Module
on
Research Methods

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Preface

Research methods course is widely given in the universities both for under graduate and post graduate students. Though the course is given based on the curricula, the contents of the course may vary depending on who gave the course to specific group of students. This means, students' level of exposure to the course differs even though they are supposed to take the same course. Nowadays the number of universities as well as the number of programs in each university is significantly increased. This calls for developing a standard module to harmonize the teaching of research methods course. The module is mainly prepared for post graduate program. But anyone who has interest to learn how research could be conducted can use this module. The module includes many issues starting from the definition and types of research. Since we also encourage students to publish their thesis work, the last session of this module describes how researchers should write a manuscript submittable to journals for publication. Exercises are added in the module to enhance active learning. The learner is strongly advised to go through the exercises. To be inclusive, we included both quantitative and qualitative methods which make the module a little bit voluminous. This we hope will be an advantage for the learner since he can get many things in the module without much effort to refer other teaching materials.

The authors

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Module Introduction

Research methods is broadly defined as the application of theories, concepts and techniques of research activities to perform scientific research works. This module is developed to harmonize the teaching of research methods course to students. It is primarily developed using the existing curricula for post graduate programs in the health science field. The main focus of this module is to provide postgraduate students with the skills needed to conduct research of sufficient quality and rigour that enables it to be useful for evidence based decision-making. The reader will also have the skills of assessing the quality of information to view other people's research with a critical eye. The Module introduces principles, methods, and elements of the research process within the context of quantitative, qualitative, and mixed design approaches. Learners will use these theoretical underpinnings to critically understand how to define a research problem, how to develop research questions, how to do research, how to write a thesis report or manuscript, and how to critically appraise research outputs so as to use them for evidence based decision making. The module sessions included in the module are introduction to research and literature review, Quantitative research methods, Research ethics, Introduction to qualitative research, Qualitative research methods, Research proposal and thesis report writing, and manuscript writing.

Purpose of the Module

This module is prepared to standardize the teaching of research methods course mainly for MPH/MSc and other postgraduate health sciences students. It can also be used as a resource for anyone who is interested in research.

Module Learning Outcomes

After studying this module, students will be able to:

- Identify a problem to be researched
- Write a thesis/research proposal
- Conduct research
- Write a thesis report
- Write a manuscript
- Critical appraise evidence

Session One: Introduction to research and literature review

Session introduction

This session begins by describing about the term 'research'. Different scholars define Research differently. In 2002 Oxford English Dictionary define research as "the systematic study of materials and sources in order to establish facts and reach new conclusions." According to McMillan and Schumacher (1997) define research as "a systematic process of collecting and analyzing information (data) for some purpose." Discussions then move on to critical literature review steps and recognise its importance in research work. Having provided this information, the session then focuses on the theoretical considerations involved in the first stage of the research process: formulating the research problem and research questions, hypotheses or objectives.

Session Learning Outcomes

By the end of the session, students should be able to:

- Discuss what is meant by the term 'research' and describe the stages of the research process
- Identify and formulate a research problem using literature review as sources of information
- Access resources and use the proper citations and references
- Formulate and write research questions or hypotheses and research objectives
- Construct reliable research tools for data collection on the basis of other researchers

1. Definition and Types of Research

1.1. Research defined

We can define research as an activity of systematic enquiry that seeks answers to a problem.

Research experiences in our everyday lives

In our daily lives we all encounter research. The results of research are presented to us in different form such as articles, books, newspaper, reports, and media programmes. For example, Poverty and health are presented to the public through television news reports and some other political issues are also very popular with magazines as well as television programmes. Thus, through different medias the public become familiar to reading and hearing about this issues and although people may not be aware of it, we used to making our own judgments about research findings. If we take the example of poverty and health, many of us have taken into consideration information that has been presented on 'effect of poverty on health of

individuals within the context of our country. We assess the information what has been presented, create an opinion as to the relevance and validity of the research ideas, and reach to our own conclusions based on the following considerations:

- why the research was conducted
- what we understand is the question to answered
- how the findings are presented
- what we know about who conducted the research
- what other people think about the information
- how the research findings relate to us

We may choose to overlook the information, if we don't understand what the findings mean, we may disagree, or agree with the findings and either to adjust our contribution to curb the problem or decide that we would have other computing priority agendas. In other words, you may not be aware of it, but you already have some understanding of the research process, the role of research, research concepts, and research evaluation.

1.2 Characteristics of Research

Research is a process of collecting, analyzing and interpreting information to answer questions. But to qualify as research, the process must have certain characteristics: it must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical.

Table 1: Characteristics of Research Activities to Qualify as Research

Criteria for good research	Descriptions
Controlled	• Exploring causality in relation to two variables, set the study to minimizes the effects of other factors affecting the relationship
Rigorous	• you must be meticulous in ensuring procedures followed to find answers to questions are relevant, appropriate and justified.
Systematic	• procedure adopted to undertake an investigation follow a certain logical sequence • different steps cannot be taken in a haphazard way • Some procedures must follow others
Valid and verifiable	• Implies that whatever you conclude on the basis of your findings is correct and can be verified by you and others.
Empirical	• Any conclusion drawn are based upon hard evidence gathered from information collected from real life experiences or observations.
Critical	• critical scrutiny of the procedures used and the methods employed is crucial to a research enquiry. • The process of investigation must be foolproof and free from drawbacks. • The process adopted and the procedures used must be able to withstand critical scrutiny.

Remarks: For a process to be called research, it is imperative that it has the above characteristics.

2. Research Types

Based on purposes Research differ accordingly. There are three major research types such as application, objectives, inquiry mode, and sometimes may be use as mixed method research.

2.1 Application (Pure and Applied Research)

Applied research is "hands-on", which means that researcher is actually working with the topic while conducting the research. Generally, applied research focuses on

"practical problems" such as public health issues/ clinical issues in order to come up with solutions to better or improve an existing condition.

Basic research is often called "pure" research and is considered the foundation for applied research. It is often considered researching to increase knowledge as opposed to applied research truly is intended to solve a problem.

2.2 Objectives (Descriptive, Co-relational, Exploratory and Explanatory)

- **Descriptive research (statistical research):** The idea behind this type of research is to study frequencies, averages, and other statistical calculations. The main goal of this type of research is to describe the data and characteristics about what is being studied.
- **Correlation research :** measures the relationship between two or more variables or gives an indication of how one variable may predict another.
- **Exploratory research** is a type of research conducted because a problem has not been clearly defined. Exploratory research helps determine the best research design, data collection methods, and selection of subjects. Given that it is fundamental in nature, exploratory research often concludes that a perceived problem does not actually exist.
- **Explanatory research** explores "why," and attempts to explain as the purposes of explanatory research. It builds on exploratory and descriptive research and further identifies the reasons for something that occurs. It looks for causes and reasons.

2.3 Inquiry mode (qualitative and quantitative): From the process adopted to find answer to research questions – the two approaches are:

- Structured approach
- Unstructured approach

- **Unstructured approach (qualitative):** The unstructured approach to inquiry is usually classified as qualitative research. This approach allows flexibility in all aspects of the research process. It is more appropriate to explore the nature of a problem, issue or phenomenon without quantifying it. Main objective is to describe the variation in a phenomenon, situation or attitude. E.g., description of an observed situation, the historical enumeration of events, an account of different opinions different people have about an issue, description of working condition in a particular industry.
- **Structured approach (quantitative):** quantitative research is usually classified as structured approach to inquiry. Here everything that forms the research process includes objectives, design, sample, and the questions that you plan to ask of respondents is predetermined. It is more appropriate to determine the extent of a

problem, issue or phenomenon by quantifying the variation. For example it is deals with measurement of attitudes, behaviors and perceptions of study subjects.

In short quantitative research address the following issues:

- Means the data is analyzed in terms of numbers.
- Involves the collection of numerical data.
- Predicts and explains data in the form of statistical analysis.
- Uses the numerical method to analysis and interpret the results.
- Finds out the relationship among quantifiable variables and the results are inferred.

learning activity 1.1

The Instructor can ask the students to think and plan for doing research as their graduation requirement on different public health research topics such as factors affecting increasing early childhood mortality, factors increasing maternal mortality. Suppose that the instructor asks students to plan for doing research on factors affecting increasing mortality on early childhood in certain locality, the instructor would give directions and set the limits for this planning.

For example: you have one million Ethiopian birr to do this research and you can do this research in one year period; and you have to spend all the money but cannot over spend. You research design could be prospective or retrospective follow up . Now ask the students to think of their personal and research context, research outcomes and policy implications and limitations etc. and ask them to rationally plan the process.

Give them ten minutes to plan.

Comment 1.1

- Now ask them how they planned it. As some of the students share how they planned it, through this discussion establish that the planning involves a complete research process. One has to see the problem and objectives. One has to do literature review by gathering information from different literatures and discuss with their colleagues those who have the expertises. The process also involves research methodology. For instance, some students will directly go to the literature review and understand what is already know about their research questions and what is unknown in the subject matter.

Ask them in the same way how they would analyze gathered information collected from the literature review they have done and share that it is their data analysis that leads to their conclusions and decision making.

Learning Activity 1.2: Identify the Research Types from the Following

- After the introductory lecture on types of research, the instructor will provide the participants with a worksheet which contains the following statements:

1. If you are going to study the relationship between job satisfaction and career development of health professionals working at the university of Gondar, this is an example of _____.
2. If you are going to find out reasons of staff turnover in the Hospital, this is an example of _____.

The instructor ask the students to fill in the blanks with appropriate statements about the types of research.

Comment 1.2

1. Correlation research
2. Explanatory research

3. Research as a process

Research process as impression of linearity: Research can be seen as a series of linked activities moving from a beginning to an end. Research usually begins with the identification of a problem followed by formulation of research questions or objectives. Proceeding from this the researcher determines how best to answer these questions and so decides what information to collect, how it will be collected, and how it will be analyzed in order to answer the research question.

At each operational step in the research process you are required to choose from a multiplicity of methods, procedures and models of research methodology which will help you to best achieve your objectives.

3.1 Steps in linearity Research Process:

- Formulating the Research Problem
- Extensive Literature Review
- Developing the objectives
- Preparing the Research Design including Sample Design
- Collecting the Data
- Analysis of Data
- Generalization and Interpretation

Cyclical or iterative Research Process: On the other hand, research process is often an iterative process whereby the process of conducting the research will give rise to new ideas which, in turn, feed back into the data collection and analysis stage. Decisions made early in the research process are often revisited in the light of new insights or practical problems encountered along the way.

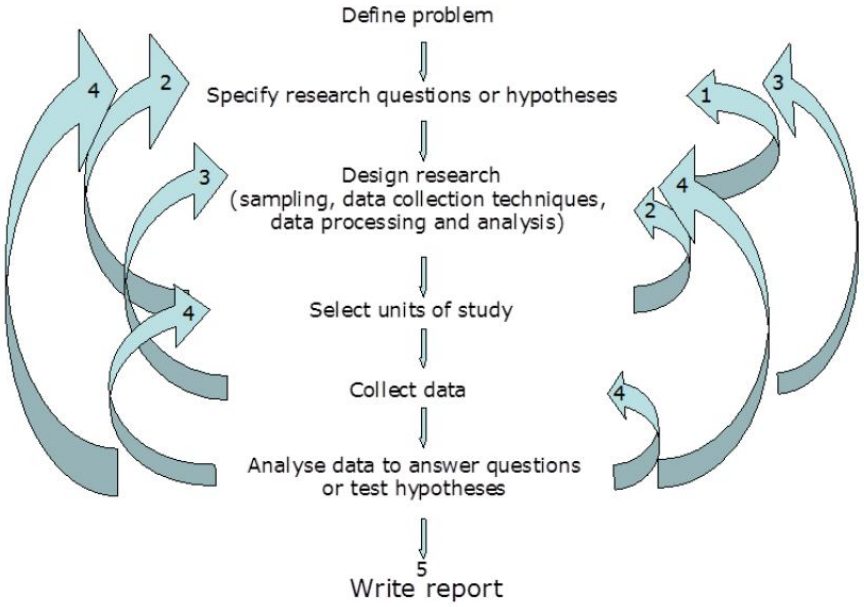


Figure 2 cyclical or iterative Research Process

Sources:

1. Through the process of designing your research, consideration of both practical and conceptual issues may force to reconsider original research question.
2. Difficulties with access to research sites or participants may cause to reconsider questions or methods.
3. Issues arising during data collection may suggest that additional data are required or reveal problems with the original research question.
4. Problems or new questions arising from analysis of data collected so far may result in a need to collect more data, sample elsewhere or employ a different technique.
5. Finally you progress to the report writing stage.

Regardless of the route taken subsequently, research should start with the problem and the research questions. If the intention of research is to answer your questions, it follows that choice of method should develop from question: choose the method that can best provide the information you need to answer your research question given the resources available to you. This is one reason why it is very important to be clear as to what you are asking.

As you can see there are numerous choices to be made within the research process. Planning your research involves the consideration of four overlapping themes.

- The conceptual approach – the philosophical underpinnings of research

- Research design – how data collection is organized
- Data collection techniques – how data are collected
- Sampling – from whom data are collected

These aspects of research planning can be represented as forming different layers of a research 'onion'.

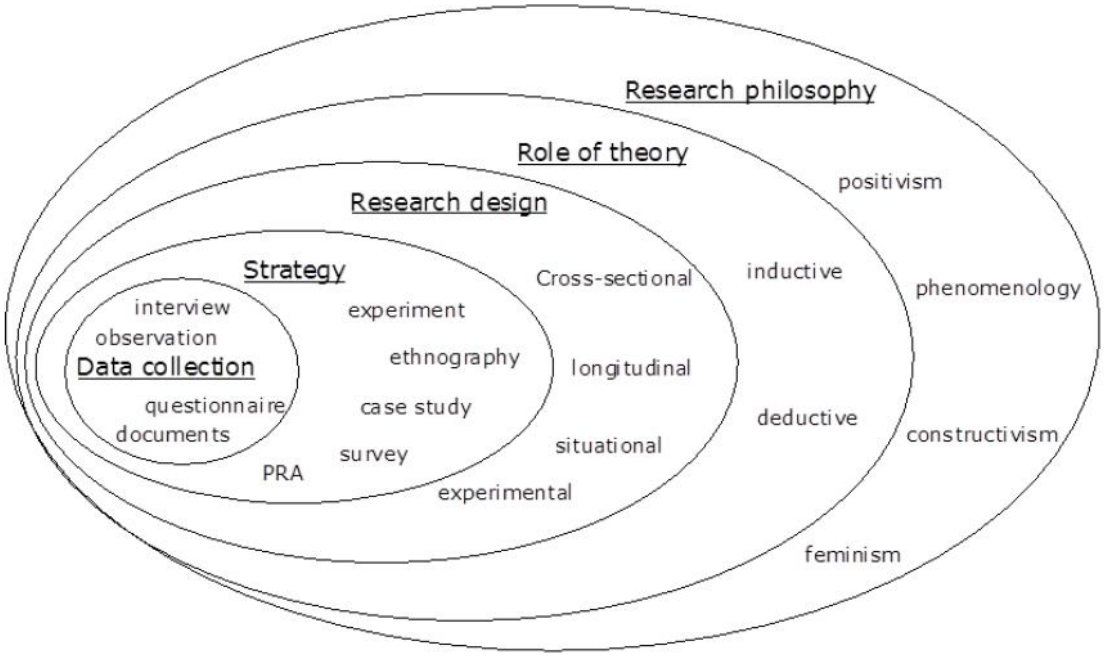


Figure 3: The 'onion' diagram of research choices

Each layer of the onion presents a different set of choices regarding research philosophy, research approach, method and so on. All research involves choices at all these levels, though these choices are not always made explicit. Choices further into the centre of the onion are often, but not always, contingent on those made further out.

Other Considerations

Choices in research planning must also take into account the following:

- The types of information outputs required – who needs the information and for what purposes
- Research resources – time, funds, facilities, staff, and access
- Ethical considerations – for example, within the research plan is it possible to obtain informed consent from all participants, does the plan

involve any risks to the safety of the researcher, can the researchers assure the confidentiality of all information given?

4. From Research Idea to Researchable Problem

4.1 Sources of research ideas

Ideas for research problems or topics can arise from a range of different potential sources such as personal or professional experience, a theory, the media, or other research studies.

1. Personal professional experience

Our daily personal or professional experience lead to identify a problem that we would like to have a solution. Alternatively, we may encounter a question or questions that we would like to try and answer.

For example, on a personal level, you may prefer the taste of organically produced vegetables and thus you may speculate if people general in Ethiopia prefer the taste of organically produced vegetables to those produced non-organically. The research topic is a study into taste preferences and the question 'do people in general in Ethiopia prefer the taste of organically produced vegetables to those produced non-organically?'

2. Theory

Theories are ideas about how things relate to each other. Theories may be general, commonly held beliefs (such as, man is mortal, therefore Abebe is Mortal) or more technical ideas (for example, that global warming is causing a change to the timing of the seasonal responses of the change of cultivation in Ethiopia).

There are many ways of expressing theories, some are very formal, others are informal. Here are some examples:

- The idea that distance learners have different needs than on-campus students is a theory.
- Theories may be useful in suggesting interesting questions and generally guiding fieldwork, but should not restrict us from exploring alternative explanations. The end result of the research process is knowledge.

3. Literature and Media

There are many sources of literature, such as journal articles, books, and newspapers. When searching and reading literature it is possible to encounter gaps in information and knowledge, and problems for which there is currently no solution. These may provide a good basis for research. We are also flooded with information presented by the media, such as television, which again might give rise to research ideas.

Considerations in Selecting a Research Problem

These help to ensure that your study will remain manageable and that you will remain motivated.

1. **Interest**: a research endeavour is usually time consuming, and involves hard work and possibly unforeseen problems. One should select topic of great interest to sustain the required motivation.
2. **Magnitude:** It is extremely important to select a topic that you can manage within the time and resources at your disposal. Narrow the topic down to something manageable, specific and clear.
3. **Measurement of concepts**: Make sure that you are clear about the indicators and measurement of concepts (if used) in your study.
4. **Level of expertise**: Make sure that you have adequate level of expertise for the task you are proposing since you need to do the work yourself.
5. **Relevance**: Ensure that your study adds to the existing body of knowledge, bridges current gaps and is useful in policy formulation. This will help you to sustain interest in the study.
6. **Availability of data**: Before finalizing the topic, make sure that data are available.
7. **Ethical issues**: How ethical issues can affect the study population and how ethical problems can be overcome should be thoroughly examined at the problem formulating stage.

4.2 Formulating the research problem

Once the general topic or problem has been identified, this should then be stated as a clear research problem, that is, taken from just a statement about a problematic situation to a clearly defined researchable problem that identifies the issues you are trying to address.

It is not always easy to formulate the research problem simply and clearly. In some areas of scientific research the investigator might spend years exploring, thinking, and researching before they are clear about what research questions they are seeking to answer. Many topics may prove too wide-ranging to provide a researchable problem. Choosing to study, for instance a Public health issue such as maternal mortality ratio, does not in itself provide a researchable problem at particular district level. The problem is too wide-ranging for one researcher to address because it required large denominator. Therefore it will be time and other resources unfeasible and the results from such a study would consequently lack depth and focus.

Steps in formulation of a research problem :

Working through these steps presupposes a reasonable level of knowledge in the broad subject area within which the study is to be undertaken. Without such knowledge it is difficult to clearly and adequately 'dissect' a subject area.

Table : Show Steps in formulation of a research problem

Steps	Descriptions
Step 1	Identify a broad field or subject area of interest to you
Step 2	Dissect the broad area into sub areas.
Step 3	Select what is of most interest to you.
Step 4	Raise research questions.
Step 5	Formulate objectives.
Step 6	Assess your objectives.
Step 7	Double check your research question

4.3 Statement of Research Problem

An adequate statement of the research problem is one of the most important parts of the research. Different researchers are likely to generate a variety of researchable problems from the same situation since there are many research issues that can arise out of a general problem situation. Your research will be able to pursue only one in depth.

For a problem statement to be effective in the planning of applied research it should have the following characteristics.

1. The problem reflects felt needs
2. The problem is non-hypothetical, i.e. it must be based on factual evidence
3. It should suggest meaningful and testable hypotheses – to avoid answers that are of little or no use to the alleviation of the problem
4. The problems should be relevant and manageable

Formulating the research problem allows you to make clear, both to yourself and the reader, what the purpose of your research is. Subsequent elaboration of method should be oriented to providing information to address that problem. The problem statement is therefore a very important device for keeping you on track with your research. It is also one means by which your research will be evaluated – does the research address the problem as stated.

5. Literature Review

Literature review is an important part of any research. It gives a foundation for the research by enlightening the researcher about the process. You need to provide evidence that you are aware of the current trends and issues in your area of interest and cognizant of the current state of knowledge on the subject.

5.1 Literature review as sources of information

Any research, no matter the scope of the research, requires reading about:

- what other people have done in the area of your interest,
- how they have done it,
- what are the gaps in the research in that area

Any new generation of knowledge is based on previous and existing knowledge. To write about your findings you need to have information either to support or refute your arguments. Ideally this reading should form the basis for choosing your research methodology. Reading continues and spills over into the stage of data collection and analysis. Some reading is naturally required at the stage of interpretation of the qualitative or quantitative data to embed your research in its settings. Moreover, every new articles you read will have a cumulative effect on the existing body of knowledge in your mind, pushing to you reinterpret or rethink some of your previous assumptions or ideas. But there is a limit to the changes you can make in your literature review. The best way is to prepare a first draft and then polish it at the stage of data interpretation when you will be reading your literature review again to present your analysis in a coherent manner with cross-references related to your literature review.

5.2 Important Reasons to review literature

Some reasons for including a literature review in your research paper/thesis are:

- Essential preliminary task in order to acquaint yourself with the available body of knowledge in your area of interest.
- Literature review is integral part of entire research process and makes valuable contribution to every operational step.

Reviewing literature can be time-consuming, daunting and frustrating, but is also rewarding. Its functions are:

Summary points of functions of Literature review

Reason for Literature review	Descriptions
Bring clarity and focus to research problem	• Better understand the subject area • To conceptualize research problem clearly and precisely • To understand the relationship between research problem and the body of knowledge in the area • Contextualization shows awareness of the work going on in field and identifies the niche to occupy
Improve your methodology	• If similar procedures and methods others used to the ones that you are proposing, • to learn what procedures and methods have worked well for them, what problems they have faced with them. • To select a methodology that is capable of providing valid answer to your research questions
Broaden your knowledge	• It ensures to read widely around the subject area to conduct the study • As you are expected to be an expert in your area of study, it helps fulfill this expectation. • It also helps to understand how the findings of the study fit into the existing body of knowledge.
Contextualize your findings	• How do your answer research questions compare with what others have found? • What contribution have been able to make in to the existing body of knowledge? • How your findings different from those of others? • To answer these questions go back to literature review • It is important to place findings in the context of what is already known in field of enquiry.

5.3 Procedure for reviewing the literature:

1. Search for existing literature in your area of study;
2. Review the literature selected;
3. Develop a theoretical framework;
4. Develop a conceptual framework.

5.4 Sources of literature review

Search for existing literature:

To effectively search for literature in your field of enquiry, it is imperative that you have in mind at least some idea of broad subject area and of the problem you wish to investigate, in order to set parameters for your search.

- Articles in Journals
- Books
- Internet
- Research Reports
- Government Documents
- Abstracts
- Reviews
- Unpublished Theses
- Electronic Research Information Center/Social Sciences Citation
- Index/Dissertation Abstracts Index

Most of this material is now available on the Internet. Libraries in established higher education institutions are another rich resource for locating the required materials.

5.5 Review the literature selected:

After identifying books and articles as useful, the next step is to start reading them critically to pull together themes and issues that are associated. If you do not have a theoretical framework of themes in mind to start with, use separate sheets of paper for each article or book.

Once you develop a rough framework, slot the findings from the material so far reviewed into that framework, using a separate sheet of paper for each theme of that framework. As you read further, go on slotting the information where it logically belongs under the theme so far developed. You may need to add more themes as you go.

Read critically with particular reference to the following aspects:

- Note whether the knowledge relevant to your theoretical framework is confirmed beyond doubt.
- Note the theories put forward, the criticisms of these and their basis, the methodologies adopted and the criticisms of them.
- Examine to what extent the findings can be generalized to other situations.
- Ascertain the areas in which little or nothing is known-the *gaps* that exist in the body of knowledge.

5.6 Writing up the literature reviewed

In order to comply with the first function of literature review i.e. to provide theoretical background to your study:

List the main themes that have emerged while reading literature

- Convert them into subheadings. These subheadings should be precise, descriptive of the theme in question, and follow a logical progression.

- Now, under each subheading, record the main findings with respect to the theme in question, highlighting the reasons for and against an argument if they exist, and identify gaps and issues.
- In order to comply with the second function of literature review i.e. contextualizing the findings of your study requires you to very systematically compare your findings with those made by others. Quote from these studies to show how your findings contradict, confirm or add to them. It places your findings in the context of what others have found out. This function is undertaken when writing about your findings i.e. after analysis of your data

5.7 Presenting the Literature Review

Literature review is specific piece of writing designed to inform readers of a topic, establish credibility as a researcher, and argue the need for, and relevance of the research work.

Most find it difficult task that takes patience, practice, drafts, and redrafts *(O'Leary, 2004:84)*

O' Leary's quote encapsulates the essence of the literature review. You have to be certain that the review is adequate and sufficient.

The literature review should have a definite structure based on the arguments that you want to make or the task that you want to accomplish through it. Prepare a blue print of the structure of your research. This can be revised as your thinking evolves but a basic outline would help you to begin writing. You can also use it to fill in the bits and pieces as your reading advances or your theoretical perspectives develop. Use empirical evidence to substantiate your argument (Gay, 2000). This will authenticate your carriage.

Be judicious in the selection of relevant literature and avoid the temptation to include every single source that you have accessed. Moreover, be careful to be recent and up to date in citing. With the internet revolution, the pace of knowledge generation and meaning making has multiplied manifold and access to the internet is also within reach.

One valid suggestion for writing a good literature review is to read a few well written literature reviews. Because it will give an idea about how to go about it. Finally, literature review is an ongoing process that overlaps other stages of your research. It will then support your arguments and contribute to your analysis and interpretation of the data.

In public health, literature review is usually a separate chapter. Sometimes it is built into the introduction section. However, in sciences, the literature review is usually part of the introduction. The role of literature remains the same both in sciences and public health.

5.8 Sample Literature Review

If you are doing action research, a good way to begin your literature review would be to define what it is.

Action Research

Action research can be defined as the process of studying a public health situation to understand and improve the quality of public health services.... It is a systematic and orderly way for public health experts to observe their practice or to explore a problem and a possible course of action.... Action research is also a type of inquiry that is pre-planned, organized, and can be shared with other public health experts.

The world average infant mortality rate is about 42/1000 live births; and it varies from 3/1000 live births in some highly developed countries such as Japan and Sweden to about 182/1000 live births in least developed countries such as Afghanistan and Sierra Leone (UN Inter-agency Group, 2011, Jupitor,2008). Some of the world highest rates of infant mortality are found in sub-Saharan Africa, especially in West and Central Africa where 92 deaths per 1,000 live births in 2009 (UN Inter-agency Group,2011). In Eastern and Southern Africa, infant mortality has fallen 33 per cent since 1990, from 103 deaths per 1,000 in 1990 to 69 per 1,000 in 2009.

Table 1 summarizes the reduction of infant mortality rates between the years 1990 and 2009 in different regions of the world. The development has been slowest in sub-Saharan Africa as compared to other regions of the world. Moreover, the declines of infant and Perinatal mortality were not uniform and varied greatly in size, timing, and pace in this region.

Table - Reduction of infant mortality rate (IMR) during 1990-2009 in the world

Region	Reduction of IMR /1000 live births
Sub- Saharan Africa	109 to 81/1000
West and Central Africa	118 to 92/1000
Eastern and Southern Africa	103 to 69/1000
Middle East and North Africa	57 to 32/1000
South Asia	89 to 55/1000
East Asia and the Pacific	40 to 21/1000
Latin Americans the Caribbean	41 to 19/1000
Central and Eastern Europe	42 to 19/100
Industrialized countries	8 to 5/1000
The world	62 to 42/1000

Source: Child Mortality report inter agency group 2011

In Ethiopia, infant and Perinatal mortality rates remain high compared to some eastern African countries. National level infant and Perinatal mortality rate was estimated 59 /1000 live births and 46/1000 births respectively (EDHS, 2011). Substantial variations in infant mortality rates were also observed across the regional states in the country.

Learning Activity 1.3

After the delivered the lecture, if possible, take the students to the e-library; if not possible, arrange 5 to 6 Published Articles. Make each of these Journal articles should be related to one general theme. Use 5-6 themes such as women empowerment and higher education in Ethiopia, gender equality issues, primary education, and socioeconomic issues and women empowerment in Ethiopia. Give these sets of research ideas to different groups. Ask each students to develop a research topic for himself/herself and then do a brief literature review using the set of literatures provided to his or her group.

Comment 1.3: Please read related literature to the topics given above and synthesis literature part of your research topic. please follow steps given in the main body of the literature to prepare your literature review.

5.9 Conceptual frameworks

Conceptual frameworks are sometimes called “research” or “theoretical” frameworks. Conceptual frameworks take a broad view of the program itself in order to clarify the relationship of its activities and its main goals to the context in which it operates. It is also a useful tool for identifying and illustrating a wide variety of factors and relationships that may affect program success. The design should show the interrelationships between all factors that are relevant to achieving the program’s goals. These factors can be systems, organizations, government or institutional policies, infrastructure, population characteristics, or other features of the operational landscape that may help or hinder the program’s success.

Constructing a conceptual framework clarifies your assumptions about the causal relationships between significant features of the program context, clarifying aspects that your planned intervention may affect as well as other factors beyond your control. Identifying the variables that factor into program performance, and organizing the explicit ways they interact with each other sets the stage for outlining the objective results you can reasonably expect from your program activities. Clarifying all of these issues is a critical step toward designing valid measures for analyzing, or evaluating, the success of those interventions.

A common tactic here is to ‘unpack’ your idea or problem thus generating a range of possibilities before narrowing down on one or two themes. Following the suggestions of Punch (1998) steps could be:

1. write down the all the concepts involved, and all the sub-questions you can think of pertaining to the issue. Reading around your research idea will help to generate questions and information and to identify themes and potential information sources
2. subdivide your questions where possible; split wide general questions into smaller ones
3. begin to order questions and develop focus: group questions together under common themes, separate general and specific questions
4. start to trim by selecting those questions that you wish to deal with, consider the resources that will be available to you
5. collate these thoughts within a loose conceptual framework this shows how questions and themes are related and may help guide your thinking at a later stage.

This process of thinking wide and then focusing and delimiting your questions, should result in a handful of research questions that you wish to investigate. These may still need further modification to render them answerable; they may need to be operationalize.
Note: there are no right or wrong answers in such an exercise; the purpose is to get you thinking about as many facets of your research idea as possible. It should also cause you to question some of the concepts you might previously have accepted as given.

Learning activity 1.4
Develop conceptual framework for Get into groups of 4 or 5 students.

- Develop conceptual framework for utilization of family planning/maternal and child health services.
- Identify factors that influence health service utilization
- Arrange factors into a conceptual framework
- After 30 minutes, a member of each group will share the framework with all participants

Comment 1.4: See conceptual framework annexed at the end of this module.

6.0 Managing the literature

The bibliography/reference at the end of a recent article or book can provide you with an adequate reading list of most relevant materials related to the topic. Once

the relevant literature has been located and found through the sources suggested, the next step is to manage it. This requires efficient and selective reading. Once you try locating the relevant literature, you will discover that it is available in vast quantities. Now the primary task is to pick out the material that is actually related and relevant to your research area. This requires you to be a proficient reader who can get the gist of things quickly as you will have to go through a lot of reading.

In an article published in a journal, the first thing to do is look at the abstract or summary of the article. This will give you an idea whether it is relevant for you. In the case of a book you should look at the list of contents, the blurb, the summaries usually given at the end of the chapters and the introduction. This will tell you quickly if any part is pertinent for you.

The next step is to follow a clear system of keeping track of your reading references. You need to create a management system that will incorporate your sources with all relevant details including a note about where you found that article or book. This means that you put down that the article/book was on the shelf or in the library you have created. A number of computer programs like Endnote, Procite, or Reference Manager are available to keep track of your references. This will save a lot of hassle and futile finger biting at the end when you desperately need a page number for a quote and cannot remember where you had found the material. These programs can automatically format references in any number of styles once the basic details have been entered. It is also useful to annotate your references. You can write brief notes on the Index Cards. This will provide you with a methodical and organized review of materials that you have read. It is a record of the accuracy, relevance, and quality of the sources you have consulted. Your critical comment, that is your informed and considered evaluation, can also be added. These annotations can be varying in length and content depending on the pertinence of the material reviewed. It will minimize the time when you have to incorporate them in your writing.

7. Formulating Research Questions, Hypotheses, And Objectives

Research questions

If you have gone through the 'brainstorming' process described above you will probably have a number of questions which are close to your requirements as research questions they appeal to your interests and are likely to be answerable within your time and resource constraints. Phrase your questions so that they are simple and clear. It is usually best to pose only one or two questions. Do not pose more than three questions at a time because it leads to much larger research project. Start questions with terms like, how, who, what, why, and when. Questions should be specific, not vague.

Example research questions

- What factors determine the quality of laboratory services?

- Is there a relationship between the training of laboratory personnel and the quality of their diagnosis?
- Is the quality of laboratory diagnosis influenced by high workload on laboratory personnel?

The questions above represent wide differences in scope and complexity and hence will make very different demands on research resources. Some of these questions might later need to be modified to fit resources (abilities, time, finance, equipment) while still addressing research problem.

Research hypotheses

What is a hypothesis?

A hypothesis is a tentative answer to a research problem that is advanced so that it can be tested.

When do we use a hypothesis?

It is appropriate to use a hypothesis when you are testing a theory. Definition of theory is very broad – it could be 'an idea about how things relate to each other'. If you have an expectation of how your research question will be answered (the outcome) then it is fair to say you have a theory in mind. If you ask of your research question 'What is the expected outcome?' and have an answer, you can ask why? What is my thinking behind this prediction? This is essentially the theory that you will be testing.

If you are not able to predict the answer to your question then your approach is not one of theory testing and you should not proceed with developing hypotheses to test. Your research questions remain as such. This will be the case if your research is descriptive or exploratory in nature.

Developing a hypothesis from a research question

Developing hypotheses requires that you identify one character, variable of a sampling unit that causes, affects, or has an influence on, another character, variable of the same or other sampling units. The character, variable that affects other variables or sampling units is called the independent variable. The character, variable which is affected by the independent variable is called the dependent variable or response variable.

Note that although for the purposes of research methodology some variables may be called 'dependent' when investigating their relationship with other 'independent' variables, this does not imply the existence of a causal (as compared with associative) relationship unless strict rules of research design are followed. This issue is discussed in more detail later in the module.

Good hypotheses

There are two criteria for good hypotheses. One, hypotheses are statements about relationships between variables. Two, hypotheses carry clear implications for testing the stated relationships. These criteria mean, then, that hypothesis statements contain two or more variables that are measurable or potentially measurable and that they specify how the variables are related.

Research without hypotheses

In exploratory research our base knowledge of a subject may be so low that we cannot formulate meaningful hypotheses. Nonetheless, exploratory research should be guided by a clear sense of purpose. Instead of hypotheses, the design for the exploratory study should state its purpose, or research objectives as well as criteria by which the exploration will be judged successful.

For example, if we would like to start and encourage mothers to make use of family planning services, we may first need to know the social norms or cultural issues of the community before we begin making meaningful hypotheses. We can state that our exploratory study would have the purpose of generating hypotheses about personal characteristics which correlate with the adoption/rejection of use of family planning services, the composition of the decision-making unit, and the factors which influence the decision either to adopt or reject. Success would be measured in terms of generating testable hypotheses.

Interpretative research, which seeks to develop knowledge through understanding meaning, does not usually proceed with hypotheses.

Research objective(s)

What are the research objectives?

In general, research objectives describe what we **expect to achieve** by a project. Research objectives may be linked with a hypothesis or used as a statement of purpose in a study that does not have a hypothesis.

Even if the nature of the research has not been clear to the layperson from the hypotheses, s/he should be able to understand the research from the objectives.

A statement of research objectives can serve to guide the activities of research. Consider the following examples.

- **Objective:** To describe what factors mother take into account in making such decisions as whether to use a new family planning services or not.
- **Objective:** To develop a budget for reducing pollution by a particular enterprise.

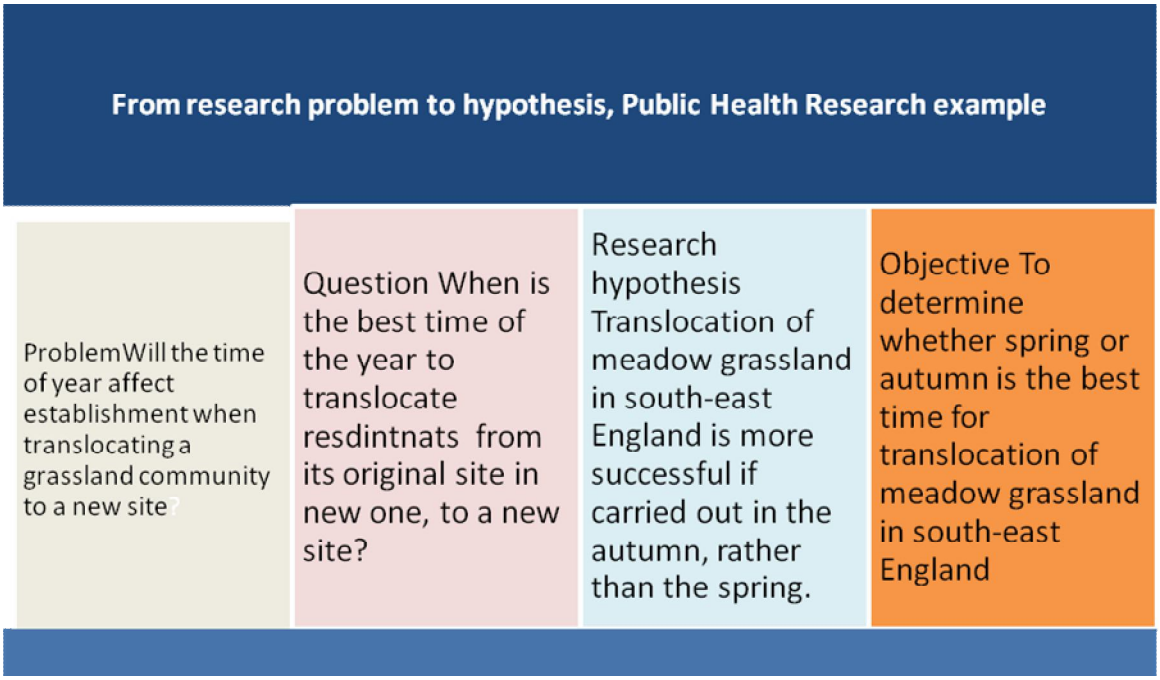
In the above examples the intent of the research is largely descriptive.

- In the case of the first example, the research will end the study by being able to specify factors which emerged in mothers decision.

- In the second, the result will be the specification of a pollution reduction budget.

These observations might prompt researchers to formulate hypotheses which could be tested in another piece of research. So long as the aim of the research is exploratory, ie to describe what is, rather than to test an explanation for what is, a research objective will provide an adequate guide to the research.

Examples of research statements



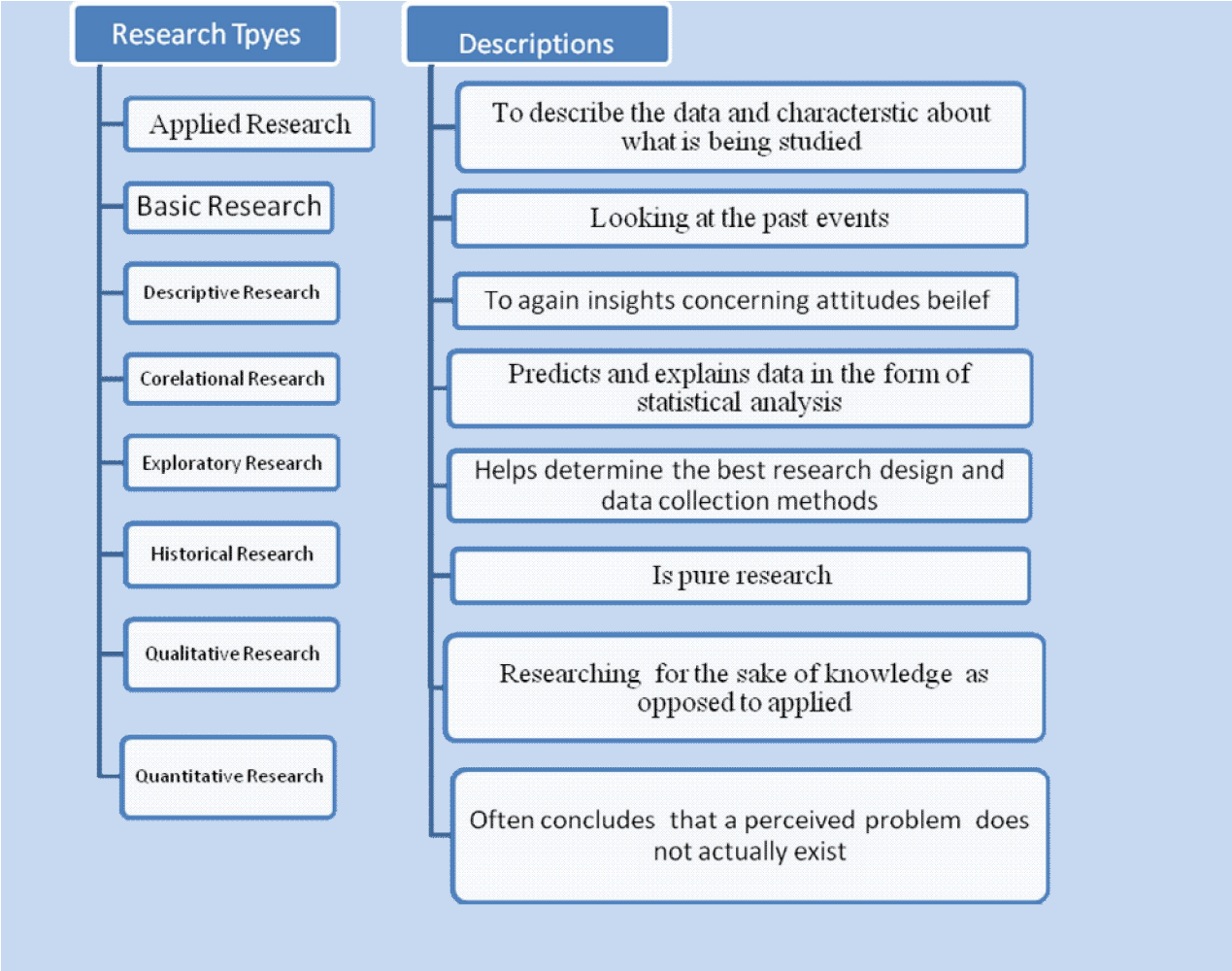
Session summary

In this introductory session of the module, you have learned about the different definitions of research, why research is done, where it is conducted and what researchers use. At the end of the section, you have acquired basic knowledge about research methods and skills based on your educational background and professional experiences. You can easily differentiate among perspectives on and approaches for classifying different research types. The classification will help you understand different concepts related to research described in later sessions.

In the literature review, you have learned what a literature review is, and why review of literature is necessary for any research. You have also been introduced to various sources for conducting literature review. It is also discussed how literature review can be managed well. To facilitate learning, a brief sample of annotation and a sample literature review are also provided.

Learning activity 1.5

Learning activity 1.5.1 Match the research types with the following descriptions



Learning activity 1.5.2: Assessment would be done through the outcome of the activity of writing literature review as provided in the example above for your thesis desertions.

Learning activity 1.5.3: Identify the independent and dependant variables in the following situation: A university teacher is interested in determining the best way to teach introductory technology course, and ensure that her students have learned the material.

Learning activity 1.5.4: Formulate hypotheses for the following two situations:

- Situation 1: What effects does viewing violence on television have on boys?

- Situation 2: A sanitation department is nearby and the smell is coming from the same direction.
- The sanitation department does a series of steps to process the sewage and wastewater.
- Hypothesis: If _____then_____.

Session two: Quantitative Research Methods

Session introduction

This session describes how researchers shall collect, organize and analyze data that are relevant to the purpose of the study. There is a need to organize the methods section into logical subsections that illustrate the steps to be followed during collection, organization and analysis of data. During proposal development, you need to describe what you want to do using future tense. Original methods shall be described in detail otherwise give references if you want to apply standard methods. When writing the methods section, selection of the study design appropriate for the study objectives is usually the initial task. The design itself guides how you should proceed with data collection, management, and analysis. Mechanisms of maintaining the quality of data shall be considered from the inception of the research project to the final write up of a scientific paper. If the methods section of a proposal is carefully written, there will be little work later on during the write up of a thesis report or manuscript because usually it is a matter of changing to past tense.

Learning outcomes

When you have studied this session, you should be able to:

- Identify the study design(s) appropriate for different research objectives
- Describe to which population groups study findings could be generalized
- Describe the minimum number of study units required for different studies and how they can be selected
- Describe the variables of a study and how they can be measured
- Describe the different data collection technique(s)
- Develop a questionnaire for data collection
- Describe what issues need to be considered during the analysis of data
- Describe the mechanisms of maintaining the quality of data

2.1 Choosing study design

Study design is a logical model that guides the investigator in the various stages of the research process. Once the researchers identify the study design, they will know how to proceed conducting that research. There are different quantitative and qualitative study designs with their own advantages and limitations. Selecting the appropriate study design shall be the first task of the researchers after they know their objectives. This session will not present the details of the different study designs. The learner shall refer the Epidemiology module to learn about the

quantitative research designs. Additionally, it is good if you refer other modules on qualitative research to learn about the qualitative study designs. But, Session five of this module also includes qualitative methods where there is slight touch of qualitative designs

The following criteria may be considered during selection of study design(s)

1) Research problem

2) Personal experience

3) Resources available for the study

1) Research problem

This is the major criteria that should be considered during selection of study designs. For example quantitative designs would be appropriate if the interest is:

- estimating the prevalence of a specific condition in a specific locality
- assessing associations between the different independent variables and a dependent variable
- Assessing the effectiveness of a new drug, vaccine etc....

Major quantitative designs include Cross sectional, Case control, Cohort, and Intervention studies.

On the other hand qualitative designs would be appropriate when:

- the topic is new
- the topic has never been addressed with a certain sample or group of people, and
- existing theories do not apply with the particular sample or group under study

Qualitative approaches allow room to be innovative and to work more within researcher-designed frameworks. They allow more creative, literary-style writing.

The major qualitative study designs include ethnography, phenomenology, grounded theory, participatory action research, and case study.

A mixed methods design is useful when either the quantitative or qualitative approach by itself is inadequate to best understand a research problem. Mixed methods are becoming popular. The integration of quantitative and qualitative methods permits a more complete and synergistic utilization of data than do separate quantitative and qualitative data collection and analysis

The problems addressed by social & health science researchers are complex. The interdisciplinary nature of research calls for mixed methods. Formation of research teams with individuals having diverse methodological interests and approaches is required.

Mixed Methods Research Designs can be used for the following purposes:

1) Validate findings using quantitative and qualitative data sources.
2) Use qualitative data to explore quantitative findings.
3) Develop survey instruments.
4) Use qualitative data to augment a quantitative outcomes study.

2) Personal experience

Researcher's personal training and experience influence the choice of design. For example, an individual trained in technical, scientific writing, statistics, and computer statistical programs and familiar with quantitative journals would most likely choose the quantitative design. On the other hand, individuals who enjoy writing in a literary way or conducting personal interviews, or making up-close observations may prefer qualitative approach. The mixed methods researcher is an individual familiar with both quantitative and qualitative research

3) Resources available for the study

Diff. types of study design are not considered equal in the strength of evidence they provide. Investigators may not be able to select the design that gives a high level of evidence. The design that gives a high level of evidence may not be feasible to do or ethical to do. For example conducting prospective cohort study produces more valid data than cross sectional study or the traditional type of case control study. Since conducting prospective cohort study is time consuming and costly, researchers with

limited time and money may opt to apply study designs which can be completed within short time period and minimal cost

2.2 Population

In epidemiological research, measurements are taken from few people and estimates are derived from these measurements. All kinds of errors prior, during and after the study can be responsible for bias in the final results. This bias can be caused by measurement errors, as well as through poorly chosen source and study populations. Bias can also be introduced during the sampling procedure. Given that epidemiological research is generally carried out with a limited number of people, the generalizability of the results could be limited by these types of bias. A good sample from a well-described study population is therefore very important. When planning research, researchers need to consider the different groups of people ranging from target population to sample population.

Target population refers to the entire group of individuals or objects to which researchers are interested to generalize the conclusions. But, because of practicalities, entire target population often cannot be studied. The target population usually has varying characteristics and it is also known as the **theoretical population**. The target population consists of all the individuals at large, for example in Ethiopia, with the same characteristics as the actual sample that will be included in the study. Sometimes target population is interchangeably used with source population. **Source population** is the underlying population from which the subjects will be drawn. E.g patient population of a hospital.

Study population is the population to which the researchers can apply their conclusions. This population is a subset of the target/source population and is also known as the **accessible population**. It is from this accessible population that researchers draw their samples. E.g Female patients who are older than 50 years admitted with a diagnosis of diabetes mellitus.

Sample population is a population selected and included in the study. Samples are subsets of study populations used in research because often not every member of study population can be measured. However, the results drawn from the investigation of the sample are interpreted and applied directly to the study population.

2.3 sampling techniques &Sample size determination

2.3.1 Research and Sample

The term sampling refers to strategies that enable us to pick a subgroup from a larger group and then use this subgroup as a basis for making inferences about the larger group. The researcher's goal is always to generalize about the population based on observations from the sample. Sampling strategies not only make it possible to collect data from a smaller number of respondents, but these strategies also make it possible to go into greater depth with this smaller number by asking more and deeper questions or by following up the structured questions with more open-ended or qualitative questions than would be possible with a larger group of respondents. When using such a subgroup to make decisions about the larger group, the subgroup must be as closely representative of the larger group as possible.

Sampling techniques are useful when we want to know how a large group would be described with regard to several variables, but there would be major added costs, narrow restrictions on the number of questions that could be asked, or some other difficulty in administering the data collection procedure to every member of the target population. If we wanted to find out how many graduate students in entire university were interested in taking a certain advanced course next semester, it would be difficult and expensive to ask every graduate student this question.

Even if we had a list of all their names, it would be difficult to get them all to reply to a questionnaire. Finally, we would probably have time to ask only one question, and it would be unlikely that we would be able to uncover the qualitative reasons behind interest or lack of interest in the course. Similarly, if we wanted to know how many number of patients showed progress after taking a certain drug in Ethiopia, we would find it a lot more convenient to administer our test to a sample of patients than to interview every patients. This will bring us to sampling

2.3.2 Sampling Strategy

The manner in which a sample is drawn is an important factor in determining how useful the sample will be for making inferences about the population from which it is drawn. It is quite possible to have a very large sample upon which no sound decision can be based. This occurs because the respondents in the sample are not really similar to the population about which we want to make generalizations. To be useful, the sample must be representative of the population about which we wish to make generalizations.

2.3.2.1 What is Sampling?

Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population. When dealing with people, it can be defined as a set of respondents (people) selected from a larger population for the purpose of a survey. The purpose of sampling is to draw conclusions about populations from samples, we must use inferential statistics which enables us to determine a population`s characteristics by directly observing only a portion (or sample) of the population. We obtain a sample rather than a complete enumeration (a census) of the population for many reasons. Obviously, it is cheaper to observe a part rather than the whole, but we should prepare ourselves to cope with the dangers of using samples.

There would be difficulties to measure the whole populations because:

- The large size of many populations
- Inaccessibility of some of the population: some populations are so difficult to get access to that only a sample can be used. E.g. prisoners, people with severe mental illness, disaster survivors and so on. The inaccessibility may be associated with cost or time or just access.
- Destructiveness of the observation: sometimes the very act of observing the desired characteristic of the product destroys it for the intended use. Good examples of this occur in quality control. For instance, to determine the quality of a fuse and whether it is defective, it must be destroyed. Therefore if you tested all the fuses, all would be destroyed.
- Accuracy and sampling: A sample may be more accurate than the total study population. A badly identified population can provide less reliable information than a carefully obtained sample.

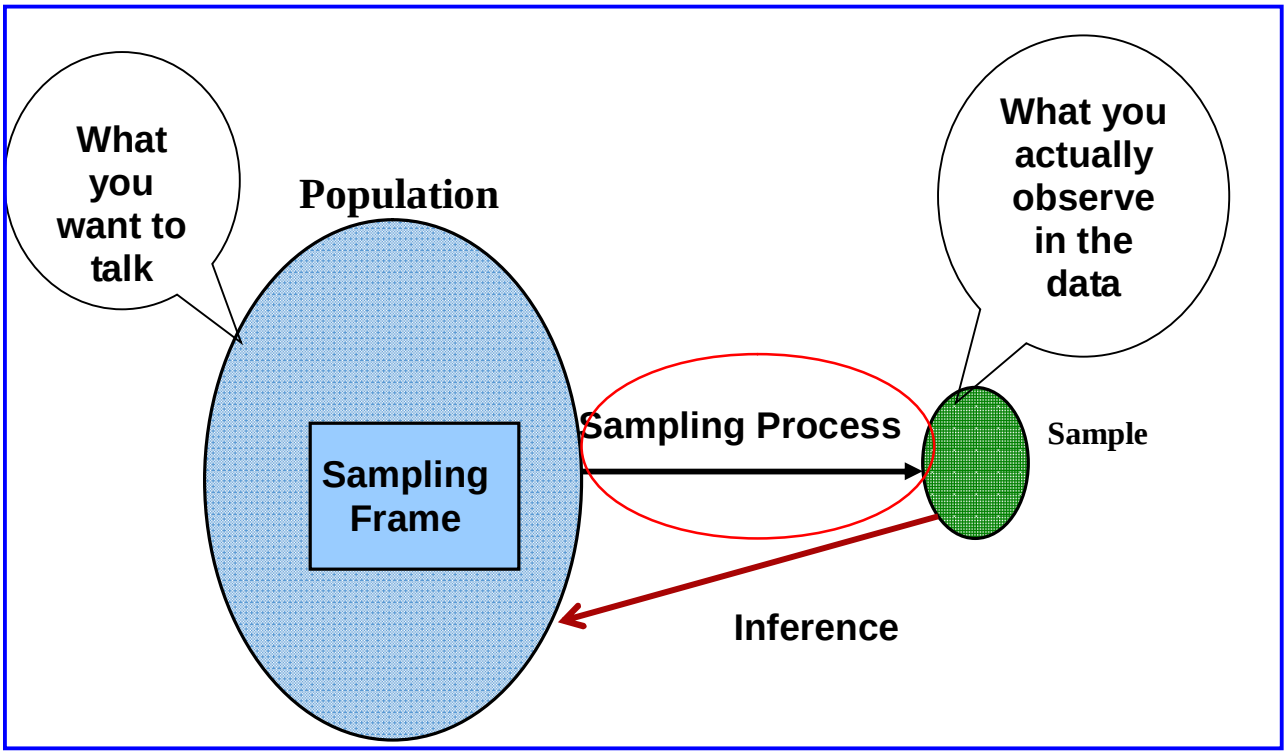


Figure 1.1: Schematic presentation of the process of sampling

2.3.2.2 Steps in Sampling Design

There are steps that we need to follow to get in to the respondents . The steps that we need to do are that:

- What is the target population? Define the target population and study population.
- What are the parameters of interest? Define the parameters of interest of the study.
- What is the sampling frame? Select the sampling frame.
- What is the appropriate sampling method? Determine which sampling method we are going to use depending on the setting of the population and the purpose of the study.
- Plan procedures to select the sampling unit
- Determine the size of the sample which will be selected from the population.
- Select actual sampling unite
- Conduct field work

2.3.3 Advantage and Disadvantage of Sampling

Advantage of Sampling

- Sampling is a must in some situations: to diagnosis the patient for a certain diseases we don't need to take the whole blood of the patient. In addition, if we want to inspect eggs, bullets and missiles, we don't need to test all. This is possible only in sample study. Thus sampling is essential when the units under study are destroyed.
- It saves time: Research without sampling might be too time consuming.
- The population to be studied may be too large or unlimited that it is almost impossible to reach all of them. Sampling makes possible this kinds of study.
- Sampling reduces the study population to a reasonable size that expense are greatly reduced.
- Sometimes the experiments are done on sample basis. The fertilizers, the seeds and the medicines are initially tested on samples and if found useful, then they are applied on large scale. Most of the research work is done on the samples.
- Sampling saves the source of data from being all consumed.
- Sample data is also used to check the accuracy of the census data.

Disadvantage of Sampling

- If sampling is biased, or not representative or too small the conclusion may not be valid and reliable
- In research the respondents of the study must have a common characteristics which is that basis of the study
- If the population is very large and there are many sections and subsections, the sampling procedure becomes very complicated
- If the researcher does not possess the necessary skill and technical knowhow in sampling procedure, then the outcome will be devastated.

2.3.4 Types of Sampling

There are many methods of sampling when doing research. One of the most important decisions that any researcher makes is how to obtain the type of participants needed for the study. The sample that we draw for our study determines the generalizability of our findings.

As we have seen before, in most situations, it is impossible to study an entire population. We typically study a subset of people drawn from a larger population and use inferential statistics to make an inference from the sample back to the population. The validity of that inference depends on how representative the sample or subset is of the population from which it is drawn. Our goal, as researchers, is to

obtain the most representative sample that we can. Some sampling strategies can get us pretty close to the population, others have problems that might result in a biased sample. As we learn about different sampling strategies, let's use the population drawn below as our starting point. When we draw our sample, we want to have a good representation of all of the kinds of people in the population.
In General there are two methods of sampling:

1. Probability Sampling Method
2. Non-Probability Sampling Method

2.3.4.1 Probability Sampling Method

Probability sampling strategies typically use a random or chance process, although there are important exceptions to this rule. Random sampling is a strategy for selecting study participants in which each and every person has an equal and independent chance of being selected. What does it mean to be independent? The researchers select each person for the study separately. Let us say you were asked to participate in an experiment, enjoyed it, and told your friends to contact the researcher to volunteer for the study. This would be an example of non-independent sampling. We assume that friends share similar values and by recruiting your friends to be in the study, the sample might represent you and your friends but not the whole population of interest. The "equal chance" and "independent" components of random sampling are what makes us confident that the sample has a reasonable chance of representing the population.
Where do we start? When we use probability sampling, we begin by defining our population. Once we have done this, we must have some sort of record or directory to use to select individual participants from the target population. The sampling frame is the population as it is defined and available through records. There are a number of probability sampling techniques that can be used depending on the types of the population complexity we want to study.

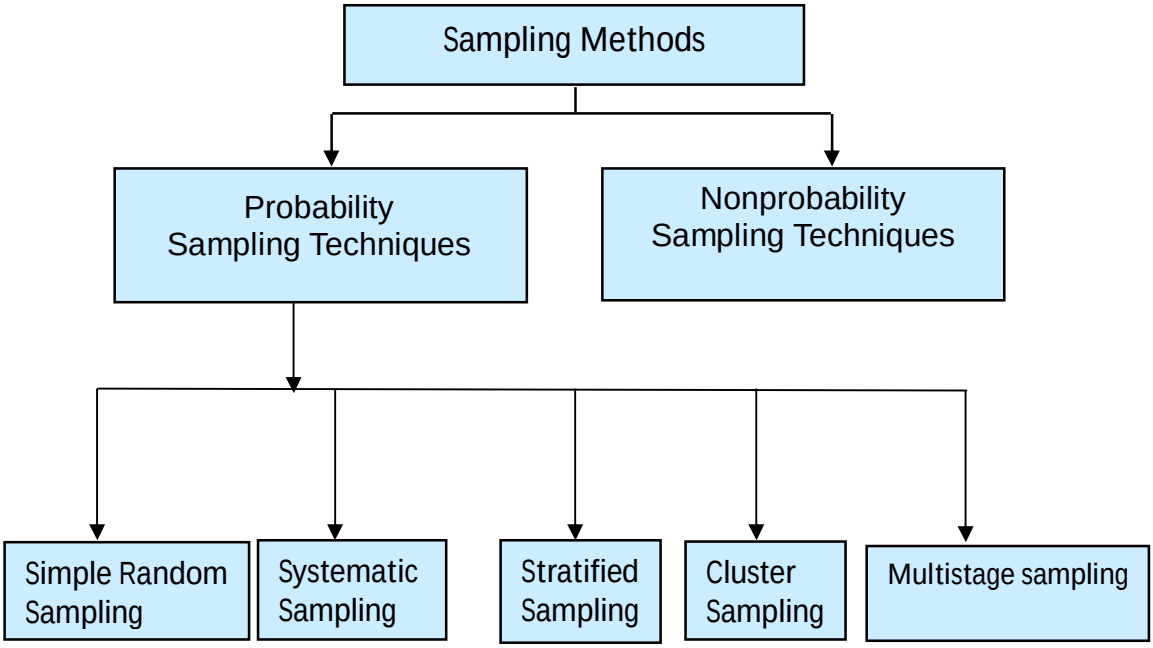


Figure 2: Schematic presentation of probability sampling methods

A. Simple Random Sampling

Simple random sampling is the most straightforward of the random sampling strategies. We use this strategy when we believe that the population is relatively homogeneous for the characteristic of interest. This sampling method has the following properties.

- The population consists of N homogeneous subjects.
- There is frame for the population
- The sample consists of n subjects or objects.
- All possible samples of n subjects are equally likely to occur

Procedures to select the sample

How do we actually take a random sample? The specific procedures that you follow may vary depending on your resources, but all involve some type of random process. Depending on the complexity of the population, we can use different tools to select n samples from the frame. These are lottery method, table of random number (they are available in the appendix of many research methods and statistics textbooks) or computer generated random number.

- Lottery method is appropriate if the total population is not too large, otherwise if the population is too large then it will be very difficult to use lottery method.

- Table of random number or computer generated random number is the feasible method to be used.

If computer is accessible, it will be very easy to use computer generated random number to select the sample. What you need to do is that specify the total population(N), the sample size (n) and the range of the frame (minimum and maximum number.) At the end the computer will display the randomly selected list of numbers according to the sample you specified. That will be your sample.

There are a number of computer programs which can generate the list of the sample for simple random sampling. Of this, openepi is one of the free software that we can access from the web. The required information to use this program are: lowest value, highest value, and the sample size you want to draw.

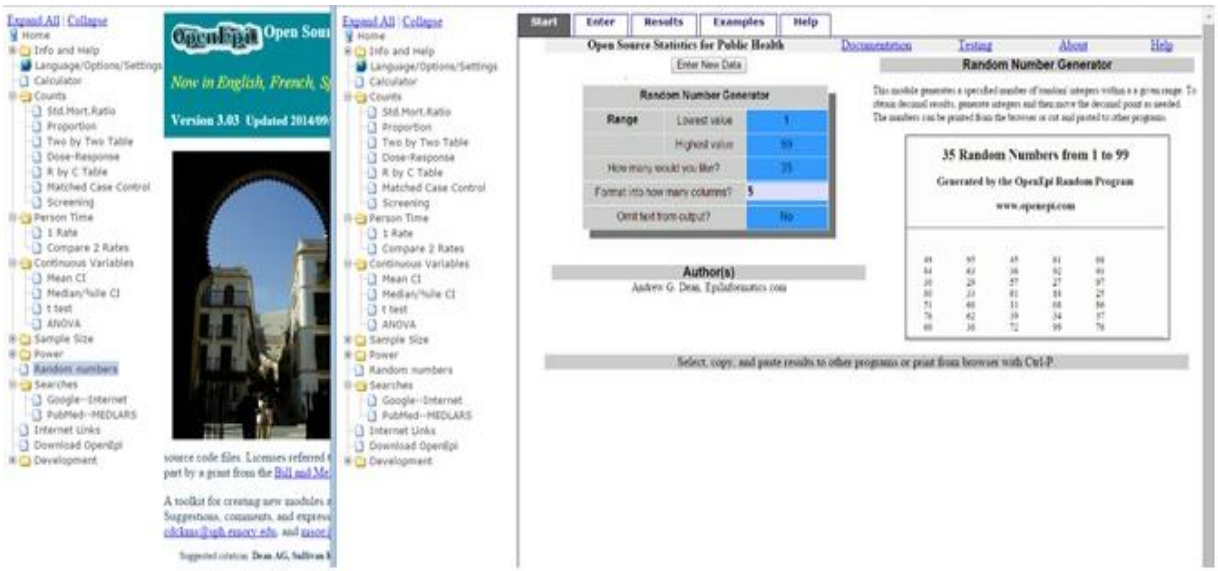


Figure 3: OpenEpi software to generate random numbers

Example 1: Consider the following condition. The total number of patients who visit Gondar University Hospital for the last six months in the year 2015 were N. We want to see the proportion of TB among those patients who visited the hospital. So if we thing that those patients who visited the hospital within the specified time period are homogeneous with respect to the variable of interest and list of the patients are available, then we can use simple random sampling to select the sample, n.

B. Systematic Random Sampling

A method of selecting sample members from a larger population according to a random starting point and a fixed, periodic interval. We use this sampling method when the population is homogenous and frame is not available.

Typically, every nth member is selected from the total population for inclusion in the sample population. Systematic sampling is still thought of as being random, as long as the periodic interval is determined beforehand and the starting point is random. It is frequently chosen by researchers for its simplicity and its periodic quality. The procedure involved in systematic random sampling is very easy and can be done manually and the results are representative of the population unless certain characteristics of the population are repeated for every nth individual which is highly unlikely. Hence, in the absence of frame, this method will be the appropriate choice.

Steps in systematic sampling:

- Define the population
- Determine the desired sample
- List the population from 1 to N
- Determine K, where k = N/n
- Select a random number between 1 and k, let us denote this number by a
- Starting at a, take every Kth number on the list until the desired sample is obtained. Then the selected list will be

  a, a + k, a + 2k, a + 3k, ...,

Note that:

- Since systematic random sampling is a type of probability sampling, the researcher must ensure that all the members of the population have equal chances of being selected as the starting point or the initial subject.

- The researcher must be certain that the chosen constant interval between subjects do not reflect a certain pattern of traits present in the population. If a pattern in the population exists and it coincides with the interval set by the researcher, randomness of the sampling technique is compromised.

C. Stratified Random Sampling

Stratified random sampling is used when we have subgroups in our population that are likely to differ substantially in their responses or behavior (i.e if the population is heterogeneous). In stratified random sampling, the population is first divided into a number of parts or 'strata' according to some characteristic, chosen to be related to the major variables being studied. For example, you are interested in visual-spatial reasoning and previous research suggests that men and women will perform differently on these types of task. So, you divide your sample into male and female members and randomly select equal numbers within each subgroup (or "stratum"). With this technique, you are guaranteed to have enough of each subgroup for

meaningful analysis. Often we used simple random sampling to select a sample from each strata after stratification.

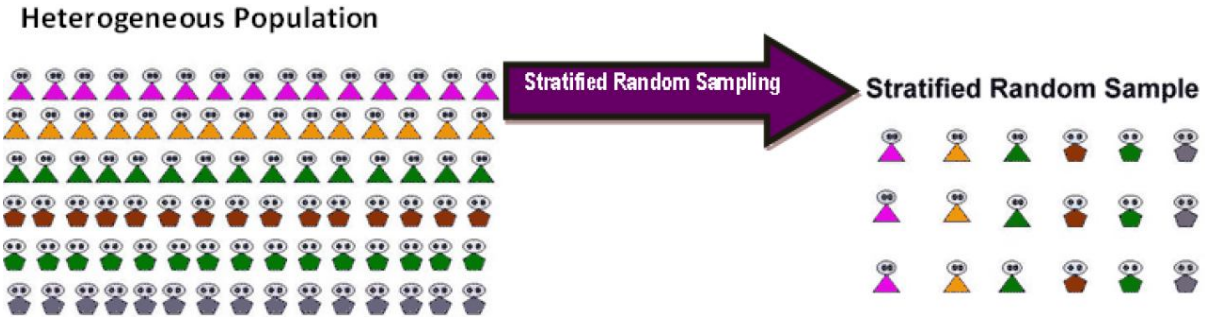


Figure 3: Characteristics of population and sample for stratified sampling

Steps involve in stratified sampling method:

- Define the population
- Determine the desired sample size
- Identify the variable and subgroups (strata) for which you want to guarantee appropriate representation (either proportional or equal)
- Classify all members of the population as a member of one of the identified subgroups
- Randomly select (using simple random sampling) an appropriate number of individuals from each subgroup. Then the total sample size will be the sum of all samples from each subgroup.

There are two methods to get the study subject from each subgroup, proportional allocation or equal allocation. We use proportional allocation technique when our subgroups vary dramatically in size in our population. For example, we are interested in risk taking among college students and suspect that risk taking might differ between smokers and nonsmokers. Given increasing societal pressures against smoking, there are many fewer smokers on campus than nonsmokers. Rather than take equal numbers of smokers and nonsmokers, we want each group represented in their proportions in the population. The subsample which will be taken from each subgroup can be determined by:

Let N be total population and N1, N2, ..., Nk be the subtotal population for strata 1, 2, ..., k respectively. Moreover, let n be the total sample size and n1, n2, ..., nk be the subsample for strata 1, 2, ..., k respectively in which:

$N = N1 + N + 2+, ...,+NK$

$n = n1 + n_2+,..., +nk$

Then the subsample ni which will be selected from subgroup Ni can be allocated equally or proportionally. Proportional allocation cab ne done:

$$n_i = \frac{nxN_i}{N}$$

Where i = 1, 2, 3,..., k

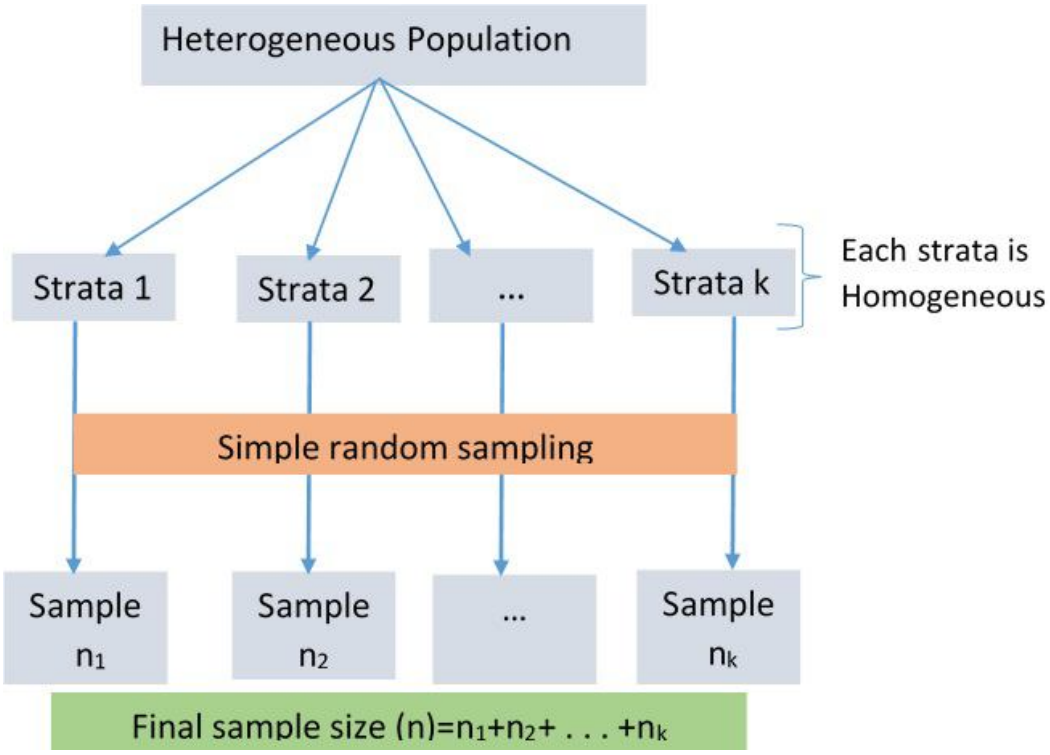


Figure 4: Schematic presentation of the distribution of sample size for each strata

The higher the population in the subgroup, the higher the sample size will be. However, equal allocation will be used if the total population from each subgroup is approximately equal.

Advantage of stratified sampling over simple random sampling:

- It can provide greater precision than a simple random sample of the same size.
- Because it provides greater precision, a stratified sample often requires a smaller sample, which saves money.
- A stratified sample can guard against an "unrepresentative" sample
- We can ensure that we obtain sufficient sample points to support a separate analysis of any subgroup.

The main disadvantage of a stratified sample is that it may require more administrative effort than a simple random sample.

D. Cluster Random Sampling

Cluster sampling is useful when it would be impossible or impractical to identify every person in the sample. If the study covers wide geographical area, using the other methods will be too costly. The idea is, divided the total population in to different clusters and then the unit of selection will be cluster. Therefore, total population in the selected cluster will be taken as the sample.

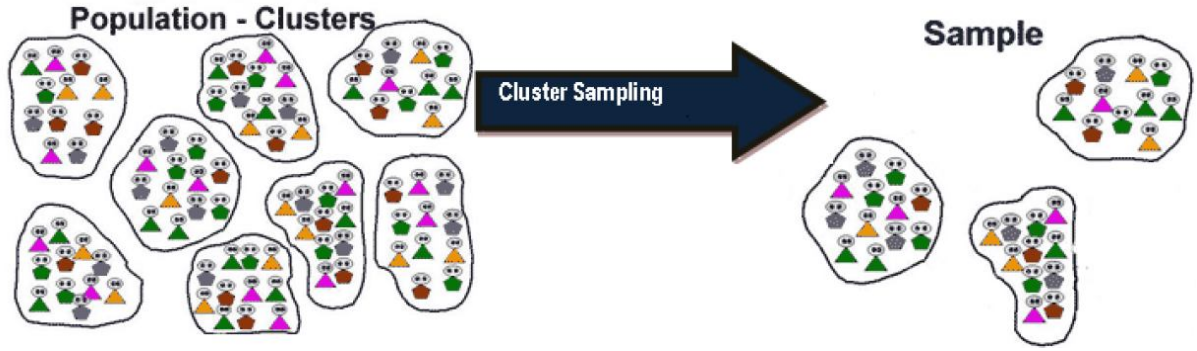


Figure 5: Characteristics of population and sample for cluster sampling

Steps in cluster sampling are:

- Define the population
- Determine the desired sample size
- Identify and define a logical cluster (can be kebele, Got, residence, and so on)
- Make a list of all clusters in the population
- Estimate the average number of population number per cluster
- Determine the number of clusters needed by dividing the sample size by the estimated size of the cluster
- Randomly select the required number of clusters (using table of random number as the total number of clusters is manageable)
- Include in the sample all population in the selected cluster.

There are different classification of cluster sampling;

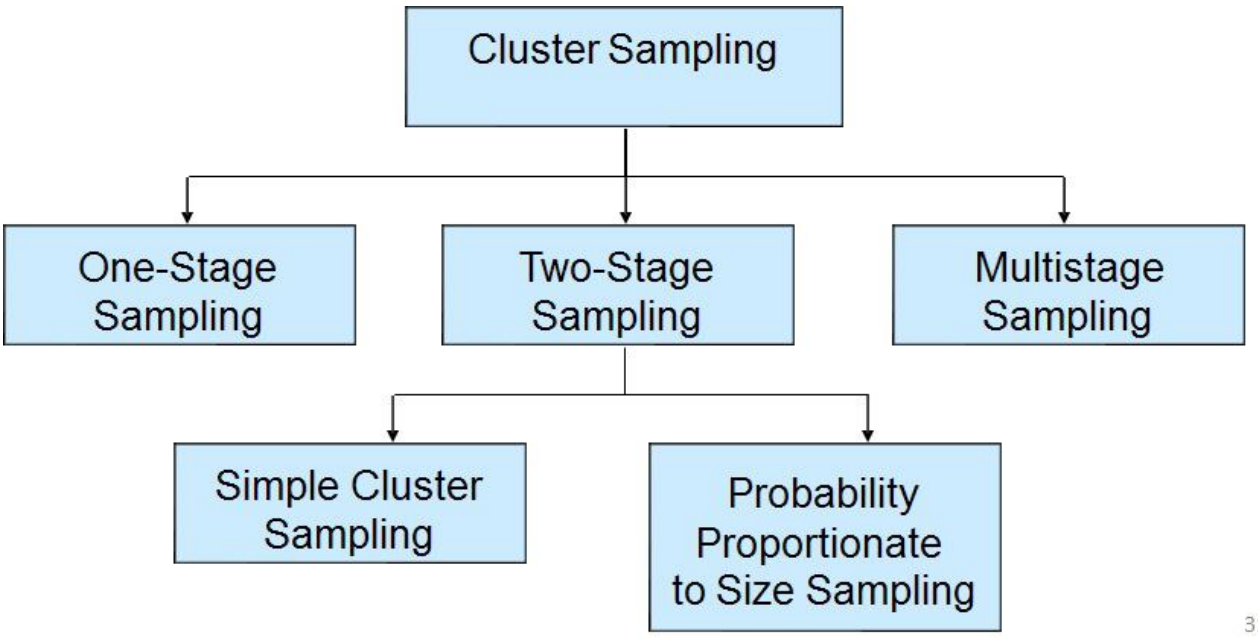


Figure 6: Illustration of cluster random sampling.

The main advantage of cluster sampling is that it saves time and money and hence it is advisable to use this method if the study covers wide geographical area. Consider the following graphical display:

E. Multistage Random Sampling

This is the most complex sampling strategy. The researcher combines simpler sampling methods to address sampling needs in the most effective way possible. For example, the administrator might begin with a cluster sample of all schools in the district. Then he might set up a stratified sampling process within clusters. Within schools, the administrator could conduct a simple random sample of classes or grades. By combining various methods, researchers achieve a rich variety of results useful in different contexts.

2.3.4.2 Non-Probability Sampling Method

Most probability sampling strategies have a random or chance component, though there are some important exceptions. It is this random component that gives us confidence that our sample is a reasonably good representation of the population. This random component can be time-consuming and expensive. Hence, in the presence of constraints, the alternative sampling method is nonprobability sampling method. Nonprobability sampling strategies are used when it is practically impossible to use probability sampling strategies. This typically occurs because of time and expense constraints and the lack of an adequate sampling frame.

Nonprobability sampling is also used when the frequency of the behavior or characteristic of interest is so low in the population that a more targeted strategy is needed to find sufficient numbers of participants for the research.

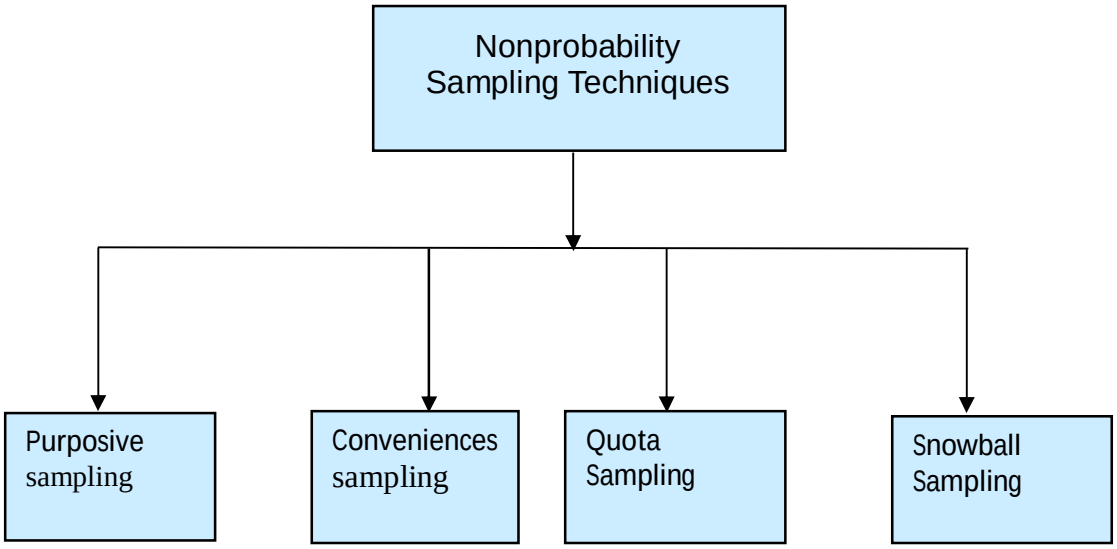


Figure 7: Schematic presentation of non-probability sampling methods

A. Purposive Sampling

Purposive sampling targets a particular group of people. When the desired population for the study is rare or very difficult to locate and recruit for a study, purposive sampling may be the only option. For example, you are interested in studying cognitive processing speed of young adults who have suffered closed head brain injuries in automobile accidents. This would be a difficult population to find.

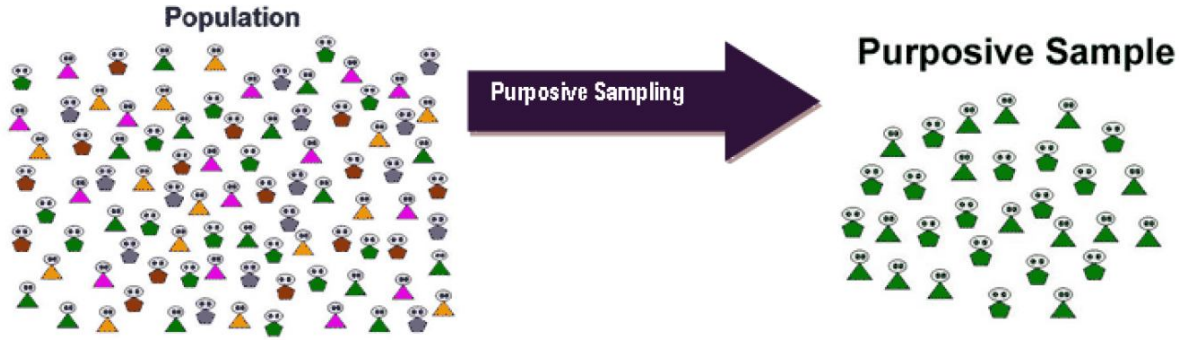


Figure 8: Schematic presentation of purposive sampling

The major problem with purposive sampling is that the type of people who are available for study may be different from those in the population who can't be located and this might introduce a source of bias.

B. Convenience Sampling

Convenience sampling selects a particular group of people but it does not come close to sampling all of a population. The sample would generalize only to similar programs in similar cities. Convenience sampling is widely used in student research projects. Students contact professors that they know and ask if they can use their classes to recruit research subjects. Convenience sampling looks just like cluster sampling. The major difference is that the clusters of research participants are selected by convenience rather than by a random process.

C. Judgment Sampling

The researcher selects the sample based on judgment. This is usually and extension of convenience sampling. For example, a researcher may decide to draw the entire sample from one "representative" city, even though the population includes all cities. When using this method, the researcher must be confident that the chosen sample is truly representative of the entire population.

D. Quota sampling

It is the nonprobability equivalent of stratified sampling. Like stratified sampling, the researcher first identifies the stratums and their proportions as they are represented in the population. Then convenience or judgment sampling is used to select the required number of subjects from each stratum. This differs from stratified sampling, where the stratums are filled by random sampling.

E. Snowball sampling

It is a special nonprobability method used when the desired sample characteristic is rare. It may be extremely difficult or cost prohibitive to locate respondents in these situations. Snowball sampling relies on referrals from initial subjects to generate additional subjects. While this technique can dramatically lower search costs, it comes at the expense of introducing bias because the technique itself reduces the likelihood that the sample will represent a good cross section from the population. What we need to do in case of snowball sampling is that first identify someone who meets the criteria and then let him/her bring the other he/she knew.

2.3.5 Sample size determination

Determining the sample size for a study is a crucial component of study design. The goal is to include sufficient numbers of subjects so that statistically significant

results can be detected. Statistically inconclusive findings make it difficult to determine whether a particular treatment or intervention was effective and to identify directions for future studies. Studies with insufficient subjects also may result in potentially important research advances that go undetected. In statistical language, these studies are referred to as "under-powered." That is, the probability that they will detect an existing treatment effect is lower than optimal. Among the questions that a researcher should ask when planning a survey or study is that "How large a sample do i need?". The answer will depend on the aims, nature and scope of the study and on the expected result. All of which should be carefully considered at the planning stage.

In general, sample size depends on:

- The type of data analysis to be performed
- The desired precision of the estimates one wishes to achieve
- The kind and number of comparisons that will be made
- The number of variables that have to be examined simultaneously
- How heterogeneous the sampled population is

The type of outcome variable under study should also be taken in to account. There are three possible categories of outcome variables. The first is where the variable of interest has only two alternatives response: yes/no, dead/alive, vaccinated/not vaccinated and so on. The second category covers those outcome variable with multiple, mutually exclusive alternatives responses, such as marital status, religion, blood group and so on. For these two categories of outcome variables, the data are generally express as percentages or rates. So we can use percentage to compute the sample size. The third category covers continuous response variables such as birth weight, age at first marriage, blood pressure and cerium uric acid level, for which numerical measurement are usually made. In this case the data are summarize in the form of means and standard deviations or their derivatives. The statistical method appropriate for sample size determination will depend on which of these types of outcome variables the investigator is interested in.

Deciding on a sample size for qualitative inquiry can be even more difficult than quantitative because there are no definite rules to be followed in qualitative study. It will depend on what you want to know, the purpose of the inquiry, what is at stake, what will be useful, what will have credibility and what can be done with available time and resources. You can choose to study one specific phenomenon in depth with a smaller sample size or a bigger sample size when seeking breadth.

2.3.5.1 Sample Size for Single Population Mean

This is the condition in which the research question is about mean (continuous variable). Three questions must be answered to determine the sample size:

1. Standard deviation of the population: It is rare that a researcher knows the exact standard deviation of the population. Typically, the standard deviation of the population is estimated:
    a. from the results of a previous survey,
    b. from a pilot study,
    c. from secondary data,
    d. from judgment of the researcher.
2. Maximum acceptable difference: This is the maximum amount of error that you are willing to accept. That is, it is the maximum difference that the sample mean can deviate from the true population mean before you call the difference significant.
3. Desired confidence level : The confidence level is your level of certainty that the sample mean does not differ from the true population mean by more than the maximum acceptable difference. Commonly we use a 95% confidence level.

Then the sample size determination formula for single population mean is defined as:

$$n = \frac{(Z_{\frac{\alpha}{2}})^2 \delta^2}{\omega^2}$$

Where

- n is the sample size for single mean
- α=The level of significance which can be obtain as 1-confidence level.
- σ=Standard deviation of the population
- w=Maximum acceptable difference
- $Z_{\alpha/2}$=The value under standard normal table for the given value of confidence level

2.3.5.2 Sample Size for Single Population Proportion

This is the situation in which the variable of interest is categorical. Three questions must be answered to determine the sample size for single population proportion:

1. Best estimate of population proportion of the variable of interest : Make your best estimate of what the actual percent of the survey characteristic is. The possible source of this proportion are:
    a. From the results of a previous study,
    b. From a pilot study,
    c. Judgment of the researcher.

d. Simply taking 50%

2. Maximum acceptable difference: This is the maximum percent difference that you are willing to accept between the true population rate and the sample rate. Commonly we use a difference of 5 percent. That is, if your survey finds that 25 percent of the sample has a certain characteristic, the actual rate in the population may be between 20 and 30 percent.
3. Desired confidence level: How confident must you be that the true population rate falls within the acceptable difference. This is the same as the confidence that you want to have in your findings. If you want 95 percent confidence, you should enter 95. This means that if you took a hundred samples from the population, five of those samples would have a rate that exceeded the difference you specified in the previous question.

Then the formula for the sample size of single population proportion is defined as:

$$n = \frac{(Z_{\frac{\alpha}{2}})^2 p(1-p)}{\omega^2}$$

Where

- n is the sample size for single mean
- α=The level of significance which can be obtain as 1-confidence level.
- p= Best estimate of population proportion
- w=Margin of error or maximum acceptable difference
    - The margin of error (w) measures the precision of the estimate
    - Small value of w indicates high precision
    - It lies in the interval (0%; 5%]
    - For p close to 50%, w is assumed to be close to 5%
    - For smaller value of p, w is assumed to be lower than 5%
- $Z_{\alpha/2}$=The value under standard normal table for the given value of confidence level
    - For α = 0.05 the Z0.025 = 1.96
    - For α= 0.1 the Z0.05 = 1.645 and so on

***Note that**: The reason behind taking 50% proportion for the variable of interest is that this is the value which gives the maximum product when we compute the sample size. Hence try to find all possible effort to get the estimated proportion from previous study.*

Example: A survey is being planned to determine what proportion of families in a certain area are medically indigent. It is believed that the proportion cannot be greater than 0.35. A 95% confidence interval is desired with w= 0.05. What sample size should be selected for the study?

Solution:

$$n = \frac{(Z_{\frac{\alpha}{2}})^2 p(1-p)}{\omega^2} = \frac{(1.96)^2 x0.35x(1-0.35)}{(0.05)^2} = 350$$

The size 350 is not the final sample for the study. There are conditions that we have to account.

Different Some Considerations

The final sample size should consider the following conditions:

- Nonresponse, lost to follow up, lack of compliance and so on. Depending on the sensitivity of the research problem, up to 15% nonresponse can be accounted.

- Consider the total size of the population (N): if N < 10000 then finite population correction formula can be used which is defined by:

$$n_f = \frac{n_0}{1 + \frac{n_0}{N}}$$

  Where nf=final sample size, n0=sample size from the above formula and N=total population.
- Design effect: Is a correction of bias in the variance introduced in the sampling design, by selecting subjects due to the use of clusters. The design effect can be calculated after study completion, but should be accounted for at the design stage. It compares the variance of simple random sampling and variance of cluster sampling;

$$Var(SRS) = \frac{P(1-P)}{n}$$

$$Var(Cluster) = \frac{\sum (p_i - P)^2}{k(k-1)}$$

  Then Design effect can be computed as

$$Design\ \text{Effect} = \frac{Var(cluster)}{Var(SRS}$$

Where

- p=global proportion,
- p_i=proportion of the ith cluster,
- n=number of subjects
- k=number of strata

The design effect is 1 (no design effect) when taking a simple random sample. The design effect varies using cluster sampling; it is usually estimated that the design effect is 2 in cluster sampling.

2.3.5.3 Sample size for two population

Equal Sample size for the Difference of proportions

Here the objective of the study is to check whether there is significant difference between two proportions coming from two different population. The sample size to be taken from each group is assumed to be equal.

Thus the sample size which will be randomly taken from each group can be determined by:

$$n(\text{each group}) = \frac{(p_1q_1 + p_2q_2)(Z_{1-\alpha/2} + Z_{\beta})^2}{(p_2 - p_1)^2}$$

Where:

- p1 =current estimate of population proportion P1 (Non-exposed or control group)
- q1 = 1-p1
- p2 = current estimate of population proportion P2 (exposed or treated group)
- q2 = 1- p2
- $Z_{\alpha/2}$=the Z value corresponding to the alpha error. This is the value at two tailed.
- Z_{β}=the Z value corresponding to the beta error. The Z value for beta is always based on one tailed test. So if beta is 0.05, 0.1, 0.2, or 0.3, then the corresponding z values are 1.65, 1.28, 0.85 and 0.52 respectively

Example : An investigator wants to determine if the fatality rate among cancer patients undergoing standard therapy differs from the case fatality rate in cancer patients receiving new treatment. The case-fatality rate among cancer patients undergoing standard therapy is 0.80, and is 0.60 for cancer patients receiving a new treatment. Find the required sample size to test a hypothesis that the case-fatality rate differed between groups at the stated level of significance, alpha = 0.05, and desired power of the test, 0.90.

Solution: From the given information,

- p1 =0.60
- q1 = 1-0.60=0.40
- p2 = 0.80
- q2 = 1- 0.80=0.20
- $Z_{\alpha/2}$ = 1.96

- $Z_\beta = 1.28$

$$n(\text{each group}) = \frac{(p_1q_1 + p_2q_2)(Z_{1-\alpha/2} + Z_\beta)^2}{(p_2 - p_1)^2} = \frac{(0.7x0.3 + 0.8x0.2)(1.96 + 1.28)^2}{(0.8 - 0.7)^2} = 388.4 \text{ T}$$

hus, 389 standard treatment users and 389 new treatment users needed for the study

2.3.5.4 Sample Size using Statistical Software

As an alternative method, statistical softwares calculate the sample size required for the study. There are many softwares which can be used to determine sample size including Openepi, and EPI-Info. These are commonly used in area of health because of their simplicity to use and understand easily.

2.4 Variables of the study & operational definition

A variable is defined as a characteristic of a person, object or phenomenon, which can take on different values. When one tries to assess associations between variables, there is a need to identify dependent and independent variables. **Response (dependent, outcome) variable** is a variable which can be affected by explanatory/independent variables. On the other hand, **explanatory (independent, predictor) variable** is a variable that explain the response variable.

Many variables can easily be measured but for some variables it is sometimes not possible to find meaningful categories unless the variables are made operational with one or more indicators. Operationalizing variables means that you make them measureable. For example, if a researcher reported that 60% of the women are knowledgeable on family planning methods, readers may have different understanding on this report unless there is standard definition for it or operationally defined. Knowledge is not usually assessed by asking only a single question. There is a need to develop a series of questions. The answers to these questions form an indicator of someone's knowledge on the issue which can then be categorized. For example, if 10 questions were asked, you might decide that the knowledge of those with 0 to 3 correct answers is poor; 4 to 6 correct answers is satisfactory; and 7 to 10 correct answers is good.

2.5 Data collection methods/techniques

The commonly used data collection techniques/methods include:

- Using available information (Document review)
- Observation
- Interviewing (face-to-face)
- Administering written questionnaires
- Focus group discussions

2.5.1 Using available information (Document review)

Analysis of the information routinely collected by health facilities is very useful for identifying problems. Researchers can also identify other sources of available data like newspapers, published case histories etc. The major advantage of available data is that collection is inexpensive. But, as a limitation, it is sometimes difficult to gain access to records or reports. Additionally, data may not always be complete and precise enough, or is too disorganized.

2.5.2 Observation

Observation is a technique that involves systematically selecting, watching and recording behavior and characteristics of living beings, objects or phenomena

Observation of human behavior can be undertaken in different ways:

A) Participant observation. Observer takes part in the situation he or she observes

Eg. A nurse hospitalized with fracture who now observes patient care practices in the ward she is admitted

B) Non-participant observation. Observer watches the situation, openly or concealed, but does not participate

Observation can give additional, more accurate information on behavior of people than interviews or questionnaires. As observations are time consuming, they are most often used in small scale studies. Observations can also be made on objects like observing the presence or absence of latrines and the state of cleanliness

2.5.3 Interviewing

It involves oral questioning of respondents, either individually or as a group. Answers can be recorded by writing them down, tape-recording, or a combination of both. Interviews can be structured, unstructured, or semi-structured

Structured interviews (standardized interviews).

This type of interview is often used in quantitative research. There is low degree of flexibility during the conduct of interview. The same sets of questions are asked, in the same order, using the same words, to different interviewees.

Unstructured interviews

These are interviews without predetermined set of questions. It is often used in combination with observation Researchers and interviewees talk freely. Interview is flexible and highly responsive to individual differences and emerging new information. Researchers have to generate relevant questions based on their interaction with the interviewees

Semi-structured interviews (Guided Interview)

In this type of interview, researchers prepare interview guides that consist of a set of questions to initiate discussion. Researchers generate other questions in interesting areas of inquiry during the interviews. It is widely used as the qualitative interview method

Qualitative Interview (In-depth interview)

Advantages of in-depth interview

- Usually yield richest data
- Permit face-to-face contact with respondents
- Provide opportunity to explore topics in depth

- Flexible according to particular individuals or circumstances - allow explaining or clarifying questions

Disadvantages of in-depth interview

- Expensive and time-consuming
- Need well-qualified (highly trained) interviewers
- Interviewee may distort information due to the desire to please interviewer
- Flexibility can result in inconsistencies across interviews
- Volume of information too large; may be difficult to transcribe and reduce data

2.5.4 Administering written questionnaires (self-administered questionnaire)

Written questions are presented that are to be answered by the respondents in written form. A written questionnaire can be administered in different ways, such as by sending questionnaires by mail; gathering all or part of the respondents in one place at one time, giving oral or written instructions, and letting them fill out the questionnaires; and hand delivering questionnaires to respondents and collecting them later

Advantages of self-administered questionnaire

- less expensive
- permits anonymity & may result in more honest responses
- does not require research assistants
- eliminates bias due to phrasing questions differently with different respondents

Disadvantages of self-administered questionnaire

- Cannot be used with illiterates
- there is often a low rate of response
- questions may be misunderstood

2.5.5 Focus Group Discussion (FGD)

One or two researchers and several participants meet as a group to discuss a given research topic. This discussion is considered as focused because it is guided by a set of specific topics (questions). Participants need to be generally homogenous on particular characteristics of relevance to the topic. FGD encourages group interaction where participants can influence and be influenced by others. FGD can be used to complement other methods. It is important to develop culturally relevant questionnaire. The number of participants in FGD should be small enough for everyone to have a chance to talk and large enough to provide diversity of opinions (Usually 8-12 participants in one group)

FGD is preferable to that of in-depth interview when:

- Group interaction will help address the research question. It bring out diverse points of view
- Breadth of data is more important than depth
- Topic is not sensitive

Advantages of FGD

- Do not discriminate against people who cannot read and write
- Encourages participants reluctant to be interviewed
- Participant interaction helps weed out false and extreme views
- Help researcher to know expressions and slang

Disadvantages of FGD

- The results are more subject to interpretive bias and error
- Analysis process is more time-consuming
- Investigator risks getting too much unnecessary information

2.6 Questionnaire design

A **questionnaire** is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. Researchers need to consider two important procedures at the outset of constructing a questionnaire. These are planning and piloting.

Planning

During planning, it is important to:

- list the topics of interest in relation to the aims of the study
- collect appropriate and tested questions and scales
- list additional items and response formats that need to be developed

Piloting

The developed questionnaire should be pretested on a sample of about 30-50 people depending on the complexity of the items. The following issues need to be addressed in the pilot study/pretest

- Is each question measuring what it is intending to measure?
- Is the wording understood by all respondents
- Are the instructions on self-administered questionnaires understood by all respondents?
- For closed questions, is an appropriate response available for each respondent?
- Are any questions systematically or frequently missed, or do some questions regularly elicit un-interpretable answers?
- Do the responses suggest that the researcher has included all the relevant issues in the questionnaire?

Questionnaire layout

The questionnaire should be visually easy to read and comprehend. The first few lines of a questionnaire usually include:

- the label ‘confidential’,
- the respondent’s serial (identification) number (to preserve anonymity),

- the title of the study
- a brief introduction

Lower case letters should be used for texts. The instructions for the respondent or interviewer should also be given clearly at the beginning for example, whether answers are to be ticked, circled, written in or combinations. A thank you statement should be given at the end of the questionnaire. Any filter questions that do not apply to some respondents must be clearly labeled and all interviewers and respondents must understand which question to go to next. Instructions about filter questions/skips are usually printed for interviewers in the right-hand margin of the questionnaire. The following are examples of filter question and skip

1a. Have you ever chewed chat?

Yes__

No__ GO TO QUESTION 2

1b. are you currently chewing chat?

Yes__

No__

Question numbering and topic ordering

Questions must be numbered (1,2 etc), and sub-questions clearly labeled (e.g 1a, 1b etc). A question and its responses should never be split over two pages, as this can lead to confusion. The order of questions is very important that questions should not skip backward and forward between topics. Each section of the questionnaire should form a module and be topic based (e.g questions should be grouped together by subject). Provide linking sentences when moving to new section/modules on the questionnaire for example, the next questions ask about some personal behaviors

Question forms

Question form refers to format of the question (closed or open-ended), and type of measuring instrument (e.g single items, batteries of single items or scales). The comprehensiveness of response choices for closed questions is important. Closed questions can be dichotomized (e.g yes/no response choices), multiple response (no restrictions on the number of responses that can be ticked) or scaled (with one response code per response frame permitted).

Structured interviews involve the use of fixed questions, batteries of questions and/or scales which are presented to respondents in the same way, with no variation in question wording and with closed qes (pre-coded response choices). Some structured questionnaires will also include open-ended questions, to enable respondents to reply in their own words. The more structured approach is only suitable for topics where sufficient knowledge exists for largely pre-coded response formats to be developed

Semi-structured interviews include fixed questions but with no, or few, response codes, and are used flexibly, often in no fixed order, to enable respondents to raise other relevant issues not covered by the interview schedule

Unstructured interviews are comprised of a checklist of topics, rather than fixed questions, and there are no pre-codes

Open questions

Open-ended questions are essential where replies are unknown, too complex or too numerous to pre-code. They are also recommended for developing questions and measurement scales. The information collected is only limited by the respondent's willingness to provide it. It can be very informative as a method, but demanding for the respondents. Most interview questionnaires include a combination of open & closed questions. Open questions following closed questions are useful for probing for clarification of reasons and explanations. Closed questions following open questions are of value on topics about which little is known and where people are likely to be uncritical or influenced by social desirability bias if presented too soon with response choices

Disadvantages of open questions

- replies can be distorted by the coding process back in the office
- They can be time consuming and difficult to analyze
- require more skilled interviewers and coders

Closed questions

Closed questions are preferable for topics about which much is known. They are quicker and cheaper to analyze. Self administered (e-g postal) questionnaire should be restricted to closed question because most respondents will not bother to write their replies to open-ended questions. Pre-coded responses always carry the risk that respondents' replies are forced into inappropriate categories. Care is needed when one is choosing the response choices for closed ended questions. There should be a category to fit every possible response, plus include 'other (specify)' category if it is

felt that there may be some unknown responses. Pre-coded numbers such as age groups need to be mutually exclusive, comprehensive and unambiguous

Form and under-reporting

Pre-coded response choices may be helpful if under-reporting is likely to be a problem. The list of alternatives must be comprehensive to prevent under-reporting. With questions asking about knowledge, open-ended questions are preferable to the provision of response choices in order to minimize successful guessing. Postal questions should also be avoided when asking questions about knowledge as they give respondents the opportunity to consult others, or to look up the answers

Question items, batteries and scales

Single item questions

Single item measures use a single question to measure the concept of interest. Single item questions are imperfect indices of attitudes or behaviors, as responses to one question can only be partly reflective of the area of interest. Responses can also be affected by other factors, including question wording, social desirability bias and interviewer bias, all of which can lead to measurement error

Batteries

Batteries of questions are a series of single questions, each relating to the same variable of interest. Each item is analyzed and presented individually, not summed together

Scales

Scales involve a series of items about a specific domain that can be summed (sometimes weighted) to yield a score. A more valid measure than a single item questions or batteries of single items is obtained, because any individual item error or bias tends to be cancelled out across the items when averaged or summed. Items on the scale should differ in content i.e they should all express a different belief about the area of interest, or different aspects of the behavior so that they will not all be limited by the same types of errors or question bias. Scales also permit more rigorous statistical analysis. Researchers usually aim to provide single score, partly because they are easier to analyze and apply. The simplest method of combining scale items is to add the item response scores. For knowledge questions each correct answer can be given a value of 1 and each incorrect answer allocated 0, and the items added to form a score. With scaled responses a numerical value can be attached to each class, such as strongly agree=4, agree=3, disagree=2, strongly

disagree=1. Many investigators allocate a middle scale value to ‘no opinion’ (e.g ‘neither agree nor disagree) responses, as in Likert Scale. In this case, the scale values would be: strongly agree=5, agree=4, neither agree nor disagree = 3, disagree=2, strongly disagree=1. The crude addition of scores, which results in all items contributing equally to the multi-item scale score, makes the assumption that all items are of equal importance. If some items are regarded as more important than others, they should be weighted accordingly (their scores are multiplied by X to enable them to count more)

Likert scale

Likert scales are the most popular for the measurement of attitude. It contains a series of ‘opinion’ statements about an issue. The person’s attitude is the extent to which he or she agrees or disagrees with each statement, usually on a five-point scale. It is conventional for high numbers to signify favorable evaluation. Scoring is reversed where necessary. The total attitude score is the sum of the responses

2.7 Planning data analysis & choosing statistical techniques

2.7.1 Data processing

Data processing refers data entry into a computer, data checks and correction, variable coding, and data cleaning. The aim of this process is to produce a relatively clean dataset.

Data Entry

Data entry concerns the transfer of data from a questionnaire to a computer file. It is converting data into a form that can be read and manipulated by computers used in quantitative data analysis. The collected data should be entered in to a data entry form which is prepared in one of the software. It is possible to enter data in almost all statistical softwars. However, some of these softwars do not have controlling mechanism for mistakes during when we create data entry template. Softwars like EPI-Info and EpiData have the feature of mistake controlling mechanism, whereas SPSS, STATA, R or SAS are powerful for analysis. Thus, it is advisable to use one of this software for data entry and then export the data to other software for analysis.

Before analysis, data must be checked for errors, outlying observation, missing observation, and data that needs coding must be coded. If there are outlying or/and missing observations, handling mechanism should be used. Deleting such observation before formal statistical test will introduce bias.

Data coding

In general computers are at their best with numbers. Some statistical packages cannot analyze alphabetic codes, some cannot understand open ended responses. We must translate variables through coding. Coding is assigning a separate (non-overlapping) numerical code for separate answers and missing values. For instance, instead of using male and female for the variable gender, it can be indicate by number 1=Male and 2=Female.

Numerical variables can be also transformed in to categorical variable through coding. When you transform numerical variable to categorical, the choice of the cutoff value should not be arbitrary. Rather, the cutoff values need reference and scientific justifications.

Data Cleaning

No matter how carefully the data have been entered some errors are inevitable. Data cleaning is need after data entry process is completed. The aim of this process is to produce a clean set of data for statistical analysis.

2.7.2 Plan for analysis

Data analysis plan is critical because it tells the reader what analysis will be conducted to examine each of the research question. In the data plan, cleaning, transformations, and assumptions of the analyses should be addressed, in addition to the actual analytic strategy selected. We do data analysis to get answer for the research question we plan answer. The study may have more than one research question which can be stated as:

- Primary research question
- Secondary research question

The appropriate methods of data analysis are determined by your data types and variables of interest, the actual distribution of the variables, and the number of cases. Different analyses of the same dataset may reflect or represent different aspects of the underlying data structure. Plan of Data analysis could contain any combination of the following types of data analysis strategies:

- **Exploratory data analysis:** This type of data analysis often occurs when a program is new, and it is unclear what to expect from the data.
- **Descriptive data analysis**: The most common type of data analysis, this approach will summarize your findings and describe the sample.
- **Inferential**: Inferential statistics allow us to draw conclusions about the larger population from which the sample is drawn. These powerful techniques may be able demonstrate if a change has occurred as a result of your program.

The purpose of analyzing data is to obtain usable and useful information. The analysis, regardless of whether the data is qualitative or quantitative, may:

- Describe and summarize the data.
- Compare variables
- Identify relationships between variables.
- Forecast outcomes

2.7.2.1 Descriptive statistics

When data have been clean and checked, the next explanatory step is to examine the distribution of each variable. The distribution of each variable should be explored where distribution refers to the way data are distributed, in order to draw conclusions about a set of data. With continuous variables, the aim is to determine whether or not normality may be assumed. If not we may wish to consider transforming the variable, or may wish to categorize the variable for analysis (e.g. age groups). With categorical variables, we obtain the frequency distribution of each variable. Based on the distribution, we may wish to amalgamate certain categories for analysis. The probability distribution of a categorical variable tells us with what probability the variable will take on the different possible values.

The characteristics of categorical variables can be described by charts or frequency table. There are variables which need to be described by charts and there are variables which are appropriately described using table.

Table 1: Nutritional status of Adult people living with HIV/AIDS on ART at Achefer Woreda,June 2015,(N=315).

Variable	**Frequency**	**%**
BMI(kg/m2)		
<18.5	85	27
18.5-24.99	207	65.7
25-29.99	21	6.7
≥30	2	0.6

When you construct a table, make sure rows and columns are labeled correctly. The title should be self-explanatory (tells what, when how and who). The title of the table should be at the top. There are different types of table; simple table, two-way table, composite table and dummy table.

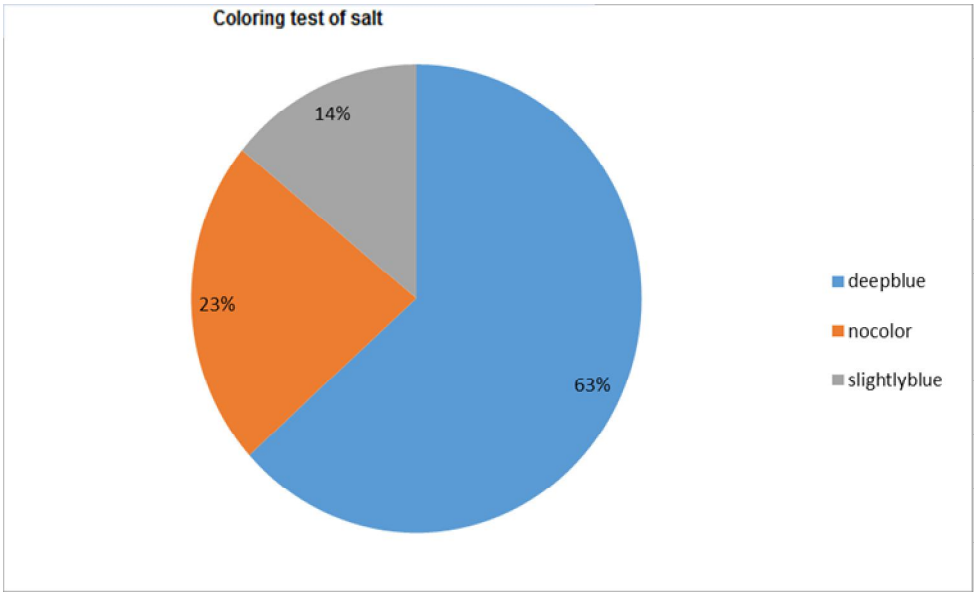


Figure 7: Pie-chart showing availability of iodized salt at household level in Mecha district North-West Amhara, April, 2015.

Another chart for categorical variable is bar chart. Consider the variable staple dies for pregnant women who attained ANC at Gondar university hospital. This data can better presented using bar-chart.

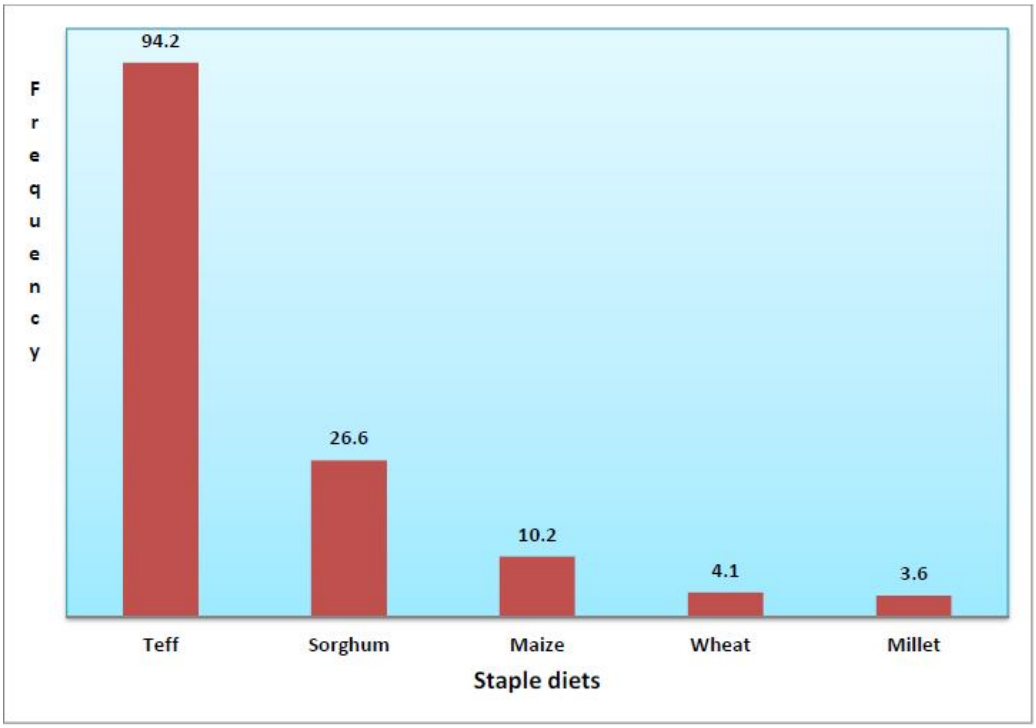


Figure 8: Staple diet of pregnant women at the UOG Hospital, Gondar, northwest Ethiopia, 2015

The characteristics of numerical variables can be described by graphs and summary statistics. Consider data from 48 university students and we want to describe this data to explore information. One method of describing the data is to use graph and plot.

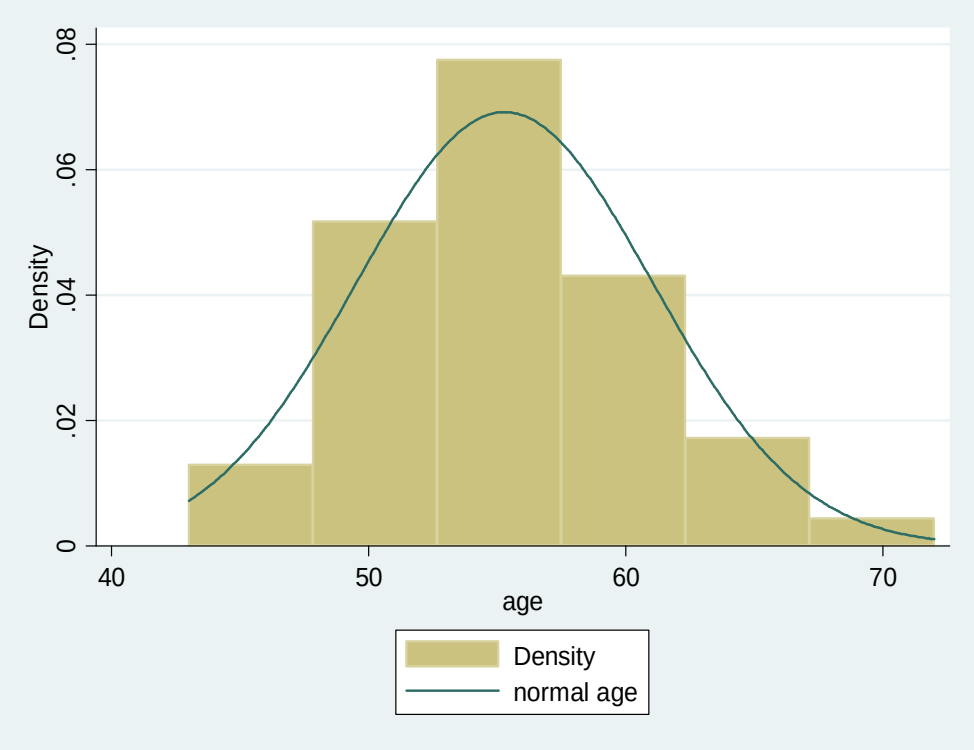


Figure 9: Histogram displaying frequency distribution of the weight of 48 students in a class for biostatistics course at University of Gondar.

Another type of plot which can describe continuous variables is box plot. Consider the data on gestational age and birth weight of infants. In order to highlight visually the differences between two or more distributions, box plots for each of these distributions may be drawn side by side.

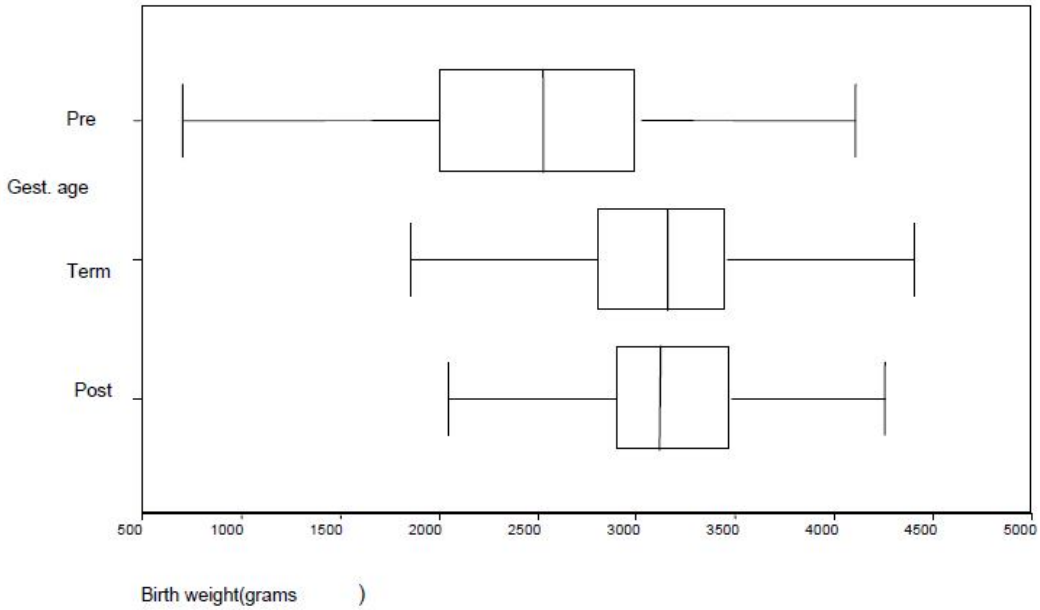


Figure 10: Box plot of gestational age and weight of new born

Scatter plot can be also used to have glance information for variable relationship. Consider the variables mean arterial blood pressure and duration of hypertension. The two variables can be presented in a scatter plot to explore possible relationship.

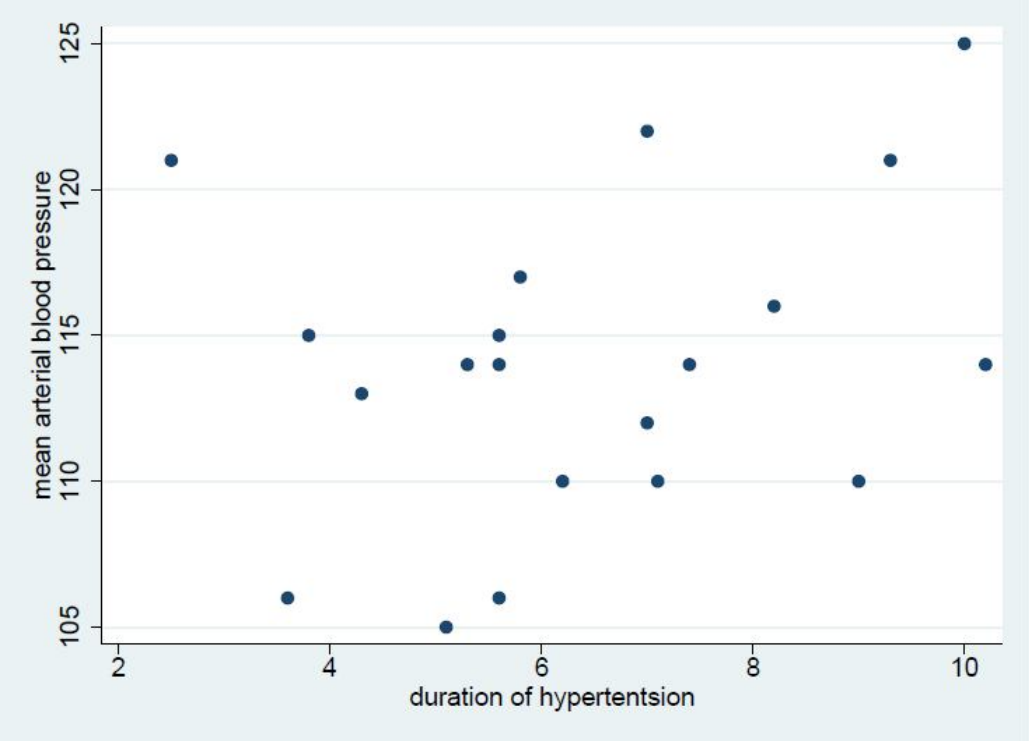


Figure 11: Scatter plot of hypertension duration and arterial blood pressure

Statistical summary measures like mean, median, mode, inter quartile range, variance and standard deviations can be used to get more information about the variable. Consider the Jimma infant survival data. The variables weight of infant in gram, length in centimeter, arm circumference and mothers age were recorded. These variables can be summarized by mean, standard deviation, minimum and maximum values.

Table 2: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
weight	7873	3113.62	515.97	1180	5800
length	7873	49.20	2.81	30	64
arm circumference	7872	10.71	1.13	5	16
Mother age	8040	26.34	6.30	14	50

The information obtained from frequency tables, charts and graphs need to be described in text and linked to the objectives. Some of the research questions may be answered by descriptive information. If there are research questions which need analytic information, we further analysis the data using inferential statistics.

2.7.2.2 Inferential Statistics

In practice, we do not know the true population probability distribution, but wish to infer, from our sample, something about it. Statistical inference is the process of using samples to make inferences about a population. This includes estimation and hypothesis testing.

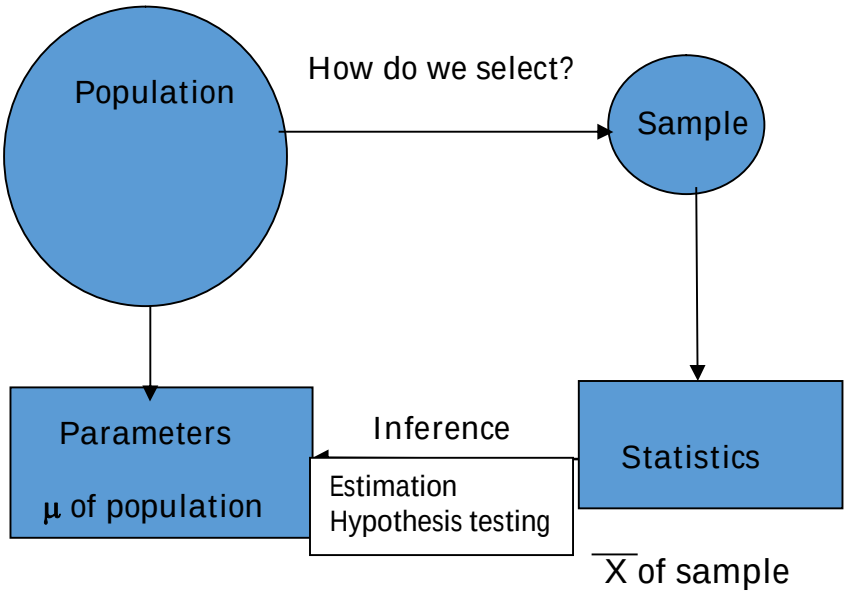


Figure 12: Schematic presentation of statistical inference

Depending on the research question, we may need to estimate parameters, confidence interval, and p-value for the population from which we identified the problem. To do so, we need to choose appropriate statistical model. The choice of the model depends on, objective of the study, study design, nature of the variable, distribution of the variable, sample size, and the number of group we want to compare. Depending on the data type that we want to model, there are different types of statistical models. These include; t-test, analysis of variance, binary logistic regression, Poisson regression, linear regression, and survival analysis to mention few. These are the basic statistical models which assumes independency among the observations of the outcome variable. If the assumptions are violated, they have extensions like linear mixed model, generalized linear model, generalized linear mixed model and so on.

2.7.2.3 Comparison of two groups

If the research question is comparison of two groups, then the appropriate statistical test will be t-test. There are two types of t-test

1. One sample t-test
2. Independent sample t-test
3. Paired sample t-test

Before we used these tests, the normality and homoscedasticity assumptions should be tested.

2.7.3 Comparing more than two groups

Analysis of variance is used if we want to compare more than two groups. This test also requires the dependent variable to be normal, has constant of variance among groups, and independent observation.

Example: Consider child survival data with variable arm circumference and gravidity. The variable gravidity is categorized in to three groups. We want to compare arm circumference among the three groups of gravidity which leads to ANOVA. The model is fitted in SPSS and the output is given below:

ANOVA

arm circumference

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	153.186	2	76.593	61.297	.000
Within Groups	9832.654	7869	1.250		
Total	9985.839	7871			

2.2.1.1 Binary Logistic regression

Categorical data are data with nominal or ordinal scale. Binary outcomes having two levels, i.e., alive or dead, diseased or not diseased. This types of variable are quite common in public health and biomedical researches.

The response variable in binary logistic regression is assumed to binary (success and failure). The independent variables can be any type. The model has three components as it is one of the family of Generalized linear model (GLM);

1. Random component
2. Systematic component
3. Link function

The Simple logistic regression model can be formulated as :

$$\log it(p) = \alpha + \beta x$$

Where α= represents the overall disease risk, β=slope of the model which refers represents the fraction by which the disease risk is altered by a unit change in x, and x=independent variable. The odds ratio of the variable x can be computed as Exp(β). When we include more than one independent variables in the model, then the logistic model will be multiple logistic regression model. The resulting odds ratios are adjusted which are less affected by confounding variables.

$$\log it(p) = \alpha + \beta_1 x_1 + \beta_2 x_2 +, ..., + \beta_k x_k$$

Example: Logistic regression for factors association with anxiety among HIV patients at ALERT hospital ART clinic, 2015.

Explanatory variables	Anxiety		COR,95%(CI)	AOR,95%(CI)
	yes	No		
Sex				
Male	30	136	1	
Female	105	146	3.26(2.04,5.21)	**3.13(1.80,5.44**
Marital status				
Single	39	91	1.25(0.74,2.12)	1.14(0.62,2.10)
Divorced	32	37	2.53(1.39,4.60)	**2.51(1.26,5.00**
Widowed	26	43	1.77(0.96,3.25)	1.31(0.65,2.61)
Married	38	111	1	
Comorbid disease				
TB	24	26	2.21(1.21,4.01)	**2.74(1.37,5.47**
Others	16	29	1.32(0.68,2.54)	1.38(0.66,2.88)
No disease	95	227	1	
Perceived stigma				
Yes	105	137	3.70(2.32,5.92)	**4.00(2.40,6.69**
No	30	145	1	
Good social support				
Yes	48	134	1	1
No	87	148	1.64(1.01,2.50)	1.25(0.76,2.05)

Conclusion: The covariate sex, marital status comorbid diseases, and perceived stigma were significantly associated with the outcome variable

2.2.1.2 Poisson regression

Count data are very common in many applications. Examples of count data include; number of patients visiting a certain hospital per day, CD4 counts, number of live births in a given district per year, and so on. Count data are commonly analyzed using Poisson regression model. The Poisson model assumes that yi, given the vector of covariates xi, is independently Poisson-distributed with

$$f(y) = \frac{e^{-\lambda}\lambda^{x}}{x!}$$

Poisson regression is characterized by common mean and variance. Suppose Y count outcomes, and let x represent the corresponding covariate values. Then the Poisson regression can be formulated as:

$$\log(\lambda) = \alpha + \beta x$$

Exp(β) measures the change in the expected log counts (incidence rate). We can include more independent variables in the model which results multiple Poisson regression.

$$\log(\lambda) = \alpha + \beta_1 x_1 + \beta_2 x_2 +, ..., + \beta_k x_k$$

2.2.1.3 Linear regression

When the response variable y is continuous and the covariate x is any form, then we can use linear regression to predict the effect of x on y. The model can be formulated as:

$$y = \alpha + \beta x$$

The coefficient β measures the change in the response variable y for a unit change in the dependent variable x (if x is continuous). When we add more explanatory variables, then the resulting model is multiple linear regression which can be formulated as:

$$y = \alpha + \beta_1 x_1 + \beta_2 x_2 +, ..., + \beta_k x_k$$

Before we start reporting the output of the model, the assumption of normality of the error term, linearity, independent and equal variance should be tested. If there is any assumption violation, then transformation is needed.

2.2.1.4 Survival analysis

Survival Analysis refers to statistical methods for analyzing survival data. Survival data could be derived from laboratory, clinical, epidemiological studies, and so on. Response of interest is the time from an initial observation until occurrence of a subsequent event. This time interval from a starting point and a subsequent event is known as the survival time.

Survival data can be summarized by life table, Kaplan-Meier survival curve, and log-rank test non-parametrically before we consider regression models.

Cox-proportional hazards model is used to predict the effect of covariates on time-to event as an outcome variable. The hazard function for individual i is modeled as:

$$h_i(t) = h_0(t)\exp(\beta x)$$

Where $h_0(t)$ is the baseline hazard function, β is regression coefficient, and x_i are covariates of interest.

The baseline hazard is the hazard when all covariates are zero, and is left unspecified and this idea combined with a parametric representation of the effects of covariates gives rise to the term semiparametric. The model assumes the hazard of any individual i is a time-constant multiple of the hazard function of any other individual j. This property is called the proportional hazards assumption. The exponentiated regression parameter (Exp(β)) can therefore be interpreted as hazard ratio. Stratified Cox regression can be used to relax the assumption of proportional hazards for a categorical predictor. Adding more explanatory variable gives multiple Cox-regression model.

Example: Consider the Cox-regression model for the predictors of treatment failure.

Table: Multivariate Cox regression analysis of predictors of second line ART failure among HIV positive.

Variable	Failure status		Crude HR (95% CI)	Adjusted HR (95% CI)
	Event	censored		
Age				
15-29	17	61	1	1
30-39	26	141	0.69(0 .376, 1.28)	0 .75(0.398, 1.4)
40-49	14	68	0.764(0.376,1.5)	0.81(0.39,1.68)
>=50	10	19	1.84(0.84, 4.024)	**2.326(1.016,5.324)**
INH Prophylaxis				
Yes	3	30	2.27(0.712,7.22)	*
No	64	259	1	
WHO clinical T staging at switch				
I/II	20	107	1	
III	29	143	0.845(0.47,1.49)	0.96(0 .52, 1.745)
IV	18	39	1.59(0.83, 3.04)	**2.58(1.297, 5.14)**
CD4 cell count				
<100 cells/mm^3	47	175	1.76(1.01,2.9)	**1.78(1.03, 3.077)**
>=100cells/mm^3	20	114	1	
NRTI at first line ART start				
D4T	29	104	1	
AZT	15	137	0.86(0 .5,1.47)	*
TDF	13	48	1.8(0.916, 3.56)	*

Note that: The covariate age, WHO stage, and CD4 cell counts were significant predictors of treatment failure.

2.3 Data quality assurance

The term quality refers to being fit for the purpose. Data quality assurance includes all those planned and systematic actions necessary to provide adequate confidence that a data product will satisfy a given set of quality requirements. Many aspects of data collection can impact the quality of the data, including completeness and clarity of questionnaires, the interviewer's delivery, the accuracy of mechanical instruments, and technicians' measurement techniques. Other errors can be introduced into the data after the data are collected, during transcription, at data entry, and data manipulation for analysis. Minimizing all of these potential sources of error is very important the planning and implementation of any study.

Quality assurance

Quality assurance consists of those activities undertaken *prior* to data collection to ensure that the data are of the highest possible quality at the time they are collected. These activities include the development of the study protocol, development of the data entry and data management systems, training of data collection personnel, and testing of data collection procedures.

The major component of quality assurance is the development of the study protocol and the creation of manuals documenting the protocol. Careful design of data collection instruments, including content, format, and step-by-step instructions for completion of the instrument are necessary. Procedures should be designed to ensure that the data being produced are reliable and valid. Limitations of various types of instruments should be considered during development so that potential problems can be identified and mitigated. All aspects of the protocol must be documented in a manual of operations. This document should be viewed as the official study reference document for data collection staff and should contain all details of data collection procedures.

Collection of accurate data is only the first step. It is equally important that errors are not introduced in the process of converting the data to electronic format. For some forms it may be desirable to have the form reviewed and edited before data entry. The purpose of this review would be to ascertain that the form was complete, that skip patterns were followed, and that any data values that seemed inconsistent or looked like possible errors were checked before being entered. Double- data entry is one strategy to catch and correct any data entry errors from the original entry.

Once all protocols have been developed and documented, the next step is to train study personnel to implement the procedures. Training result in standardization and can lead to reduced costs over time.

The final step in the quality assurance process is to test all procedures that have been developed. This is often done by means of a pilot study in which the entire protocol is performed on volunteers who are similar demographically to the anticipated study subjects. The pilot study should encompass all aspects of the protocol

Quality control

Once data collection begins, the quality control procedures developed as part of the quality assurance process must be implemented. The goal of these quality control procedures is to identify and correct errors in the data both *during* and *after* data collection.

The quality assurance procedures developed during the planning phase for monitoring performance must be implemented. Frequently, studies establish procedures for identifying problems but fail to establish adequate procedures for ensuring that the problems are resolved. Items to monitor may include the following:

1) *Recruitment.* Coordinating person or group shall check whether enrolled participants meet all eligibility criteria (e.g., gender, education status etc).
2) *Performance of data collectors.* Data should be analyzed regularly to assess the performance of data collectors. Evidence that a specific data collector's data deviate significantly from the group as a whole should be reported and investigated by the quality control coordinator/supervisor.
3) *Data clean-up. D*ata should be analyzed routinely for problems such as extreme or inconsistent values. In longitudinal studies, for example, if a participant's weight is entered as 60 kg one year and 98 kg the next, it is likely that one of these values is an error which should be checked.
4) *Replicate measures.* Multiple measures taken at one point in time can be used both to identify possible data errors and to calculate more accurate measures. For example, multiple blood pressures are often taken during one study visit and averaged in order to give a more accurate value of the participant's blood pressure. Combining multiple measurements by averaging serves to provide more accurate estimates of true data values and to minimize measurement error.

Session summary

Research methods section of a protocol is the section which shall describe how researchers collect, organize and analyze data that are relevant to the purpose of the study. When writing the methods section, selection of the study design appropriate for the study objectives is usually the initial task. Selection of a specific study design depends on the research problem, personal experience, and resources available for the study. Research problem is the major criteria that should be considered during selection of study designs. Quantitative study designs would be appropriate when the interest is quantifying the occurrence of a problem and assessing associations between dependent and independent variables. On the other hand, qualitative designs would be appropriate when the topic is new or has never been addressed with the particular group under study. A mixed methods design is useful when either the quantitative or qualitative approach by itself is inadequate to best understand a research problem. Researcher's personal training and experience also influence the choice of design. An individual trained in technical, scientific writing, statistics, and computer statistical programs and familiar with quantitative journals would most likely choose the quantitative design. On the other hand, individuals who enjoy writing in a literary way or conducting personal interviews, or making up-close observations may prefer qualitative approach. Investigators may not be able to select the design that gives a high level of evidence. The design that gives a high level of evidence may not be feasible to do or ethical to do. The population to be included in the study should be carefully selected so that as far as possible it should be able to generalize the study findings to a bigger population i.e target (source) population. Selection of adequate sample by probability sampling techniques would enable to generalize the findings to the source population. Sample size should be large enough to address the different objectives of the study. When one tries to assess associations between variables, there is a need to identify dependent and independent variables. For some variables which can't be easily measured, for example by asking a single question, operational definition is necessary. You need also to identify a data collection technique which is appropriate for your study purpose and provide more valid data. The commonly used data collection techniques include document review, observation, interviewing, self administered questionnaire, and focus group discussion. The most commonly used data collection tool is questionnaire. Questionnaires need to be carefully prepared and pre-tested/piloted. A variable can be measured by using single item question, batteries of questions, or scales. The plan for data management shall reflect issues like which software packages will be used for data entry and analysis, what will be analyzed, which statistical tests will be used, which measures of association will be computed, what methods will be applied to control confounding etc. You should also describe how you will be assuring the quality of data. The activities applied for quality assurance include careful development of the study protocol, development of the data entry and data

management systems, training of data collection personnel, and testing of data collection procedures/tools.

Learning activities for session 2, Part 1

Read the following thesis proposal carefully and answer the questions that follow. Some parts of the proposal are deliberately omitted for the sake of the exercise

Research proposal title: Determinants of Non-adherence to Antiretroviral Therapy Among HIV- Infected Adults In Aksum Town, Northern Ethiopia: Unmatched Case – Control Study

Objectives: To identify determinants of non-adherence to Antiretroviral Therapy among HIV infected adults on ART.

METHODS AND MATERIALS

Study design: Institution based unmatched case control study design will be carried out.

Source Population: Source population will be HIV/AIDS positive adults who are on ART in Aksum town.

Study Population: The study population will be HIV/AIDS positive adults who are on ART in Aksum town during the study period.

Sample size calculation: The sample size will be computed by Kelsey formula in Epi Info version7 StatCalc for un-matched case control study. 5% type I error, 80% power and 1:2 ratio of non-adherent cases to adherent controls will be used. From previous studies, percent of controls exposed, Odds Ratio and percent of cases exposed to determinant of non-adherence to ART will be employed to carry out sample size based on table-1 below.

Table-1: sample size for factors associated with non-adherence to ART from previous studies.

SN	Determinant factors of non-adherence to ART	% controls exposed	Odds Ratio	% cases exposed	sample size		Ratio of cases to controls	Total sample size by adding 5% non response
					cases	controls		
1	CD4 Count	12.1	2.18	21.7	130	260	1 :2	411
2	Quality /enough food	46	2.19	68.4	81	161	1 :2	258
3	Occupation	20.7	2.7	31	56	112	1 :2	177

Therefore the final sample size for the study will be 411(137cases and 274 controls).

Sampling procedure

By scanning patient ART follow up charts, clients will be selected who were non-adherent (poor and fair) at least once in the last three visits for follow up appointment. From the selected non-adherent HIV-infected clients, those who will report having ingested less than 95% of the total number of the prescribed antiretroviral medication for the last one month will be considered as “cases”. Clients that were with good adherence in all of the last three visits and those who will report having ingested 95% or more of the total number of the prescribed antiretroviral medication for the last one month will be considered as “controls”.

Baseline assessment will be conducted using registration book to know daily flow of non-adherent (cases) and adherent (controls). Then based on this baseline assessment, proportional sample allocation will be done for Aksum St.Marry Hospital and Aksum Health Center. To select participants all cases will be included in the study (cases are rare) and for controls systematic random sampling method will be used. The first participant will be selected at random. Finally data will be collected until the sample size will make up the whole sample of 411.

Inclusion and exclusion criteria

Inclusion criteria

HIV-infected adults ≥18 years old receiving ART at the study site for six month or more will be included in the study.

Exclusion criteria

HIV-infected clients on ART who are seriously ill and being hospitalized unable to communicate and participate during the study period will be excluded from the study.

Study variables

Dependent variable: non-adherence to ART

Independent variables includes

Socio-demographic and economical factors: - age, sex, religion, marital status, educational status, occupation, income and residence

Psychosocial factors: - social support, disclosure of sero-status, alcohol use and substance use (cigarette smoking and chat chewing).

Medication related factors:- WHO staging, opportunistic infection, duration on ART treatment, side effect of ART, adherence to schedule and illegal drug use

Nutrition/feeding related factors: - BMI, feeding frequency and dietary diversity

Immunological factor: - CD4 count

2.4 Operational definition of variables

Adherence to ART: - will be defined as HIV-infected clients who started ART before six months that will report having ingested greater than 95% of the total number of the prescribed antiretroviral medication in the current visit.

Non-adherence to ART: - will be defined as HIV-infected clients who started ART before six months that will report having ingested less than 95% of the total number of the prescribed antiretroviral medication in the current visit.

Dietary diversity: - is the number of reported different foods and food groups consumed in a household over a 24- hour period. This does not include food group consumed outside home. It is classified as low $\leq$ 3 food items, medium 4-6 food items and ≥6 food items as higher based on Food and Agriculture Organization (FAO) recommendation(33).

Depression: - a score of 1 to 4-No depression, 5 to 9 mild depression, 10 to 14 moderate depression, 15 to 19-moderately severe depression and 20 to 27 severe depression(37).

Data collection procedure

Data collection instrument

Data on socio demographic, medication, nutrition, psychosocial and Immunological related factors and self report adherence to ART will be collected by document review, and face to face interview using a structured pre-tested questionnaire developed from different literatures. The questionnaire will be first developed in English version and translated to the local language Tigrigna version and then translated back to English by different interpreters to check for its consistency. Secondary data will be extracted from ART registration follow up charts.

Data quality control

In order to ensure quality of data, by taking 5% of the total sample size, pre testing of the questionnaire will be done on HIV/AIDS clients on ART nearby Health Center a week prior to the actual study and necessary modification will be done for the questionnaire according to the gap identified.

Two day training will be given to data collectors and supervisors on how to approach the clients and how to collect data from ART registration charts. Interview of participants will be carried out in private room. Data collection process will be strictly followed day to day by the supervisor and principal investigator and the collected data will be checked for completeness and consistency every day by supervisor and principal investigator. Before analysis, data cleanup and cross check will be done and missing values will be coded

Data management and analysis

Data will be coded and entered into epinfo version 7.0 and will be exported to STATA Version 12 for analysis. Descriptive analysis will be conducted to describe the study participants in relation to relevant variables. Bivariable analysis will be used to assess the presence and degree of association between dependent and independent variables.

Finally factors that show association in bivariable analysis and which has P-value less than 0.2 will be entered in to multiple logistic regression models for controlling confounding factors and to identify significant factors of non-adherence to ART among HIV infected adults. At the end adjusted odds ratio with 95% CI and P-value <0.05 Will be considered as significant.

Learning activity 2.1.1

Based on the above information, do you think the design he/she proposed is appropriate? Why?

Comment 2.1.1

Though, not methodologically the strongest, case controls design can be used for this purpose. Especially, it is feasible to conduct a case control study than conducting a prospective cohort study.

Learning activity 2.1.2

What possible biases could affect the validity of this study? Is there any mechanism of controlling confounding before data analysis proposed in this study? What are the mechanisms?

Comment 2.1.2

Information bias could be one of the problems. For example, those who missed doses may report as if they are taking the drug based on the prescription which may lead to social desirability bias. Adherence to schedule is listed as one of the independent variables. This is not appropriate since it is also part of the definition of the dependent variable. No mechanism of controlling confounding before data analysis is proposed in this study

Learning activity 2.1.3

To what larger population can the findings of this study be generalized? Why?

Comment 2.1.3

The study findings can be generalized to HIV/AIDS positive adults who are on ART in Aksum town since it is expected that HIV positive adults are expected to visit health institutions in Aksum. If other towns in Tigrai Region are similar, the study may also be generalized to towns in Tigrai Region

Learning activity 2.1.4

Do you think all the dependent and independent variables will be measured appropriately so that there will be meaningful analysis of the variables? Why?

Comment 2.1.4

Some variables like adherence may not be appropriately measured because of social desirability bias. Similarly, there can be misclassification during measuring variables like disclosure of sero-status, substance use, and illegal drug use

Learning activity 2.1.5

The researcher is planning to apply document review and face to face interview to collect data. What problems shall the researcher expect to encounter?

Comment 2.1.5

Records may not be complete. Additionally, because of social desirability bias respondents may not tell their real behavior

Learning activity 2.1.6

What mechanisms will be applied to control confounding during the analysis stage? Do you think these mechanisms will be sufficient?

Comment 2.1.6

He/she planned to conduct multivariable logistic regression which may be appropriate to control during the analysis stage if sample size is sufficient

Learning activities for session 2, Part 2

Consider the following topic of research and answer the question asked about the topics.

Learning activity 2.2.1: Magnitude of HIV status disclosure to sexual partners and factors associated with it among PLHA attending in North Gondar Zone
Learning activity 2.2.1.1: Propose the most appropriate sampling method that you think
Learning activity 2.2.1.2: Compute the minimum sample size for each after getting proportion.
Learning activity 2.2.1.3: What is the dependent variable of the study?
Learning activity 2.2.1.4: Choose appropriate statistical model to answer the research questions
Learning activity 2.2.2: Birth outcome and Postpartum Morbidity Among Antenatal care attendant Mothers in Gondar town, North west Ethiopia
Learning activity 2.2.2.1: Propose the most appropriate sampling method that you think
Learning activity 2.2.2.2: Compute the minimum sample size for each after getting proportion.
Learning activity 2.2.2.3: What is the dependent variable of the study?
Learning activity 2.2.2.4: Choose appropriate statistical model to answer the research questions
Learning activity 2.2.3: Assessment of knowledge of major reproductive cancers, their early detection measures and associated factors among women of Gondar town
Learning activity 2.2.3.1: Propose the most appropriate sampling method that you think
Learning activity 2.2.3.2: Compute the minimum sample size for each after getting proportion.
Learning activity 2.2.3.3: What is the dependent variable of the study?
Learning activity 2.2.3.4: Choose appropriate statistical model to answer the research questions

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Session Three: Ethics

Session introduction

There is no doubt scientific research has contributed a lot to the development of our world. The ethics of scientific research is somewhat unique within professional ethics in the sense that good science requires the ethical practice of science. Nevertheless, a course in research ethics cannot and should not have as its central focus the question, "Why should I be moral?" This question, while important, is not specific to the field of scientific research. A course in research ethics, as envisioned by the Dartmouth team, must be a course that teaches the tools for making ethical decisions relative to matters of research. It will be designed for those scientists who are already committed to being ethical researchers. Such a course should provide students the answers to the question, "How can I make moral decisions?"

Much research has been carried out in different disciplines, one of which is health research. Health research has played a significant role in minimizing the burden of various diseases. Health research aims at solving health and health related problems. At the same time it has also raised ethical questions. Public attention was drawn to ethical questions by reported abuses of human participants in biomedical experiments especially during the Second World War. Since then ethics has become an evolving issue which has drawn global attention. During the Nuremberg war crime trials, the Nuremberg code was drafted as a set of standards for judging researchers who had conducted biomedical experiments on concentration camp prisoners. This became the prototype of many ethical guidelines which came later to correct the pitfalls of the former. The guidelines consist of rules that guide investigators or reviewers of research protocols in their work. In addition to these rules, broader ethical principles provide a basis on which specific rules may be formulated, criticized and interpreted. In spite of the formulation of many ethical guidelines, a number of ethical dilemmas still arise indicating that ethics is a very sensitive issue.

Learning Outcomes

After the completion of this session, the participants will be able to:

- understand the ethics involved in conducting research
- recognize the three research ethics concerning the research participants

3.1 Ethics Concerning Research Participants in the Procedure of Data Collection

Recognize the three main research ethics related to research participants. In research ethics, you have to follow the application of fundamental ethical principles to a variety of topics in scientific research. Different disciplines and professions have norms for behavior that suit their particular aims and goals. Some of the norms promote the aims of research, such as pursuit of knowledge and truth as well as avoidance of error. The ethical standards promote the values that are essential to collaborative work, because research often involves a great deal of cooperation and coordination among different participants, disciplines, and institutions. The ethical norms such as patenting policies, data sharing policies, and confidentiality rules in peer review are designed to protect intellectual property interests while encouraging collaboration.

3.1.1 Respect for a person

Respect for persons addresses three main ethical considerations such as respect for autonomy, informed consent and confidentiality .

3.1.2 Autonomy

This principle aspires to protecting the multiple and interdependent interests of the person _ from bodily to psychological to cultural integrity. It refers to the obligation on the part of the investigator to respect each participant as a person capable of making an informed decision regarding participation in the research study.

3.1.3 Confidentiality

The second very important research ethic is the participants right of privacy through our assurance of confidentiality. The researcher(s) shall assure that information that has been obtained in the course of investigation remains confidential to protect participants from possible harm at the revelation of such information. Data unlinked from individual(s) or group(s) does/do not jeopardize confidentiality. The privacy of individual participant needs to be kept throughout the investigation by the researcher(s).

3.1.4 Informed Consent:

The importance of informed consent of research participants is unquestionable and should be analyzed in terms of containing the three basic elements i.e. information, comprehension and voluntarism. The information shall be given in writing and signed by the participant. When the informed consent is that of a third party, the reasons for the indirect approach shall be stated and be part of the protocol.

Research participants or persons giving proxy consent cannot give full informed consent unless the consent form contains adequate information. And the information on what the study entails to the individual as a result of participation in the study shall be expressed in a language that is
understandable to the participant.

Generally, the consent form should explicitly indicate the followings:

purpose of the research, its duration, procedures, foreseeable risks and discomforts, extent of confidentiality, expected benefits to the participants as well as the community at large, compensation to possible injury and the full address of appropriate ethics monitoring body. The consent form should also clearly indicate that the research participants are free to withdraw from the study any time they want. Research participants are not also obliged to respond to all questions in the study questionnaire.

3.1.5 Beneficence

Beneficence is participants are treated in an ethical manner not only by respecting their decisions, but also protecting them from harm and making efforts to secure their well-being. Two general rules have been formulated as complementary expressions of beneficence these are do not harm and maximize possible benefits and minimize possible harms. The Hippocratic oath that stated “do no harm” has remained a fundamental principle of medical ethics. This was extended to the act of research, i.e., one should not injure study participants regardless of the benefits that might come to others.

The rules of beneficence affect both individual investigators and the community. Investigators are obliged to give forethought to the maximization of benefits and the reduction of risk that might occur because of the study. It is always useful to recognize the longer term benefits and risks that may result from the improvement of knowledge and from the development of novel therapeutic procedures.

The role of the principle of beneficence is sometimes ambiguous, e.g., a study that presents more than minimal risk without immediate prospect of direct benefit to the children involved. There can be two different scenarios with regard to decisions. One scenario is that the research should not be allowed, while the other is that this limit would rule out much research promising great benefit to children in the future. This could make the choice difficult. Beneficence has two components: benefits and risks.

3.1.6 Justice

Justice connotes fairness and equity, and concerns in the distribution of benefits and burdens of research. Generally, Justice does not mean treating all individuals the same. Kitchener (1984) points out that the formal meaning of justice is "treating equals equally and unequal unequally but in proportion to their relevant differences" (p.49).

It also demands equitable selection of participants, i.e., avoiding participant populations that may be unfairly coerced into participating, such as prisoners and institutionalized children. Injustice may arise when selecting participants only from a specific socio-economic class, age, sex, racial, cultural, and institutional make up.

Appropriate justification should be put in place if the research is absolutely necessary with beneficial predicated outcome.

The principle of justice also requires equality in distribution of benefits and burdens among the population group(s) likely to benefit from the research. Distributive justice means that no segment of the population should be unfairly burdened with the harms of research. It thus imposes particular obligations towards individuals who are vulnerable and unable to protect their own interests in order to ensure that they are not exploited for the advancement of knowledge.

On the other hand, distributive justice also imposes duties neither to neglect nor discriminate against individuals and groups who may benefit from advances in research.

3.2 Ethical Issues Concerning Research Writing: What Constitutes Intellectual Property?

In the research ethics, you have to follow the application of fundamental ethical principles to a variety of topics including a scientific research. Different disciplines and professions have norms for behavior that suit their particular aims and goals. Some of the norms promote the aims of research, such as knowledge, truth, and avoidance of error. The research ethics maintain prohibitions against fabricating, falsifying, or misrepresenting research data. It helps to promote the truth and avoids error. The ethical standards promote the values that are essential to collaborative work, because research often involves a great deal of cooperation and coordination among different discipline and institutions. The ethical norms such as patenting policies, data sharing policies, and confidentiality rules in peer review are designed to protect intellectual property interests while encouraging collaboration

3.2.1 Plagiarism

Plagiarism refers to copying other's work. Plagiarism is an act of fraud. It includes:

- stealing and passing off others ideas and words as your own;
- using other's production without crediting the source; or
- giving incorrect information about the source of a quotation.

Following are some of the ways of plagiarism:

- **Deliberate miscues**: providing inaccurate information regarding the sources making it impossible to find them.
- **Accidental plagiarism:** where students do not understand what document is and how to do it
- **Intentional plagiarism:** i.e., cutting/pasting, or presenting other's work as their own.

How to avoid plagiarism?

Most cases of plagiarism can be avoided by:

- citing the proper sources and acknowledging the original material.

- providing the sustainable model developed by the institutions in order to detect and prevent plagiarism.
- teaching students about plagiarism and how to avoid it helps to minimize plagiarism.
- creating a culture of research rather than detecting and punishing for plagiarism.
- introducing laws against plagiarism.

Learning Activity 3.1

- Provide instruction and resources that teach students the skills of paraphrasing, summarizing, critical analysis, etc.
- Direct students to reference and guidelines relevant to their area of research.
- Make the task so specific that students are unable to simply download from the web, or copy from the book.
- Ask students to relate particular theories, concepts, issues in current newspaper articles.
- Get students to integrate theory and experience (e.g., field trips, practicum, and reflective writings).
- Critically analyze the given articles.
- Ask students to regularly hand in samples of their classroom notes and use these to give them feedback on their identification of key issues and their integration of these into their work.
- Ask students to keep a logbook of their learning throughout the project/thesis

3.2.2 Ethical issues relating to the researcher

1. Avoiding bias: Bias on the part of the researcher is unethical. Bias is a deliberate attempt to either to hide what you have found in your study, or highlight something disproportionately to its true existence.
2. Provision or deprivation of a treatment: Both the provision and deprivation of a treatment/ intervention may pose an ethical dilemma for you as a researcher. Is it ethical to provide a study population with an intervention/ treatment that has not yet been conclusively proven effective or beneficial? But if you do not test, how can you prove or disprove its effectiveness or benefits?

   There are no simple answers to these dilemmas. Ensuring informed consent, 'minimum risk' and frank discussion as to the implications of participation in the study will help to resolve ethical issues.

3. Using inappropriate research methodology: It is unethical to use a method or procedure you know to be inappropriate e.g. selecting a highly biased sample, using an invalid instrument or drawing wrong conclusions.
4. Incorrect reporting: To report the findings in a way that changes or slants them to serve your own or someone else's interest, is unethical.
5. Inappropriate use of the information: The use of information in a way that directly or indirectly adversely affects the respondents is unethical. If so, the study population needs to be protected.

   Sometimes it is possible to harm individuals in the process of achieving benefits for the organizations. An example would be a study to examine the feasibility of restructuring an organization. Restructuring may be beneficial to the organization as a whole bur may be harmful to some individuals.

   Should you ask respondents for information that is likely to be used against them?

   It is ethical to ask questions provided you tell respondents of the potential use of the information, including the possibility of it being used against some of them, and you let them decide if they want to participate.

Session summary

In this session we have discussed the importance of research ethics in all context of research. Research cannot be conducted unless we ensure collaboration and cooperation of different participants, disciplines, and institutions. The three major ethics principles related to respect for a person, beneficence and Justice were addressed critically.

Learning activity 3.2: How do you observe ethics in your day to day interaction with your colleagues?

Learning activity 3.3: You want to get nutritional data on the school children in one of the primary school in Gondar town through a school survey. How will you get this information? What research ethics related to the participants will you address and how will you deal with it?

QUALITATIVE RESEARCH METHOD

Session Four: INTRODUCTION TO QUALITATIVE RESEARCH

INTRODUCTION

One of the objectives of the CMHS is "to carry out relevant basic and applied researches for the advancement of knowledge and improvement of health care system of the country". This is also emphasized in the educational principles of the college that "Providing curricula and teaching programs that are Community Oriented that enable a graduate to identify health problems of the community and to improve patterns of health care", which could not be practical without performing researches. Based on this principle many basic and applied researches had been and are being performed by the academic staff and students. Majority of the researches follow that of quantitative methods rather than qualitative methods.

It is high time to produce a learning material that will enable staff and students to develop knowledge and skill on qualitative research method. This session is meant to contribute towards the development and improving the status of researchers in qualitative research.

Qualitative research nowadays is growing and applied in many basic and applied researches. Many texts are produced on how to go about it. This session is mainly focuses on the introduction of qualitative research in particularly focusing on the scope, principles and characteristics.

LEARNING OUTCOMES

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

4.1. Understand the extent, purpose or intention of qualitative research in conducting research,

4.2. Identify the rules or beliefs governing a qualitative research,

4.3. Identify the feature/quality/typical nature of a qualitative research.

4.1. THE SCOPE OR THE EXTENT OF QUALITATIVE RESEARCH.

Qualitative research provides an in-depth understanding of human behavior and the explanation behind it. It also explores using the **why and how** questions.
It is a method of naturalistic enquiry aiming to study people in their natural social settings and to collect naturally occurring data. The focus is on the meanings the participants in the study setting (i.e. in the field in their natural settings), attach to their social world.

Qualitative research describes in words rather than numbers the qualities of social phenomena through different methods such as observation, interviews, diary methods, biography, focus group discussions, etc.

Qualitative research methods allow the researcher to work with the primary and secondary data (transcribed from interviews, observational notes, and documents), to explore the nature of the stories people tell or the way they behave to look at the different perspectives, understandings and interpretations that social beings bring to each social situation in which they participate.

The researcher's role is to listen, observe, theory test (in the case of interviews), and then interpret or make sense of what she/he sees and hears. As the extent and nature of the data cannot be known before they are collected, the process of collecting and analyzing qualitative data often intermingle. The collection of some data from perhaps a small number of in-depth interviews may be followed by analysis, which then helps the researcher to identify further data that are needed to test out or develop his/her preliminary interpretations. The researcher is in close touch with the real situations of the data, close to the ground.

HISTORY

Short history of the development of qualitative research:

- ✓ Until the 1970's used only to refer to a discipline of anthropology and sociology.
- ✓ During the 1970s and 1980s Qualitative Research began to be used in other disciplines, such as studies of educational, social works, management, political sciences, health services, etc.
- ✓ In the late 1980s and 1990s new methods of Qualitative Research evolved, to address the perceived problems with reliability and imprecise modes of data analysis.
- ✓ In the last thirty years the acceptance of Qualitative Research by journal publishers and editors has been growing.
- ✓ Original meanings: qualitative originated from a Latin word Qualitas which means consistency, nature, feature, attribute, and condition. Qual describes

as observable condition, composition of systems, processes and their features. It is expressed as language.

DEFINITION OF QUALITATIVE RESEARCH

Different scholars on the field define qualitative research in many ways.

- It is a study, which is conducted in a *natural setting* where the *researcher, an instrument of data collection*, gathers words or pictures, analyzes them inductively, *focuses on the meaning* of participants, and describes a process that is both *expressive* and *persuasive* (=sound reasoning) in *language.*
- It aims to gather an ***in-depth understanding*** of human behavior and the ***reasons*** that govern such behavior.
- It is needed to provide **insights** to people's life style, behavior, their knowledge, their feelings and attitudes, their opinions and experience.
- The Qualitative Research method investigates the ***why, what, and how*** of decision making, not just *how much/many , where, when, and how often.*
- Qualitative research methods are methods for collection, analysis, and interpretation of data on phenomena that are not easily reduced to numbers or that might be destroyed by an attempt to do so

THE AIMS OF QUALITATIVE RESEARCH

Qualitative Research

- Helps ***to discover*** the range, psychological nature, motives, behavior, rather than measuring their incidence or rationalized opinions.
- Allows people to contribute and share their ***views and feelings*** in a conversational format.
- Is a method of *naturalistic enquiry*;
- Aims to study people in their *natural social settings* and to collect naturally occurring data;
- Describes in *wards* rather than numbers;
- Is *multi-methods* in focus;
- In general, it enables us to make sense of reality, describes and explains the social world, and develops explanatory models and theories.

Essential Features of Qualitative Research

The central ideas guiding qualitative research are different from those in quantitative research. The essential features of qualitative research are the correct choice of appropriate methods and theories; the recognition and analysis of different

perspectives; the researchers' reflections on their research as part of the process of knowledge production; and the variety of approaches and methods.

Preliminary lists of Qualitative Research Features are:

- **Appropriateness of methods and theories**
  - The object under study is the determining factor for choosing a method and not the other way round.
  - qualitative research's central criteria depend on whether findings are grounded in empirical material or whether the methods are appropriately selected and applied, as well as the relevance of findings and the reflexivity of proceedings
- **Perspectives of the participants and their diversity.**
- **Reflexivity of the researcher and the research.**
- **Variety of approaches and methods in qualitative research.**

WHY AND WHEN TO USE QUALITATIVE RESEARCH?

The following *Reasons* could call for a Qualitative Inquiry:

- Topics that need to be explored: This is a situation where variables cannot be easily identified; theories are not available to explain behavior of participants/their population of study.
- Need to present a detailed view of the topic.
- Not enough to present answers to the problem.
- Need to study individuals in their natural setting.
- Need to write in a literary style: This is where the writer engages a story telling form of narration.
- Where there is sufficient time and resources on the extensive data collection in the field and detailed data analysis,
- The nature of research question: In a qualitative study, the research questions often starts with a *how* or a *what;* and

The Roles of Qualitative Research in Public Health

A. Understand success or failure of a program

Read the following published research paper entitled **"If you want to know, Ask Them: A Modern Fable"** (Fable= a short story that teaches a lesson or truth) and answer the questions below.

Exercise I.

If You Want to Know, Ask Them: A Modern Fable

A country plagued with high rates of STI and low condom use invited a team of experts to introduce a new contraceptive option: the female condom. This new barrier device, they argued, was an effective alternative to the male condom and would at last give women the control they needed to protect themselves or their partners against infection.

Working with local counterparts, the team initiated a program to strengthen STI prevention and treatment services, inform people about the female condom, train providers in its use, stock the shelves of clinics and dispensaries, and recruit lay outreach workers to carry the message to women in the communities. Six months later, encouraging results showed that rates of infection had dropped; women and men were indeed seeking treatment for STI symptoms. Twelve months later, treatment rates were still up, but rates of new infection were not declining as expected.

The team was forced to conclude that introduction of the female condom was not a cost-effective strategy because it had little sustained impact on the incidence of STI. The team leader, however, began to suspect that there might be more to the story. She invited a social scientist with qualitative research skills to investigate further the failure of the female condom to lower STI rates. This researcher designed a follow-up study that used in-depth interviews, focus groups, and clinic observation to explore the meaning of the new device to different community groups. He and his trained interviewers soon learned that clinicians were not distributing the female condom because they feared being accused of lacing the condoms with HIV virus – a rumor that was circulating in the community. Data from providers about the popular belief that the female condom could carry HIV were reinforced by comments from women in the communities. Talking with women revealed that most women knew about the method but did not ask for it, believing that providers who rarely suggested it) either did not have it or thought it was ineffective or even dangerous.

In both men's and women's focus groups, participants discussed what the female condom meant to them. Men were candid in their criticism of giving women control over pregnancy and therefore license to engage in extramarital affairs. They surprised the researchers with their anger at a program that "encouraged promiscuity" while claiming to promote reproductive health. Some even questioned the motives of women "who would want to collect a man's semen" in a condom. Against a backdrop of cultural beliefs in the power of witchcraft to bring harm to one's enemies, men's anxiety concerning illicit use of female condom was a serious and understandable obstacle to the program.

Women felt caught between program messages urging them to try the female condom and partner resistance. Although most were attracted to the idea of independent protection, they also understood that control carried it's on risks. By accepting the female condom, they possibly would trade the risk of infection for the risk of abandonment by partners who could them of infidelity.

Listening to people tell how they made their decisions gave program developers the information they needed to understand and address specific social and cultural issues in female condom promotion. But even more important was the realization that the forces motivating sexual and reproductive decisions are complex and often more powerful than competing health promotion messages. We may not know why some programs succeed and others fail, but the simple lesson from this situation is that if you want to understand how and why people make the decisions they do, ask them.

2. What was the first strategy did the researcher used?
3. What were the activities performed to implement the first strategy?
4. How was the result?
5. Why was the female condom not a cost-effective strategy?
6. What action did the researcher took after the first result?
7. What research design implemented by the new team?
8. What were the new findings?
9. Why do people not use the health facility?
10. Why has the female condom not the same success of the male condom?
11. What is the recommendation of the researcher?

B. **Prepare the Implementation of a Programme (informs actions)**

C. **Refine the Implementation of a Programme - Enhances decision making.**

READING ASSIGNMENT I.

Read the Published Research Paper entitled as **Maternal health care professionals' perspectives on the provision and use of antenatal and delivery care: a qualitative descriptive study in rural Vietnam** ***on Page 75.***

D. Additional applications:

- Identify attributes to be included in a questionnaire.
- Explain results from quantitative research**.**

4.2. The Principles that govern in the utilization of qualitative research.

Key features of qualitative methodology

Qualitative research is **humanistic** because it focuses on the personal, subjective, and experiential basis of knowledge and practice.

It is **holistic** because it seeks to situate the meaning of particular behaviors and ways of doing things in a given context.

Qualitative researchers are constantly trying to make sense of what they see and hear in a specific context; their approach to understanding what is going on is **interpretive**, in other words, their aim is more often to explain rather than to merely describe. How the data gathered on people's experiences are interpreted depends much on the researcher's theoretical presuppositions and background.

Qualitative researchers, more than quantitative researchers, generally adopt a **reflexive** position vis-à-vis their research, in other words, they are explicit about how their personal history and biography shape the questions asked, the framing of the research and the presentation of data. These four characteristics of qualitative research require a different methodological approach.

Methods in qualitative research are generally open-ended and in-depth, and **naturalistic**, that is, they attempt to study things, people and events in a natural (non-experimental) setting. The methodology is **flexible** because it may use multiple methods to examine the same question or area ('triangulation') and iterative, refers to questions or studies that are repeated over time with the same informant or group of informants. This is feasible when a researcher has access to the same informant over the course of a study, and is useful when new questions arise, or the researcher wants to go back and check some of the data s/he has analyzed.

The Nature of Qualitative Research

Qualitative research is the main method used by anthropologists in participant observations and/or qualitative interviewing of members of a culture (ethnography), and by social scientists whose approach is rooted in a phenomenological perspective.

It originates in social anthropology and mainly concerned with developing explanations of the social world. In opposition to positivist thinking which dominates quantitative research, it predicted upon the socially constructed nature of reality.
The two main paradigms in the social sciences are **Naturalism** that provides the theoretical basis for qualitative approaches and **Positivism** that provides the theoretical basis for quantitative approaches.

The Main Features of Naturalism

- Social world should be studied in its *natural state.*
- World cannot be understood as a set of causal relationships because human actions are based on *meanings.*
- Getting close/ focus on the *micro* – about sharing life of those being studied to share people's interpretations of their world.
- *Theory generating* or emphasis on *induction.* Researcher does not describe the phenomena using pre-determined categories.
  Inductive reasoning begins with observations and builds up general statements and hypotheses from them for testing.

A *holistic approach* – open to gathering any data that will shed light on the problem.
The natural scientist systematically observes and measures the behaviour of matter and the

results of these investigations are regarded as 'facts'; these are believed to be undistorted by the value judgement of the scientist.

The Main Features of Positivism

The method of investigation used depends on the investigator's assumptions about society. A considerable body of social science is directed by research methods drawn from the natural science. This approach is known as *positivism.*

Positivism aims to discover laws using quantitative methods and emphasizes *positive facts.* Thus, positivism assumes that there is a single objective reality, which can be ascertained by the senses, and tested subject to the laws of the scientific method.

Positivism in social science assumes that human behavior is a reaction to external stimuli and that is possible to observe and measure social phenomena, using the principles of the natural scientists, and the hypothetical-deductive method, and thereby to establish a reliable and valid body of knowledge about its operations based on *empiricism* (actual evidence gathered through use of senses, i.e. observed).

Deductive reasoning means that the investigator starts with general ideas and develops specific theories and hypothesis from them, which are then tested by collecting and analyzing data.

Positivists are not concerned with measuring the meaning of situations to people because they cannot be measured in a scientific and objective manner.

- Belief in *objective nature of reality* that can be studied and understood.
- *Experimental design* is the model for social research.
- Emphasis on the *quantification of observations* using neutral/standardized language.
- Discounts subjective understandings and intentions of humans.
- *Theory testing.*

4.3. CHARACTERISTICS OF A QUALITATIVE RESEARCH

The eight characteristics of qualitative research, which are important to consider are:

4.3.1. *AN EXPLORATORY AND DESCRIPTIVE FOCUS*

Research studies are qualitative and designed to discover what can be learned about some phenomenon of interest, particularly social phenomena where people are participants or subjects. Qualitative researchers develop a general 'focus of inquiry' that helps to guide the discovery of what is to be known about some social phenomenon. Researchers are interested in investigating and responding to exploratory and descriptive questions such as 'In what ways do people in this rural town build informal social networks?' 'How do people who work in this place think the physical environment could be improved?' The outcome of any of these studied is not the generalization of results, but a deep understanding of experience from the perspectives of the participants selected for study.

4.3.2. *EMERGENT DESIGN*

Important leads are identified in the early phases of data analysis and pursued by asking new questions, observing new situations or previous situations with a slightly different lens, or examining previously unimportant documents. This broadening or narrowing of what is important to study (i.e., the focus of inquiry) and the consequent sampling of new people and settings is anticipated and planned for, as best one can, in qualitative research designs.

4.3.3. *A PURPOSIVE SAMPLE*

In qualitative research, participants or settings are carefully selected for inclusion, based on the possibility that each participant or setting will expand the variability of the sample. Purposive sampling increases the likelihood that variability common in any social phenomenon will be represented in the data, in contrast to quantitative research random sampling which tries to achieve variation through the use of random selection and large sample size.

4.3.4. *DATA COLLECTION IN THE NATURAL SETTING*

Qualitative researchers are interested in understanding people's experience in context. The natural setting is the place where the researcher is most likely to discover, or uncover, what is to be known about the phenomenon of interest. Extended amounts of time with people in the places they inhabit is a critical feature of indwelling, fostering the development of both explicit and tacit knowledge.

4.3.5. *EMPHASIS ON 'HUMAN-AS-INSTRUMENT'*

The qualitative researcher has the added responsibility of being both the collector of relevant data – data whose relevance changes as the study proceeds – and the culler of meaning from the data, which most often is in the form of people's words and actions. It is possible to include other formal instruments, such as questionnaires or tests, in a qualitative study.

4.3.6. *QUALITATIVE METHODS OF DATA COLLECTION*

The data of qualitative inquiry is most often people's words and actions, and thus requires methods that allow the researcher to capture language and behavior. The most useful ways of gathering these forms of data are participant observation, in-depth interviews, group interviews, and the collection of relevant documents. The researcher in the form of field notes collects observation and interview data and audiotape interviews, which are later transcribed for use in data analysis. There is also some qualitative research being done with photographs and videotaped observations as primary sources of data.

4.3.7. *EARLY AND ONGOING INDUCTIVE DATA ANALYSIS*

The characteristics of qualitative research described so far point to two important characteristics of qualitative data analysis:

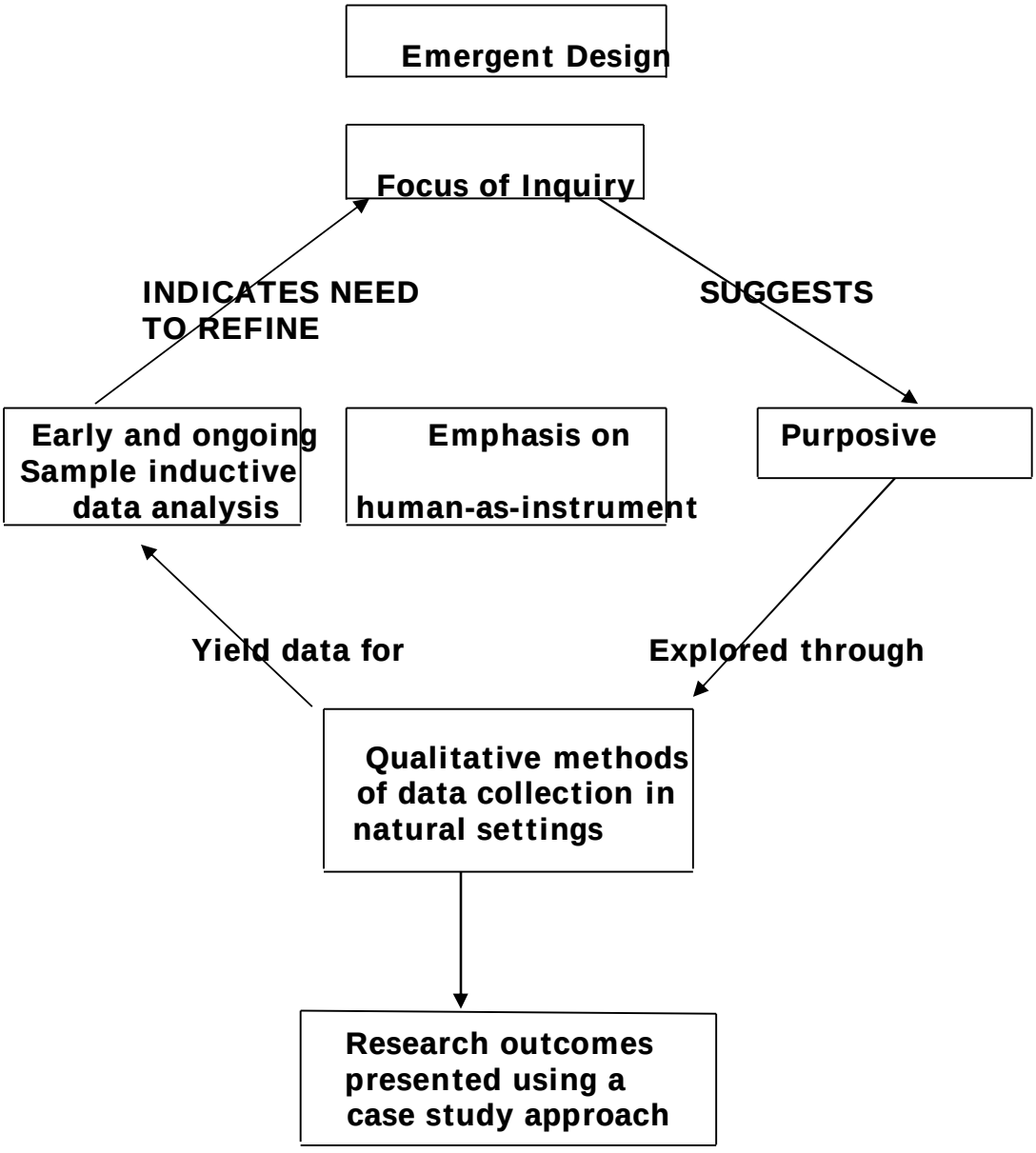
a/. It is an going research activity, in contrast to an end stage, when the design is emergent;

b/. It is primarily inductive. Analysis begins when one has accumulated a subset of the data, providing an opportunity for the salient aspects of the phenomenon under study to begin to emerge. Pursuing the relevant persons, settings, follows these initial leads or documents that will help illuminate the phenomenon of interest. In other words, there is a broadening or narrowing of the focus of inquiry as the data suggest it. *What is important is not predetermined by the researcher*. Within the broad boundaries of the researcher's focus of inquiry, the data studied for what is meaningful to the participants in the study or 'participant perspectives'. The outcomes of the research study evolve from the systematic building of homogeneous categories of meaning inductively derived from the data.

4.3.8. *A CASE STUDY APPROACH TO REPORTING RESEARCH OUTCOMES*

The results of a qualitative research study are most effectively presented with a rich narrative, sometimes referred to as a case study. The number of cases varies with each study, from one case to several. With book length reports, the researcher has an opportunity to provide many excerpts from the actual data that let the participants speak for themselves – in word or action – thereby giving the reader sufficient information for understanding the research outcomes. In article length reports, the researcher by necessity is briefer, using a modified case-study mode of reporting. A qualitative research report characterized by rich description should provide the reader with enough information to determine whether the findings of the study possibly apply to other people or settings.

Figure1. Showing Characteristics of Qualitative Research



(Adapted from '**Beginning Qualitative Research**, A philosophic and Practical Guide'. Pamela M.

Exercise II. Instruction

1. Observe the following picture and list down what you have seen/watched.
2. How do you relate this exercise with a qualitative research?

SUMMARY

QUALITATIVE RESEARCH

- It is useful to gain an in-depth and first-hand understanding of a problem to inform for further development of a quantitative study.
- It helps for further explanation to provide insight into the results of a quantitative study.
- It helps to understand the differences among groups or categories beliefs, opinions, and behaviors.
- It helps to gain insight into what influences/hinders people's decision – making practices and behaviors on different issues.
- Audiences are receptive to qualitative research.

Self-Assessment Questions (SAQs) for Study Session 4

Now that you have completed this study session, you can access how well you have achieved its Learning Outcomes by answering these questions. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

Exercise III.

Instruction: Identify the following as related to either *Qualitative* or *Quantitative* Research.

1. A study which the researcher carefully designs all aspects of the study before actually collecting any data;_____
2. You know in advance what you are looking for; _____
3. The design emerges as the study unfolds;_____
4. "How do teachers in special education classes react to distance learning?"_____
5. The Researcher deals with data in the form of words; _____
6. List at least three methods for the application of Qualitative Research?

7. Show at least three differences between Qualitative and Quantitative Researches?
8. Can we use both Qualitative and Quantitative Research designs/ approaches in a research? Yes___ No___
9. Which of the two aims to generate hypothesis and to describe rather than testing hypothesis and generalizing? Qualitative _____ Quantitative____
10. Which favors counting rather than natural observation? Qualitative _____ Quantitative____

SESSION FIVE: QUALITATIVE RESEARCH METHODS

Introduction

A method is a particular procedure for accomplishing or approaching something and order lines of thought or behavior which is originated from Greek word *methodos which means pursuit of knowledge, (*Concise Oxford Dictionary-10th Edition).

In applied research, qualitative methods have become very important tools, because they provide in-depth or insights into the local perspectives of study populations. The great contribution of qualitative research is the culturally specific and contextually rich data it produces. Such data are proving critical in the design of comprehensive solutions to public health problems in developing countries.

As a qualitative researcher, it is mandatory to know the different methods of qualitative research and when to use them based on the area of inquiry. In general, qualitative research is *multi-methods* in focus. The investigator has the responsibility of selecting the best method/s based his/her problem to address because each method has its own advantages and disadvantages. Choosing a method depends on the subject under investigation, researcher's preferences, time and money available, and funders and/or audience preferences.

What questions can qualitative methods in applied research investigate?

- **Contextual:** identifying the form and nature of what exists:
  - What are the dimensions of attitudes/ perceptions that are held?
  - What is the nature of people's experiences?
  - What needs does the population of the study have?
- **Diagnostic:** examining the reasons for, or causes of, what exists?
  - What factors underlie particular attitudes or perceptions?
  - Why are decisions or actions taken, or not taken?
  - Why do particular needs arise?
- **Evaluative:** appraising the effectiveness of what exists
  - How are objectives achieved?
  - What affects the successful delivery of programmes or services?
  - How do experiences affect subsequent behaviors?
- **Strategic:** identifying new theories, policies, plans and actions
  - What types of services are required to meet needs?
  - What actions are needed to make services more effective?
  - How can systems be improved?
  - What strategies are required to overcome identified problems?

LEARNING OUTCOMES

5.1. Understand the various *Steps* to be followed and when to use Qualitative Research.
5.2. Review literature for generating qualitative research ideas.
5.3. Develop relevant skills in conducting Qualitative Research.
5.4. Recognize when and where to use qualitative research methods.
5.5. Formulate qualitative research questions.
5.6. Develop and apply basic study instruments for collection of qualitative data
5.7. Record and manage qualitative data
5.8. Prepare qualitative data for analysis.
5.9. Assess/evaluate the *Quality* of Qualitative Research.
5.10. Distinguish between quantitative and qualitative approaches.
5.11. Examine when to use combination of qualitative and quantitative research approaches.

5.1. CHOOSING STUDY DESIGN/PROCESS FOR QUALITATIVE RESEARCH.

The process of designing a qualitative study is **not liner.**

5.1.1 Identify the general *area of inquiry/investigation*

Choose the topic something a researcher wants to know more about. Most applied researches are drawn to an area of inquiry out of *personal interest or experience*, or a desire to help *solve a problem*, or in a response to a *request from a stakeholder/donor.* In PH, areas of inquiry might be, e.g. the need for dental care, introduction of a new method for cancer prevention, prevalence of HIV, etc. The chose is rooted in values and expectations that the inquiry will in some way *benefit society*.

5.1.2. Specify the *purpose* of the research

Define the broad area in terms of specific issues that will form the core of the study.

5.1.3. Define the research *problem*

Identify the problem/issue of interest that guides the entire project. A research problem may also come from ***earlier studies,*** perhaps a query as to why or under what circumstances a finding has occur. Understand the depth and parameters of the problem: literature review, other people's views.

Conduct a literature review: Investigate prior research findings, identify gaps in literature and explain how your study will address the gaps.

In general, this will indicate the style of research design, the data collection techniques and even the presentation of the findings.

5.1.4. Develop the larger *conceptual framework*

Conceptual Framework is:

- One way to keep your *design centered* on the research problem is to take the time to develop a Conceptual Framework.
- A *set of related ideas* behind the research design.
- Simple *list of concepts* and their possible associations.
- An elaborate *schematic diagram* of key influences, presumed relationships, and possible outcomes of the research problem.
- A *map* of your ideas.

What is conceptual framework good for?
It helps to outline the ***research question***, provides a context in which others will be able to understand the research, and it is the ***"springboard***" from which you are studying.

Exercise IV: Develop a conceptual framework on the following topic.

"Decision to enroll in a Voluntary Health Insurance"

5.1.5. Phrase *questions* that will address the research problem.

Generate research question concerning the problem. The research problem will determine whether your design should focus on people's experiences, actions and behaviors, on their opinions and values, on their feelings or emotional responses, or what they know or believe.

A. Experience or behavior questions

- How did people in this area controlled malaria?

B. Opinion or value questions

- What is your opinion on Health Extension Program?

C. Feeling questions

- How do you feel when unknown guest comes to visit you at the office?

D. Knowledge questions

- What are the different methods of HIV/AIDS transmission?

Formulate overall research questions:

a. Address what the researcher wants to know more about.
b. Identify the significance of the study.
c. Explain why it is important to study the topic.

Choose an appropriate type of qualitative research to address the research question.

Type of Qualitative Research **Purpose**

- Phenomenology - Focuses on the **lived** experience of participants.
- Grounded Theory - To inductively **generate a theory** merging from the data that describe and explain the phenomena.
- Ethnography - Examines **cultures** (language, practices, ideas, beliefs) and the cultural characteristics of a group of people.
- Case Study - To provide an **in-depth description** of one or more cases.
- Qualitative Context Analysis - To explore the **underlying meaning** of messages or phenomena. It may also be used in evaluation.

Questions can be developed during the research design plan, any more questions will be generated during the initial survey phase of field work. It is not fixed, may be dropped as irrelevant, some may be modified or new questions may be added as the study proceeds.

Exercise V: Develop questions based on the following research problem.

From Research Problem to ***Research Question.***

Research Problem:

"To assess the feasibility of introducing dual-method use (DMU), the use of condoms with another contraceptive method, among couples at risk of pregnancy and STIs".

READING ASSIGNMENT II

Read the example on questions designed for qualitative research on page 91.

5.1.6. Select *Data Collection methods* that will best address the research questions.

Match the research questions with the methods and techniques that can yield the richest information. The major methodological strategies are *observation*, study of existing *documents*, *in-depth interview, and focus group discussions.*

5.1.7. Define *participants*, select a *sampling strategy*

In qualitative research selecting criteria may change as the study progresses. This will allow the researcher to follow new leads with information from new

sources.

Participant Selection

Researchers will use *purposeful sampling* to choose participants who can offer the fullest and most relevant information about the topic under study. It establishes the criteria/conditions necessary to be included the study, i.e. choose a case/cases that match these criteria.

Several Types of *Participant Selection*

- **Typical**

A case is chosen because it is taught *to be like the majority*. The Researcher may be interested in data on typical facilities, not services that are extremely good or extremely *poor.*

- **Extreme/deviant**

Selects extreme cases in order to highlight and understand characteristics of typical situations. After the norm for a typical case is established, the researcher may want to explore *extreme cases* in order to make a comparison. E.g. A study of RH provider effectiveness selected two clinics known for *high levels* of clients and two with a *poor reputation* in the local community.

Methods: observation of services, interviews with clients.

Comprehensive

A situation in which *all the cases* in a sample can be examined.

- **Unique-case selection:** Selection is based on *unique or rare attributes.*
- **Reputation-case selection**

A case is chosen on the recommendation of experienced experts, based on its *reputation* (=trusted or admired).

- **Comparable-case selection**

  Selecting cases on the *same relevant characteristics* over a period of time in order to compare results for replication.

- **Critical-case selection:** One case that makes the point *dramatic.*
- **Convenience sample:** The case/cases that can be studied most *easily, cheaply, or quickly.*

Other sampling techniques are:

Snowball sampling

- Technique to identify informants with special understanding.
- Investigator starts with one selected participant.
- Investigator asks each participant to suggest others with similar ability to address the issues, “who knows a lot about….?”

- Valuable when researcher does not know the field.

Homogenous sampling

When looking for *differences in a group which is apparently similar*. For studying a group in depth (often used in FDGs). E.G.– Exploring the impact of an AIDS prevention programme on male truckers at risk of HIV. Initial formative phase to establish criteria that determine the risk and selective representatives that meet all these criteria.

Heterogeneous sampling

When looking for a *common compound in apparently different people*. E.g. Explore a common factor for family planning. Selection of rural, urban and suburban family clinics serving different socioeconomic groups.

Intensity / Maximum variation sampling

It focuses on *excellent* but not necessary extreme examples of a phenomenon. Samples are small and rich in information but not unusual. E.g. Study about how health deliver can be sensitive to the particular needs of women, selection of women-centered RH services.

Opportunistic sampling

On the spot decision to take advantage of unforeseen opportunities after fieldwork has begun. E.g. Study on contraceptive use was started in clinics A group of women who met the researchers outside in a village where spontaneously included.

5.1.8. Data Collection

Some of the actual processes of collecting data include observation, interviewing, filming, photography, and record review.

- Identify how you will collect your data.
- Discuss how you will recruit your sample.

5.1.9. Define how *data collectors* will be trained and monitored.

- Describe the type of data to be collected, the number of participants and why.
- Describe your sample and settings: Address the parameter of your sample (inclusion and exclusion criteria).

5.1.10. Define *ethical standards* that will assure the protection of study participates.

All human research should begin with the informed consent of participants. It means that study participants understand the following:

- ✓ Possible risks and benefits,

- ✓ Voluntary participation,
- ✓ Assurances of confidentiality
- ✓ The purpose of the research,
- ✓ How they were chosen to participate,
- ✓ Data collection procedures, and
- ✓ Whom to contact with questions and concerns.

5.1.11. Define methods of *Data Analysis*

It is the process of systematically organizing the field notes, interview transcripts, and other materials until you understand them. Data analysis dependent on what type of qualitative research you are pursuing. Each method and methodologies has their own views on how to analyze the data.

5.1.12. Decide how results will be d*isseminated*

5.1.13. Report Writing/Write Up

It is highly essential that the report needs to include the following:

- **a.** To interpret and to present the data according to the data analysis technique.
- **b.** Using quotes as evidence to support your themes and sub-themes.
- **c.** Compare and contrast the results of your study to the literature in the discussion.
- **d.** State the studies' limitations.
- **e.** Make recommendations for future research.

Generally report writing takes the form of long narratives, sometimes combined with pictorial presentations. Many formats to choose from and needs to have a *Beginning, Middle* and an *end.*

The Beginning should include a general *background* to help readers understand the focus of your paper. The *introduction* often concludes with a description of the design of the rest of the paper. The *description* should include

- ✓ a discussion of the research methods and techniques used,
- ✓ the time and length of the study,
- ✓ the number of settings and subjects,
- ✓ the nature of the data,
- ✓ where and how the documents were located,
- ✓ researcher-subject relations,
- ✓ check on the data, and other information that might help the reader to evaluate the soundness of your study.

The Middle makes up the bulk of the work, argue your thesis, present your theme and illuminate your topic. Use the most salient quotations you can find to illustrate the main points of the thesis.

The End should be written as a conclusion, often the focus is decisively restated, the arguments reviewed, and the implications elaborated.

5.2. APPROACHES TO COLLECTION OF QUALITATIVE DATA.

What are Research Methods? Research methods are the *techniques* used by researchers to *structure a study, gather* and *analyze* relevant to the research question. Qualitative Research Methods:

- Are methods for *collection, analysis* and *interpretation of data* on phenomena that are *not easily reduced to numbers* or that might be destroyed by an attempt to do so; e.g. love, health, etc.
- Allow the researcher to work with primary and secondary data.
  The researcher's role is to *listen, observe*, and then *interpret/make sense* of what she/he sees and hears.

Types of Data collection tools in Qualitative Research

- **Interviews:** are typically conducted one-to-one. They seek to understand participants' personal perspectives and on an issue, or event, or situation. This may include: in-depth interview, Key informant interview.
- **Focus Groups:** are used to understand a groups' opinions, ideas, or attitude about a product, issue, or event.
- **Participant Observation:** Involves living among or observing a group of people over the causes of a long period of time and participatory in their daily activities to provide insight to their cultural practices.
- **Field Notes:** these are notes that researchers take during the course of data collection.
- **Archrivals Texts:** Important texts (policy, brief, paper, or book) that provide information relevant to the research topic.
- **Open ended responses on a survey or questionnaire:** Short answer questions. They are used to supplement quantitative information.

The most common tools for data collection in qualitative research methods are presented as follows (Observation, Interview, FGD, and Document Review)**.**

1. OBSERVATION

Observation techniques are methods by which an individual or individuals gather *firsthand data* on programs, processes, or behaviors being studied. It is a research method in which the investigator systematically *watches, listens* to the records the phenomenon of interest.

Observation is not limited to 'watching' but extends to the *direct gathering* of information by the investigator using the senses, generally both sight and hearing. It is the oldest and most basic tool, involved in any kind of research (*quantitative, qualitative*) and learning. The data to be collected during observation are body language, facial expression, behavior, other non-verbal expressions of meanings, movements, etc. observation method provide researchers /evaluators with an opportunity:

- To collect data on a wide range of behaviors,
- To capture a great variety of interactions, and
- To openly explore research/evaluation topic.

By directly observing operations and activities, the researcher/evaluators can develop a *holistic* perspective, i.e. an understanding of the context within which the research/project operates.

Observation of behaviors, actions, activities and interactions is a tool for understanding more than what people say about situations, and can help to understand these complex situations more fully. This approach also allows the researcher/evaluator to learn about things the participants/staff may be *unaware* of or that they are *unwilling/unable* to discuss in an interview/focus group.

Observations can be useful during both *formative and summative* phases of evaluation. It can be descriptive or analytical and observations are carried out using a carefully developed *set of steps* and instruments. It is usually are guided by a *structured protocol*.

The protocol should prompt the observer to:

Describing the setting: where the observation took place and what the physical setting was like;

Identify the people who participated in those activities, i.e. characteristics of those who were present;

Describe the content of the intervention, i.e. actual activities and messages that were delivered;

Document the interactions between implementation staff and project participants;

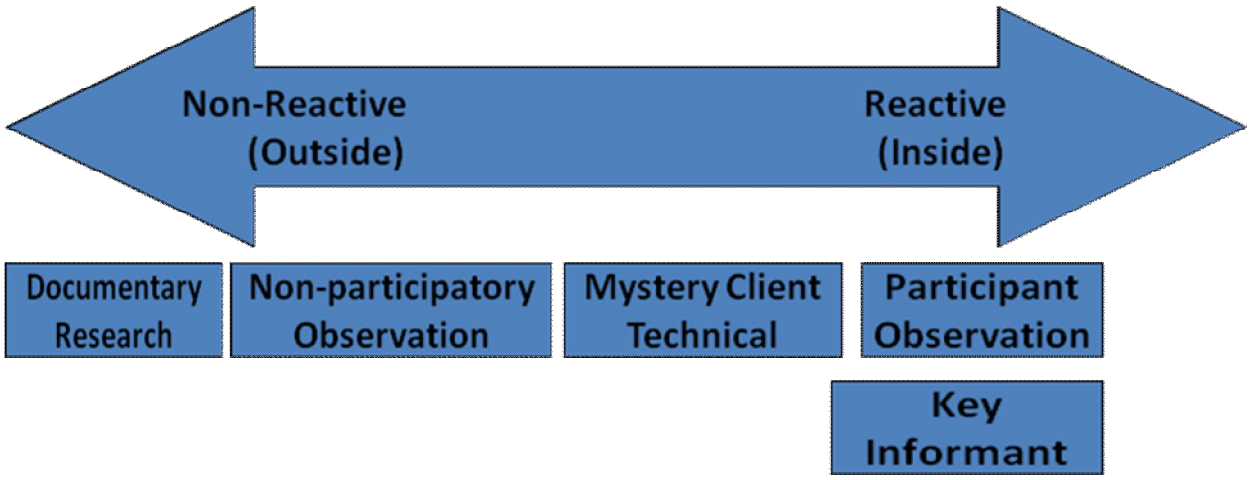
Describe and assess the quality of the delivery of the intervention; and

Be alert to unanticipated events that might require refocusing one or more evaluation questions.

Field Notes are frequently used to provide more in-depth background or to help the observer remember salient events if a form is not completed at the time of observation. *Field Notes* contain the description of what has been observed. The *descriptions* must be *factual, accurate, and through* without being judgmental. The *date and time* of the observation should be recorded, and everything that the observer believes to be worth noting should be included. *No information should be trusted to future recall.*

Informed consent must be obtained from participants before any observational data are gathered. The i*ssues of Privacy and Access* need to be considered.

Outside or Inside Perspective



Observation method can be Participatory: Concealed/Covert, or Non-participatory or Structured/Unstructured.

1. Participant Observation

Researchers typically *become/involved* to be member of a culture, group, or setting, and adopt roles to conform to that setting. The aim is for the researcher *to gain a closer insight* into the culture's practices, motivations, and emotions. Events are observed and recorded, together with the interpretation and explanation. It is the best method for understanding the experiences of people and the meanings they attach to them. Participant Observation are two types: Concealed Participant Observation and Covert Participant Observation.

A. Concealed Participant Observation

The participant observer may be honest about his/her role in the group, or may conceal/ hide the investigation and *pretend to be a normal member of the group*. Concealment does *raise ethical questions* in relation to the lack of informed consent. It also leads to a great deal of *emotional stress* on the part of the observer.

Exercise VI: Read the article on Covert observation of psychiatric hospitals and answer the questions followed.

(Source: Rosenhan D.L. (1973) 'On being sane in insane places', Science, 179; 250-8.

Rosenhan was interested in how reliable and valid diagnostic measures of 'sanity' were and whether psychiatric staffs were able to distinguish the sane and inane. He devised an experiment in which eight 'normal' people got themselves admitted to US Psychiatric Hospitals by claiming to hear voices that said 'hollow' 'empty' or 'thud' but by other ways presenting their 'real' medical and social histories to admission clinic staff. All were admitted with a diagnosis of schizophrenia except one with a diagnosis of manic depressive psychosis. On admission, researchers behaves normally and cooperated with hospital routines, given that they spent considerable time in the hospitals waiting to be discharged their undercover status provided an opportunity for covert observation. Rosenhan's paper reports on their experiences of being hospitalized and the ways in which the diagnostic label they had received at admission shaped the interpretation of their behavior by staff. None of the researchers were identified as sane pseudo-patients by staff; although interestingly many other patients challenged them assuming that they were undercover journalists or researchers. In general, they were discharged with diagnosis of 'Schizophrenia in remission'.

Rosenhan's findings were important. Not only did he contribute to the debate around the social construction of labels as such as schizophrenia, but the reports of his pseudo-patients were an important contribution to our understanding of the effects of both hospitalization and labeling. Labeling someone as mentally ill shapes the interpretation of all their behavior. As patients with a diagnosis, the everyday behaviors of the researchers, such as writing notes or being anxious in the new hospital environment, were seen as symptoms of their diseases. Rosenhan's decryption of many aspects of hospitalization, such as the low level of interaction between staff and patients, the occasional abuse of patients and lack of privacy, were a significant development in our understanding of how institution lead to depersonalization and may contribute to mental health, rather than cure it. With other studies of long-term institutions, this pseudo-patients study was an influence in the gradual policy shift in many countries away from asylums and towards other forms of care for those with mental health problems.

However, the design of the study raises a number of **ethical questions.** First, there are the problems of **deceit.** Except in one case, neither the hospital staff nor other patients knew that they were participants in the research (though some patients did guess), and had not consented to the part. Rosenhan defends the concealment (though he does admit it is distasteful) on the basis that it was necessary. It was the only way that these data could have been gathered. If hospitals were warned that researchers would try to get themselves aditted there would be no way of knowing whether the process of admission and expenses on the wards were typical or not. The hospitals and staff are not named in the report. Rosenhan's is not interested in exposing poor practice (as an undercover journalist might) but rather in generalizing from his data to say something about the ways in which mental illness is dealt with in American health care system. The defense against breaching normal expectations of informed participation is thus a public interest one, based on utilization principles. In short, the ends (furthering public knowledge with the aim of improving services for some of the most marginalized people in society) could be said to justify the means. Arguably, though Rosenhan's study 'spoils the pitch' for future researchers attempting to study psychiatric services in more open ways, making mental health professionals defensive and less willing to consider change. If these disadvantages are taken in to account, the benefit in terms of the service improvements may be less likely. A final ethical consideration is the **safety of the research team.** Once admitted to the hospitals, most of the researchers wanted to leave very quickly, as they were unpleasant places to be. It is, however, difficult to get discharged at short notice, and they spent between 7 and 52 days as patients. This expense may be distressing, and there was also the danger of having to take unnecessary medications.

Reference: Qualitative Methods for Health Research, Judith Green and Nicki Thorogood, Second Edition, 2009.

Meanings of selected words from the above study:

- Sane= not mad
- Insane= very foolish, serious mentally ill.
- Deceit= deception (deceive).

Question on the article on Covert Observation of Psychiatric Hospitals

1. What was the aim/purpose/problem of the study?
2. What actions did the researcher took to address the above problem?
3. What were the findings?
4. What were the results?
5. What was the main problem with such a method?
6. What was the remark made by the researcher?

Application of Participant Observation

It will help to investigate *complex behaviors* that cannot be easily explained or understood from outside.

Its limitations may require *more time* than outside observation, a*daptation* is not always possible and researcher is sometimes clearly outside the study population, e.g. male researcher studying females, non-drug user researcher studying drug users, cross-cultural studies, etc.

Key Informants in Participant Observation

Key Informants are insiders with special knowledge, status, or communication skills, speak on behalf of others, may be suggested by population under study or in advance by the researcher and lay investigator having better access to community under study.

Limitations of Key Informant are data collected is "second hand" information, control about bias of key informant d may engender jealously or suspicion in the group under study.

B. Overt/ Non-Participant Observation

Researcher collects data without interacting with participants' activity. It shows how something happens rather than how people perceive it happening. The researcher gather information with his/her own eyes instead of with participants' eyes. It can be descriptive or analytic.

Observation and participant observation may be done or shown *openly/ publicly (overt).* There may be suspicious about academics and their motives among local communities. *Time* must be spent to form links and explanation should be

offered about how the study can be mutually advantageous. Access is usually obtained through negotiations with a 'gatekeeper' (e.g. head of an organization). The first step is writing to the heads of the organizations about the aims, nature and confidentiality of the study and its potential value. This permission is often given without consulting the members being studied and the investigator needs to be aware of this.

***Application* of Non-Participatory Observation**

To validate interview data (e.g. did the provider really give the information that he claimed to give during counseling according to an interview?).

Limitations: Interpretation may be biased by researcher's cultural and social background.

Qualitative observations are frequently referred to as *Ethnography.* It is a description and interpretation of a cultural/social group/system (Creswell, 1998). In such a study, the researcher examines the group's observable and learned patterns of behavior, customs, and ways of life. Here, the *researcher becomes a participant observer, and gets immersed in the day-to-day lives of people* or through one-on-one interviews with members of the group. The researcher focuses on the meanings of behavior, language, and interactions of the culture-sharing group.

Structured Observation

The researcher has *to begin with a conceptual definition*, what is to be observed and standardized with a validated measurement instruments, and the proceeds to make the observations in order to test the theory. The contents are

- *The Setting*: What is the physical environment like? What is the context? Etc...
- *The participants:* Describe who is in the setting? How many people and their roles? Etc...
- *Activities* and *Interactions:* What is going on? Is there a definable sequence of activities? Etc...
- *Frequency* and *Duration:* When did the situation being observed begin? How long does it last? Etc...
- *Data Collection Tools:* Eyes and other senses, watch, scales, microscope, check-list, etc.

Advantages of Observation Methods

It is to gain access to behavior of which individuals themselves may provide *biased* accounts, or indeed be *unaware*.

It provides *direct information* about behavior of individuals and groups.

It permits researcher/evaluator to enter into and understand situation/context.

It gives more detailed and context related information.

It provides good opportunities for identifying *unanticipated outcomes*.
It permits collection of information on facts not mentioned in an interview.
It permits tests of reliability of responses to questionnaires.
It exists in natural, unstructured, and flexible setting.

Disadvantages of Observation Methods

- *Ethical issues* concerning confidentiality or privacy may arise.
- *Observer bias*: selective perception of observer may distort/affect the investigation.
- The impossibility of observing a *large random* sample of people, organizations or other units of study.
- Rich data but may be *hard to quantify/replicate.*
- *Expensive and time consuming*.
- May *affect behavior* of participants.
- Investigator has little control over situation.
- Need well qualified, highly trained observers; may need to be content experts.

2. INTERVIEW

It is designed to allow the respondent *to tell their story in their own ways.* It also allows the subject matter *to be explored in some depth.*
The use of the interview as a data collection method begins with the assumption that the participants' perspectives are *meaningful, knowable,* and *able to be made explicit* (clear, detail), and that their perspectives affect the success of the research/project.
An interview is selected when *interpersonal contact is important* and when opportunities for follow up of *interesting comments* are needed. There are different types of interview such as Structured, Semi-structured, In-depth (Unstructured/Focused) and In-depth or Semi-Structured**.**

- **In-depth (unstructured/Focused**) is not fixed order.
- **In-depth or Semi-Structured**: It is a conversation between the researcher and the subject about the researcher area/topic.

READING ASSIGNMENT III and IV.
READ THE EXAMPLES ON STRUCTURED AND SEMI-STRUCTURED QUESTIONNAIRES ON PAGE 92 and 95.

- **Individual In-depth Interview** is detailed information obtained from individuals. It is One-to-one and r*eliable for highly personal, sensitive or confidential topics.* Interviewee can be either "key informants" or "ordinary

people". It is valuable for searching busy people, probing deeper into individual attitudes, lasts for 30-90 minutes, and minimum sample size 10-30.

- In-depth Interviews is a dialogue between a skilled interviewer and an interviewee. Its goal is to elicit *rich, detailed material* that can be used in analysis (Lofland and Lofland, 1995). It is best conducted *face to face,* although in some situations telephone interviewing can be successful. The interviewer does not follow *a rigid form;* and seek to encourage *free* and *open responses*. It also encourages capturing of respondents' perceptions in their *own words* and characterized by extensive *probing* and *open-ended questions.* Usually ilt needs the preparation of an *Interview Guide.*

It

- Includes a list of questions or issues that are to be explored for *following up on key topics,*
- Helps the interviewer to remember the points to cover;
- Suggests ways of approaching and talking about topics;
- Helps the interviewer *pace the interview* and make interviewing more systematic and comprehensive.
- Reminds the interviewer about probes (= to search & examine carefully & thoroughly) and ways of asking questions.
- Ensures that the interviewer covers all the topics;
- Gives a possible order of topics; and
- Helps the interviewer to enable people to talk in their own ways, and fully as possible.
- Includes an introduction and way of ending the interview. It needs to have a Beginning, a Body and an End.

Beginning: Put the respondent at ease and help them to begin to talk, ask them to describe their situation or something that has happened to them and give them clearer ideas of the nature of the interview.

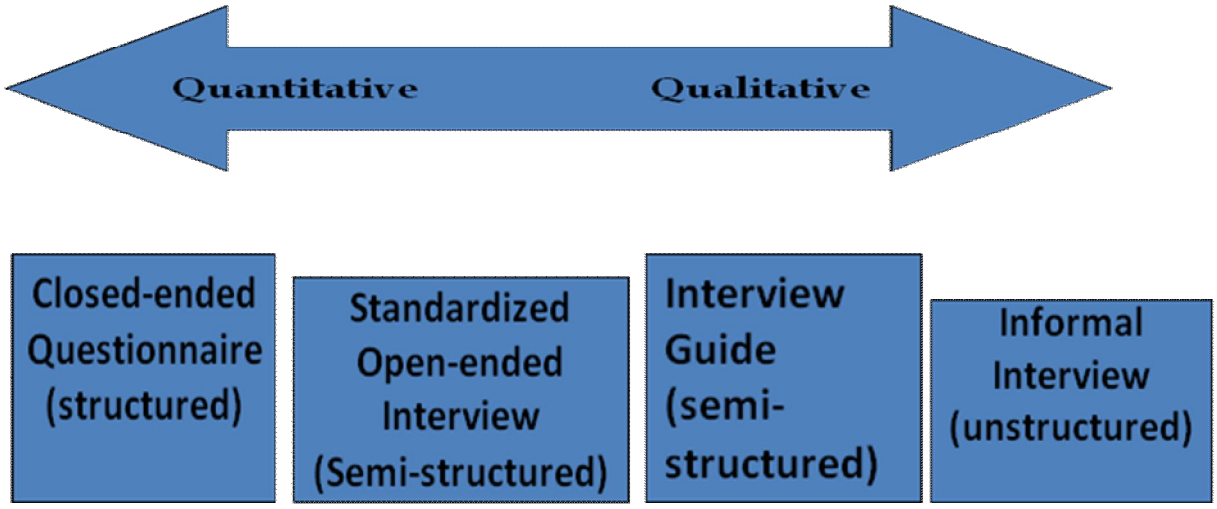
Body: Moves to the areas of particular interest to the researcher. As progressed more detailed or sensitive areas may be discussed. The researcher must be prepared to be

flexible and to come back to explore in more depth areas that have been mentioned but not developed by the respondent.

End: As the interview draws to its close, the researcher moves on to less sensitive and more general matters. Remind again that the interview is *confidential.*

Reading the Interview: In-depth interviews are usually *recorded* and then *transcribed*. The interviewer *must be familiar* with the tape recorders and other accessories.

Types of In-depth Interview



- In-depth (unstructured/Focused): No fixed order.
- In-depth or Semi-Structured: It is a conversation between the researcher and the subject about the researcher area/topic.

TIPS ON IN-DEPTH INTERVIEWING

- The key to being a good interviewer is to be *a good listener & questioner.*
- Remember the interview is a *conversation, not an interrogation*.
- *Don't assume* that you understand what the respondent means - ask
  - Can you tell me more about that?, Can you tell me how you feel about that?, In what way was that a good/bad experience?
- Try to *sit an angle* to the respondent and maintain eye contact.
- *Don't be thrown* if they say something which shocks or surprise you.
- Look expectant and encouragingly say "that is interesting!"
- Use *probes to encourage* people to tell you more:
  - "What happened next?", Can you tell me more about...?"
  - "You said earlier that... could we talk a bit more about that?"
  - "What do you mean?", "In what way?"
- *Embarrassing situations and sensitive* issues may be tackled by:
  - "What about you? How do you feel about that?"
  - "Some people say that...what do you think about that?"
- *Avoid double questions*,

  E.g. "How do you feel about going there with other people and having what they want to do?"
- *Avoid leading questions*,

  E.g. "Don't you think it would be better if...?"
- *Don't sum up* what people say: rather, say: "Am I right in thinking that you...?"

Don't interrupt the flow if they don't immediately answer the question, but don't let them stray too far away from the topic- gently bring them back! "That's very interesting; I wonder if we could now move on to talk about..?"

Potential Pitfalls/Problems when considering In-depth Interviews

1. There may be substantial variation in the interview setting. These limit the interviewer's control over the environment and the interviewer may have to be contend with disruptions and other problems.

2. There may be a large gap between the respondent's knowledge and that of the interviewer; interviews are often conducted with knowledgeable respondents, yet administered by less knowledgeable interviewers, or by interviewers not completely familiar with the pertinent social, political, or cultural context. The s*olution* is not only to employ highly trained and knowledgeable staff, but also to use interviewers with special skills for specific types of respondents. The researcher to conduct the interviews, if this can be done without introducing or appearing to introduce *bias*.

Factors to consider in determining the *setting* for In-depth Interviews and FG:

Select a setting that provides *privacy* for participants: Select a location where there are *no distractions* and it is *easy to hear* respondents speak, a *comfortable location*, a *no threatening environment*, a location that is *easily accessible* for respondents', and a *facility equipped* for audio or video recording. Stop telephone or visitor *interruptions* to respondents interviewed in their office or homes; and provide seating arrangements that *encourage involvement and interaction.*

Recording Interview Data

It can be recorded on *tape*, with the permission of the participants, and/or s*ummarized in notes*. D*etailed recording* is a necessary component of interviews since it forms the basis for analyzing the data.

Three *Procedures for Recording the Data*:

First approach:

- ✓ The interviewer/transcriber *listens* to the tapes and *writes* a verbatim account of everything that was said.
  - *Transcription of the raw data includes word-for-word quotations* of the participant's responses as well as the interviewer's descriptions of participant's characteristics, enthusiasm, body language, and overall mood during the interview.

- ✓ It is essential that the participants have been *informed that their answers are being recorded*, that they are assured confidentiality, and that their permission has been obtained.

A Second possible procedure for recording interviews draws less on the word-by-word record and more on the notes taken by the interviewer or assigned note taker. This method is called "note expansion."

- ✓ As soon as possible after the interview, the interviewer listens to the tape to clarify certain issues and to confirm that all the main points have been included in the notes.
- ✓ The note expansion approach saves time & retains all the essential points for the discussion.
- ✓ A disadvantage is that the interviewer may be more selective or biased in what he/she writes.

In the *third approach,* the interviewer use no tape recording, but instead takes detail notes during the interview and draws on memory to expand and clarify the notes immediately after the interview.

- ✓ This approach is useful if time is short, the results are needed quickly & the questions are simple.
- ✓ The interviewer must frequently talk and write at the same time, a skill that is hard for some to achieve.

The d*ata collection tools for* In-depth Interviews are Interview Guide, Check-list, Questionnaires, and tape recorder.

Semi-structured Interview (*Interview Guide*)

List of topics to be covered has to be prepared and the interview decides sequence and wording of questions.

Strengths: Interviews remain fairly conversational and situational. It ensures similar basic lines.

Weakness: It lacks flexibility in sequencing and wording and can result in different responses reducing the comparability.

Informal Interview

Questions emerge out of the context/follow the natural flow. There is no predetermined of questions topics or wording.

Strengths: There is maximum flexibility, people feel more open, and useful at initial stage of research.

Weakness: Different information collected from different people with different questions.

Advantages of In-depth Interview

- Usually yield richest data, details, new insights;
- Permit face-to-face contact with the respondents;
- Provide opportunity to explore topics in depth;
- Permits clarification of questions.
- Affordability to experience the affective as well as cognitive aspects of responses;
- Allow interviewer to explain or help clarify questions, increasing the likelihood of useful responses.
- Suitable for use with both literates & illiterates.
- Has higher responses rate than written questionnaires.
- Allow the interviewer to be flexible in administrating interview to particular individuals or circumstances.

Disadvantages of In-depth Interview

- Expensive and time consuming;
- Need well qualified, highly trained interviewers;
- Interviewee may distort information through recall error, selective perceptions,
- Presence of interviewer can influence, desire to please interviewer;
- Flexibility can result in inconsistencies across interviews; and
- Volume of information too large, may be difficult to transcribe and reduce data.
- Reports of events may be less complete than information gained through observation.

EXERCISE VII: INTERVIEW Class Work

1. Organize students in Group: 5 students in each group.
2. Select a topic for each group.
3. The interviewer has to develop relevant questions for the interview, 4/5/or more based on the given topic.
4. When one interviews the other group members will observe and evaluate the way how the interview is being conducted. Take notes on the positive and negative aspects. The focus areas could be:
   - Greetings/Self-presentation/Introduction, body Language, questioning, follow up/Probing, closing, etc.
5. The Observer group will reflect the positive and negative aspects to the class.

Sample Format: It has to be used by the Observer Group

Issues	**Positive Aspects**	**Negative Aspects**
Greetings/ Self-presentation/ Introduction		
Body Language		
Questioning		
Follow-up/ Probing		
Closing		

3. FOCUS GROUP DISCUSSION (FGD)

FGDs are used as a research method to find out what *groups of people think and how they discuss ideas together.* It attempts to create a natural phenomenon a group of people with *something in common* discussing an issue/event and is *not used to find out what each individual thinks* or has experienced but rather *how the group discusses the topic being researched (*group dynamics).

The hallmark of focus groups is the explicit use of the *group interaction to generate data and insights* that would be unlikely to emerge without interaction found in a group. The technique inherently allows *observation* of group dynamics, *discussion*, and *firsthand insights* into the respondents' behaviors, attitudes, language, etc. Hence, it combines elements of both *interviewing* and *participant observation*.

The group discussion is then structured to allow the group to discuss the issue before moving on to complete the task. *Interviewer is a moderator* that facilitates the group process. The facilitator prepares *a guide* to help in structuring the discussion while allowing the interaction between the members of the group to develop. It relies on interview guide/topic guide.

TIPS ON FGDS

A Focus Group

- **Is a group discussion, i.e. group discusses views with each other;**
- **are a gathering of 8 – 12 people who share some characteristics relevant to the research (has members who have something in common); homogenous group;**
- **Focused on a particular topic;**
- **Sitting in a circle;**

Although *FGs* and *in-depth interviews* share many characteristics, they should not be used interchangeably.

One *Moderator* who guides and facilitates the group (starts to ask questions), keep the discussion focused, keeps the discussion moving, handles emotions, encourages all participants to speak. S/he must be experienced and knowledgeable and important to be ethnic and culturally appropriate

One *Note Taker* whose tasks are limited. S/he takes care of tape recording, and takes notes.

Time limited: not longer than 2 hours.

Respondents' social class, level of expertise, age, cultural background, and sex should be considered. They need to be paid for attendance and provided with refreshments and are typically asked to reflect on the questions asked by the moderator. They are permitted to hear each other's responses and to make additional comments. It is not necessary for the group to reach any kind of consensus, it is necessary for people to disagree. One/two persons should not dominate. *Informed consent* is necessary and *confidentiality* should be assured.

FGD has a *beginning, middle,* and an *end.* At the *Beginning* let the people get talking and share relating experiences and ideas. In the *Middle* part help people to focus by asking more specific questions and at the *End* complete the group task.

Preparation of FDGs

- Collect brief profiles of each participant, i.e. education, occupation, marital status, family size, age, etc. This will help analyzing the data later. Profiles should include only information that may be relevant to the study question.
- Keep sensitive issues of the profiles/background information confidential (i.e. age at first pregnancy, use of contraception, etc...) and define demographics variables that you think will have an impact on the study (i.e. sex, age, education, parent/non-parent, rural/urban).
- Collect the background information with informed consent of participants, individually – not in the group.
- Use code numbers – not the names of the participants to link background information to the answers given during the FDG.

Conducting a FGD

- Requires a high level of interpersonal skill of the moderator: create a group of *conversational partners,* be able to listen with *non-judgmental interest,* show real interest, curiosity, empathy, and encouragement, must be flexible, creative, able to comment to each person's unique response, and stay with his topic guide.
- Do not use microphones passed around.
- For some sensitive topics, sex and cultural background should match between moderator and participants.
- Note taker should take notes *who said what,* even if the discussion is tape recorded.
- Explain the purpose of the meeting to participants.
- Assure participants that tapes will not be shared outside the research team and that their names will not appear.
- Participants should understand that there is no right or wrong answer.
- Moderator should explain *ground rules:* speaking one at a time, not interrupting each other, have fun, you may end the discussion with some refreshments for the participants, payment or not???

Before Leaving for the Site: Review notes, study protocols and topic guide, Gather materials, prepare tape recorder (extra), sufficient cassettes, batteries (extra), notepads, pens, labels, name tags, topic guides, gifts/travel, other relevant materials and test tape recorder.

At the site before Discussion Begins

- Set up the room (Refreshment, arrange chairs in a circle)
- Test the tape recorder and label the cassette with the date and group identification code; load and test it.

- Greet the participants and collect socio-demographic data informally.
- Make labels with numbers corresponding to data sheets if you are using them to identify individual speakers during recording and note taking.

Starting the Discussion

- Introduce yourself and invite participants to introduce themselves.
- Summarize the purpose of the study.
- Describe the FGD process. Emphasize
  - There is no right or wrong answers;
  - All should participate and respect the opinion of others;
  - Help to keep the discussion on track;
  - Describe the use of the tape recorder;
  - Remind the participants that notes will be taken;
  - Inform the discussion will last approximately 1 ½ hours;
  - Invite questions.

Conduct the Discussion

- Begin with warm-up questions.
- Be aware of who is talking and who is not.
  - Do not allow one/two individuals to dominate;
  - Bring silent participants into the discussion.
- Use broad, open-ended questions and avoid yes/no or short-answer questions
- Frame the discussion with more general questions and encourage participants to raise issues that are important to them.
- Always probe: Probing does not mean suggesting a more interesting answer. Probes that suggest answers are leading probes and must be avoided. Following are examples of leading probes *NOT* to use:
  - Do you mean……?
  - Are you saying that….?
  - Is that the only thing you can think of?
  - You do not mean that …?

Good non-leading probes are usually general inquires such as the following:

- How do you mean?
- In what way?
- What other methods (means of) do you know?
- There is no hurry, take a moment to think about it and tell me all that comes to your mind.

- Do not hesitate to use silence and non-verbal prompts (nodding, raising the eyebrows, etc...);
- Note any questions that the group does not seem to understand, as well as questions that stimulate good discussion.
- Record body language and other nonverbal communications.

  - An idea stated forcefully or even angrily might emphasize the strength of a participant's convictions.

  - A hesitant manner might suggest the participant is not sure about the idea.
- Use the guidelines flexibly; return to topics that were not fully discussed or that need more thought.

End of Discussion

- Thank the participants.
- Explain how the discussion information will be used.
- Remunerate: e.g. travel expense, gifts, etc...
- Collect everything and check the cassettes

After the Discussion

Expand your notes in outline form. The note taker and moderator should do together immediately following the session, if possible at least on the same day. Record in writing any nonverbal data. Transcribe the tapes; develop the system; Review the transcribed notes and add the researcher's comments in parenthesis, include observations about the group, remarks to probe in latter discussions, or methodological problems. Then translate.

Advantages of FGD

- May encourage people to participate who otherwise may not want to,
- May be able to generate more ideas,
- Quick information at less cost,
- Obtaining data from illiterate communities,
- Good at exploring attitudes and opinions,
- Researcher can be present at session,

Disadvantages of FGD

- Some topics may be *too sensitive* and too personal,
- Deviant views may be inhibited,
- Moderator may influence participants,
- Errors if there is no homogeneity,
- Results are harder to analyze & interpret.

Data Collection Tools that are necessary for FGD are FGD guide, Tape recorders, and Hand notes.

EXERCISE VIII. FGD I Class Work

Instruction: Conduct FGDs based on the given/developing your own topics.

- ✓ **Select one PI/Moderator and one *Observer***
- ✓ **Present your findings to the class**
- ✓ **Use your mobile phone for recording**
  - **Cigarette Smoking**
    - Is smoking bad? - Why shouldn't you smoke?
    - Who smokes? - What are the risks of smoking?
    - What should be done to stop smoking?
  - **Healthy Lifestyles Program**
    - How do you define healthy lifestyles?
    - You have been in the program for five months, what do you think so far of the program?

EXERCISE IX. FGD II Class work

Instruction:
Develop questions based on the following topics and conduct FGD:

- ✓ **HIV/AIDS,**
- ✓ **STIs,**
- ✓ **Air Pollution,**
- ✓ **TB,**
- ✓ **Personal Hygiene.**

4. DOCUMENTARY EVIDENCE

- Independent evidence, e.g. medical records
- Only totally uninfluenced way of data collection.
- May provide an historical context (allows to acquire historical perspective and knowledge).
- Useful for subjects difficult to study.
- Material you are examining has been collected by others.

Data Collection Tools for Documentary Evidence are check-lists, data compilation forms. Records, newspaper article, handwritten documents, letters, other articles, epidemiological surveys, demographic and health survey, pictures, posters, radio and TV shows, billboards, songs, diaries, etc...

Applications of Documentary Evidence:

- Secondary transcription from interviews of FGDs.
- To address government policy as presented in the press or radio.
- To address gender bias in health care, radio dramas/comedies.
- To understand context: cultural norms, values, beliefs, peoples hope, fear, triumphs.

Advantages

It is inexpensive, saves money, and permits observation of trends over the past.
It is very informative.

Disadvantages

Data is not always easily accessible,
Ethical issues concerning confidentiality,
Information may be imprecise or incomplete,
Words and behaviors may have different meanings at the time the document was created.

Exercise X. Select the best method

Instruction

In pairs consider the following scenarios and consider how you would conduct some qualitative research with group and the pros and cons of using *Interviews, Observation, or Focus Group Discussion* with each. *Select the Best method and justify.*

1. **Children's experiences of Asthma clinics.**
2. **Women's experiences of undergoing cervical smear tests.**

5.3. ANALYSIS OF QUALITATIVE RESEARCH DATA

(using different methods and computer assisted methods such as open code software)

Introduction

In qualitative research data collection and data analysis are *interwoven*. The analysis b*egins as soon* as the first data are collected and analytic notes are recorded during data collection.

It is systemic but *not rigid* and this has the advantage of following the researcher to go back and *refine questions, develop hypothesis, and pursue emerging avenues of inquiry in further depth. It r*elies on *cutting, sorting and pasting.*

Principles of Qualitative Data Analysis

1. Reality is subjective

Respondent's view may differ from researcher's view and reality depends on the researcher view. Description of a situation depends on the perspective.

Exercise XI. Instruction

1. Observe the following two pictures and list down what you have seen/watched.
2. How do you relate these exercises with the above principle of a qualitative research?

Picture 1

Principles of qualitative data analysis

What do you see here?

Therefore, during data collection and analysis learn to recognize, and become aware of your own perspective, check your perceptions against the raw data. You need to be open to surprising findings but do not immediately interpret them and actively seek for alternative explanations. The more precise and neutrality you collected your data, the better and easier will be your analysis.

2. A Phenomenon cannot be understood without its *context*.

You need to aware the physical setting (of a behavior, disease, or process), historical, social, political climate, organizational and individual characteristics. Qualitative Researchers consider how informant's stories are shaped.

3. Theory guides and results from qualitative research

Theory "a set of interrelated concepts, definitions, and proportions that presents a systematic view of events/situations by specifying relations among variables"

4. Exceptional cases may yield insight into a problem

Although analysis aims to seek common patterns, it is important to understand exceptions. Why and how do individuals differ from the group? Individuals that appear exceptional may in fact represent a large group that was not investigated yet.

5. Understanding of human behavior emerges slowly and nonlinearly.

Approach may take numerous rounds of questioning, reflecting, rephrasing; why and how do individuals differ from the group? Analysis should begin in the field to have time for additional data collection.

QUALITATIVE RESEARCH *TECHNIQUES*

1. Interpretive Techniques

Expert observes, examine the data, interpret it via forming an impression and report their impression in a structured and sometimes quantitative form.

2. Coding

It is an interpretive technique that both organizes the data and provides a means to introduce the interpretations of it into certain quantitative methods. Most coding requires the analyst to read the data and demarcate segments within it. Each segment is labeled with a "code"- usually a word or short phrase that suggests how the associated data segments inform the research objectives.

When coding is complete, the analyst prepares reports via a mix of:

- summarizing the prevalence of codes,
- discussing similarities and differences in related codes across distinct original sources/contexts, or comparing the relationship between one or more codes.

3. Recursive Abstraction

Some qualitative dataset are analyzed without coding. A common method here is recursive abstraction, where *dataset are summarized*; *those summaries are then further summarized, and so on.* The end result is a *more compact summary* that would have been difficult to accurately discern without the preceding steps of distillation.

4. *Mechanical Techniques*

Some techniques rely on *leveraging computers to scan and sort large sets* of qualitative data. One such scenario is for datasets that are simply too large for a human to effectively analyze or where analysis of them would be cost prohibitive relative to the value of information they contain. A frequent criticism of Mechanical Technique is the absence of a human interpreter.

Define Methods for Data Analysis

- Who will conduct the data analysis?
  What level of detail will be needed to respond to your research question?
- Will the analysis be computer-assisted or manual?
- If a computer will be used, decide about the software package.
- Will the whole team be involved or will specific team members be responsible for different aspects of investigation?
- Will team members work separately and then meet to share the findings?

Methods for Qualitative Data Analysis

The methods of qualitative data analysis that are frequently being used are:

- Thematic content analysis
- Grounded Theory
- Framework analysis
- Narrative analysis

Approaches	Aim
Descriptive: • Thematic Analysis • Framework Analysis • Narrative	Descriptive summary by pre-determined themes or framework
Analytical: • Grounded Theory	**Abstract level:** • Conceptual issues • Insight to new knowledge • Theory generation

5.3.1. THEMATIC CONTENT ANALYSIS (TCA)

Exercise XII. Instruction

1. Observe the following pictures and list down what you have seen / watched of each picture.
2. How do you relate these exercises with Thematic Content Analysis?

Picture 1.

What are common 'themes' in these pictures?

Picture 2

What are the common themes in the four pictures below?

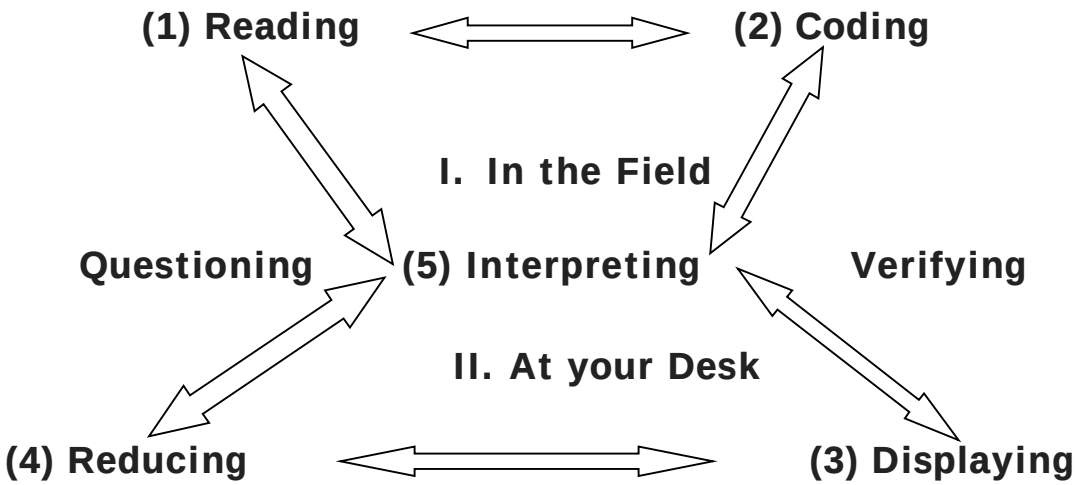
THEMATIC CONTENT ANALYSIS

- Is a descriptive presentation of qualitative data.
- A satisfactory TCA portrays the thematic content of interview transcripts by identifying *common themes* in the text provided for analysis.
- *Categorize recurrent* or common '*themes*' (frequently recurring issues),
- Most common approached used in health journals,
- Aims to present the key elements of respondent's accounts,
- May be applied for *texts*, *interview notes, notes from observation, images,*
- Tools for thematic analysis: coding, indexing

  Coding *is* the process of attaching labels to lines of the text so that the researcher can *group and compare similar pieces of information*.

Indexing is the process that generates a word list comprising all the substantive words and their locations within the text.

STEPS IN THEMATIC CONTENT ANALYSIS



1. Reading: Read, Read, Read

- Read for Content: Did you get the information you intend to collect?
  Begin to identify emerging themes and develop tentative explanations
- Read for Quality: How were data obtained? Where notes recorded? Were interview questions neutral?
- Read for Language
- Read word by word

2. Coding

Attach labels (codes) to parts of the text that represent those themes

- According to meaning of words, to emotions represented by some words, to decision making, to individuals attitudes or attitudes of the environment and according to behavior .

3. Displaying

Make an inventory of the information by clustering the codes. Identify principal theme in each block of material, and identify sub-themes in each block of material. Look for evidence that supports or denies each theme and sub-theme, and look at what language is used to express ideas. Record emergent ideas as memos and look for link between themes.

EXAMPLE ON DISPLAYING

Main theme: health seeking behavior => peoples' access to health services is poor.

Sub-theme: different factors hamper access to services.

Evidence: list evidence for each factor in text of interviews.

Emergent ideas……

Link between themes: health care seeking behavior linked to quality of care…to poverty…to culture, etc.

4. Reducing

- C*lustering of similar themes* according to their volume or frequency; how often it was mentioned? How it was emphasized by respondents?
- D*istilling* the information to make visible the most essential concepts and relationships.
- Separate *essentials from non-essentials*.
- Use *visual approaches* for data reduction such as matrixes, diagrams.

5. Interpretation: the act of identifying and explaining the core meaning.

- Explain the main clues to the reader.
- must provide answers to your research question and be relevant to the topic.
- should develop credibility and trustworthiness.

The other approaches for data analysis are:

***Framework analysis*:** practical and quicker

***Grounded Theory*:** more theoretical, sociological and extensive.

5.3.2. FRAMEWORK ANALYSIS

It is used to analyze *in-depth and focus group data.*

It facilitates systematic analysis and involves *summarizing* & classifying data within a *thematic framework* (code book).

It relies on the skills of the analyst.

The Five stage of Framework Analysis

Stage I: *Familiarization*: Read, listen to tapes, reread notes.

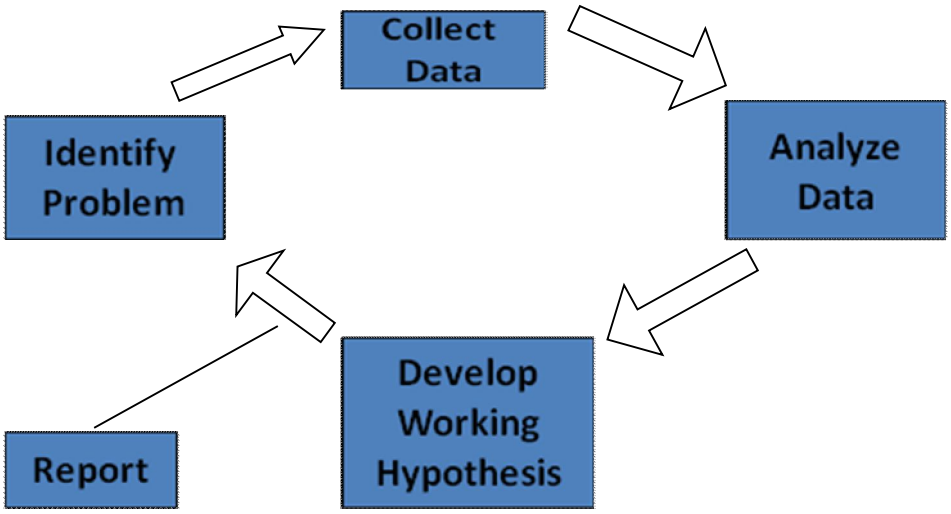
Stage II: *Identifying a thematic framework*: Develop coding scheme, themes become labels.

Stage III: *Indexing*: Based on comparison within and between cases.

Stage IV: *Charting*: Rearranging data according to content (table, matrix, diagram). And sorted by themes or by case.
Stage V: *Classifying and interpreting* qualitative data.

5.3.3 GROUNDED THEORY

It is developing a theory directly from empirical data. It emphasizes the cycling process of data collection, analysis and interpretation until a point of saturation is reached (no new information).



It involves constant comparison (moving forward and back between data and interpretation).
It is founded in intense coding of early data to generate many potential codes as possible. Follows Open Coding: codes are continuously modified and improved, and Theoretical sampling: sampling goes on after first round of analysis based on findings.

Grounded Theory (other definitions)

- is a method for discovering *theories, concepts, hypothesis and propositions directly from data*, rather than from prior assumptions, other research, or existing theoretical frameworks.
- is a theory that is *inductively derived* from the study of the phenomena it represents rather than deductive.
- Encourages the initiation of research without any preconceived theoretical ideas about the topic being researched.
- The point of Grounded Theory is to encourage the researcher to be *as flexible as possible when interpreting the findings of the research.*

Stages of conducting Grounded Theory Analysis

Stage I: Open Sampling and Open Coding

- *Sampling* is about the explicit generation of information to refine and develop theory rather than the notion of randomness/representation.
- *Saturation* of the theory is when *no new categories are found* which relate to the central issue/process being researched.

Stage II: Purposive Sampling and Axial Coding

- *Purposive Sampling* is about locating more data to confirm/elaborate categories, identifying relationships or suggest limits to their applicability.
- *Coding:* The process of *making the data manageable by classifying into topics and sub-topics and attaching labels* to concepts and themes that appear in the data.

Stage III: Discrimination Sampling and Selective Analysis

- Deliberate and directed selection of further data from persons, sites or documents to confirm that the theoretical accounts is saturated.

5.3.4. NARRATIVE ANALYSIS

It is telling a story for transferring a message, for illustrating complex issues.

The story is the topic of the analysis like let the patient tell his/her story.

Narrative should contain six elements:

- *Abstract*: which summarizes the story?
- *Background:* information setting the context, cast list, orientates the listener.
- *Complicating action:* (i.e. 'then I collapsed', I was completely lost).
- *Resolution:* what happened at the end of the sequence or moral of the study?
- *Evaluation*
- *Coda*: 'so that's my story'.

COMMON TYPES OF QUALITATIVE RESEARCH DESIGN

A research design is a logical model that guides the investigator through the research process. The major qualitative research designs include:

- Grounded theory: theory (what happens? and why?)
- Phenomenology: event
- Ethnography: person
- Case study: describing experience

Qualitative methods approaches: illustrations using breast cancer

Grounded theory	What are the coping strategies adapted by women while living with breast cancer?
Phenomenology	What are the commonly held views about breast cancer?
Ethnography	What is the lived experience of women having breast cancer in different social contexts?
Case Study /Narrative analysis	How do a typical woman with breast cancer get health care ?

GROUNDED THEORY

A qualitative research that add to the existing body of knowledge – developing **new theories** about a phenomenon. **Theory** is a set of well-developed categories that are systematically interrelated to form a theoretical framework that explains the phenomenon.

PHENOMENOLOGY

It describes things that are part of the world in which we live: **events, situations, experiences or concepts.** Phenomenological research investigates individuals' **lived experience** of events – for example the experience of caring for someone with AIDS/terminal cancer: meaning of caring in that context, the components of caring, the impact of caring: negative and positive.

It is philosophical belief that, unlike matter, humans have a consciousness. They ***interpret*** and experience the world in terms of ***meanings*** and actively construct an individual social reality.

ETHNOGRAPHY

It is the ***study of people*** in ***naturally occurring*** settings or 'fields' by means of methods which capture their ***social meanings*** and ordinary activities, involving the researcher participating directly in the setting, if not also the activities, in order to collect data in a systematic manner but without meaning being imposed on them externally. Ethnography routinely builds in ***triangulation of method*** because it involves the use of multiple methods of data collection. In its most characteristic form...[ethnography] involves the ethnographer

- ***participating***, overtly or covertly, in people's daily lives for an extended period of time,
- ***watching*** what happens,

- ***listening*** to what is said,
- ***asking questions***, and
- ***collecting*** whatever data are available to throw light on the issues that are the focus of the research' (Hammersley and Atkinson, 1995:1).

The goal is to tell the whole story of a group's daily life, to **identify the cultural meanings, beliefs** and patterns of the group. Studies culture of organizations, programmes and groups of people with common social problems such as smoking and drug addiction (shared experience). Ethnography helps to develop **cultural awareness and sensitivity** and enhances the coverage and quality of services.

Ethnography is a written description of a particular culture - the customs, beliefs, and behavior - based on information collected through fieldwork." --Marvin Harris and Orna Johnson, 2000.

"Ethnography is the art and science of describing a group or culture. The description may be of a small tribal group in an exotic land or a classroom in middle-class suburbia." --David M. Fetterman, 1998.

Typical ethnographic research employs three kinds of data collection: ***interviews, observation, and documents.*** This in turn produces three kinds of data, ***quotations, descriptions, and excerpts of documents,*** resulting in one product narrative description. This narrative often includes charts, diagrams and additional artifacts that help to tell "the story" (Hammersley, 1990).

When to use ethnography?

Ethnography is most appropriately used for inquiry that requires:

- In-depth understanding,
- Rich narratives (if using qualitative interviews),
- Social phenomena being studied over a period of time,
- An understanding of the social meanings constructed by individuals' themselves,
- Topics not easily accessible through simple face-to-face interviews, and
- Topics which involve examining processes of change, examining negotiated lived experiences, topics which see culture as constructed and reconstructed through actors' participation' are especially suited to participant observation and ethnography' (O'Reilly, 2005: 29)

Challenges of Ethnography

- Very time consuming,
- Completely reliant on the individual researcher (or a small team),
- Difficult to gain full access,
- Difficult to achieve objective distance and the danger of 'going native',
- Reporting findings and the role of interpretation, and
- Ethical dilemmas of participation.

CASE STUDIES

Case studies are in-depth investigations of **a single or small number of units.** Case study may offer ***rich*** and ***depth*** of information not usually offered by other methods. Ranges in complexity: from the simplest: description of a single event or occurrence to a complex: analysis of a **social situation over a period of time.**

Exercise XIII.

Class/Take-Home Exercise: Design a Qualitative Study

Instruction: This can be exercised in the class as a group or take-home assignment as an individual work.

1. The class will divide in groups
2. Each group will decide about a *general area of inquiry.*
3. Each group will design a qualitative study to address their study by addressing the following:
   a. Define the ***research problem***
   b. Prepare a ***conceptual framework*** to guide your study
   c. Develop a *methodology* (which tools do you use for data collection)
   d. Develop a ***sampling strategy*** (who would you interview and why?)
   e. ***Reflect on the field implications*:** How will you contact people and who will interview them.
   f. List ***themes*** you wish to address in the interview
   g. Prepare 2 – 5 ***sample questions*** to each theme
   h. Consider the ***ethical implications*** of your study
4. Prepare a ***presentation*** of your study design (flip chart).

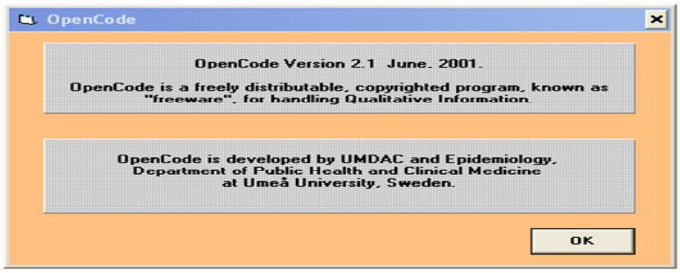
5.3.4. COMPUTER BASED SOFTWARE FOR QUALITATIVE ANALYSIS

- It is possible to conduct qualitative analysis with a computer.
- Concerns: relying too much on computer shortcuts will impede the process by distancing the researcher from the text.
- Advantages of computers
  - Ease the burden of cutting and pasting by hand.
  - Produce more powerful analysis by creation and insertion of codes into text files, indexing, construction of hyperlinks, and selective retrieval of text segments.

1. Open Code Software

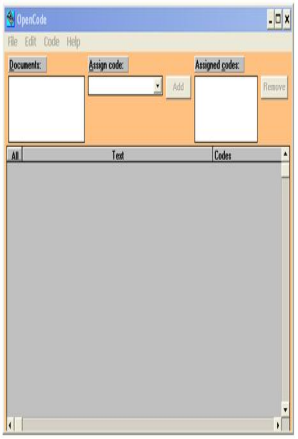
Computer Program for Handling Qualitative Data
Umea University, Umea, Swede

THE OPEN CODE COMPUTER PROGRAM

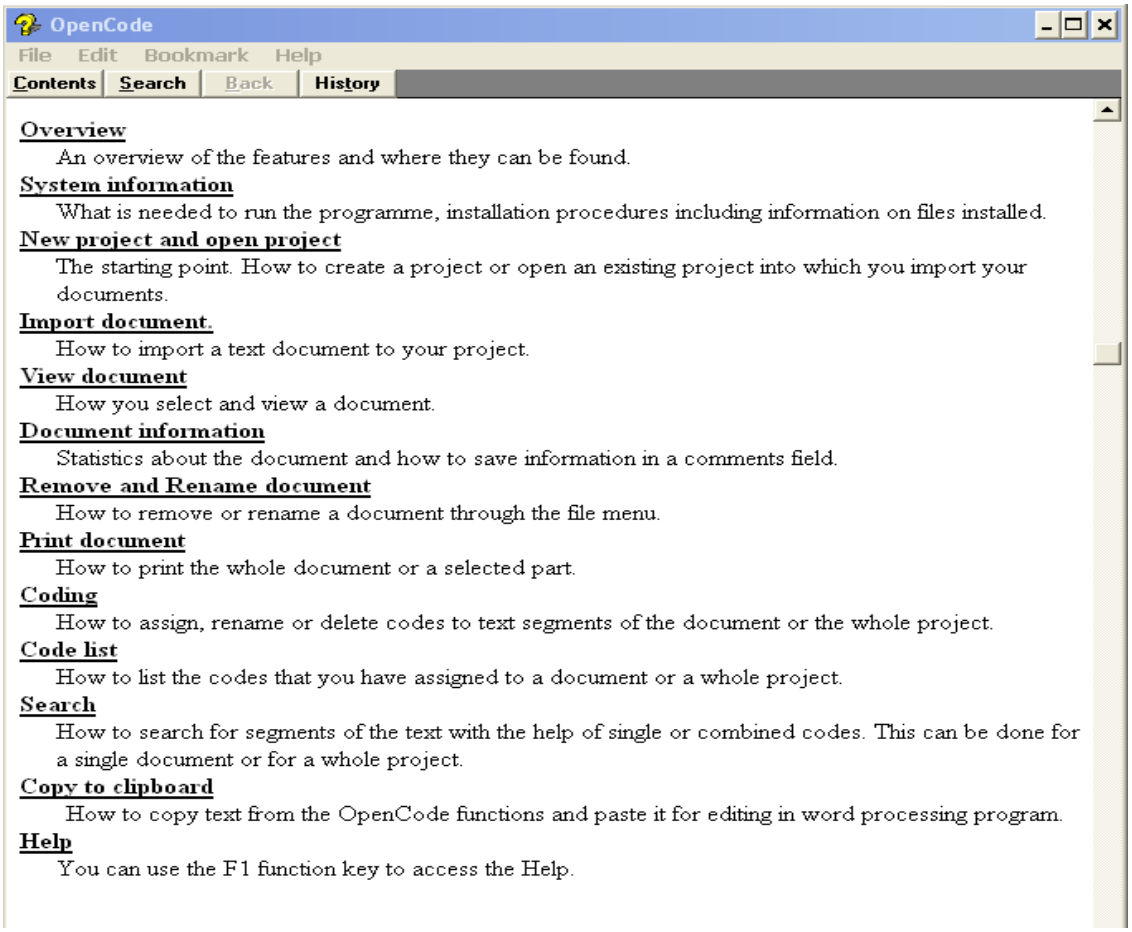


A tool for classifying and sorting qualitative information.

MAIN FEATURES OF OPEN CODE



- **import documents typed in any word processing program**
- **assign codes to segments of the text**
- **produce list of codes showing frequency of use**
- **search for single or combined codes in the documents**
- **produce lists of search results**
- **print the results from any of the functions**



2. **NVivo** is a qualitative data analysis (QDA) computer **software** package produced by QSR International. It has been designed for **qualitative** researchers working with very rich text-based and/or multimedia information, where deep levels of **analysis** on small or large volumes of **data** are required.

Benefits of using **Nvivo Qualitative Research analysis software**

Qualitative Research analysis software	**Uses**
• **Store data** in one place	- Manage multiple types of data (i.e. interview, FGD, observation).
• **Code data**	
• **Organize data**	
• **Model data**	
• **Search data**	

5.4. EVALUATION OF THE QUALITY OF QUALITATIVE RESEARCH

Introduction

As an expert of a qualitative researcher, it would be very important to know and develop skill on how to evaluate the quality of a qualitative study/paper. Evaluation could be done during the process of the study (monitoring) and/or at the end/predetermined period (evaluation). There are pertinent areas where one has to concentrate for evaluation. Some are indicted underneath:

- **Questions to be asked:**
  - Are the *process of data collection* adequately described?
  - Sampling: Did the sample include the full range of possible cases or settings?
  - Were efforts made to obtain data that might contradict or modify the analysis by extending the sample?
- **Data Collection and Analysis**
  - Were the data collection and analysis procedures systematic?
  - Did the analysis incorporate all the observations?
  - Is evidence provided in support of the analysis?
  - Is sufficient original materials presented?
- **Reflexivity of the account**
  - Was sufficient data included in the reports of the study to provide evidence for the conclusions that were drawn?
  - *Worth/Relevant:* Were this piece of work worth doing at all? Has it contributed usefully to knowledge?
- ***Clarity of Research Question***
  - Was it clear by the end?
  - *Appropriateness of the design of the question?*
  - Would a different method have been more appropriate?
- ***Context***
  - Is the context *adequately described* so that the reader could relate the findings to other settings?
  - Is there *evidence* that supporting materials is representative?
  - Is there evidence of efforts to establish *Credibility/Dependability* (validity/ reliability)?
  - Is the study set in a broader context?

Characteristic of a "Good" Qualitative Research

The following short list of **characteristics of a 'Good'** Qualitative Research is presented by Creswell (1998):

- It entails rigorous data collection: The researcher collects multiple forms of data, summarizes them adequately and spends adequate time in the field.
- The study is framed within the assumptions and characteristics of the qualitative approach to research.

- The researcher identifies studies and employs one or more traditions of inquiry.
- The researcher starts with a single idea or problem that s/he seeks to understand, not a causal relationship of variables.
- The study involves detailed methods, a rigorous approach to data collection, data analysis, and report writing. The writing is so persuasive that the reader experiences 'being there'.
- Data is analyzed using multiple levels of abstraction. That is, the researcher's work is presented in a way moves from particulars to general levels of abstraction.
- The writing is clear, engaging, and full of unexpected ideas. The story and findings become believable and realistic, accurately reflecting all the complexities that exist in the real situations.

Evaluation of Quality of Quantitative and Qualitative Research Methods

Question Asked	Issue	Quantitative Method	Qualitative Method
Have we really *measured* what we set out to measure?	**Truth Value**	**Internal validity**	**Credibility**
How *applicable* are our results *to other subjects* & other contexts?	**Applicability**	**External Validity Generalizibility**	**Transferability**
Would our findings be *repeated* if our research was *replicated* in the same context with the same subjects?	**Consistency**	**Reliability**	**Dependability**
To what extent are our findings *affected* by personal interests & bias?	**Neutrality**	**Objectivity**	**Conformability**

READING ASSIGNMENT IV.

Instruction:

Read the published paper entitled 'Socio-cultural factors in decisions related to fertility in remotely located communities: The case of the Suri ethnic group' and answer the questioned followed, page 96.

5.5. DIFFERENCES BETWEEN QUALITATIVE AND QUANTITATIVE RESEARCH METHODS

Both methods are systemic, rigorous, but they do not answer the same question or address the same problem. It is like comparing an apple and an orange.

Exercise XIV: Qualitative versus Quantitative Exercise

***Aim*: to consider and apply your understanding of the main features of Qualitative and Quantitative Approaches**

***The Task*: You will be given a table showing the features of Qualitative and Quantitative approaches. This table will be incorrect. It is your *task to re-shuffle the answers so that they are in the right places.* Individually select the appropriate answer for each of the boxes in the table and mark 'X' for an answer that need re-shuffling/incorrect and '✓' for an answer that doesn't need re-shuffling/Correct answer.**

Explanations	Logical Positivist, Quantitative	Naturalist, Interpretive, Qualitative	Mark X or ✓
Aims	Generating hypothesis/ describing	Testing hypothesis/ generalizing	
Purpose	Discovery	Verification	
Stance (=a way of thinking/ standing)	Reductions, inferential, deductive, outcome oriented / rational	Expansionist/ exploratory/ inductive/ process oriented, intuitive	
Method	Observing/interviewing/action research, focus groups	Counting, measurements, surveys, experiments	
Implementation of method	Decide in field setting	Decided a prior	
Instrument devises	The researcher	Physical devise/ pen and paper	
Researcher's stance	Outsider	Insider	
Relationship of researcher and subject	Close/interactive and inseparable	Distant/independent	
Setting	Laboratory	Nature	
Data	Rich, deep, Credible	Hard, reliable, and credibility	

MAIN AREAS OF DIFFERENCE BETWEEN QUALITATIVE AND QUANTITATIVE RESEARCHES

Characteristics	Quantitative	Qualitative
Purpose	- Theory testing: to establish facts, - Cause and effect relationship, - Generalization	- Develop concepts, -Describe multiple realities and interpretation - Transferability
Designs	- Predetermined, Structured - Do not change during the course of the study	- Flexible: to allow for change - General rather than confined
Data	- Quantifiable, using counts and measures, Statistical - Variable are defined ahead of time, - Managed according to the procedures outlined in the research proposal	- Descriptive and deal with qualities, - May contain field notes, people's own words, personal/official documents, - Extensive and difficult to manage, - Relatively unstructured, - Ways of collecting: interviews, stories, diaries, documents, reports, observation, pictures, Videos.
Subject Samples	- Tend to be large, - Requiring random selection, - May need control group, - Estimate population.	- is small, - May be non-representative of the large groups, -New cases may be added if resources are available.
Investigator's Relationship with Subjects	- his/her role is to observe and measure, - he/she is detached and at a distant.	- intense contact with participants over a long period of time.
Techniques/Methods	- Experiments, survey, structured interviewing, structured observation/ formal observation - Statistical analysis of data.	- Observation, reviewing documents, interview, focus groups discussion, narrative.

Characteristics	Quantitative	Qualitative
Instruments & Tools	- Tests, inventories, questionnaires, hardware.	- The researcher is often the only "tool" for data collection. - Guiding questions. - Audio or video tape records, etc.
Data Analysis	- Occur at the conclusion of the data collection, - Deductive; uses statistical manipulation, - Prove/disprove hypothesis.	- On-going throughout the study. - Data are analyzed as they are gathered. - Inductive in nature. - Theory is built as the data are grouped and analyzed: Theory emerges. - Does not quantify data; - Labor intensive; - Time consuming; - Relies on the skill, vision and integrity of the researcher**.**
Outcome	- Will answer specific questions by producing statistical evidence to prove a point.	- is a lengthy descriptive document. - Presenting the data in words rather than numbers, - Verification of an existing theory or new grounded theory.
Problems	- Difficulty in controlling variables that will affect the study (confounding factors), - Study's validity may be in questions. - The investigator & data collectors may affect the subject or environment.	- Time consuming - Difficulty of using naturalistic methods to study large populations, - Difficulty of managing large amount of data.
Others	- Answers How often? How many? - Collect numbers, - Begin with an idea/a hypothesis, - Strength is reliability (repeatability). - By deduction allows conclusions to be drawn, - Valid (validity): measures what they are claiming to measure.	- Answers What? Why? How? - Collects words, - Generate ideas, hypothesis & future, research questions, Explores respondent's own Experience, - Strength is credibility: closeness to the truth, Develops concepts to help understand social phenomena in a natural setting, - Able to uncover information which is to difficult to get at.

5.6. MAIN APPROACHES TO QUALITATIVE RESEARCH

There are three *main approaches* to qualitative research:

Field-Based

The main purpose of field-based research is *to collect original data from participants, through interviews and/or some form of observation*. The majority of qualitative researches are carried out in this way.

Action-Based

It attempts to bring about *change through an evaluation of a situation.* The research achieves her/his aims by means of *intervention*, by working with people to help them change their environment, or providing sufficient information to enable them to take responsibility for changes in their own life situations.

Library-Based

The main purpose of library-based research is *to investigate and analyze information,* which tends to be stored in the libraries, institutions, or private collections in the form of journals, diaries, letters, newsletters, case notes, legal, political, and medical documents, books, photos, films, videos and television programs.

5.7. DRAWING CONCLUSIONS TRUSTWORTHINESS AND CRDIBILITY

Establishing Trustworthiness

Trustworthiness is defined as

- "The extent to which one can believe in the research findings" (Glaser and Strauss 1967)
- "How can a researcher be certain that the findings of inquiry are worth paying attention to, worth taking account of?" (Lincoln and Guba 1985, p.398)
- "The truth value of research findings"
- "Judging the quality of research findings"

CRITERIA FOR TRUSTWORTHINESS

QUANTITATIVE RESEARCH	QUALITATIVE RESEARCH
- Validity - Reliability - Objectivity - Generalizability - Standardized instruments - Administered to randomly selected population - Reliability & validity assessed straightforward. -	- Credibility - Dependability - Conformability - Transferability - Not based on standardized instruments - Smaller, non-random samples - Often accused of being too ssubjective, not relevant, not replicable.

5.7.1. Credibility (=Truth value) focuses on confidence in the truth of the findings and includes accurate understanding of the context.

Techniques to increase credibility:

- Looking for negative cases for emerging hypotheses.
- Testing rival explanations.
- Seeking explanations for inconsistencies arising from triangulation of respondents.

5.7.2. Transferability (=Applicability) is to apply lessons learned in one context to similar contexts.

Techniques to increase transferability:

- Draw conclusions carefully, be sure that the data support them
- Identify what elements of context may be applied elsewhere

- Describe in detail all information (context, characteristics of study participants, nature of their interaction...
- Comparing with existing research
- Test theory derived from a study in a second study

5.7.3. Dependability (=Consistency) is consistency of observing the same findings under similar circumstances.

Techniques to increase transferability:

- Transparent description of methods.
- Clear and logical connection of research question to research design.
- Good research practice (purposive sampling, systematic coding).
- Investigator triangulation.

5.7.4. Conformability (=Neutrality) is the extent the research findings can be confirmed by others. Confirm that data reflect as accurately as possible the participant's perspectives and experiences.

Techniques to enhance Conformability:

- Reflection: observe and document your own role in the research process.
- Conduct data audit to check for potential areas of bias.
- Preserve your raw data for later cross-check.
- Adequate training of the researcher.

5.7.5. Triangulation borrows the idea from navigation, with the idea that taking two readings/measures will enable us to pinpoint the 'truth' more accurately

- of data sources are archives, interviews, video, images
- of investigators, contexts, situations
- use multiple methods: Participant observation, FDG, in-depth interview
- of samples use multiple source of informants, patients and health providers, mothers and non-mothers, husbands and wives....
- gather multiple perspective you gain more complete understanding.
- Remember reality is subjective.

EXERCISE XV.

Instruction:

1. **What do you observe? List down whatever you see in the picture.**
2. **How do you relate this picture with a qualitative research?**

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GLOSSARY

Archives ongoing records maintained by institutions within society.

Bias deviation in one direction of the observed value from the true value of the construct being measured (as opposed to random error).

Case a single unit in a study (e.g. a person or setting, such as clinic, hospital).

Case Study a research method, which focuses on the circumstances, dynamics and complexity of a single case, or a small number of cases.

Closed question the question is followed by predetermined response choices into which the respondent's reply is placed.

Coding the assignation of (usually numerical) codes to each category of each variable.

Content analysis the systematic analysis of observations obtained from records, documents and field notes.

Coping the cognitive and behavioural efforts to manage the internal and external demands of the stressful situation.

Ecological studies research where the unit of observation is a group of people rather than an individual (e.g. schools, cities, nations).

Empirical based on observation.

Empiricism a philosophical approach that the only valid form of knowledge is that which is gathered by use of the sense; explanation should be based on actual observations, rather than theoretical statements.

Ethnography the study of people in their natural settings; a descriptive accounts of social life and culture in a defined social system, based on qualitative methods (e.g. detailed observations, unstructured interviews, analysis of documents). This method is used by anthropologists.

Ethnomethodology a method for the study of a cultural group (ethno), and more specifically meaning the methods of the people; the study of how people use social interaction to make sense of situations (to create their 'reality').

Field research, research which takes place in a natural setting.

Focus groups a research method of interviewing people while they are interacting in small groups.

Grounded theory the investigator develops conceptual categories from the data and then makes new observations to develop these categories. Hypotheses are derived directly from the data.

Holistic the phenomenon of interest is viewed in terms of the relationships between each level of the system. Holism identifies the whole of the social system as more than the simple sum of individuals within it. Holism is at the centre of sociological theory.

Hypothesis a tentative solution to a research question, expressed in the form of a prediction about the relationship between the dependent and independent variables.

Hypothetico-deductive method beginning with a theory and, in a deductive way, deriving testable hypothesis from it, the hypothesis are then tested by gathering and analyzing data and the theory is supported or refuted.

Information bias misclassification of, for example, people's responses due to error or bias.

Interpretive approach the theoretical perspective that social scientists must include the meaning that social actors give to events and behaviour; symbolic interactionists and ethnomethodologists hold interpretive perspectives and subscribe to the philosophy of phenomenology.

Interview a research method, which involves a trained interviewer asking questions and recording respondents' replies. Interview questions can be structured (printed on a questionnaire with set question wording and pre-coded response categories), semi-structured (mostly open-ended questions, i.e. with no pre-coded response categories) or unstructured and in-depth (listed topics about which interviewers probe respondents for their views and experiences).

Leading question question phrased in a way, which leads the respondent to believe that a certain reply, is expected.

Naturalistic research descriptive research in natural, unmanipulated, social settings using les obtrusive, qualitative methods.

Need includes felt need (want), expressed need (demand), normative need (experts' definitions which can change over time in response to knowledge) and comparative need (comparisons with others and considerations of equity).

Observation a research method in which the investigator systematically watches listens to and records the phenomenon of interest.

P value P is the symbol of probability associated with the outcome of a test of a null hypothesis (i.e. the probability that an observed inferential statistic occurred by chance, as in $P<0.05$); p (small p) is used for proportions. Statistical tests exist which, in

appropriate study designs and samples, can test for the probability of observing the values obtained.

Paradigm a set of ideas (hypothesis) about the phenomena under inquiry.

Paradigm shift this occurs, over time, evidence accumulates which refutes, or is incompatible with, the paradigm, and thus the old paradigm is replaced by the new one.

Participant observation a research method in which the investigator takes part in (i.e. has a 'role' in) the social phenomenon of interest.

Perspective a way of interpreting empirical phenomena.

Phenomenology the philosophical belief that, unlike matter, humans have a consciousness. They interpret and experience the world in terms of meanings and actively construct an individual social reality.

Phenomenological sociology based on the concept of social structure of reality through the social interaction of people (social actors), who use symbols to interpret each other and assign meanings to perceptions and experiences.

Positivism aims to discover laws using quantitative methods and emphasises *positive facts.* It assumes that human behaviour is a reaction to (i.e. determined by) external stimuli and that is possible to observe and measure social phenomena, using the principles of the natural scientist, and to establish a reliable and valid body of knowledge about its operation based on empiricism and the hypothetico-deductive method.

Precision the ability of a measure to detect small changes in an attribute.

Prospective study collection of data over the forward passage of time (future).

Qualitative research social research, which carried, out in the field (natural settings) and analysed largely in non-statistical ways.

Quantitative research the measurement and analysis of observations in a numerical way.

Random error the errors in the study (usually from the sampling) randomly vary and sum to zero over enough cases; random error results in an estimate being *equally* likely to be above or below the true value.

Random sampling this gives each of the units in the target population a calculable and non-zero probability of being selected.

Randomisation assignment at random of people to experimental and control groups in experiments.

Reactive (Hawthorne) effect a guinea pig effect (awareness of being studied). If people feel they are being tested they may feel the need to create a good impression, or if the study stimulates new interest in the topic under investigation then the results will be distorted.

Relativism no single system of knowledge or beliefs (or 'social facts') exists; it is dependent on context (i.e. culture).

Reliability the extent to which the measure is consistent and minimises random error (its repeatability).

Research design this refers to the strategy of the research - how the sampling is conducted, whether a descriptive or experimental design is selected, whether control groups are needed, what variables need to be operationalised and measured, what analysis will be conducted.

Research methods, or techniques these are methods of data collection – interview, telephone, postal surveys, diaries and analysis of documents, observational methods and so on. They are also the instruments to be used.

Responsiveness a measure of the association between the *change* in the observed score and the change in the true value of the construct.

Sample a subset of a population.

Sampling techniques used to obtain a subset of a population without the expense of conducting a census (gathering of information from *all* members of a population).

Sampling distribution the distribution of means of all possible different samples of ***n*** observations that can be obtained from this population. It has a mean equal to the population mean. It is a normal distribution (assuming the sample size is large enough).

Sampling error any sample is just one of an almost infinite number that might have been selected, all of which can produce slightly different estimates. Sampling error is the probability that any one sample is not completely representative of the population from which it was drawn.

Sampling frame a list of the sampling units from which the sample can be drawn.

Selection bias bias in the sample obtained.

Sensitivity ability of the actual gradations in the scale's scores to reflect these changes adequately; probability of correctly identified affected person ('case').

Sensitivity analysis a method for making plausible assumptions about the margins of errors in the results, and assessing whether they affect the implications of the results. The margins of error

can be calculated using the confidence intervals of the results or they can be guessed.

Simple random sample a probability sampling method that gives each sampling unit an equal chance of being selected in the sample.

Social stratification the structured inequalities that exist between social groups owing to the unequal and systematic distribution of rewards and resources.

Specificity a measure of the probability of correctly identifying a non-affected person (i.e. 'non-case') with the measure.

Standard deviation this is the most common measure of dispersion. It is based on the difference of values from the mean value (the spread of individuals results round a mean value); it is the square root of the arithmetic mean of the squared deviations from the mean.

Standard error this a measure of the uncertainty in a sample statistic; the standard deviation of the sampling distribution is called the standard error. It is related to the population variation. The standard error of a mean is the standard deviation of the population divided by the square root of the sample size.

Statistical significance significance at the 0.05 per cent level means that five times in 100 the results could have occurred by chance, i.e. if the test was performed 100 times, on five occasions significant results will occur by chance.

Stigma the social reaction which leads to a spoilt identity and application of the label of deviant society.

Survey a method of collecting information from a sample of the population of interest (known as a sample survey).

Systematic error the errors in the study result in an estimate being more likely to be *either* above or below the true value, depending upon the nature of the systematic error in any particular case.

Systematic research the process of research should be based on an agreed set of rules and processes which are rigorously adhered to, and against which the research can be evaluated.

Systematic review of the literature review prepared with a systematic approach to minimising biases and random errors, and including components on materials and methods.

Systematic random sampling a sample in which every ***kth*** case is selected from the population (***n***) (with a random starting point).

Theory a set of logically interrelated propositions and their implications.

Triangulation the use of three or more different research methods (i.e. multiple methods) to investigate the phenomenon of interest.

Type I error (or alpha error) the error of rejecting a true null hypothesis.

Type II error (or beta error) the failure of reject (i.e. acceptance of) a null hypothesis when it is actually false.

Validity, external the extent to which the research findings can be generalised to the wider population of interest and applied to different settings.

Validity, internal the extent to which the instrument is really measuring what it purports to measure.

Variable an indicator assumed to represent the underlying construct or concept, produced by the operationalisation of the latter.

ANNEX

Annex I. READING ASSIGNMENTS

READING ASSIGNMENT I (page 6).

Maternal health care professionals' perspectives on the provision and use of antenatal and delivery care: a qualitative descriptive study in rural Vietnam

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Abstract

Background

High quality maternal health care is an important tool to reduce maternal and neonatal mortality. Services offered should be evidence based and adapted to the local setting. This qualitative descriptive study explored the perspectives and experiences of midwives, assistant physicians and medical doctors on the content and quality of maternal health care in rural Vietnam.

Method

The study was performed in a rural district in northern Vietnam. Four focus group discussions with health care professionals at primary health care level were

conducted. The data was analysed using qualitative manifest and latent content analysis.
Result
Two main themes emerged: “Contextual conditions for maternal health care” and “Balancing between possibilities and constraints”. Contextual conditions influenced both pregnant women’s use of maternal health care and health care professionals’ performance. The study participants stated that women’s uses of maternal health care were influenced by economical constraints and cultural norms that impeded their autonomy in relation to childbearing. Structural constraints within the health care system included inadequate financing of the
primary health care, resulting in lack of human resources, professional re-training and adequate equipment.
Conclusion
Contextual conditions strongly influenced the performance and interaction between pregnant women and health care professionals within antenatal care and delivery care in a rural district of Vietnam. Although Vietnam is performing comparatively well in terms of low maternal and child mortality figures, this study revealed midwives’ and other health care professionals’ perceived difficulties in their daily work. It seemed maternal health care was under-resourced in terms of staff, equipment and continuing education activities. The cultural setting in Vietnam constituting a strong patriarchal society and prevailing Confucian norms limits women’s autonomy and reduce their possibility to make independent decisions about their own reproductive health. This issue should be further addressed by policy-makers. Strategies to reduce inequities in maternal health care for pregnant women are needed. The quality of client-provider interaction and management of pregnancy may be strengthened by education, human resources, re-training and provision of essential equipment.

Background:

The UN Millennium Goals include reducing maternal and neonatal mortality and morbidity worldwide [1]. The strategies used to achieve these goals include family planning, skilled attendance during pregnancy and childbirth, and access to emergency obstetric care [2]. Antenatal care (ANC) refers to the care of pregnant women using evidence-based interventions that are considered beneficial. WHO consider it essential that all women are offered tetanus toxoid immunisation, screening and treatment of anaemia and syphilis, and are examined for pregnancy related complications such as hypertensive disorders and malpresentations. HIV screening is recommended in as a situational intervention, i.e. in endemic areas [3]. Client provider-interaction remains the core of clinical practice and the care offered should be acceptable for both the health care professional and the client [4, 5]. Clients’ health care seeking behaviour worldwide has been assumed to be the result of clients’ individual characteristics, patients’ identified needs, health status, patients’ satisfaction, the structure of the health care system, and the external environment such as the infrastructure [6-8]. Strengthening the competence of midlevel providers and improving communicative skills can improve the quality of maternal health care [9-11]. Vietnamese society has been strongly influenced both by traditional Confucian values and (after the Communist revolution in 1945) by political actions that promote equality between males and females [12]. The development goals from the 1940’s strive for equal opportunities for men and women. The strategy included among other things changes in legalization and
family planning goals and promoted women’s position in society [12]. This is contradicted by the Confucian tradition that states that women are inferior to men [13]. The Vietnamese system is often described as being in transition with traditional beliefs still intertwined with official strategies of equality [14]. Early marriage and childbearing have been typical characteristics of the traditional Vietnamese family [13]. According to the legislation, the minimum

age for marriage is 18 years for women and 20 years for men. Political and social transition has created greater inequity between population groups, disfavouring ethnic minorities living in mountainous areas [15]. Vietnam is currently undergoing changes towards a more market-oriented provision of health care. In Vietnam, ANC is free and mainly provided at the community health stations (CHS).The Vietnamese government recommends three ANC visits during pregnancy [7, 16]. Information on factors associated with the use of ANC in Vietnam is limited, but associations between maternal education, occupation, parity, and ethnicity have been shown [7, 17]. About 88% percent of women are assisted by a skilled attendant at birth [18]. Vietnam enjoys low maternal mortality ratio and neonatal mortality rate compared to other countries in the same income category or geographical area [18]. The maternal mortality ratio in Vietnam is estimated to 150 per 100 000 live births; the infant mortality is estimated to be 19 per 1000 live births [18]. Two-thirds of infants' deaths are estimated to be attributed to the neonatal period, indicating suboptimal care at birth and the first week of life. The Vietnamese government states that reducing maternal and perinatal mortality is the development target for the century. The national plan on safe motherhood for 2003 to 2010 targets adequate supply of essential drugs, educated health care professionals, identification and treatment of anaemia and prevention of mother to child transmission of HIV among other objectives [19] . Strengthening the health system is crucial to provide effective care to all women and their new born children [1]. Health care need to be clinically safe and culturally sensitive [5, 20]. This may be achieved by listening to the voices of the health care providers [21]. This qualitative descriptive study explored the perspectives and experiences of midwives, assistant physicians and medical doctors on the content and quality of maternal health care in rural Vietnam.

Method

The data collection was conducted during December 2004 in Bavi district, approximately 60 km north of Hanoi, Vietnam. Farming (rice production) and live stock breeding are the main economic activities in the district [22]. The health care system in the district includes 32 communal health stations, (CHS) three regional general clinics and one district hospital with surgical capacity. The communal health station is commonly staffed with one midwife responsible for antenatal and delivery care and one nurse. Often the head of the CHS is a medical doctor or an assistant physician responsible for the general medical care and management of the CHS. The CHS is equipped with per-oral or injection drugs, but has no capacity to perform instrumental deliveries [23]. Patients in need of surgical interventions are referred to the district hospital. Each CHS supports approximately 7500 inhabitants. A demographic surveillance site called the FilaBavi has been functioning in the Bavi district since 1999. The FilaBavi has been described in detail elsewhere [22]. FilaBavi was used as a framework for identifying eligible participants for the study. All midwives responsible for ANC at the CHS associated with FilaBavi (n=21) and eight medical doctors and assistant physicians were identified using the salary list (N=29). They were invited by a written letter to participate in the study. All invited participants agreed to participate. Four FGDs with six to eight participants in each group were conducted. The groups were homogenous with respect to profession; three FGDs were performed with midwives and one FGD with assistant physicians and medical doctors. Background information on the
participants is presented in Table 1.

An interview guide was constructed for the first three FGD. It was revised before the FGD with medical doctors and assistant physicians, and issues

related to the management of the CHS were added. The FGDs took place during the day in a conference room at one of the CHS. The FGD was moderated by one of the members of the research team (third author; Le Quyen Duong, LQD) who at the time was a female medical student. The moderator (LQD) presented open-ended questions concerning participants' perspectives and experiences related to antenatal and delivery care. First author Sophie Graner, (SG) participated in the FGD as an observer. SG had a female Vietnamese interpreter next to her who quietly translated Vietnamese into English during the FGD sessions. Field notes were taken by SG and a Vietnamese female assistant during the FGDs. All participants were informed of the aim of the study and that participation was voluntary. Each participant was guaranteed confidentiality and oral consent to use the tape recorder was obtained from all participants. The FGDs were transcribed verbatim and then translated to English. Each FGD lasted approximately 90 minutes. Qualitative manifest and latent content analysis was applied to analyse the data [24]. The analysis aimed at finding the manifest and latent meaning of the data [25]. Content analysis is a stepwise process [26]. The data was initially read several times by SG and last author Marie Klingberg-Allvin (MKA) in order to find a sense of the whole. The data was thereafter divided into units of meaning that were condensed [25]. The condensed meaning units were abstracted and labelled with a code by SG and MKA independently. Diverging codes were reevaluated and consensus was reached. The codes were then compared and divided with regard to similarities and differences by SG together with MKA. The codes were later grouped into subcategories and categories by the same authors, searching a more latent content for each level of abstraction. After discussing the latent meaning of the categories two main themes emerged. All the authors read, discussed and agreed on the final categorization and themes. The study was approved by the head of the Bavi district hospital and the Medical University,
Hanoi.

Results

Two main themes emerged: "Contextual conditions for maternal health care" and "Balancing between possibilities and constraints". The themes, categories, and subcategories are presented in Table 2. Categories, subcategories, and selected quotations are presented under each theme to illustrate the findings.

Contextual conditions for maternal health care

Two categories are included in this theme: "Facilitators and barriers to access of maternal health care" and "Organisation of maternal health care".

Facilitators and barriers to access of maternal health care

Different socio-cultural factors that influence whether and when pregnant women participate in the antenatal care programme were discussed. The rate of ANC visits among women was perceived by the maternal health care professionals to be high. Economical constraints, lack of time, or a pregnant woman felt well during pregnancy were mentioned as reasons for women to sometimes neglect ANC.

The pregnant women living in rural areas have financial and time constraints for examination [since they need to work]. I have to explain to them that they might experience complications affecting themselves and their unborn child during their pregnancy. (Midwife).

Free iron supplementation was mentioned as a contributing factor for attending ANC. Participants had noticed a lower ANC attendance after this governmental supply was withdrawn.

Some years ago in the ANC program we gave pregnant women iron supplements

free of charge. They visited us regularly then. Now, we don't give them iron supplements, so they neglect the examinations. (Midwife).

Women expecting their third or subsequent child were perceived to be ashamed, and it was expressed that these women tried to conceal their pregnancy.

They expect the fourth child. When the periods don't appear on the defined day,

they tell us under their breath. (Midwife)

Improved general knowledge regarding sexual and reproductive health and the Vietnamese two-child policy were described as the main reasons for a decreased number of children per family. The pregnant women, their husbands and the extended family were perceived as keen on optimizing conditions during pregnancy.

Because now, they only have few children. Pregnant women are taken care of from pregnancy till birth in order to have a healthy baby. Even some disadvantaged pregnant women without husband came to ask us for counseling to have a healthy baby. ... Generally, the perception and awareness [of pregnant women and their family about pregnancy] is profitable for the health of both mother and baby. (Midwife)

The participants stated that the most important reason to continue childbearing after the stipulated two children was lack of sons. These multiparous women were considered at high risk both from a physical and psychological perspective and in need of extra care from the midwife.

Some women who have given birth 4-5 times, but all of her babies are girls, often have psychological shocks. Some women live together with parents-in–law who are often impacted by feudal belief. These women are required to continue to give a birth until she has a son. If not, their parents-in-law will look for another wife for their husband in order to have a son to maintain the continuity of the family line. Therefore, these women are very worried. So, we need to encourage them a lot. (Midwife)

Organization of maternal health care

The daily responsibilities included patient mobilization, public information, examination and counseling of pregnant women, and management of labour. Women identified as high-risk patients were referred to a higher level of maternal health care either during pregnancy or at the time of birth.

After monitoring for eight hours, the cervix is only dilated 3-4 cm. In the 9th hour, it's within alert time. We have to send the pregnant woman to hospital at once. This woman has prolonged labour. The partogram helps us identify the risk deliveries at an early stage and send the pregnant woman to hospital on time. (Midwife)

If we discover a woman with high blood pressure in this station, the best is to refer her to the hospital; that's the rule here. (Midwife)

Lack of money and transportation were mentioned as the main obstacles for referral but also fear of medical complications or pain after surgery emerged as additional factors.

Although my CHS is far from the hospital, we do not have access to cars. In urgent cases, we use motorbikes to take the patients to the hospital. It is frightening when an obstetrical emergency occurs during or after birth. (Midwife)

Self-medication with drugs available in the market is common in Vietnam. Pregnant women were perceived by the participants as very knowledgeable about drugs' potential harmful effects during pregnancy. It was anticipated that pregnant women sought medical advice from health care professionals before taking medication. On the contrary, traditional herbs were generally considered as harmless. The heads of CHS – i.e., medical doctors or assistant

physicians – were responsible for the organization of the daily work and medical routines as well as the administrative tasks. The ANC and referral of pregnant women were mainly the responsibility of the midwives but supervised by the heads of CHS.

The station head has the right to supervise the midwives in their work. If there is
any problem, he has the right to discipline the midwives. (Assistant physician)

The heads of CHS tried to organize the work so that all employees were informed of women assessed as having high-risk pregnancies. This was done through weekly meetings and labeling of medical records with colored paperclips. The heads of CHS also stressed the importance that health care professionals needed to be available 24 hours per day.

In my station, I try to set up some requirements for the employment of staff. If possible, we should select staff that lives near the station. I refuse to employ a candidate who lives far from the station. (Assistant physician)

The financing of the CHS did not allow for two employees on night duty, but this problem was solved by dividing one salary into two.

We discussed and had a lot of meetings. However, the duty allowance is for one staff; two health staff must be assigned to be on duty to assure medical safety. One salary is divided between the two health staff on duty. The staff must accept this solution. (Assistant physician)

The need of adequate facilities, human resources and professional re-training were stressed in all FGDs. It was clear that these constraints were frustrating for the health care professionals working at CHS.

I think we're lacking many things. The first is clinical knowledge. I think all the officers in a CHS need to be trained to carry out deliveries. The second is lack of human resources. There should be at least two officers who are trained specially in obstetrics on a night duty in each CHS. The third is [medical] instruments. There should be a standard room in each CHS. This room should be airy in the summer and cold in the winter. The most important thing we need now is a heater, which is essential for both mothers and babies. A lot of problems appear during labor. I also need drugs, oxygen and vacuum aspirators. The officers in CHS want the government to supply us with training, human resources, and equipment. All this is essential. (Midwife).

To improve knowledge and professional skills, it is necessary to have short training courses every year for the staff at the communal station. All staff will then have the chance to access new guidelines and they can share the experiences and learn the new techniques to provide better primary health care to the inhabitants. (Assistant physician)

Balancing between possibilities and constraints

Two categories are included: "Interpersonal interactions" and "Health care professionals' working conditions".

Interpersonal interactions

The midwives were eager to underline their role as health care providers and the importance of pregnant women following their medical advice.

They [pregnant women] must rely on us. We tell them what we can anticipate. They often follow properly what we advise and never argue. (Midwife)

The hierarchical relationship between the midwife and the pregnant woman illustrated above was contradicted by many examples of a caring attitude. Being unmarried and pregnant is socially unacceptable in Vietnam. A married woman is cared for by her husband, but a single young pregnant woman is considered vulnerable socially, usually expelled by her family and at increased risk of having a complicated pregnancy and birth.

When a woman is pregnant, her husband takes care of her. However, the girls

who are unmarried are often not cared by their families either. . . . Therefore, I take special care of them. **(**Midwife)

In Vietnam, the legal age for marriage is 18 years for women, and pregnancy before this age was considered to be associated with obstetrical and psychosocial complications.

Personally, I haven't met any cases like that [pregnant adolescents] in my commune. If there had been such cases, I would have been very worried for everything. Firstly, these young mothers are worried about their situation during the pregnancy. Secondly, the neighbors and relatives will have negative opinions about her pregnancy. They [the adolescents] withdraw, creating difficulties for the health professionals to communicate with them. They are very shy and don't dare to have antenatal care or vaccination. Thus, I think that they will be at a higher risk when they give birth (Assistant physician)

It was prominent in all groups that the husbands' involvement in childbearing and birth had changed during the last years. It was described how most of the husbands were deeply concerned about their pregnant wife and supported her to take precautions to deliver a healthy and strong child. Husbands were considered important support for the women during pregnancy and childbirth, and they were often present in the delivery room to support their wives. Some husbands, however, were considered shy and the traditional view that childbearing is women's responsibility remained in the population.

They [husbands] are actually very considerate, but regarding the childbirth, they are not able to care for their wives since they perceive the childbirth as the responsibility of women. (Midwife).

The midwives presented different strategies to motivate women to attend sufficient number of ANC visits during pregnancy. They had a close collaboration with population counselors in each village who reported women that were pregnant and advised them to attend ANC. Midwives described how they approached pregnant women at home in order to motivate them to have examinations.

It is convenient because we have collaborators. They know who is pregnant because they live in the same village. . . . The collaborators go to the household if the pregnant woman has not attended ANC. We come together with them to the women's homes. (Midwife)

A prominent opinion expressed in all groups was the pregnant women's desire to give birth at the CHS.

They [pregnant women] mostly want to give birth in CHS because the midwives are friendly. . . . They will feel unsatisfied if we advise them to go to the hospital.

(Midwife).

In some cases, the midwives suspected pregnant women hid essential information in their obstetrical history or delayed arrival at the CHS so they could deliver at CHS. The midwives described how they found themselves pressured to carry out risk deliveries at the CHS.

Many pregnant women try to hide their obstetric history. I was sure that one pregnant woman had had obstetrical complications earlier, but she insisted on the opposite. Then I have to tell her that I am sure her previous deliveries were difficult and she admitted to a complicated obstetrical history. (Midwife)

Strategies were developed to avoid blame from pregnant women or their families in case of an unfavourable pregnancy outcome. Some midwives suggested that the pregnant woman had an antenatal ultrasound investigation in order detect foetal malformations before birth. In other cases the pregnant women or their relatives were sometimes asked to sign a paper that removed the health care professional of responsibility.

I request all the women between 7Th and 9th month of pregnancy to have an ultrasound scan. I want them to find out about any foetal deformity as soon as possible. If we identify the malformation when the baby is born, the family may think that it is my mistake. (Midwife)

Health care professionals' working conditions

The midwives described mental and physical constraints in their work environment. Some felt they could handle first-degree lacerations, but lacerations of higher degrees were sometimes left to heal without adequate treatment.

I lack proper instruments for suturing. I'm only able to suture the exterior. If the interior ruptures, I can do nothing. I can diagnose interior ruptures but I have to ignore it because I don't have essential instruments for suturing. **(**Midwife)

The health care professionals' ability to safeguard good hygiene and apply aseptic techniques during care during childbirth in order to prevent infections was limited. Shortage of appropriate gloves and sterilizers caused concern in relation to pregnant women who were HIV-positive. Fear of HIV transmission was explicit among the participants and especially problematic as they lacked the equipment to protect themselves from HIV transmission. The risk of becoming HIV infected in their daily work was acknowledged as a substantial problem:

It's very dangerous to work in the CHS. One of my husband's friends, who is a principal of a school, said to my husband: 'Your wife works in obstetrics. We do not know if she is infected with HIV or not. She may transmit it to you.' That man made me worried. (Midwife)

The midwives' situation was defined by lonely work, long work hours and few possibilities for collegial support even during obstetrical emergencies. Their situation was further described as lack of collegial support and mistrust of their clinical competence at debriefing sessions.

Her family [the pregnant woman] wasted time for preparation such as transportation. She arrived at hospital late. In this case, the head of the department of obstetrics criticised me. At CHS, she [pregnant woman] has laid on the investigation table for a very short time. However, she told the head [at the hospital] that she had laid on the investigation table for 30 minutes. Unfortunately, he believed her. (Midwife)

An altruistic attitude and a pride of being a midwife were conveyed. Their salary, however, was not considered proportionate to the responsibility, the workload, and the personal risks involved.

Health officers at CHS like me have many difficulties at work. Sometimes I think

I'm a very good health worker. (Midwife)

Discussion

The most prominent findings of this qualitative descriptive study were the significance of the contextual conditions for pregnant women's and health care professionals' actions and structural factors restricting the performance within antenatal and delivery care. The pregnant women's use of maternal health care was influenced by economical constraints and cultural norms that impeded their autonomy in relation to childbearing. Structural constraints within the health care system included inadequate financing of primary health care (resulting in lack of human resources), of professional re-training, and of adequate equipment. zxZ

Vietnam has undergone rapid socio-demographic changes and economical growth during the last two decades that have created inequity [17]. Our study describes how economical constraints act as a barrier for pregnant women to attend ANC. Hesitance to seek a higher level of medical care in case of an obstetrical emergency and fear of complications and pain after surgery were

further described. Worldwide the aim is to reduce the patient fees for health care [1]. A national health insurance scheme in Vietnam is in place with benefits for those in paid employment and for the poor [20]. In the geographical area where the study was conducted, women were self-employed and hence not covered by the insurance scheme. A study focusing on a cash transfer scheme in India has shown the importance to target the poorest women when designing policies as well as addressing the quality of obstetrical care at the health facilities [27].

According to the participants in our study, women expecting their third child or more were exclusively women with only daughters. They were described to attend ANC late and hence considered as obstetrical risk patients for both medical and psychological reasons. This finding is coherent with another study from Vietnam where high parity and belonging to an ethnic minority was negatively associated to the use of ANC [7]. Women expecting a third child (or more) might have neglected to attend ANC in fear of being reprimanded according to the official two-child policy even though this policy was officially abolished in 2003 [7, 17].

Pregnancy and childbearing are the leading cause of death among adolescents (ages 15 to 19) worldwide [28]. In the current study, adolescents were perceived as being at high obstetrical risk and midwives tried to give pregnant adolescents extra support. The midwives had the opinion that adolescents should deliver at the hospital rather than in the CHS. This was an interesting finding since there is little medical evidence for this recommendation. This finding further contrasts with the evidence-based interventions influencing the Vietnamese maternal health care in general [29]. In Vietnam, the legal age for marriage is 18 years, and plausibly the perception of young women as risk patients was more an expression of the social vulnerability these women suffer.

Vietnam is a society with a patriarchal family system based on Confucian values where women's decision making power is limited [30]. This was confirmed in the FGDs by the description of the role of the pregnant woman's husband and mother-in-law during pregnancy and childbirth. Men's influence on women's sexual and reproductive health outcomes have been increasingly recognized globally. The need to incorporate men has been highlighted when developing frameworks for sexual and reproductive health programs [31]. Male

involvement has been shown to be an important strategy in improving women's reproductive health in a similar context [32]. Strengthening women's empowerment in decision making is essential to improve reproductive health [1]. The participants in our study described how men constituted important support for their pregnant wives and how the midwives encouraged men to be involved at childbirth. This and the participant's positive attitudes suggest that it is feasible to incorporate men in future reproductive health programs in Vietnam.

Constraints to provide high quality of maternal health care

Quality of maternal health care has been neglected in many low income countries, but the perspective is changing and quality is now seen as a key element in the provision of health services in a country like Vietnam [33]. Lack of human resources remain an obstacle to an efficient health system in many countries [1]. Quality of care depends on both high technical competence, access to adequate equipment, and good client-provider interaction [8]. All participants in our study stressed lack of adequate equipment, human resources, and professional retraining as major constraints. The heads of CHS urged that the primary health level should be prioritized and funding increased. Implementation of continuous in-service

training for health care professionals at all levels is essential to safeguard the clinical competence required to meet all clients' needs**.** Supervision and audits with feedback, rather than only written guidelines, have been identified as effective tools to improve health care professionals performance in low income settings [34].

The heads of CHC described several strategies on how to optimize the use of human resources at the health stations, but they did not provide strategies to improve specifically the client provider interaction. Successful interpersonal relations are not only the result of the individual provider's personality, but also depend on numerous managerial decisions such as the establishment's norms, supervision, job description, and level of training [8, 33]. Exchange of adequate information given by competent providers who are sensitive to the client's specific needs during pregnancy and labour are central in order to improve the quality of maternal health care [35]. In Vietnam, an individual perceived as knowledgeable (either due to academic training or age) is held in esteem. The traditional hierarchal client/provider relationship has been shown to negatively influence the quality of family planning information in another study from Vietnam [36]. Another prominent finding was the perception that pregnant women strongly desired to deliver at the CHS and they sometimes resisted being transferred to a higher medical level. As previously discussed financial situation in the family could contribute to this hesitance. An additional explanation might be lack of understanding due to inadequate information on the medical conditions upon which the decision was based. It has been estimated that only 50% of Vietnamese women are informed on the procedures during ANC and the women's involvement in decision making is uncommon [37]. In the present study, the midwives expected their pregnant women to follow the medical advice given.

Methodological considerations and trustworthiness

Focus group discussion is a method to gather information from specific population subgroups on a topic not well known to the investigator [38]. The method allows for the generation of rich and detailed data that usually leave the study participants perceptions intact [38]. We composed homogenous groups with regards to profession (6-8 participants) to avoid hierarchical relations [39]. After each FGD, the data was preliminary analysed and after the

first three FGD with midwives, all eligible midwives in the study area had been included. A fourth FGD with assistant physicians and medical doctors was then conducted to explore any new perspectives based on professional background. However, no new information emerged in this fourth FGD and hence it was concluded that saturation of the data was obtained. It has been suggested to divide trustworthiness into credibility, dependability, transferability and conformability [40]. We have made an attempt to provide a clear description of the data collection, data analysis, the context and the research team in order to allow the reader to assess the rigor of the study [40, 41]. In the current study we argue that the degree of credibility is high due to well-organized and well-prepared focus group discussions moderated by a person with prior knowledge of the context, language, and cultural meanings related to the topic studied. The dependability was strengthened by the fact that data was collected during a relative short time (four weeks), and we do not consider that the phenomena under study changed over time. Field notes were taken by SG during the FGD. The notes were additional to the transcribed and translated data and enriched the material. The data collection was five years prior to the final analysis, which may be considered a limitation to the study and made triangulation and member checks impossible for practical reasons. Transferability was strengthened by the

clear description of the data collection procedures, the setting and process of analysis. One weakness might be that the data was initially collected in Vietnamese and then translated into English and thereafter analysed. We tried to compensate for this disadvantage by confirming the results with the Vietnamese member in the research team (LQD) who also rechecked the transcription and retranslated the quotations back into
Vietnamese. A multidisciplinary team with Vietnamese and Swedish researchers with substantial experience from qualitative research took part in all stages of the research process [42].

Conclusion

Contextual conditions strongly influenced the performance and interaction between pregnant women and health care professionals within antenatal care and delivery care in a rural district of Vietnam. Although Vietnam is performing comparatively well in terms of low maternal and child mortality figures, this study revealed midwives' and other health care professionals' perceived difficulties in their daily work. It seemed maternal health care was under-resourced in terms of staff, equipment and continuing education activities. The cultural setting in Vietnam constituting a strong patriarchal society and prevailing Confucian norms limits women's autonomy and reduce their possibility to make independent decisions about their own reproductive health. This issue should be further addressed by policy-makers. Strategies to reduce inequities in maternal health care for pregnant women are needed. The quality of client-provider interaction and management of pregnancy may be strengthened by education, human resources, re-training and provision of essential equipment.

List of abbreviations:

Antenatal care (ANC), Communal health stations (CHS), Focus group discussions (FGD),
Gunilla Krantz (GK), Ingrid Mogren (IM), Le Quyen Duong (LQD), Marie Klingberg-Allvin
(MKA), Sophie Graner (SG).

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Table 1. Participants in the FGD by age, sex, profession, and years of professional experience.

FGD No	Participant No	Sex	Age (years)	Professional	Professional Years of Experience
1	1	F	37	Midwife	15
	2	F	26	Midwife	4
	3	F	23	Midwife	2
	4	F	30	Midwife	12
	5	F	24	Midwife	10
	6	F	49	Midwife	24
	7	F	36	Midwife	12
2	8	F	32	Midwife	9
	9	F	30	Midwife	7
	10	F	42	Midwife	19
	11	F	41	Midwife	17
	12	F	32	Midwife	10
	13	F	52	Midwife	30
	14	F	40	Midwife	16
	15	F	32	Midwife	9
3	16	F	47	Midwife	24
	17	F	23	Midwife	2 mths
	18	F	45	Midwife	25
	19	F	39	Midwife	7
	20	F	41	Midwife	20
	21	F	45	Midwife	20
Mean					**14.0±8.1 years**
4	22	M	35	Medical doctor	

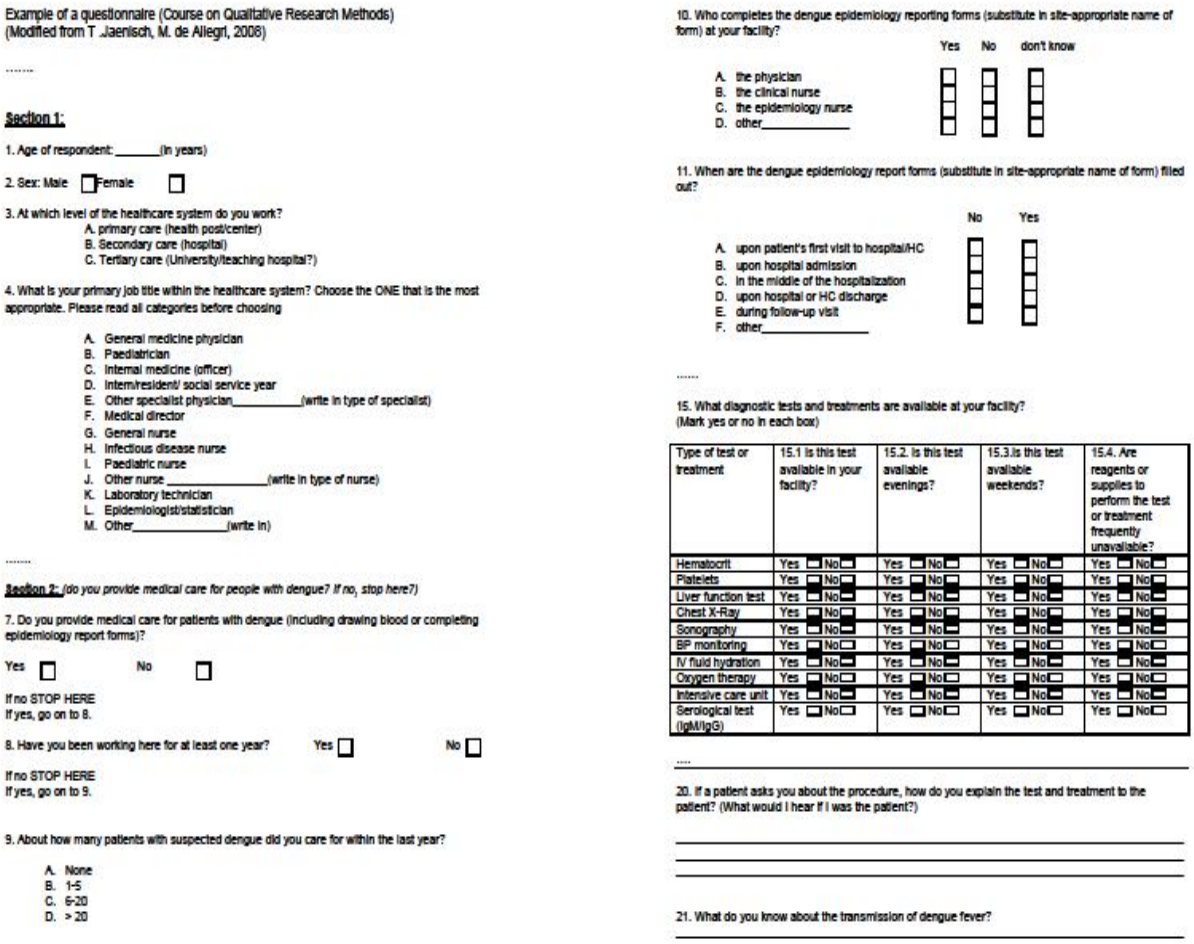
11				
	23	M	43	Assistant physician
21				
	24	M	48	Assistant physician
28				
	25	M	42	Assistant physician
5				
	26	M	36	Assistant physician
12				

Table 2. Themes, categories and sub-categories

Theme	**Category**	**Subcategory**
Contextual conditions for maternal health care	Facilitators and barriers to access of maternal health care	*Pregnant women's reasons for attending ANC* Changing society *Son preference* *Routine care at ANC and at delivery* *Management of CHS and for employment* *Suggested improvements*
Balancing between possibilities and constraints	Interpersonal interactions	*Midwife-pregnant woman interaction* *Husbands role during and childbirth* *Midwife-family interaction* *Pregnant women's desire to deliver at the CHS*

	Health care professionals' working conditions	*Physical work environment*
_____		*HIV*
_____		*Mental work environment*

READING ASSIGNMENT II. Example of a question (Page 18)



Example of a questionnaire (Course on Qualitative Research Methods)
(Modified from T .Jaenisch, M. de Allegri, 2008)

.....

Section 1:

1. Age of respondent: _____(in years)

2. Sex: Male ☐ Female ☐

3. At which level of the healthcare system do you work?
   A. primary care (health post/center)
   B. Secondary care (hospital)
   C. Tertiary care (University/teaching hospital?)

4. What is your primary job title within the healthcare system? Choose the ONE that is the most appropriate. Please read all categories before choosing

   A. General medicine physician
   B. Paediatrician
   C. Internal medicine (officer)
   D. Intern/resident/ social service year
   E. Other specialist physician_____(write in type of specialist)
   F. Medical director
   G. General nurse
   H. Infectious disease nurse
   I. Paediatric nurse
   J. Other nurse _____(write in type of nurse)
   K. Laboratory technician
   L. Epidemiologist/statistician
   M. Other_____(write in)

.....

Section 2: *(do you provide medical care for people with dengue? If no, stop here?)*

7. Do you provide medical care for patients with dengue (including drawing blood or completing epidemiology report forms)?

Yes ☐ No ☐

If no STOP HERE
If yes, go on to 8.

8. Have you been working here for at least one year? Yes ☐ No ☐

If no STOP HERE
If yes, go on to 9.

9. About how many patients with suspected dengue did you care for within the last year?

   A. None
   B. 1-5
   C. 6-20
   D. > 20

10. Who completes the dengue epidemiology reporting forms (substitute in site-appropriate name of form) at your facility?

	Yes	No	don't know
A. the physician	☐	☐	☐
B. the clinical nurse	☐	☐	☐
C. the epidemiology nurse	☐	☐	☐
D. other_____	☐	☐	☐

11. When are the dengue epidemiology report forms (substitute in site-appropriate name of form) filled out?

	No	Yes
A. upon patient's first visit to hospital/HC	☐	☐
B. upon hospital admission	☐	☐
C. in the middle of the hospitalization	☐	☐
D. upon hospital or HC discharge	☐	☐
E. during follow-up visit	☐	☐
F. other_____	☐	☐

.....

15. What diagnostic tests and treatments are available at your facility?
(Mark yes or no in each box)

Type of test or treatment	15.1 Is this test available in your facility?	15.2. Is this test available evenings?	15.3.Is this test available weekends?	15.4. Are reagents or supplies to perform the test or treatment frequently unavailable?
Hematocrit	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
Platelets	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
Liver function test	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
Chest X-Ray	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
Sonography	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
BP monitoring	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
IV fluid hydration	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
Oxygen therapy	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
Intensive care unit	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐
Serological test (IgM/IgG)	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐	Yes ☐ No☐

....

20. If a patient asks you about the procedure, how do you explain the test and treatment to the patient? (What would I hear if I was the patient?)

_____
_____
_____

21. What do you know about the transmission of dengue fever?

_____

Reading Assignment III (page 29).

STRUCTURED QUESTIONNAIRE: Example: Health Service Providers

Date:…… Place: ……

Note: The objective of this questionnaire is strictly to study the issues in the cervical cancer screening and not to judge the professional skills and knowledge of the individual respondent.

1. Health staff category and Sex: Male Female

Doctor _____
Nurses_____
Pharmacist_____
Lab Technician_____
Midwife_____

Others_____

2. Do you think that cervical cancer is curable?

Yes

No

3. Do you know what the risk factors are for cervical cancer?

S. N.	Risk factor	Yes	No	Don't Know
1	Human Papilloma Virus			
2	Smoking			
3	Immunosuppression			
4	Chlamydia Infection			
5	Diet			
6	Oral contraception			
7	Multiple pregnancies			
8	Young age at 1st Pregnancy			
9	Hormonal therapies			
10	Family history			

4. Do you think this can be used for cervical cancer screening?

	Yes		No		Don't know	
i. Pap smear test						
ii. VIA						
iii. HPV DNA						
iv. Colposcopy						

5. What do you think should be the age of starting cervical cancer screening?

i. 15 to 20 years_____

ii. 20 to 25 years_____

iii. 25 to 30 years_____

iv. More than 30 years_____

6. What do you think should be the interval of the cervical cancer screening?

I. Once a year_____

II. After every 3 years_____

III. After 5 every years_____

IV. Once in 10 years_____

7. Do you ask women routinely if they are screened for cervical cancer?

Yes___

No____

8. Do you refer the women for screening if screening is not done at your centre?

Yes____

No_____

9. Do you ask males for their wives are screened?

Yes____

No_____

10. Do you do vaginal examination yourself?

Yes____

No_____

11. Do you use speculum for vaginal examination?

Yes____
No_____

12. Do you use speculum for cervical cancer screening?

Yes____
No_____

13. Do you use a source of light for the examination

Yes____
No_____

If yes then which source?

.....
....

14. Do you think cervical cancer is a public health problem?

Yes____
No_____

15. Do you think it is easy to diagnose cervical cancer?

Yes____
No_____

16. Do you think that women are really susceptible to cervical cancer in the region?

Yes____
No_____

17. In your opinion who should perform cervical cancer screening in health facilities?

I. Midwife_____
II. Nurses_____
III. Health officer_____
IV. Doctor_____
V. Gynecologist
(You are allowed to tick more than one profession)

18. Will women in your culture accept that cancer screening (including vaginal examination) is performed by male health professionals?

Yes____
No_____

19. In your opinion do females think that they are at risk of cervical cancer?

Yes____
No_____

20. In your opinion are females careless about their sexual health?

Yes____
No_____

21. In your opinion do they fear cancer screening with vaginal examination?

Yes____
No_____

22. In your opinion are they simply not interested in the test?

Yes____
No_____

23. Do you think that test is an unpleasant procedure for the females?

Yes____
No_____

24. What are the reasons of low coverage or why women do not under go CCS in your opinion?

.....
.....
.....
.....

25. Which method do you think would be most appropriate in your settings?
VIA, Pap smear, Colposcopy, HPV, Please tick and explain why?

.....
.....
.....

……
……
26. Any other thing would you like to mention.
……
……
……
……
……

Reading Assignment IV (page 29).

SEMI STRUCTURED IN-DEPTH INTERVIEW

IN-DEPTH INTERVIEW FORMAT
Place of interview:…… Date:……
Participants in the Interview
S. N. _____ Sex_____

Some leading questions for the interview

1. What do you think about the cervical cancer? Would you share your experience related to the magnitude of the problem?

2. Is it an issue of concern for our women?

3. What is the opinion of our women on this subject?

4. Why women do not come for screening/vaginal examination with speculum for cervical cancer?

5. What can be done to address this issue?

6. Whom do you consider as the women of high risk group and how can we reach this high risk group?

7. What could be the best method to do screening in our situation?

8. What problems do you see in responding the problem of cervical cancer?

9. How can you improve the situation?

READING ASSIGNMENT V

Original article

Socio-cultural factors in decisions related to fertility in remotely located communities: The case of the Suri ethnic group

1. Yetmgeta Eyayou[1], Yemane Berhane[2], Legesse Zerihun[3]

Abstract

Background: Fertility decisions and factors related to fertility decisions in remotely situated communities of Ethiopia are not known.

Objective: This study is aimed at describing the socio-cultural factors affecting decisions related to fertility in the Suri ethnic group.

Methods: The study applied the qualitative research method. In-depth interviews and observations were used as data collection methods. Analysis was done manually in the field and using computer software.

Results: The Suri have an old tradition of practicing child spacing. The reasons for child spacing are related to child welfare, maternal well-being, and the violent way of life in Suri society. Methods of child spacing practiced include the rhythm method, post-partum abstinence, and prolonged breastfeeding. Traditional sexual norms support child spacing practices in Suri community. These traditional fertility norms are likely to be eroded with changes in lifestyle.

Conclusion: Trends in fertility need to be monitored regularly and appropriate measures should be taken to introduce and promote family planning and child health services to ensure a healthier life for isolated communities during their
integration into the general public. [*Ethiop.J.Health Dev.* 2004;18(3):171-174]

Introduction

Modern family planning methods are widely believed to influence fertility worldwide (1). However, traditional methods are still used as the main method of fertility regulation in African societies. The social, cultural and traditional beliefs and practices that are embedded in the social system have an impact on decisions related to fertility (2). Fertility patterns observed in developing countries in general, and in Ethiopia in particular, can be attributed to the traditional attitudes and cultural values held by communities and tradition of communities that favors having a larger number of children (3).

Traditional family planning methods constitute a considerable proportion of the contraceptive methods used in both urban and rural Ethiopia. The socio-cultural factors that affect decisions regarding fertility and fertility regulation in remote areas of Ethiopia are poorly understood (4). This study was conducted in order to get some insight about fertility related issues in remote areas with special focus in Surma district in Southern Ethiopia.

The total population of the Suri is estimated roughly at around 60,000. They live in isolation with little exposure to ideas and influences outside their villages. It can be taken as an ideal community to investigate the traditional norms that affect in fertility related decisions. Hence, the objective of this study is to investigate the socio-cultural factors that are involved in making decisions related to fertility and the nature of traditional contraception available in Suri society.

Methods

A qualitative study using key informant in-depth interviews and observation was conducted from December 2002 to Jan 2003in Surma woreda of Bench – Maji zone of the Southern Nations, Nationalities and People's Regional State, which is located 752 Km southwest of Addis Ababa along the Ethio – Sudanese border. The study population is the Suri ethnic group that includes the Tirma, Chai and Baale tribes, all living closely in the southwestern region

of Ethiopia starting from the Kibish valley and extending westwards towards the Boma plateau in Sudan to the west, and northwards up to the Akobo river. There are 21 kebeles in the woreda. Anjo, Gome, Tulgit and Haru kebeles were included in the study owing to their accessibility by road transport and relative security. Saturation and redundancy of information were used to determine sample size. Key informants were recruited using heterogeneous and snowball sampling techniques.

Interviews were tape-recorded when appropriate and possible. Translators were used when informants did not speak Amharic. The researcher sought social acceptance by Suri garments, by working in the local clinics, and by giving health education. Each interview and field note was translated into English. Tape-recorded interviews were transcribed word for word. A contact summary note was written for each interview to summarize each encounter and to look for saturation and gaps. The transcribed and translated text document was entered into the OpenCode Version 2.1 computer software for handling qualitative data and for coding and code sorting. Neutrality was maintained during coding. Codes were categorized according to the major themes of the research question. Data were reduced to get the overall sense of the data following the main themes of the study. Ethical clearance was obtained from Addis Ababa University, Faculty of Medicine.

Results

Characteristics of the study area and population

A total of 60 interviews were conducted; 33 of the respondents were from Tulgit, 18 from Anjo, 3 from Haru, 4 from Kibish and 2 from Kassi villages. Male to female ratio was 1:1. Most male informants were polygamous. There is no polyandry in Suri for married women. Only 7 of the informants were literate. A number of observations were made during the interviews as well as separately.

The Fertility Culture: perceptions and the need to regulate

Children are highly valued and desired irrespective of their sex as both sexes fill a very crucial gap in the social, cultural and economic life of a Suri family. Couples with many children are respected. A middle aged woman expressed her desire to have many children by saying, *“God willing, I want to have as many children as possible, even more than 10 children”.*

Another middle-aged man who is the father of 4 children said, *“I want to have as many children as possible…up to 20 children is acceptable for me”.* Boys are shepherds, providers of security, and extra hands in mining gold and cattle raiding. A girl fetches up to 30 cattle and one AK-47 rifle through dowry. Having many children is considered as insurance against high child mortality that is highly prevalent in the area. The Suri people are very much afraid of the unforeseen catastrophes that robe them of the privilege of having children at an old age. An elderly man said, *“Only three of my 12 children survived. Nine of them died due to illnesses during their childhood”.*

Suri men marry as many wives as their economy allows in order to form large families. A middle-aged man remarked, “*I have now six children from two wives. In order to have up to 40 children I have to marry up to six wives.”* The desire to have many children is not directly translated to welcoming all births in close succession. Widespread practice of spacing and delayed age of first marriage do not allow women to have as many children as they want. The age at first marriage is approximately around the mid-twenties. The Suri give a space of 2 – 4 years between children in order to properly raise one child before the second child is born. A middle-aged woman said, *“In Suri culture, we do not give birth to children one over the other in a row. If I have a child this*

harvest season, the next child would be after another two harvest seasons. I give birth only after the lasts child starts to walk and play by itself".

The Suri believe that the "cup" they use for feeding children normal the *shorka*, has a very wide circular or oval opening, which cannot fit in to the mouth of an
infant or a small child. Breastfeeding is considered as readily available and easy to feed for children. If another child is born before the former one is able to feed on family diet, the child would be weak, starts to crawl again if it has already started to walk, and can be affected by diseases very easily and could even finally die. In addition, cow's milk is not readily available in the residential areas of Suri people because cattle are kept in far away grazing areas. Only adolescents and adult males live in the ranches where the cattle are kept and the distance is too long to transport milk from the ranches daily. Some families do keep milking cows in the villages if there is a child who needs milk and is not able to get it from his mother. There is also a desire to introduce bottles to feed their babies to solve the problem related to child feeding. A middle-aged man said, *"If bottles were available for us to feed our children the way other people do, we would be glad to have as many children as we could without the need for giving space in between."*

The Suri believe that a mother needs good food to "calm down and heal" after giving birth. In order to treat the damages caused by pregnancy and delivery mothers would be fed meat, milk, blood and porridge in postpartum days. Child spacing is strongly believed to help mothers regain their strength.

The Suri people frequently encounter violent clashes and bloodshed with neighboring Dizi, Me'en, Anuak and Bume tribes primarily for cattle. A typical violent incident starts with the unexpected arrival of armed groups carrying guns, shovels and spears to a village. They kill whoever they find, burn the houses and loot property. As women and children are the ones that mostly live in the villages they are the first victims of such incidents. Every member of the family is expected to know the enemy's arrival and try at least to save himself from the attacks by confrontation, hiding or Socio-cultural factors in decisions related to fertility in remotely located communities fleeing. If a couple have two or three children who can't run or hide by themselves, the damage to such a family would be heavy. Hence, the Suri believe that they should wait until the former child is able to differentiate between friends and enemies, and is able to walk by him/herself and hide when enemy approaches the village. An elderly man said, *"We space the birth of our children intentionally. If the Bume come to kill us and destroy our property, it would be easier to carry one child and flee to a safer carrying two or three children. When children are old enough, they can hide themselves in the bushes when the Bume come".*

Traditional fertility regulation methods

The rhythm method is widely practiced in Suri society. Mothers and elder sisters train younger girls on ways of preventing pregnancy using the rhythm method. Though widely practiced during pre-marital years, couples also use the rhythm method for child spacing. Suri women calculate their menstrual days by making reference to the position of the moon to identify the "safe and unsafe" in times their menstrual cycles. Young girls prepare a string on which they draw knots that represent each day of the menstrual cycle in order to remember their safe days. These knotted strings are used as calendars.

Sexual abstinence starts when a woman is pregnant and continues until the hild is able to walk and on family diet. This might continue for up to 3 years. Post – partum sexual abstinence only concerns women. Men are allowed to have other wives as well as extramarital sexual contacts as they wish. Polygamy and multiple sexual partners are believed to facilitate post – partum abstinence. Men also spend most of their time looking after the cattle and away from home, and whenever they are at home the couple do not usually share beds or sleeping quarts. The traditional belief that men and women who have had sex in the past 10 days are not allowed to drink milk and blood, widely available and nutritious foodstuffs, also facilitates sexual abstinence.

Suri mothers breastfeed their children for more than two years primarily because breastfeeding is reliable, and economical. The advantage e of breastfeeding for the prevention of pregnancy is not perceived well in Suri community. Lack of breastfeeding is believed to cause compromised child growth, repeated episodes of malaria and eventually death but no association is made with fertility.

Discussion

The fact that Suri people value children highly is also common in most African societies (5-6). Children are considered as extra hands for household chores as well as in cattle herding, and as a source of security and wealth through dawries. The desire to have many children in Suri society is related to the benefits children bring to the family, as is the case elsewhere in Africa (3). The Suri welcome children irrespective of their sex unlike the widely observed son preference in many societies (7). Traditionally the Suri women practice child spacing in the way other women in tropical Africa do to reduce marital fertility (8). This study has identified various factors that restrict the Suri couples from having the number of children they always desired. These factors include concern for child welfare especially related to child feeding practices as it has been the case in Zaire and Bangladesh (9-11), concern about the deterioration of maternal health due to closely spaced births as in Bangladesh (11), and the constant threat of violence and bloodshed in the area. Violence has always been part of the community to such an extent that it has dictated a considerable part of their daily live (12-13).

The age at first marriage for most Suri women is their mid twenties. The men also marry at a later age. This is by far a late age of marriage compared with the national median age of marriage, which is around 17.2 years for women and 23.2 years for men aged 25-29 (14). The reasons behind higher age of first marriage are the time required for men to collect the required number of cattle for dawing that takes years of cattle herding as well as cattle raiding. The fact that the responsibilities of married life are feared by most girls also delays marriage. Suri boys and girls enjoy their premarital life very much. Most women consider married life as a bondage they do not want to rush into. The practice of early sexual initiation with liberal sexual norms before marriage makes the urgency to marry less. Suri couples widely practice traditional contraception methods to prevent pregnancy in ways similar to the tribal societies of India (7). Prolonged breastfeeding and post partum sexual abstinence are factors that account for long birth intervals in tropical Africa too, which has a post partum sexual abstinence of 16.7 months (10). Even though prolonged lactational amenorrhoea of up to 19 months is reported in Ethiopia, the period of post partum sexual abstinence is only 2 months nationally (15). An earlier anthropological study on Suri culture also indicated

that Suri girls make use of the rhythm method to avoid pregnancy during the premarital stage (16). The effect, of on child welfare, of prolonged, exclusive breastfeeding practice for up to 4 years even without any supplementation as seen in Suri society needs further. The desire by the community to use feeding bottles in place of breastfeeding could potentially exacerbate the poor child survival situation.

The fertility culture observed in the isolated communities in this study would soon be very difficult to sustain as land size for pasturing large numbers of animals becomes less and less available due to increasing population and labor migration to urban areas, that often occurs with diminishing resources in places of origin, require adaptation in fertility regulation methods. With increased integration of the communities into the larger population of Ethiopia the handling of women cannot continue the same way. The status of women and the treatment they receive in the isolated communities is very pathetic. The routine use of abortion as a means of ending unwanted pregnancy from a desired conception test is largely unacceptable in many aspects but at least from the woman's health aspect, in the contemporary society. There are various initiatives to raise the status of women as a whole in the country that can help them to get relatively better conditions to make choices in marriage and in fertility decisions. Thus, it is very important for policy makers to get insight into such trends to make the transition from isolation to integration fairly smooth in terms of population dynamics. A well designed population policy and appropriate services are needed to balance the population growth with the resources available locally.

Acknowledgement

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Source(: *Ethiop.J.Health Dev.Ethiop.J.Health Dev. 2004;18 (3)* 172).

EXERCISE: EVALUATE THE QUALITY OF A QUALITATIVE RESEARCH

Instructions:

1. Read individually the above scientific paper entitled as "**Socio-cultural factors in decisions related to fertility in remotely located communities:**
The case of the Suri ethnic group" .
2. In groups evaluate the quality of the paper by answering the following questions:
3. Present your evaluation to the class.

A. What is the context of the paper (background of the authors, journal type, to
whom is the paper addressed/who is the audience?).
B. Does it follow scientific writing or did the authors use a narrative approach?

Criteria for assessment of a paper written in scientific writing style:

• **Overall approach and consistency, clarity**

How was the topic treated in terms of scientific understanding, consistency and logic structure of presentation, how do you appraise its originality? Is it easy to understand?

• **Technical quality and layout:**

Format, headings, labeling and legibility of figures and tables, formal correctness of literature citations, does each figure/table have its self-contained legend?

• **Summary:**

Does the summary cover the problem, the study question (s) / objectives or hypothesis and the importance to health care, the methods used to investigate the questions, the results and their interpretation, the conclusion, any recommendations?

• **Introduction:**

Does the introduction explain the larger context of the study, narrowing the view down to the core problem? Does this chapter cover the significance of the research question(s) including any necessary background information, is there a description of how the study will answer the research question(s)? Is there a clear statement of objectives?

• **Methodology:**

Does this chapter inform the reader about all material and methods used, their adaptation to special objectives and conditions in this actual study? (The reader must be able to repeat the study in all details in the same or similar setting - and to be conscious about the limitations and strengths of the methods used).

• **Results:**

Is there a clear presentation of the results referring to the methods and tools that were used to come to the results? Are the results adequately documented with respect to controls, to significance and reliability? Do text and figures match without being redundant? Is the interpretation of the results clearly separated from the results itself?

• **Discussion/Conclusions:**

Do the authors present an interpretation of the results and an analysis of the implications of the findings for the study question(s), i.e. in which way the objectives of the study have been achieved? Is there a discussion of the limitations and how these limitations influence the final conclusions? Is the discussion in congruence with the research question ensuring that a case is made to support the conclusions? Are areas suggested that require further research? (*The reader may not agree with the conclusions, but should be able to follow clearly, to see and understand the logic).*

Annex II. SHORT ANSWERS FOR THE EXERCISES

Self-Assessment Questions (SAQs) for Study Session 4

Exercise I. (Page 5)
If You Want to Know, Ask Them: A Modern Fable

1. The main reason was high rates of STI and low condom use in the community.
2. They Introduced a new contraceptive option: the female condom.
3. Working with local counterparts, the team initiated a program to strengthen STI prevention and treatment services, inform people about the female condom, train providers in its use, stock the shelves of clinics and dispensaries, and recruit lay outreach workers to carry the message to women in the communities.
4. Six months later, encouraging results showed that rates of infection had dropped; women and men were indeed seeking treatment for STI symptoms.

   Twelve months later, treatment rates were still up, but rates of new infection were not declining as expected.
5. Not a cost-effective strategy because it had little sustained impact on the incidence of STI.
6. Invited a social scientist with qualitative research skills to investigate further the failure of the female condom to lower STI rates.
7. The new team designed a follow-up study that used in-depth interviews, focus groups, and clinic observation to explore the meaning of the new device to different community groups.
8. He and his trained interviewers soon learned that clinicians were not distributing the female condom because they feared being accused of lacing the condoms with HIV virus – a rumor that was circulating in the community. Data from providers about the popular belief that the female condom could carry HIV were reinforced by comments from women in the communities.
9. Talking with women revealed that most women knew about the method but did not ask for it, believing that providers who rarely suggested it) either did not have it or thought it was ineffective or even dangerous.
10. In both men's and women's focus groups, participants discussed what the female condom meant to them. Men were candid in their criticism of giving women control over pregnancy and therefore license to engage in extramarital affairs. They surprised the researchers with their anger at a program that "encouraged promiscuity" while claiming to promote reproductive health. Some even questioned the motives of women "who would want to collect a man's semen" in a condom. Against a backdrop of cultural beliefs in the power of witchcraft to bring harm to one's enemies, men's anxiety concerning illicit use of female condom was a serious and understandable obstacle to the program.
11. We may not know why some programs succeed and others fail, but the simple lesson from this situation is that if you want to understand how and why people make the decisions they do, ask them.

Exercise II. The Picture (Page 12)

1. A bold old person,
   A person (blind?) with a stick,
   A lady carrying grasses (?),
   Gray haired person at the back,
   Layers of stones (fence),
   Doors,
   Steps,
   A Window,
   A tube for water flowing,
   'OSTERIA', written on the gate
2. In qualitative research in-depth insight is highly essential so that the study will be valid. In the above picture, if you don't see seriously and watch carefully it is unlikely that you could observe the above findings.

Exercise III. Identify the following as related to either *Qualitative* or *Quantitative* Research (page 13).

1. Quantitative
2. Quantitative
3. Qualitative
4. Qualitative
5. Qualitative
6. List at least three methods for the application of Qualitative Research?
   FGD, In-depth interview, Observation
7.

Purpose	- Theory testing: to establish facts, - Cause and effect relationship, - Generalization	- Develop concepts, - Describe multiple realities and interpretation - Transferability

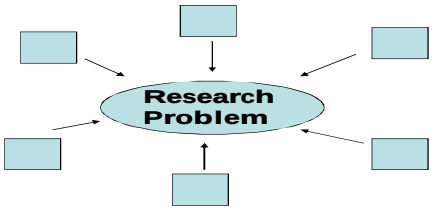
8. Yes
9. Qualitative
10. Quantitative

Exercise IV. Developing Conceptual framework on the following topic (Page 17).

"Decision to enroll in a Voluntary Health Insurance"

- Individual factors
- Cultural factors
- System based factors, etc.

All the factors should direct to the main problem and need to be put around the main problem. Arrows have to direct to main problem.



Exercise V: Develop questions based on the following research problem (Page 18).

Research Questions

- How and to what extent do women perceive themselves to be at risk of pregnancy and STI/HIV?
- How do ***women view*** DMU?
- What do they know about DMU?
- To what extent women will accept DMU?
- How do ***men view*** DMU?
- What do men believe is the purpose of using two methods?
- What are ***providers' opinions*** on DMU?
- How do they describe in recommending of DMU to couples? What obstacles? How to solve the obstacles?
-

Exercise VI. Article on Covert observation of psychiatric hospitals (Page 25)

1. The main purpose was to assess how reliable and valid diagnostic measures of 'sanity' were and whether psychiatric staffs were able to distinguish the sane and inane.

2. He devised an experiment in which eight 'normal' people got themselves admitted to US Psychiatric Hospitals by claiming to hear voices that said 'hollow' 'empty' or 'thud' but by other ways presenting their 'real' medical and social histories to admission clinic staff. All were admitted with a diagnosis of schizophrenia except one with a diagnosis of manic depressive psychosis. On admission, researchers behaves normally and cooperated with hospital routines, given that they spent considerable time in the hospitals waiting to be discharged their undercover status provided an opportunity for covert observation.
3. Labeling someone as mentally ill shapes the interpretation of all their behavior. As patients with a diagnosis, the everyday behaviors of the researchers, such as writing notes or being anxious in the new hospital environment, were seen as symptoms of their diseases.
4. Reports of his pseudo-patients were an important contribution to our understanding of the effects of both hospitalization and labeling. Labeling someone as mentally ill shapes the interpretation of all their behavior. As

patients with a diagnosis, the everyday behaviors of the researchers, such as writing notes or being anxious in the new hospital environment, were seen as symptoms of their diseases. Rosenhan's decryption of many aspects of hospitalization, such as the low level of interaction between staff and patients, the occasional abuse of patients and lack of privacy, were a significant development in our understanding of how institution lead to depersonalization and may contribute to mental health, rather than cure it. With other studies of long-term institutions, this pseudo-patients study was an influence in the gradual policy shift in many countries away from asylums and towards other forms of care for those with mental health problems.

5. The design of the study raises a number of **ethical questions.** A final ethical consideration is the **safety of the research team.** Once admitted to the hospitals, most of the researchers wanted to leave very quickly, as they were unpleasant places to be. It is, however, difficult to get discharged at short notice, and they spent between 7 and 52 days as patients. This expense may be distressing, and there was also the danger of having to take unnecessary medications.
6. If these disadvantages are taken in to account, the benefit in terms of the service improvements may be less likely.

Exercise VII. Class Work on Interview (Page 35)

Exercise VIII. Class work on FGD I (Page 40)

Exercise IX. Class work on FGD II (Page 41)

Exercise X. Select the best method (Page 42)

1. **Children's experiences of Asthma clinics.**
   Before deciding the method it is pertinent to understand the topic. How do you define children? It is a range 5-14 years, so which age group are you going to use for the study? Two and more options: if the age of children is above 10 years, they can be our subjects, if less than that you may ask the mother/caregiver. Hence, the best method is one-to-one interview.

2. **Women's experiences of undergoing cervical smear tests.**
   This is clear for sensitive issue we prefer interview method. Who will be your subjects? The physician (Gynecologist) or the woman who undertake the test, etc.

Exercise XI. Picture I and 2: The same as Exercise II (Page 43 and 44).

Exercise XII. Picture 1 and 2 (Page 47 and 48).

It is to select common themes. In the first picture: People, Beers, the view, etc.

In the second picture: People, Soft drinks, the view, written promotional materials, etc.

Exercise XIII (Page 55)

Class/Take-Home Exercise: Design a Qualitative Study.

N.B. This can be performed at the class /given as take-home assignment.

Exercise XIV: Qualitative versus Quantitative Exercise (Page 62).

Aims	**X**		
Purpose	**X**		
Stance	✓		
Method	**X**		
Implementation of Method		**X**	
Instrument Devises		**X**	
Researcher's Stance		✓	
Relationship of researcher and subject			**X**
Setting	✓		
Data	**X**		

Exercise XV. The same as other pictures (page 67).

Session Six: Research Proposal and Thesis Report Writing

Session introduction

After proper and complete planning of the study the plan should be written down. the protocol is the detailed plan of the study. Every research study should have a protocol and the protocol should be written.

The written protocol:

- Forces the investigators to clarify their thought and to think about all aspects of the study.
- Is a necessary guide if the team (not a single investigator) is working on the research.
- It essential if the study involves research on experimental animals, in order to get the institutional ethical approval.
- Is an essential component of a research protocol submitted for funding.

During the process of the development of the protocol investigators can and should try to benefit from advice of colleagues and experts in refining their plan. But once a protocol for the study has started and progressed it should be adhered to strictly and should not be changed. This is particularly important for multicenter studies. violation of the protocol can discredited the whole study. if the violation are minor at least that part of the study should be excluded from the analysis.

Additional steps after writing the protocol particularly in larger studies with team of investigators is to develop what may be called the operational manual for the study. this will include detailed instruction to the investigators to ensure a uniform and standardized approach to carrying out the study will good quality control. A well thought out and well written protocol can be three main criteria:

- Is it adequate to answer the research question and achieve the study objectives?
- is it feasibility in the particular set up for the study?
- Does it provide enough detailed that can allow another investigators to do the study and arrive at comparable conclusion?

  the protocol should outline the rational for the study, objectives, the methodology used and how the data will be managed and analyzed. it should highlighted how ethical issues have been considered and where appropriate how gender issues are being addressed.

Learning Outcomes

After the completion of this session, the participants will be able to:

- understand what the important components of a research proposal
- write a research proposal

Writing Research Proposal

Writing a research proposal is a different experience than any other types of writing. It involves more clarity of mind as well as a more systematic approach

towards the writing process itself. A research proposal is an outline, a sketch, or a blueprint of a building that you want to build.

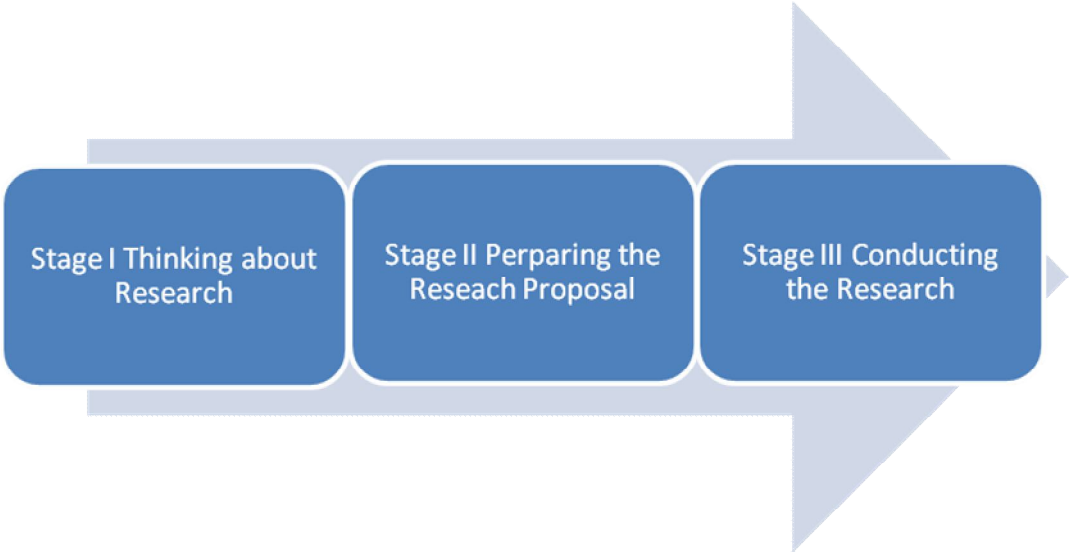


Figure: Stages of Proposal writing and Research work

This chapter mainly deals with the first two stages. It addresses the issues of thinking systematically, identifying a research problem, defining the topic, preparing a title, forming a hypothesis, and making research questions.
Do not abruptly start writing your research proposal; think well before you write. Thorough and detailed thinking would reduce the number of attempts to revise the proposal. At the 'Thinking about it Stage' it can be helpful if you:

- are inclusive with your thinking
- write down your ideas
- are not overly influenced by others- it's your research
- try and set a realistic goal
- set appropriate time lines

Once you start thinking, your line of thought should be in the following sequence:

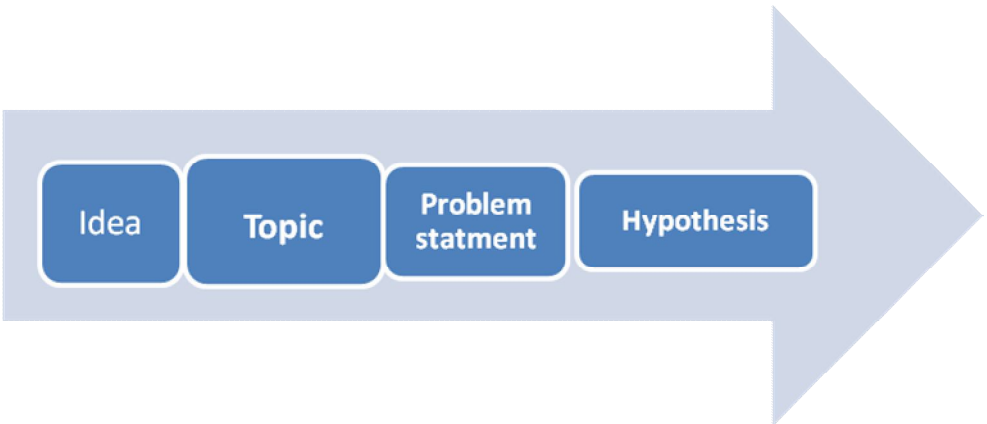


Figure: line of thought and sequence to write research idea to Hypothesis.

Defining the topic

A well-defined research topic gives focus, sets boundaries, and provides direction. It:

1. Defines and identifies the focus of the research.
2. Defines the nature of the research endeavour- whether the aim is to discover, explore, explain, describe, or compare.

3. Defines the areas of interest- whether the interest is why, when, where, what, or how.
4. Indicates if a relationship is foreseen between concepts being explored- whether looking for impacts, decreases, causes, correlations, etc.

Including a title on your proposal

Title of your research is the first introduction of the reader to your work which implies it should clearly convey the intended message. Preparing a good title means:

- having the most important words appear toward the beginning of your title
- limiting the use of ambiguous or confusing words
- looking for unnecessary words when you have too many words, and
- including key words that will help researchers in the future

Selection of a research problem

At the outset of your research, make sure you have identified a worthwhile problem which has not been previously answered. Since research is always about some problem/s, identification and selection of this problem is most crucial in designing a research proposal.

According to Tuckman (1994), "Although selecting the research problem is one of the most difficult steps in the research process, it is unfortunately the one for which the least guidance can be given". However, According to Tuckman (1994), a problem statement must have the following characteristics:

- It should ask about a relationship between two or more variables.
- It should be clearly and unambiguously stated.
- It should be stated in question form (or, alternatively, in the form of an implicit question such as, the purpose of this study was to determine whether...).
- It should be testable by empirical methods; that is, it should be possible to collect data to answer the question(s).
- It should not represent a moral or ethical position.

Apart from these guidelines provided by Tuckman (1994), it can also be useful if ensure that the problem that you have identified is of some theoretical or practical significance. It can also be helpful if from the wide range of potential problems for study, at the initial stage, you narrow the range to problems that are relevant to your academic/ professional interest and current level of research skills. Later on, considering other factors such as available resources, time etc. you can select a problem for your research. Tuckman (1994) has presented various models that can be helpful in the selection of a problem; for instance, the following three-dimensional model:

Statement of the problem: examples

A problem can be stated in the form of an explicit or an implicit question. For example: The study examined whether students taught by direct method achieved higher reading scores than those taught by the communicative approach. (Implicit question) Or, What is the relationship between motivation and achievement? (Explicit question)

What is a hypothesis?

As a researcher you do not know about a phenomenon, but you do have a hunch to form the basis of certain assumption or guesses. You test these by collecting

information that will enable you to conclude if your hunch was right. The verification process can have one of the three outcomes. Your hunch may prove to be right; partially right; or wrong.

Without this process of verification, you cannot conclude anything about the validity of your assumption. Hence, a hypotheses is a hunch, assumption, suspicion, assertion or an idea about a phenomenon, relationship or situation, the reality or truth of which you do not know. A researcher calls these assumptions/ hunches hypotheses and they become the basis of an enquiry. In most studies the hypotheses will be based upon your own or someone else's observation.

Hypotheses bring clarity, specificity and focus to a research problem, but are not essential for a study. You can conduct a valid investigation without constructing formal hypotheses.

The functions of hypotheses:

The formulation of hypothesis provides a study with focus. It tells you what specific aspects of a research problem to investigate.

- A hypothesis tells you what data to collect and what not to collect, thereby providing focus to the study.
- As it provides a focus, the construction of a hypothesis enhances objectivity in a study.
- A hypothesis may enable you to add to the formulation of a theory. It enables you to specifically conclude what is true or what is false.

Once you have identified and stated a problem, the next step is to create a hypothesis. Putting it in a simple way, a hypothesis is a wise or educated guess. It is an assumed answer to the question posed in a research problem statement. However, it is only an 'assumed' answer or an expectation that is tested in the study later on. You must bear in mind that a hypothesis differs from an observation, which represents outcomes actually found.

How to form a hypothesis?

Focusing on your research problem, you can create the hypothesis. Simply try to give a direct answer to the question posed in the problem statement. For example:

Research Q1: What is the relationship between motivation and achievement?

Hypothesis1a: Motivation and achievement are positively related.

However, this is not the only possible guess you can make. You may assume that:

Hypothesis 1b: Motivation and achievement are negatively related.

Thus, a hypothesis shows some (positive or a negative) relationship between the variables. As far as the question of structuring a hypothesis is concerned, there can be varieties of ways for instance:

Research Q2: Do students learn more from a directive or nondirective teacher?

Hypothesis 2: Directive teachers give more effective instruction than non-directive teachers.

It is also important here to introduce you to the 'Null Hypothesis'. It is a small little creature who says: 'I represent no relationship between the variables that you are studying'.

Example: There is no relationship between motivation and achievement.

Where do hypotheses come from?

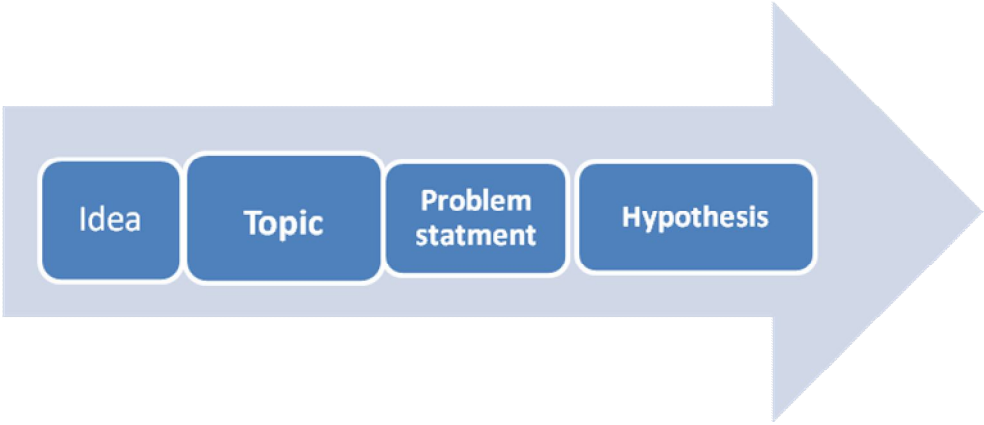
Given a problem statement- Are A and B related? A researcher can construct three possible hypotheses:

1. Yes, as A increases, so does B.
2. Yes, as A increases, B decreases.
3. No, A and B are unrelated.

The number of possible hypotheses may possibly increase as the number of variables increases.

Learning Activity 6.1

To introduce how to write research proposal, the facilitator needs to make a PowerPoint presentation from the contents, especially using the points that are given in the form of bullets under various headings in the contents. The facilitator will take the participants through



At every stage of delivery, ask participants to practically do it that is ask each participant to choose an idea, then to develop a topic out of it, and finally write the problem statement and finally make the hypothesis. Resources: The content will serve as resource.

Session summary

In this session of the module, you have learnt the important components of a research proposal: problem statement, research question, hypothesis and others methodological sections.

Learning activity 6.2: Application Problems

Answer the questions for each research problem.

Learning activity 6.2.1: The following are examples of research topics. Indicate the decisions necessary in order to conduct the study, and restate each as a useful research question.

- Effects of different ways of learning social studies
- Effects of cooperative versus competitive instruction on attitudes toward learning
- Opinions of parents toward education
- Family characteristics and school attendance
- Validity of wise for school performance

Learning activity 6.2.2: Write a directional hypothesis for the following problem statement, and identify the type of variables in the hypothesis. "Low-achieving students frequently respond positively to behavior modification programs. Is there any relationship between the type of reward (tangible or intangible) and the amount of learning?"

Learning activity 6.2.3: State a hypothesis based on each of the research questions listed below:

- What is the effect of individualized and structured social studies on high school students?
- Is there any difference in students' engagement in tasks when a teacher uses a positive introduction and when a teacher uses a neutral introduction to tasks?
- Does non-promotion of elementary pupils improve their personal adjustment?
- Do middle school children produce more narratives when taught in an academic teacher's class or when taught in a cognitive-development teacher's class?
- Do teachers' perceptions of job stress differ among teachers of mildly retarded, moderately retarded, and non-retarded children?

Learning activity 6.3: Session Assessment question

Learning activity 6.3.1: In a study, researchers attempted to test the hypothesis: smaller class size leads to higher student grades. Which of these statements is true?

A. Class size is the independent variable.
B. Class size is the dependent variable.
C. Grades are the independent variable.
D. Grades are the dependent variable.

Learning activity 6.3.2: Which of these is an objective?

A. Does fertilizer A increase wheat yield?
B. A study to determine the effect of fertilizer A on wheat yield in the UK.
C. To describe how a staple food subsidy influences farming practices in Bhutan.
D. Do staple food subsidies influence farming practices in Bhutan?

Learning activity 6.3.3: Which of these statements are true about hypotheses?

A. A hypothesis is an assertion which can be tested.
B. Hypotheses are appropriate in research where variables can be measured.
C. Hypotheses are necessary for rigorous research.

Session Seven: Scientific Writing Skills

Session introduction: Scientific Writing is a "SKILL" that must be developed through practice**.**

Learning outcomes

By the end of the session, the students will be able to:

- define a scientific paper and manuscript
- understand the basic sections of a scientific paper.
- learn the purpose and organization of the various sections and the elements that comprise them.
- appreciate the importance of 'quality' in writing a scientific paper.
- learn about effective strategies for dealing with requests of journal editors and reviewers /assessors.
- be aware of authorship responsibilities
- be aware of the publication process

7.1 Definitions

Manuscript: A document that has not yet been published

Scientific paper - is a written and published report describing original research results. Scientific Writing welcomes you to the "world" that teaches you about the common phrase "publish or perish". It tries to show you in many ways, both theoretically and practically, how to academically survive in the academia. Survival in the academia depends on not only teaching but also doing research and publishing. You need to publish scientific papers, books and other literary materials for professional development. Your tool for producing a scientific paper is what you harvest in the form of knowledge and skill in scientific writing. Self teaching/learning is the best approach. A paper that explains the scientist's motivation for doing an experiment, the experimental design and execution, and the meaning of the results. Scientific papers are written in a style that is exceedingly clear and concise.

The purpose of scientific paper is:

- To inform an audience of other scientists about an important issue to document the particular approach they used to investigate that researchable ideas.

Scientific writing is NOT a science. There are no proven theories or testable hypotheses

Note that scientific writing:

- Is a SKILL that must be developed through practice. Good writers never cease learning.
- Should inform the reader.
- Scientific papers **should be reviewed by scientific peers** and published in journals.
- In other words, a scientific publication is:

The first publication of original research results, in a form whereby others can repeat the research and test the conclusions, in a peer reviewed publication (a

journal or other source document) which is readily available within the scientific community.

The commonest components and structure of a Scientific Paper: IMRAD

- Introduction,
- Methods,
- Results,
- Discussion

Abstract: The abstract is a summary of a paper and be able to stand alone. It is the first section and sets the tone of the paper for the reviewer. It must be concise and easy to read and must cover the important points of the paper. It must be brief (typically not more than about 5% of the length of the entire paper or, in other words, usually no more than about 250 words). Many publications have a required style for abstracts; the "Guidelines for Authors" provided by the publisher will provide specific instructions. Stay within the publisher's guidelines, or your manuscript might be rejected.

Ten Steps to Writ an Effective Abstract

The best way to write an effective abstract is to start with a draft of the complete manuscript and follow these 10 steps:

1. Identify the major objectives and conclusions.
2. Identify phrases with keywords in the methods section.
3. Identify the major results from the discussion or results section.
4. Assemble the above information into a single paragraph.
5. State your hypothesis or method used in the first sentence.
6. Omit background information, literature review, and detailed description of methods.
7. Remove extra words and phrases.
8. Revise the paragraph so that the abstract conveys only the essential information.
9. Check to see if it meets the guidelines of the targeted journal.
10. Give the abstract to a colleague (preferably one who is not familiar with your work) and ask him/her whether it makes sense.

Writing an effective abstract will improve the chances of your manuscript being accepted, encourage people to read it, and increase its impact. A number of studies have indicated that a badly written manuscript with poor use of English, even with good science, has less chance of being accepted and published.

A good abstract should:

1. State main objectives. (What did you investigate? Why?)
2. Describe methods. (What did you do?)
3. Summarize key results. (What did you find out?)
4. State major conclusions and significance. (What do your results mean? So what?)
5. NOT include references or refer to figures or tables.

Frequently, readers of a scientific journal will only read the abstract, choosing to read at length those papers that are most interesting to them. For this reason, and because abstracts are frequently made available to scientists by various computer abstracting services, this section should be written carefully and concisely to have

the greatest impact in as few words as possible. Although it appears as the first section in a paper, most scientists write the abstract section last.

Learning activity 7:1

- Read the abstract section of the paper provided
- Scrutinize the flow of information
- You will write an abstract for your manuscript at the end of this training

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RESEARCH ARTICLE Open Access

Predictors of perinatal mortality in rural population of Northwest Ethiopia: a prospective longitudinal study

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Abstract

Background: Perinatal mortality is one of the serious challenges in meeting maternal and child Millennium Development Goals in developing countries. Identifying its predictors is an important step to develop focused and appropriate health interventions for reducing perinatal deaths. This study therefore aims at identifying predictors of perinatal mortality in a rural setting in northwest Ethiopia.

Methods: A prospective longitudinal study was conducted at Dabat Health and Demographic Surveillance site, northwest Ethiopia, from November 2009 to August 2011. Data were collected by interviewing the mothers or guardians of eligible children. Multiple logistic regressions were employed to identify potential predictors.

Results: A total of 1752 eligible children were included in the study. Perinatal mortality rate in the study population was 50.22 per 1000 (95% CI: 39.99, 60.46) total births. In multiple logistic analysis, previous still birth [(AOR = 8.38, 95% CI: 3.94, 17.83)], twin birth [(AOR = 7.09, 95% CI: (3.22, 15.61)], not receiving tetanus toxoid vaccine during the index pregnancy [(AOR = 3.62, 95% CI: 1.57, 8.34)], short birth interval of less than 24 months [(AOR = 2.58, 95% CI: (1.61, 4.13)], maternal illiteracy [(AOR = 4.83, 95% CI: (1.45, 16.05)] and mothers' running own business [(AOR = 5.40, 95% CI: 1.40, 27.96)] were the main predictors associated with increased risk of perinatal death.

Conclusions: Predictors of perinatal death in the study area are easily recognizable and potentially preventable with the existing maternal health programs. Efforts need to be intensified in expanding maternal and newborn health services to significantly reduce perinatal mortality in rural settings.

Keywords: Perinatal mortality, Early neonatal mortality, Still birth, Ethiopia

Introduction

Places your work in contest and gives readers enough information to appreciate your objectives. A good introduction 'hooks' readers; they become interested in the study and its potential significance. May be easier to write after drafting Methods, Results, and Discussion because you may have clearer understanding of what you are introduction The purpose of the Introduction is to stimulate the reader's interest and to provide pertinent background information necessary to understand the rest of the paper. You must summarize the problem to be addressed, give background on the subject, discuss previous research on the topic, and explain *exactly* what the paper will address, why, and how. Besides motivating a reader to read your manuscript and to care about your results, the Introduction is useful also to the journal's reviewers and editors in judging the importance of your manuscript.

An introduction is usually 300 to 500 words, but may be more, depending on the journal and the topic. Therefore, the introduction needs to be very concise, well structured, and inclusive of all the information needed to follow the development of your findings.

Some people recommend that introduction be the first section written when writing a manuscript. Below are the steps in developing an effective introduction. However, since every journal is different, it is important that you look at papers in your targeted journal to determine whether they use all of these steps. For example, some journals do not include conclusions in the introduction.

1. Begin the Introduction by providing a concise *background* account of the problem studied.
2. State the *objective* of the investigation. Your research objective is the most important part of the introduction.
3. Establish the *significance* of your work: Why was there a need to conduct the study?
4. Introduce the reader to the pertinent *literature*. Do not give a full history of the topic. Only quote previous work having direct bearing on the present problem.
5. Clearly state your *hypothesis*, the variables investigated, and concisely summarize the methods used.
6. *Define* any abbreviations or specialized terms.
7. Provide a concise *discussion* of the results and findings of other studies so the reader understands the big picture.
8. Describe some of the major *findings* presented in your manuscript and explain how they contribute to the larger field of research.
9. State the principal *conclusions* derived from your results.
10. Identify any *questions* left unanswered and any new questions generated by your study.

Other points to consider when writing your introduction:

1. Be aware of who will be reading your manuscript and make sure the Introduction is directed to that audience.
2. Move from general to specific: from the problem in the real world to the literature to your research.
3. Write in the present tense except for what you did or found, which should be in the past tense.
4. Be concise.

Learning activity 7.2

- Read the introduction section of the paper provided.
- Scrutinize the flow of information and connection between the paragraphs.
- Write a three paragraph introduction for your manuscript. Hint: You may consult your proposal and modify its introduction

Background

Perinatal Mortality Rate (PNMR) is known to be one of the key health status and socio-economic indicators of the community [1]. It is specifically a sensitive index of the quality of prenatal, obstetric, and early neonatal care available to women and newborns in any setting [2,3]. There are an estimated ten perinatal deaths for each maternal death [4]. At least 75% of the perinatal deaths that occur in developing countries are caused by problems that also kill women. These include prolonged/obstructed labour, puerperal sepsis, eclampsia, women's nutrition, infection and hemorrhage [5].

Global estimates show that the PNMR in developed regions of the world is about 10 per 1000 total births compared to 50 per 1000 total births in less developed regions [1]. Sub-Saharan Africa has the highest rate of perinatal deaths, 56 per 1000 births [1]. According to the Ethiopian Demographic and Health Survey (EDHS) 2011, PNMR in Ethiopia was estimated at 46 per 1000 births [6], however, the rate varies by regions ranging from 20 to 58 deaths per 1000 births. The PNMR was 55 per 1000 births in the Amhara Regional State, where this study was conducted [6].

Although the country has intensified efforts to provide basic maternal and child health services through the Health Extension Program [7,8], reducing perinatal deaths remains a formidable challenge to achieving Millennium Development Goal 4 in rural Ethiopia [9,10],

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where only 4.1% of deliveries are attended by skilled birth attendants [6].

The causes of perinatal morality are multiple and include previous still births [11], twin births [12,13], being unimmunized for two doses of tetanus during pregnancy [14], birth interval of less than 24 months for the index child [15-17], illiteracy [18-20] mother's being farmer by occupation [21].

In a country like Ethiopia, where only 10% of the births are delivered at a health facility, documenting the rate and causes of perinatal mortality through a community based prospective study is an important input for planning effective interventions. Previous estimates in Ethiopia are either largely hospital-based [22,23] or retrospective household surveys [6] which have obvious limitations associated with recall and selection bias. In addition, the risk factors for the perinatal mortality are poorly documented and understood in northwest Ethiopia. Thus, the objective of this prospective follow up community-based study was to estimate PNMR and to identify the potential risk factors in rural communities of northwest Ethiopia.

Methods

In the Materials and Methods section you explain *clearly* how you conducted your study in order to enable readers to evaluate the work performed and permit others to replicate your study.

You must describe exactly what you did: what and how experiments were run, what, how much, how often, where, when, and why equipment and materials were used. The main consideration is to ensure that enough detail is provided to verify your findings and to enable the replication of the study.

You should maintain a balance between brevity (you cannot describe every technical issue) and completeness (you need to give adequate detail so that readers know what happened).

This should be the easiest section to write. Since each journal has different requirements, review the journal's guidelines before beginning to write this section. The steps listed here are a general compilation of these requirements.

1. Order your procedures chronologically or by type of procedure and then chronologically within type of procedure using sub-headings, where

appropriate, to clarify what you did. It is up to you to decide what order of presentation will make the most sense to your reader.

2. Use the past tense and the third person to describe what you did. For example: “The sample was incubated at 37ºC for 3 days.” - NOT: “I incubate the sample at 37ºC for 3 days.”
3. Describe your experimental design clearly, including the hypotheses you tested, variables measured, how many replicates you had, controls, treatments, etc.
4. Explain why each procedure was done. Reference may be made to a published paper as an alternative to describing a lengthy procedure.
5. Identify the source of any specific type of equipment, a specific enzyme, organism, or a culture from a particular supplier, which is critical to the success of the experiment.
6. Describe in detail any modifications to equipment or equipment constructed specifically for the study and, if pertinent, provide illustrations of the modifications.
7. Precisely quantify measurements (all metric) and include errors of measurement.
8. Describe the dates and the site where your field study was conducted including physical and biological characteristics of the site, if pertinent to the study’s objectives.
9. Identify treatments using the variable or treatment name, rather than an ambiguous, generic name or number (e.g., use "healthy donors" rather than "group 1").
10. If required by the journal, mention the approval for the study by the relevant ethics committee(s) and the informed consent of the subjects.
11. Describe statistical tests and the comparisons made; ordinary statistical methods should be used without comment; advanced or unusual methods may require a literature citation.
12. Show your Materials and Methods section to a colleague and ask whether they would have difficulty in repeating your study.

Information is usually presented in past tense, either active voice (e.g., I observed humming birds daily . . .) or passive (Humming birds were observed daily . . .). Passive writing has traditionally been used in scientific writing, but active writing is now preferred by many editors. When writing with an active voice, avoid using ‘I’ or ‘we’ too often. Check “Instructions to Authors” to determine if active writing is recommended in a particular journal.

Include enough information so that the study could be repeated:

1. Methodology provides *context* for evaluating your data
2. Credibility of your ‘argument’ depends, in part, on how clearly and precisely you describe your methods.
3. Detailed methods may be useful to others in your field attempting to repeat your study or conduct similar studies.

What information should be included?

Materials:

1. Complete taxonomic information (e.g., subspecies or strains) on organism(s) used,
2. How, where and when organisms were obtained,

3. Sex, age, size, physiological state, or rearing conditions.
4. Equipment used (if equipment is unusual or not commonly used, it's appropriate to provide name and address of supplier/manufacturer).
5. Composition, source, and quantities of chemicals, media, and solutions (if not commonly used, provide name and address of supplier.

If information about any materials (e.g., the 'recipe' for one of your solutions) has been provided in previous publications, refer readers to that source (as long as it's a readily available source) to save space.

Methods – describe procedures in detail.

1. For field studies: dates of study, duration & timing (e.g., morning or evening) of observation periods, how animals were captured &, if relevant, marked, how focal animals were selected, etc.
2. For lab studies: temperature conditions, pH, criteria used to make measurements, etc. When using a method already described in a journal article, you can just *cite* the reference.

If you alter the published methods in any way, changes need to be described in detail. Specify where the study was conducted (especially for field studies). For field studies, describe features of the study site relevant to your research. Indicate the statistical procedures used &, if less common procedures are used, provide some explanation & provide references. It is also appropriate to indicate which statistical software (e.g., SAS, SPSS) was used. Ethical issues in human and animal studies.

Make sure information is presented in an organized, logical manner:

- Order in which information is presented varies.
- Review lots of methods sections in journals in your area of study to get a feel for typical format
- If the methods section is long and covers different topics, it would probably be wise to use *subheadings* that clearly break the text into several labeled sections.

Learning activity 7.3

- Read the Materials and Methods section of the paper provided.
- Scrutinize the flow of information and connection between the paragraphs/subheadings
- Try to write methods section from your proposal for your manuscript

Methods

Study setting

The study was conducted at the Dabat Health and Demographic Surveillance Site (HDSS) located at Dabat district in northwest Ethiopia (Figure 1). Dabat has one district hospital, two health centers, three health stations, and twenty-nine health posts that are providing health services to the community [24]. The HDSS covers ten (three urban and seven rural) randomly selected *kebeles* (the lowest local administrations in the Ethiopian context). At the time of the study, there were 46,165 people in the DHSS with 49% of children under 14 years. The HDSS has been collecting information on vital events like, birth, death, migration, and pregnancy registrations and outcomes thereof on quarterly and regular bases since 1996 [24].

Study design

The study was part of a larger prospective follow-up research on infant mortality. The perinatal deaths (stillbirths and early neonatal deaths) which occurred during the follow-up period from November 2009 to August 2011 were included.

Study population and sample size

All mothers living in the site and reported in second/ third trimester of pregnancy were invited to join the prospective longitudinal study. Pregnancy was detected through interview by trained data collectors. For identifying the predictors of perinatal mortality, all deaths during the perinatal period were compared to those who survived the perinatal period.

Data collection

Data were collected using a structured questionnaire adapted from the UNICEF multiple indicator cluster survey questionnaire [25]. The questionnaire was pre-tested on an adjacent population. The data collection was overseen by three field supervisors who had previous experiences in conducting similar studies in the study area. Seventeen data collectors with high school education and previous experience were recruited for the study. Prior to the actual data collection, a five day intensive training was given to data collectors and field supervisors about data collection tools and study procedures. The data collectors and field supervisors were assisted in the field by local informants who were residents of the study villages. The local informants were trained to report the end of pregnancy to the data collectors as soon as they identify the event irrespective of the pregnancy outcome. Data quality was maintained through regular on-site supervision and by conducting random rechecking of 5% of the respondents in each locality.

Study variables

Perinatal mortality was the outcome variable. It was a dichotomous variable indicating whether the child is alive or dead through the perinatal period. The explanatory variables included as potential predictors for perinatal death were maternal age at pregnancy outcome, maternal and paternal educational status, maternal and paternal occupation, marital status of parents, taking of at least two prophylactic dose of TT vaccine during the index pregnancy, birth interval (less or more than 24 months) for the index child, maternal previous still births, ever use of family planning methods, sex of the neonate and whether the neonate was single or multiple birth.

Data management and analysis

Double data entry was done on a regular basis using EpiInfo for windows Version 3.5. The error rate was below 5%, except for spelling errors for alphanumeric variables. The data were transferred from EpiInfo to STATA Version 11 software and cleaned by reviewing frequency tables, logical errors, and checking outliers. Analysis was done in a series of steps.

A bivariate analysis was carried out to examine the relationship between perinatal death and the potential

predictors without adjusting for other covariates. Then all potential predictors with P-value less than 0.20 in the univariate analysis were used to include more potential predictors. Factors previously reported to be associated with perinatal deaths were entered into a multiple logistic regression model to examine their effects simultaneously.

In the multivariate analysis model, possible associated factors were examined for evidence of collinearity which was reflected either by the changes in the direction of effect between the univariate and multivariate analysis or implausible standard errors for a particular variable. The final model used was found to be a valid model with Hosmer-Lemeshow goodness of fit with an associated P value greater than 0.05. Odds ratios (ORs) and 95% confidence intervals (CIs) were computed using logistic regression models to assess the relationship between perinatal mortality and each selected variable.

Ethical consideration

Ethical approval was obtained from the University of Gondar Ethical Review Board. A formal letter was written to the local district administrative and health offices. Informed verbal consent was secured from all mothers or guardians of the study participants. The right of the respondent to withdraw from the interview or not to participate was informed and respected. The final results of the research will be communicated to government offices and most importantly to the study subjects and members of the community through health extension workers.

Result

The purpose of a Results section is to present the *key* results of your research without interpreting their meaning. It cannot be combined with the Discussion section unless the journal combines the Results and Discussion into one section. The results should be presented in an orderly sequence, using an outline as a guide for writing and following the sequence of the Methods section upon which the results are based. For every result there must be a method in the Methods section. It is important to carefully plan the tables and figures to ensure that their sequencing tells a story.

1. Determine which results to present by deciding which are relevant to the question(s) presented in the Introduction irrespective of whether or not the

results support the hypothesis(es). The Results section does not need to include every result you obtained or observed.

2. Organize the data in the Results section in either chronological order according to the Methods or in order of most to least important. Within each paragraph, the order of most to least important results should be followed.
3. Determine whether the data are best presented in the form of text, figures, graphs, or tables.
4. Summarize your findings and point the reader to the relevant data in the text, figures and/or tables. The text should complement the figures or tables, not repeat the same information.
5. Describe the results and data of the controls and include observations not presented in a formal figure or table, if appropriate.
6. Provide a clear description of the magnitude of a response or difference. If appropriate, use percentage of change rather than exact data.
7. Make sure that the data are accurate and consistent throughout the manuscript.
8. Summarize the statistical analysis and report actual P values for all primary analyses.
9. Use the past tense when you refer to your results.
10. Number figures and tables consecutively in the same sequence they are first mentioned in the text. Depending on the journal, they should be in order at the end of the report after the References, or located appropriately within the text of your results section.
11. Provide a heading for each figure and table. Depending on the journal the table titles and figure legends should be listed separately or located above the table or below the figure. Each figure and table must be sufficiently complete that it could stand on its own, separate from the text.
12. Write with accuracy, brevity and clarity.

when writing a result section a manuscript use past tense. Evidence is presented to address the gap or question noted in the introduction. Summarize the data. Generalize with explanatory details, statistics, tables, and figures. Point out trends in the data so the readers will see why you drew the conclusions that you did. Relationships between data and generalizations are apparent by observing how tables and figures are referred to. Tables and figures are important tools for reporting results, but tables and figures only present data; Generalizations needed to interpret those data need to be provided in the text.

- For example, refer readers to a table or figure, then tell readers what patterns to notice.
- Do not interpret the data with the text: hold all discussion of the significance of the results for the Discussion section.

Integrating quantitative data with the text

- Mean values presented in text should be accompanied by standard deviation or standard error; range may also be presented, if relevant with medians.

- When reporting results of statistical analyses, provide the test statistic (e.g., F value, z value, t value, or chi square value) degrees of freedom, and probability level.
- Use accepted abbreviations and symbols. These may vary somewhat among disciplines
- Do not begin sentences with numbers. Either write out the number or better revise the sentence.

Tables and figures: Which should be used to present data?

Each table or figure must be independent (self- explanatory). Readers should be able to understand the information presented without having to refer to the text.

- Tables- used when exact values are important or when no clear patterns would be apparent in a figure.
- Figures (graphs)- highlight trends and patterns. Of course, not all figures are graphs.
- Other types of figures include diagrams, cross- sections, maps, photographs, and flow charts.
- Specific guidelines for tables and figures can be found in "Instructions for Authors" of each journal.

General guidelines include:

- Table titles and figure captions should be as concise and informative as possible (which helps make them independent)
- Tables and figures must be referred to in the text and must also be integrated with the text.
- Do not repeat in the text what is already apparent in a table of figure.
- Do not simply refer to a table or figure without some explanatory text (e.g. Results are shown in Figure 2)
- Check tables and figures for agreement with the rest of the paper**.**

Designing tables:

- As a rule, don't use tables unless absolutely necessary.
- Editors frequently note the high cost of publishing tables in journals.
- Like elements read down, not across.
- Words in a column are lined up on the left; numbers on the right (or on the decimal point)
- Horizontal lines may be used but rarely are vertical lines used
- Column headings must be brief and precise.
- Footnotes may be used for clarification, but should not unnecessarily repeat details provided in Methods section.
- Tables must be self- explanatory, but need not present details needed to repeat experiment.

Learning activity 7.4

- Study the tables in the paper given to you.
- Scrutinize the columns and rows, titles, legends, etc.
- Construct a table(s) from your data

Results

The study comprised 1752 pregnant women followed from their second/third trimester through 7th day post delivery (Table 1). A total of 88 perinatal deaths were identified at the end of the follow up period. The PNMR in the study was 50.22 per 1000 total births (95% CI 39.99, 60.5). The contribution to this PNMR from stillbirths was 23.4 per 1000 births (95% CI: 16.31, 30.48) and that of early neonatal deaths was 27.5 per 1,000 live births (95% CI 19.25, 34.39).

In the multivariate logistic regression, the following factors were associated with increased risk of perinatal mortality. Among the socio-demographic factors, maternal illiteracy [AOR = 4.83, 95% CI (1.45, 16.05)], and working on own business [AOR = 5.40, CI (1.40, 27.96)]; among child factors being a female child [AOR = 1.61, 95% CI (1.04, 2.67)] and multiple/twin birth [AOR = 7.09, 95% CI, (3.22, 15.61] were significantly associated with perinatal death.

Maternal factors associated with perinatal mortality were history of stillbirth [AOR = 8.38, CI (3.94, 17.83)], birth interval of less than two years [AOR = 2.58, CI (1.61, 4.13)], and not immunized mothers for at least

Table 1 Number of births, perinatal deaths and mortality rates in rural population of northwest Ethiopia, 2009–2011

Description	Total	(95% Confidence Interval)
Total births	1752	
Total live births	1711	
Still births	41	
Early neonatal deaths	47	
Perinatal deaths	88	
Still birth rate (per 1000 birth)	23.4	(16.3,30.5)
Early neonatal death rate (per 1000 live births)	27.47	(19.3,34.4)
Perinatal mortality rate (per 1000 births)	50.23	(39.9, 60.5)

Constructing a figure

- If the data show pronounced trends and promote understanding of the results, and if exact numbers need not be presented and the information cannot easily be presented in the text, use a figure.
- A graph generally is not needed when trends or relationships are not statistically significant.
- Most commonly used figures are bar graphs and plotted points (and lines or curves). When plotting points, be careful about extrapolating!
- Legends should be specific and informative. Do not simply repeat the labels of the two axes as the legend (e.g., Variation in singing rates versus time).
- Be more descriptive (e.g., variation in singing rates of male American Robins during the breeding season)
- Make sure lettering and numbers are large enough for photographic reduction (figures submitted for publication are always reduced; sometimes substantially)

- Do not extend axes beyond what the figure requires. To save space, remember that axes need not start at 0 & it's alright to put breaks in axes.
- Be sure axes are labeled.
- Be sure patterns (for bar graphs) or symbols(for points) or connecting lines (between points) exhibit sufficient contrast.
- Do not put too much information in one figure.
- There are no specific rules, but, in general, you should probably try to avoid more than about four different symbols, lines, or bars.
- When plotting means, indicate variability in data by providing standard errors or standard means.
- Authors submitting manuscripts to journals type the figure legends on separate pages, not on the figures themselves.

Learning activity 7.5

- Study the figures in the paper given to you.
- Scrutinize the axes, titles, legends, etc.
- Construct a figure(s) from your data

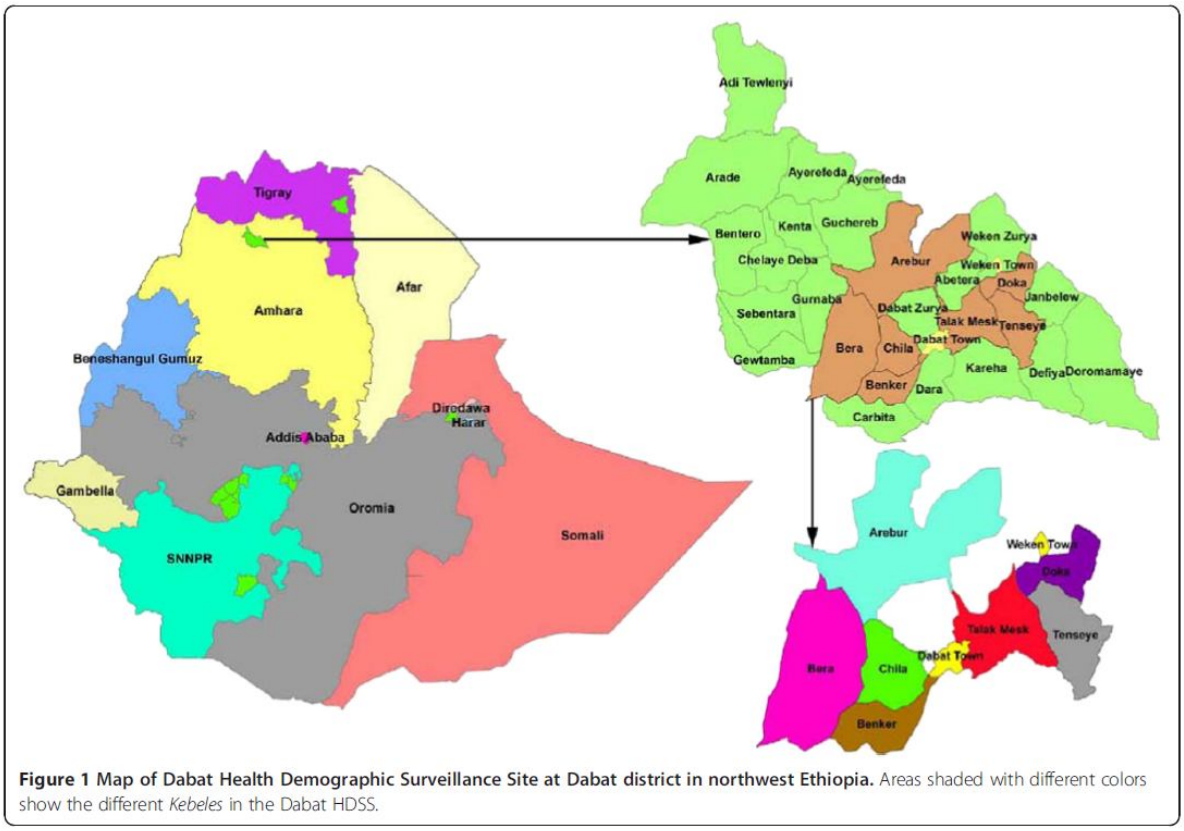

Figure 1 Map of Dabat Health Demographic Surveillance Site at Dabat district in northwest Ethiopia. Areas shaded with different colors show the different *Kebeles* in the Dabat HDSS.

Discussion:

The purpose of the Discussion is to state your interpretations and opinions, explain the implications of your findings, and make suggestions for future research. Its main function is to answer the questions posed in the Introduction, explain how the results support the answers and, how the answers fit in with existing knowledge on the topic.

The Discussion is considered the heart of the paper and usually requires several writing attempts. The organization of the Discussion is important. Before beginning you should try to

develop an outline to organize your thoughts in a logical form. You can use a cluster map, an issue tree, numbering, or some other organizational structure. The steps listed below are intended to help you organize your thoughts.

To make your message clear, the discussion should be kept as short as possible while clearly and fully stating, supporting, explaining, and defending your answers and discussing other important and directly relevant issues. Care must be taken to provide a commentary and not a reiteration of the results. Side issues should not be included, as these tend to obscure the message. No paper is perfect; the key is to help the reader determine what can be positively learned and what is more speculative.

1. Organize the Discussion from the specific to the general: your findings to the literature, to theory, to practice.
2. Use the same key terms, the same verb tense (present tense), and the same point of view that you used when posing the questions in the Introduction.
3. Begin by re-stating the hypothesis you were testing and answering the questions posed in the introduction.
4. Support the answers with the results. Explain how your results relate to expectations and to the literature, clearly stating why they are acceptable and how they are consistent or fit in with previously published knowledge on the topic.
5. Address all the results relating to the questions, regardless of whether or not the findings were statistically significant.
6. Describe the patterns, principles, and relationships shown by each major finding/result and put them in perspective. The sequencing of providing this information is important; first state the answer, then the relevant results, then cite the work of others. If necessary, point the reader to a figure or table to enhance the “story”.
7. Defend your answers, if necessary, by explaining both why your answer is satisfactory and why others are not. Only by giving both sides to the argument can you make your explanation convincing.
8. Discuss and evaluate conflicting explanations of the results. This is the sign of a good discussion.
9. Discuss any unexpected findings. When discussing an unexpected finding, begin the paragraph with the finding and then describe it.
10. Identify potential limitations and weaknesses and comment on the relative importance of these to your interpretation of the results and how they may affect the validity of the findings. When identifying limitations and weaknesses, avoid using an apologetic tone.
11. Summarize concisely the principal implications of the findings, regardless of statistical significance.
12. Provide recommendations (no more than two) for further research. Do not offer suggestions which could have been easily addressed within the study, as this shows there has been inadequate examination and interpretation of the data.

13. Explain how the results and conclusions of this study are important and how they influence our knowledge or understanding of the problem being examined.
14. In your writing of the Discussion, discuss everything, but be concise, brief, and specific.

- The purposes of the introduction and discussion are inversely related to introduction section the research question and reviews state of knowledge in the field that motivated the question
- The discussion explains how the question has been answered (at least in part) by the new research and shows how the field's knowledge is changed with the addition of this new knowledge.
- Interpret your results, and support conclusions with evidence.
- Tell the readers what your findings mean.

1. Do the data support the original hypothesis?
2. Why or why not?
3. Refer to your data, citing tables or figures where necessary (BUT do not repeat the data!).
4. Discuss the work of other investigators.
5. Are your findings consistent with their?
6. How do your results fit into the bigger picture?

- Do not present every conceivable explanation.
- Too much speculation weakens a discussion.
- Based on your data, pick and support the most plausible interpretations.
- Recognize the importance of negative results.
- Negative results require an explanation, and may provide new insight!
- Proceed from the specific to the general (but not too general)
- Start by pointing out your major findings (s) (without excessively repeating results).
- Focus the reader's attention on the most important findings, patterns, or trends.
- If there are conflicting or unexpected results, suggest expiations.
- Compare your findings with the work of other investigators.
- Are your results similar?
- Supplement your own evidence with relevant material from other studies.
- If other investigators obtained results different from yours, suggest possible explanations for the differences.

Conclusions

Conclusions are often the most difficult part to write, and many writers feel they have nothing left to say after having written the paper. However, you need to keep in mind that most readers read the abstract and conclusion first. A conclusion is where you summarize the paper's findings and generalize their importance, discuss ambiguous data, and recommend further

research. An effective conclusion should provide closure for a paper, leaving the reader feeling
satisfied that the concepts have been fully explained.

1. Be sure to read the journal's guidelines regarding Conclusions. Always be mindful that different types of scientific papers will require different types of conclusions. For example, some journals require the Conclusions to be part of the Discussion and others, to be a separate section. It is also beneficial to read Conclusions of published articles in the journal you are targeting.
2. Begin with a clear statement of the principal findings. Authors commonly make the mistake of hiding this message deep within the Conclusions.
3. Open with a statement that conveys enough information to cause the reader to carry on reading. The next few sentences should elaborate, if necessary, on the opening statement.
4. State your conclusions clearly and concisely. Be brief and stick to the point.
5. Explain why your study is important to the reader. You should instill in the reader a sense of relevance.
6. Prove to the reader, and the scientific community, that your findings are worthy of note. This means setting your paper in the context of previous work. The implications of your findings should be discussed within a realistic framework.
7. Strive for accuracy and originality in your conclusion. If your hypothesis is similar to previous papers, you must establish why your study and your results are original.
8. Conclude with how your testing supports or disproves your hypothesis. By the time you reach the end of your conclusion, there should be no question in the reader's mind as to the validity of your claims.
9. **Do not r**ewrite the abstract. Statements with "investigated" or "studied" are not conclusions.
10. **Do not i**ntroduce new arguments, evidence, new ideas, or information unrelated to the topic.
11. **Do not a**pologize for doing a poor job of presenting the material.
12. **Do not i**nclude evidence (quotations, statistics, etc.) that should be in the body of the paper.

If the journal requires a statement regarding the need for further research, it should be used to point out any important shortcomings of your work, which could be addressed by further research, or to indicate directions further work could take.

- End with more general interpretations and conclusions.
- Can you generalize from your findings to other situations?
- How does your work contribute to an understanding of the broader topic?
- Try to end the discussion with *a strong concluding statement*.

Learning activity 7.6

- Read the discussion section of the paper given to you.
- Understand the different approaches used in discussing the results in reference to previous works.

- Write a discussion section for your data

Discussion

The PNMR among the rural population of northwest Ethiopia was very high, and the finding is in agreement with previous national reports by WHO, 2007 [1], and EDHS, 2011 for the Amhara Regional State of Ethiopia [6]. A recent community-level study conducted in Burkina Faso reported a PNMR of 79.0 per 1000 total births which was greater than the findings of this study [13]. The possible reason for the difference might be the fact that the Ethiopian Government has initiated a community based health service package (Health Extension Package) that intensified the availability of maternal and child health services through the Health Extension Program [7]. The health extension workers provide family planning and immunization services; they promote preparedness for birth and readiness for complications, and active management of the third stage of labor among others [8].

The risk factors identified in this study, namely low educational status of mothers, maternal ownership of business as occupation, history of still birth, short birth interval of less than two years, mother's being unimmunized for at least two doses of TT Vaccine during pregnancy are in agreement with findings of previous studies done in other developing and middle income countries [11,18,21].

In this study, the highest perinatal mortality was observed among illiterate mothers, and the finding is similar to those of other studies in developing countries [19,20]. Evidences from other developing countries also indicated that increased levels of mother's education were observed to be associated with improved chances of infant survival [26]. Our findings emphasize the need for encouraging female literacy which by itself is expected to provide multiple benefits and better chances for alleviating poverty and poverty-related health problems [26]. Education can improve economic status, access to health care, and birth spacing which are known to reduce the risk of perinatal mortality [27].

The results of this study also specified that twin are more likely to die during the perinatal period compared to children born singletons, as has been reported by a similar study in rural Burkina Faso [13]. Intrauterine growth restrictions and birth defects and/or disabilities that are common in multiple pregnancy increase vulnerability to perinatal death [12,28]. These multiple pregnancies require special and expensive medical care [28] which is not accessible and available in our study area.

In our study, women who had experienced previous still birth had an increased risk of losing their children in the consecutive perinatal period, and this finding is consistent with findings of a previous study [29]. Moreover, genetic and environmental factors can lead to repeated occurrences of small-for-gestational age [SGA], birth/intrauterine growth restriction, preeclampsia, and placental abruption which can eventually cause untreated perinatal death [29,30].

A short birth spacing of less than 24 months was associated with an increased risk of perinatal mortality because of the well known phenomena related to sibling competitions recognized as the maternal depletion syndrome [15-17]. The syndrome is also associated with premature rupture of membranes and puerperal endometritis [31,32] which can cause perinatal deaths. As reported by previous studies, mothers who received at least two doses of maternal tetanus toxoid vaccinations could significantly reduce perinatal mortality [14,33].

Even though every effort was made to maintain the quality of the data, the study has limitations that should be noted when interpreting the results. First of all, readers should be cautious since the study findings show a wide confidence interval because of the small sample size of the deaths. Secondly, although the study design was prospective, it was not able to measure birth weight of the neonates and other clinical conditions which are important predicators of perinatal mortality because most deliveries took place at home and the researchers could not manage to secure resources to do anthropometric and clinical assessments immediately after birth.

Conclusion

In summary, perinatal death in the study area was largely due to preventable conditions for which existing maternal health programs have been proven interventions. Therefore, urgent actions are required to expand the existing maternal and newborn health services in the short term to rapidly and significantly reduce perinatal mortality in rural settings of Ethiopia as the country is making progress to achieving its long term vision of making poverty history.

Acknowledgements

- A short acknowledgments section usually comes between the Discussion & the Literature cited sections.
- In this section, the author(s) thank (S) anyone or any agency that assisted with the research or writing.

Learning activity 7.7

- Read the acknowledgement section of the paper given to you
- Write acknowledgement for your manuscript

Acknowledgments

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Reference

List all references cited in the manuscript and follow a format as indicated in the instruction to authors. Citing sources in the text:

1. Acknowledge the source of all material that is not your own
2. When citing in the text, put references where they make the most sense
3. Put each citation close to the information you wish to acknowledge
4. Do not always include citations at the end of sentences
5. Don't overuse citations. Citing a large number of papers may be more confusing than enlightening
6. Decide which references are most important and use them
7. Use correct format in Literature Cited section
8. Always check and double check the literature cited section for accuracy, completeness, and consistency
9. Check that no reference appears in the literature cited section that is not cited in the text
10. Make sure dates in text mach dates in literature cited
11. Check all punctuation marks, abbreviations, spacing, and spelling

Learning activity 7.8

- Read the acknowledgement section of the paper given to you.
- Write acknowledgement for your manuscript

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