possible responses is known.

For example

“What is your marital status?”

1. Single
2. Married/living together
3. Separated/divorced/widowed

☐
☐
☐

Do you smoke cigarette?

1. Yes
2. No

☐
☐

Closed-ended questions may also be used to get the respondents to express their opinions by choosing rating points on a scale.

For example,

“How satisfied are you with the maternal health services being offered at your local clinic?”

- a. Extremely satisfied
- b. Very satisfied
- c. Satisfied
- d. Not satisfied

☐
☐
☐
☐

In practice, a questionnaire usually has a combination of open and closed-ended questions, arranged in such a way that the discussion flows as naturally as possible.

In interviews questions are often asked as open-ended questions, but to facilitate recording and analysis, possible answers are to a large extent pre-categorized.

For example

Who do you think the perpetrators of child abuse are?

1. Family member
2. Neighbours
3. Strangers
4. Other, specify _____

☐
☐
☐

This type of half open-ended and half closed-ended question should be asked as open ended question, and then the interviewer should tick or write the response in the space provided if such a response does not appear in the categories given.

Steps in Designing a Questionnaire

To design a good questionnaire, you need to be patient as it always takes several drafts. The first draft deals with the **content**. The second looks critically at the **formulation and sequencing of the questions**. Then you should scrutinize the **format** of the questionnaire. Finally, you should do a **test-run** to check whether the questionnaire gives you the information that you require and whether both yourself and the respondents feel at ease with it. Usually the questionnaire will need some further adaptation before you can use it for actual data collection.

The following are the steps you will follow when designing a questionnaire:

- Concentrating on content
- Formulating questions
- Sequencing the questions
- Formatting the questionnaire
- Translation

Here is the explanation for each of the steps listed above.

Step 1: Content

Take your objectives and variables as your starting point

Decide what questions will be needed to measure or to define your variables and reach your objectives.

When developing the questionnaire, you should reconsider the variables you have chosen, and, if necessary, add, drop or change some. You may even change some of your objectives at this stage.

Step 2: Formulating questions

Formulate one or more questions that will provide the information needed for each variable.

Take care that questions are specific and precise enough that different respondents do not interpret them differently. For example, a question such as: “How is diarrhoea in children managed?” cannot be asked in such a general way because each respondent may have something different in mind when answering the question i.e.:

- One informant may think of severe diarrhoea and say they go to the hospital, another of mild diarrhoea and say they buy drugs from the private pharmacy, or make oral rehydration salt solution.
- Even if both think of the same degree of severity, they may have different sources of treatment in mind and thus answer differently.

The question should, therefore, be broken down into different parts and made so specific that all informants focus on the same thing. For example, one could:

Check whether each question measures one thing at a time.

For example, the question, “Do you smoke cigarettes and drink alcohol?” If the respondent answered Yes or No, to which portion of the question will you attach the answer? Is it “Yes” to cigarette smoking or to alcohol drinking or to both?

You should therefore, split the question into two.

Avoid leading questions.

A question is leading if it suggests a certain answer. **For example**, the question, “You smoke don’t you?” hardly leaves room for “no” or for other options. Better would be: “Do you smoke”? If yes, how many cigarettes do you smoke per day?

Sometimes, a question is leading because it presupposes a certain condition. **For example**: “What action did you take when your child had a cough the last time?” presupposes the child has had a cough. A better set of questions would be: “Has your child had a cough? If yes, when was the last time?” Did you do anything to treat it? If yes, what did you do?”

Formulate control questions to cross-check responses on “difficult” questions (sensitive questions or questions for which it is difficult to get a precise answer).

Avoid words with double or vaguely defined meanings and emotionally laden words. Concepts such as nasty (health staff), lazy (patients), or unhealthy (food), for example, should be omitted.

Step 3: Sequencing the questions

Design your interview schedule or questionnaire to be “consumer friendly.”

- The sequence of questions must be logical for the respondent and allow as much as possible for a “natural” discussion, even in more structured interviews.
- At the beginning of the interview, keep questions concerning “background variables” (e.g. age, religion, education, marital status, or occupation) to a minimum. If possible, pose most or all of these questions later in the interview. (Respondents may be reluctant to provide “personal” information early in an interview and, if they become worried about confidentiality, be wary about giving their true opinions.)
- Start with an interesting but non-controversial question (preferably open) that is directly related to the subject of the study. This type of beginning should help to raise

the informants' interest and lessen suspicions concerning the purpose of the interview.

- Pose more sensitive questions as late as possible in the interview (e.g., questions pertaining to income, political matters, sexual behaviour, or diseases with stigma attached to them).
- Use simple, everyday language.

Make the questions as short as possible. Conduct the interview in two parts if the nature of the topic requires a long questionnaire (more than 1 hour).

Step 4: Formatting the questionnaire

When you finalize your questionnaire, be sure that:

- Each questionnaire has a heading and space to insert the number, date, and location of the interview, and, if required, the name of the informant. You may add the name of the interviewer to facilitate quality control.
- Layout is such that questions belonging together appear together visually. If the questionnaire is long, you may use subheadings for groups of questions.
- Boxes for pre-categorized answers are placed in a consistent manner (e.g., on the right half of the page).
- If you use a computer, the right margin of the page should be reserved for boxes intended for computer codes.

Your questionnaire should not only be consumer but also user friendly.

Step 5: Translation

If interviews will be conducted in one or more local languages, the questionnaire has to be translated to standardize the way questions will be asked.

After having it translated you should have it retranslated into the original language. You can then compare the two versions for differences and make a decision concerning the final phrasing of difficult concepts.

Focus Group Discussion (FGD)

Definition of Focus Group Discussion: This is a data collection technique in which a group of 6-12 people are engaged in a free and spontaneous discussion on a certain topic guided by a facilitator.

FGD helps in obtaining in-depth information on perceptions, ideas and concepts of a group. The discussion should flow freely. Therefore, avoid a question-answer type of interaction.

Uses (purpose) of FGD

Focus Group Discussion can be used to:

1. Focus research and develop relevant research hypotheses by exploring in greater depth the problem to be investigated and its possible causes.
2. Formulate appropriate questions for more structured, large-scale surveys.

3. Supplement information on community knowledge, beliefs, attitudes, and behaviour already available but incomplete or unclear.
4. Develop appropriate messages for health-education programs.
5. Explore controversial topics.

Note that FGDs are not used to test hypotheses or to produce research findings that can be generalised. The findings are only true for the persons that engaged in the discussion.

How to conduct a Focus Group Discussion

To conduct a FGD, you need to do the following:

- Preparation
- Conduct the session
- Analyse the results
- Writing the report

The steps will now be outlined one at a time.

Preparation:

During the preparation you need to do the following:

- Recruit the participants
- Make physical arrangements, and
- Prepare a discussion guide

Recruitment of participants: ensure that participants have a similar background in relation to the problem under investigation. The age and sexual composition of the group should facilitate free discussion.

If you feel that free discussion of the issue is not likely when informants are mixed or if perspectives on the issue differ according to category, then organise a FGD for each category.

For example:

- A group for men and a group for women, or
- A group for older women and a group for younger women.

It may be interesting to have an additional discussion in which the groups are confronted with each other's opinions.

Participants should be invited at least 1 or 2 days in advance, and the general purpose of the FGD should be explained.

Physical arrangement: The chairs should be arranged in a circle to encourage communication and interaction during the FGD. The area should be quiet, has adequate lighting, neither too hot nor too cold and away from disturbances such as traffic, noise or phones. The FGD should be held in a neutral setting that will encourage participants to freely express their views. For example, participants cannot be free if a discussion on

traditional medical beliefs or preferences for other types of treatment is held at a health centre.

Preparation of a discussion guide: A written list of topics to be covered should be prepared. It can take a form of a series of open ended questions. Guides for different groups gathered to discuss the same subject may vary slightly, depending on their knowledge or attitudes and how the subject can first be explored with them.

Conducting the session: One member of the research team should act as “facilitator” for the focus group while the other should serve as “recorder.”

The following are the functions of the facilitator:

- The facilitator should not act as an expert on the topic. His or her role is to stimulate and support discussion.
- Introduce the session: introduce yourself as facilitator and introduce the recorder. Introduce the participants by name or ask them to introduce themselves. Put the participants at ease and explain the purpose of the FGD, the kind of information needed, and how the information will be used (for the planning of a health program, an education program, etc.)
- Encourage discussion: be enthusiastic, lively, and humorous and show your interest in the group’s ideas. Formulate questions and encourage as many participants as possible to express their views. Remember there are no “right” or “wrong” answers. React neutrally to both verbal and nonverbal responses.
- Encourage involvement: avoid question-and-answer session. Some useful techniques include:
 - Asking for clarification: “can you tell me more about.....?”
 - Reorienting the discussion when it goes off the track:
Saying: “Wait, how does this relate to.....?”

Saying: “Interesting point, but how about.....?”

Using one participant’s remark to direct a question to another, for example, “Mrs. X said...., but how about you, Mrs. Y?”
 - When dealing with a dominant participant, avoiding eye contact or turning slightly away to discourage the person from speaking, or thanking the person and changing the subject.
 - When dealing with a reluctant participant, using the person’s name, requesting his opinion, making more frequent eye contact to encourage his participation.
- Build rapport, empathize: observe nonverbal communication. Ask yourself, “What are they saying? What does it mean to them?” Be aware of your own tone of voice, facial expressions, body language, and those of the participants.
- Avoid being placed in the role of expert: when you are asked for your ideas or views by a respondent, remember that you are not there to educate or inform. Direct the questions back to the group by saying: “What do you think?” “What

would you do?” Set aside time, if necessary, after the session to give participants the information they have asked for.

- Control the rhythm of the meeting, but in an unobtrusive way: listen carefully and move the discussion from topic to topic. Subtly control the time allocated to various topics so as to maintain interest. If participants spontaneously jump from one topic to the other, let the discussion continue for a while because useful additional information may surface and then summarize the points brought up and reorient the discussion.
- Take time at the end of the meeting to summarize, check for agreement and thank the participants: summarize the main issues brought up, check whether all agree and ask for additional comments. Thank the participants and let them know that their ideas have been a valuable contribution and will be used for planning the proposed research/intervention/health education materials. Listen for additional comments made after the meeting has been closed.

Functions of the recorder

The recorder should keep a record of the content of the discussion as well as emotional reactions and important aspects of group interaction. Assessment of the emotional tone of the meeting and the group process will enable you to judge the validity of the information collected during the FGD.

Items to be recorded include:

- Date, time, and place;
- Names and characteristics of participants;
- General description of the group dynamics (level of participation, presence of a dominant participant, level of interest);
- Opinions of participants, recorded as much as possible in their own words, especially for key statements;
- Emotional aspects (e.g., reluctance, strong feelings attached to certain opinions); and
- Vocabulary used – particularly in FGDs that are intended to assist in developing questionnaires or health-education materials.

It is highly recommended that a tape recorder be used to assist in capturing information. Even if a tape recorder is used, notes should be taken as well, in case the machine malfunctions so that information will be available immediately after the session.

A supplementary role for the recorder could be to assist the facilitator (if necessary) by drawing his or her attention to:

- Missed comments from participants, and
- Missed topics (the recorder should have a copy of the discussion guide during the FGD).

If necessary, the recorder could also help resolve conflict situations that the facilitator is having difficulty handling.

Number and duration of sessions

Number of sessions: the number of focus sessions to be conducted depends upon project needs, resources, and whether new information is still coming from the sessions (that is, whether contrasting views from various groups in the community are still emerging).

One should plan to conduct at least two different FGDs for each subgroup (for example, two for males and two for females).

Duration: a focus group session typically lasts up to an hour and a half. Generally the first session with a particular type of group is longer than the following ones because all of the information is new. Thereafter, if it becomes clear that all the groups have the same opinion on particular topics, the facilitator may be able to move the discussion along more quickly to other topics that still elicit new points of view.

Analysis of Results

- After each focus group session, the facilitator and recorder should meet to review and complete the notes taken during the meeting. This is also the right moment to evaluate how the focus group went and what changes might be made when facilitating future groups.
- Then a full report of the discussion should be prepared that reflects the discussion as completely as possible, using the participants' own words. List the key statements, ideas, and attitudes expressed for each topic of discussion.
- After the transcript of the discussion is prepared, code the statements right away, using the left margin. Write comments in the right margin. Formulate additional questions if certain issues are still unclear or controversial and include them in the next FGD.
- Further categorize the statements for each topic, if required. Compare answers of different subgroups (e.g., answers of young mothers and answers of mothers above child-bearing age in the FGD on changes in weaning practices). The findings should be coherent. For example, if young women in all FGDs state that they start weaning some 3-6 months earlier than their mothers did and the women above child bearing age confirm this statement, one likely has a solid finding. If findings contradict each other, one may need to conduct some more FGDs or bring together representatives from two different subgroups to discuss and clarify the differences.
- Summarize the data in a matrix, diagram, flowchart or narrative, if appropriate, and interpret the findings.
- Select the most useful quotations that emerged from the discussions to illustrate the main ideas.

Other Data- Collection Techniques

These include:

- Nominal group technique
- Delphi technique
- Scales

- Essays
- Case studies
- Rapid appraisal techniques or soundings
- Participatory research

NOTE: In the just ended lesson, you learnt the various types of data collection techniques and tool, how to construct the questionnaire. You also learnt the factors to consider when selecting a data collection tool to use in your data collection. The next lesson is sampling. Under this lesson you will learn the types of sampling and how to select an appropriate sample and sample size.

SELF ASSESSMENT2.

1. When conducting a focus group discussion, you need the following except;
 - a) Preparation
 - b) Post the report
 - c) Conduct the session
 - d) Writing the report
2. One of the steps to follow when designing a questionnaire is sequencing the questions. T/F
 - a) True
 - b) False
3. Closed ended questions are never used in questionnaires. T/F
 - a) True
 - b) False
4. Use of available information is a data collection technique. T/F
 - a) True
 - b) False

ANSWERS TO SELF TEST

1. B
2. A
3. B
4. A

2.7.4 Ethical Considerations

Research ethics are a system of moral values concerned with the degree to which research procedures adhere to professional, legal and social obligations to study participants (Polit & Beck, 2008). Ethical approval should be requested in writing to the responsible Research Ethics Committee and other authorities such as the school, and Ministry of health.

If the recommendations from a study will be implemented in the entire study population, you are obliged to draw a sample from this population in a representative way. If partly through the research, new evidence suggests that the sample was not representative, this should be mentioned in any publication concerning the study, and care must be taken not to draw conclusions or make recommendations that are not justified.

Additionally, verbal permission followed by a signed informed consent should be sought from the respondents before a written questionnaire is administered or completed.

2.7.5 Sample Size Determination

Having decided how to select your sample, you now have to determine your sample size.

The widespread belief that the bigger the sample, the better the study becomes is not true. Generally it is advised to:

- Increase the accuracy of data collection (for example, by improving the training of interviewers or by pre-testing of the data-collection tools) than to increase sample size after a certain point.

To get a representative sample rather than to get a very large sample

Types of Sample Sizes

There are two types of sample sizes:

- A desirable sample size
- A feasible sample size

The desirable sample size is determined by the expected variation in the data: the more varied the data is the larger the sample size that you will need to attain the same level of accuracy. For cross-sectional surveys and analytical studies precise calculations can usually be made that indicate the desirable sample size.

For exploratory studies, the sample size needs to be large enough to reflect important variations in the population, but small enough to allow for intensive study methods.

Example

In a study on attitudes towards family planning, you may decide to interview three categories of informants (non-users, female users, and male users), and start with 20 to 30 interviews per category. This number could be increased if the data obtained for each category do not indicate a certain trend or if results are conflicting. The final sample size is usually a compromise between what is desirable and what is feasible.

The feasible sample size is determined by the availability of resources i.e.:

- Time
- Manpower
- Transport
- Money

General rules for Determining Desirable Sample Size

1. The desirable sample size depends on the expected variation in the data (of the most important variables). The more varied the data are, the larger the sample size will be needed to attain the same level of accuracy. For exploratory studies it is important that the sample size is large enough to reflect important variations in the population, but small enough to allow for intensive study methods.

2. The desirable sample size also depends on the number of cells we will have in the cross-tabulations required to analyze the results. A rough guideline is to have at least 20 to 30 study units per cell.

Random sampling Numbers

	1234	5678	9 10 11 12	13 14 15 16	17 18 19 20	21 22 23 24
1	8094	82 47	25 25	1 3 4 7	7 4 3 3	3 6 2 0
2	3563	82 53	21 98	9 0 4 5	2 6 1 8	2 7 5 1
3	1330	37 48	53 31	9 6 9 3	8 7 3 8	6 8 1 5
4	3565	22 53	00 16	6 4 3 2	4 7 9 6	6 0 9 5
5	7850	55 88	59 25	7 3 1 1	2 1 9 2	4 5 4 5

2.7.6 Reliability

Reliability denotes the consistency of the measures obtained in the use of a particular instrument (Burns & Grove, 2006). Treece & Treece (1986) describes reliability as the ability of a data gathering device to obtain consistent results. It is an indication of the extent of random error in the measurement method. Reliability plays a vital role in the selection of scales for use in a study. Researchers need instruments that are reliable and provide values with only a small amount of random error. Therefore, it is important to test the reliability of an instrument before using it in a study.

2.7.7 Validity

Validity is a quality criterion referring to the degree to which inferences made in a study are accurate and well founded; in measurements, the degree to which an instrument measures what it intends to measure (Polit & Beck, 2008). Validity of the tool can be measured by conducting a pilot study. In this case a semi-structured questionnaire can be used to adequately address all the issues being studied. Face validity and content validity are the validity issues most frequently reported in the literature. Therefore, they should be taken into consideration as you carry out a study.

Face validity refers to whether the instrument looks as though it is measuring the appropriate construct while content validity concerns the degree to which an instrument has an appropriate sample of items for the construct being measured and adequately covers the construct domain (Polit & Beck, 2008).

External Validity

External validity is the extent to which the findings of the research can be generalised to a larger population or to a different social, economic and political setting (Burns and Grove, 2001). The aim is to have a representative sample.

Internal Validity

Internal validity is the extent to which results of the study reflect reality rather than extraneous variables (Burns and Groove, 2006). The threats to internal validity are factors that may give false positives or false negatives in measurement of variables. They may include temporal ambiguity (lack of clarity about whether the presumed cause occurred before the outcome); and selection (pre-existing group differences). Lack of internal validity may be observed when other variables rather than those under study are responsible for part or the entire observed outcome of the variable. Therefore, the researcher has to be observant of other variables that may affect the results (Burns & Groove, 2006). Careful construction of the research design and discussing the research

design at every stage of the process with the research supervisor and a group of colleagues preserves internal validity.

2.7.8 Plan for Data Processing and Analysis

Once you have planned how you will collect the data, think of what you will do with the collected data by asking yourself the following question:

Why is it necessary to prepare a plan for processing and analysis of data?

A plan for processing and analysis of data will help you ensure that:

- All the information you need has indeed been collected and organized in a standardized way;
- You have not collected unnecessary data that will never be analysed.

This implies that the plan for data processing and analysis must be made after consideration of the objectives of the study as well as the list of variables.

The procedures for the analysis of data collected through qualitative and quantitative techniques are quite different. Therefore, you must also consider the type(s) of study and the different data-collection techniques to be used when making a plan for data processing and analysis.

Preparation of a plan for data processing and analysis will provide you with better insight into the feasibility of the analysis to be performed as well as the resources that are required. It also provides an important review of the appropriateness of your data-collection tools.

NOTE: *The plan for processing and analysis of data must be prepared before the data is collected in the field so that it is still possible to make changes in the list of variables or the data-collection.*

What to do with the collected data

(For details refer to lesson on data processing and analysis in Part 2)

What to include in the plan

When making a plan for data processing and analysis the following issues should be considered:

- Sorting data,
- Performing quality-control checks,
- Data processing, and
- Data analysis

2.7.9 Pre-Testing and Pilot Study

How can I determine whether my methods for data collection are correct before implementing my study?

Pre-testing is a small-scale trial or testing of a particular research component, e.g. a research tool or a questionnaire.

Pilot study: Is the process of carrying out a preliminary study or testing the whole methodology of the study- going through the entire research procedure with a small sample. The sample for the pilot study should be ten percent (10%) of the total population.

Reasons for carrying out a pre-test or pilot study

- To identify potential problems in the proposed study
- To revise the methods and logistics of data collection before starting the actual fieldwork
- A pre-test is simpler and less time consuming and less costly than conducting an entire pilot study

Aspects of research methodology that can be evaluated during pre-testing

- Reactions of the respondents to the research procedures can be observed in the pre-test to determine:
- Availability of the study population
- Acceptability of the methods used to establish contact with the study population
- Acceptability of questions and willingness to respond or answer to questions

Data –collection tools can be pre-tested to determine:

- Whether tools allow to collect reliable information and are suitable for analysis
- Time spent for collecting information
- Whether there is need to revise the format or presentation of questionnaires in relation to:
 - ✓ Logical sequence of questions
 - ✓ Clear wording of questions
 - ✓ Translations are accurate, and
 - ✓ Space for answers is sufficient.
 - ✓ Need for pre-categorization and adjustment for the coding system
 - ✓ Need for additional instructions
 - ✓ Determine sampling procedures and activities of research assistants

When to carry out a pre-test

It can be conducted during the workshop or before the main study to allow alterations to be made on the tools.

2.7.10. Work Plan

Activity: What do you think is a work plan and what is its use in research?
--

Well done! Now read the answers in the text below.

A work plan is a schedule, chart or graph that summarizes in clear fashion various components of a research project and how they fit together. It may include tasks to be performed, when they will be performed, who will perform the tasks, and the time each person will spend on the task.

The work plan should be simple, realistic and easily understood by those directly involved. It should cover preparatory and implementation phases of the project, data analysis, reporting and dissemination/utilization of results. Activities covered should include technical or research tasks, administrative, secretarial, training and other support tasks.

One of the uses of the work plan is a tool for monitoring and evaluation, when current status is compared to what has been foreseen in the work plan. It is also used in planning the details of the project activities and later in budgeting funds

(Refer to annex for an example of a work plan)

2.7.11 BUDGET

A budget is a planning document used by a department or organization that forecasts both receipts and expenditures.

A detailed budget helps in identifying of resources locally available & additional resources that may be required. It serves as reminder of planned activities as research gets underway.

When should budget preparation begin?

A detailed budget should be prepared at the final stage of project planning. You should specify budget for each activity in the work plan.

Budget Justification

This should be done as an explanatory note justifying briefly why the various items in the budget are required. Budget justification assists the funder keep essential items when cuts are made.

(Refer to the annex for an example of a budget)

2.8 Summary

You have now come to the end of this course's second unit where you looked preliminary research and proposal development steps which emphasise how to select a research problem, formulation of the problem statement, reviewing literature, and formulation of objectives and hypotheses. You have also looked at research methodology which ensures a systematic way of carrying out the research in practical terms as sampling and data collecting tools are used for data analysis.

The main points covered in this Unit were:

- That a research problem is a situation involving perplexing, or troubling condition. It is the topic you would like to address, investigate, or study using an appropriate study design. It can also be defined as an area of concern where there is a gap in the knowledge base needed for nursing practice (Burns and Grove, 2006).
 - That there are two (2) classifications of sampling methods: **Non-Probability sampling methods**, namely; convenience sampling, quota sampling, purposeful sampling snowball sampling and **probability sampling methods** namely: simple random sampling, systematic sampling, stratified sampling, cluster sampling and multistage sampling

2.9 SELF ASSESSMENT 2.5

1. What determines the choice of a research design in a study?
 - a) Availability of resources
 - b) Research setting
 - c) Case Studies
 - d) Cultural differences
2. In non-probability sampling method, the chance of selecting each study is very high and can be calculated. T/F
3. The following can be sources of bias in the data collection process **except**:
 - a) Use of fixed or closed questions on topics that the researcher has little knowledge.
 - b) Vaguely phrased questions; or
 - c) Questions placed in an illogical order.
 - d) Standardized Weighing scales
4. Validity is concerned with consistency of the measures in research. T/F

Well done for attempting the questions! You can now compare your answers with our answers below.

1. A
2. F
3. D

2.9 References

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