

HARAMBEE UNIVERSITY
Department of Nursing

RESEARCH METHODOLOGY

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Learning Objectives

After completing this unit, the student should be able to:

1. Define research in general and health systems research in particular
2. Enumerate the characteristics of research
3. Identify the different types of research
4. List the essential features of health systems research
5. Describe the broad divisions (steps) involved in the research process
6. Explain the roles of research in development

Introduction

What is research?

- Research in the context of public health aims to provide all aspects of information necessary for planning & effective implementation of a health system.
- Health research is the process of obtaining systematic knowledge and technology which can be used for the improvement of the health of individual groups.
- For all communities, whether wealthy or poor, health research is the top priority.

Introduction...

Definition:

-It is the systematic collection, analysis and interpretation of data to generate new knowledge and answer a certain question or solve a problem.

❖ Research is a scientific inquiry aimed at learning new facts, testing ideas, etc.

Introduction...

Health research

- It is the systematic collection, analysis and interpretation of data to generate new knowledge and answer a certain question or solve a problem of all matters of health.
- Health research is the application of principles of research on health.
- It is the generation of new knowledge using scientific method to identify and deal with health problems.

Introduction...

Purpose of Health Research

- ❖ To generate knowledge essential to effectively promote the health of the population.

Without that knowledge, effective action is impossible because it has no logical or empirical basis.

Introduction ...

Characteristics of research

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

Research must be:

Purposeful: what do you want to be able to contribute?

Targeted: Who are the audiences?

Credible: consider sources information, method of data collection, personnel involved...

Timely: Is the information needed?

Research is done to find solutions to health problems

Types of research

Level of Analysis	Object of Analysis	
	Conditions	Responses
Individual and sub-individual	Biomedical Research (Basic biological processes, structure and function of the human body, pathological mechanisms)	Clinical Research (Efficacy of preventive, diagnostic, and therapeutic procedures, natural history of diseases) e.g. studying the effectiveness of coartem in treating malaria
Population	Epidemiologic Research (Frequency, distribution, and determinants of health) e.g. Prevalence and determinant factors of TB	Health Systems research (Effectiveness, quality, and costs of services: development and distribution of resources for care)

Types of research

Basic vs. Applied research:

The classical broad divisions of research are:

basic and applied research

Basic research: also called *fundamental* or *pure* research

- the primary objective is advancement of **knowledge** and the theoretical understanding of the relations among variables
- It is necessary to generate new knowledge and technologies to deal with major unresolved health problems

Types of research

Applied research: is necessary to identify priority problems and to design and evaluate policies and programs that will deliver the greatest health benefit, making optimal use of available resources.

- Is original work undertaken in order to acquire new knowledge with a specific application in view.
- Is a research that seeks to solve practical problems

Health systems research

- It is a component of health research.
- It is research that supports health development
- It is ultimately concerned with improving the health of a community, by enhancing the efficiency and effectiveness of the health system as an integral part of the overall process of socioeconomic development.

Definition of “health system”

- A set of cultural beliefs about health and illness that forms the basis for health-seeking and health-promoting behavior.
- The institutional arrangements within which that behavior occurs; and
- The socioeconomic (political) physical context for those beliefs and institutions.
- *In short, it consists of what people believe and know about health and illness and what they do to remain healthy and cure diseases.*

Essential Features of HSR

- should focus on **priority problems**
- It should be action oriented (i.e., aimed at developing solutions)
- integrated **multidisciplinary** approach is required (approaches from many disciplines)
- should be **participatory** in nature (from policy makers to community members)
- Research must be **timely**

- Emphasis should be placed on comparatively **simple, short-term research designs** that are likely to yield practical results.
- The principle of **cost-effectiveness** is important in the selection of research projects
- Results should be presented in **formats most useful for administrators, decision makers and the community**

Overview of research process

Idea

≡

Assemble research team

≡

Work-up proposal

≡

Find appropriate funding body

≡

Submit application

What is the problem?

≡

Define your initial objective

≡

Search literature

≡

Modify your objective based on the
information you get from literature

≡

Write the full proposal guided by the objective

NB: Always focus on your objective!!

Main components of any research work

- I. Preparing a research proposal
- II. Fieldwork (i.e., data collection)
- III. Analyzing data and preparing a research report

TOPIC SELECTION

After completing this chapter, the student should be able to:

1. Describe the principles underlying whether a problem situation is researchable.
2. List the criteria for selecting a research topic.
3. Identify and select your own topic (health problem) for research based on certain guidelines.

TOPIC SELECTION...

- ❖ The development of a health project goes through a number of stages.
- ❖ Formulation of the proposal is the major task in the process of developing a research project.
- ❖ Note that the development of a research proposal is often a cyclical process.
- ❖ The process is not always linear. It is a usual practice to go up and down on the developed proposal and make the necessary revisions.

"Well begun is half done" –Aristotle.

TOPIC SELECTION...

Problem identification

- If the answer to the research question is obvious, we are dealing with a management problem that may be solved without further research
- A number of research questions could be presented that may be posed at the various levels of the health system

TOPIC SELECTION...

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

TOPIC SELECTION...

Example1:

- ❖ **Problem situation:** In district “ A “ a report showed that in the first month there were 500 children under one year old who started immunization, but at the end of the year it was found out that there were only 25 children who completed their vaccination.
- ❖ **Discrepancy:** All the 500 children at district “A “should have completed their vaccination but only 5% out of those who started vaccination have completed.

TOPIC SELECTION...

- ❖ **Problem(research) question:** why only 5% of the children completed their vaccination?
- ❖ **Definite answer:** Out of the 1 hospital, 2 health centers and 10 health stations found in district “A” only 2 health stations were functioning, the rest were closed due to insecurity in the area.
- In the example above, assuming that all the given facts are true, there is no need of undertaking a research, since definite answer is obtained to the problem situation

TOPIC SELECTION...

Example 2:

- ❖ **Problem situation:** In district “B” (population 150,000) there are 2 health centers, 1 hospital and 15 health posts and all of them function smoothly. However, at the end of the year it was found that the EPI coverage was only 25%.
- ❖ **Discrepancy:** Although district “B” had 100% availability of health services and at least 80% of the children should have had full vaccinations the EPI coverage was only 25% as seen above.

TOPIC SELECTION...

- ❖ **Problem question:** What factors influence the low EPI coverage in district “B”?
- ❖ **Possible answers:**
 - Mothers might have problems for not attending in the EPI sessions.
 - The MCH, EPI, OPD, etc... programmes might not have been integrated; hence children might have missed opportunities in getting immunization.
 - The follow up of defaulting children might not be effective and other reasons.
- ***Thus, the above problem situation is researchable.***

TOPIC SELECTION...

Criteria for prioritizing research problems

- ❖ Each problem that is proposed for research has to be judged according to certain guidelines or criteria.
- ❖ There may be several ideas to choose from. Before deciding on a research topic, each proposed topic must be compared with all other options.
- ❖ Selection and analysis of the problem should involve those who are responsible for the health status of the community (health services managers, health-care workers, and community leaders, as well as researchers.)

TOPIC SELECTION...

Helpful guidelines/criteria for selection.

a) Criteria for selecting a research topic

- *Relevance*
- *Avoidance of duplication*
- *Feasibility*
- *Political acceptability/government concern*
- *Applicability of results & recommendations*
- *Urgency of data needed/timeliness*
- *Ethical acceptability*

❖ **Personal interest**

TOPIC SELECTION...

1. Relevance:

The topic you choose should be a priority problem:

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

2. Avoidance of duplication: Investigate whether the topic has been well researched before.

- If the topic has been researched, the results should be reviewed to explore whether major questions that need further investigation remain unanswered.
- If not, another topic should be chosen.

TOPIC SELECTION...

- 3. Feasibility:** Consider the complexity of the problem and the resources you will require to carry out the study.
- Consider first the personnel, time, equipment and money that are locally available.
 - In situations where the local resources necessary to carry out the project are not sufficient, you might consider sources available at the national level.

TOPIC SELECTION...

4. Political acceptability:

- ❖ It is advisable to research a topic that has the interest and support of the authorities.
- ❖ It will facilitate the smooth conduct of the research and increases the chance that the results of the study will be implemented.

5. Applicability of results and recommendations

- Is it likely that recommendations of the study will be applied?
- It depends not only on the blessing of the authorities but also on availability of resources for implementing recommendations.

TOPIC SELECTION...

6. Urgency of results needed

- How urgently are the results needed for making a decision?
- Which research should be done first and which can be done late?

7. Ethical acceptability

- Always consider the possibility that we may inflict harm on others while carrying out research.
- Therefore, it will be useful to review the proposed study.

TOPIC SELECTION...

b) Scales for rating research topics

1. Relevance

1 = Not relevant

2 = Relevant

3 = very relevant

2. Avoidance of duplication

1 = Sufficient information already available

2 = Some information available but major issues not covered

3 = No sound information available on which to base problem-solving

TOPIC SELECTION...

3. Feasibility

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

4. Political acceptability

- 1 = Topic not acceptable
- 2 = Topic somewhat acceptable
- 3 = Topic fully acceptable

TOPIC SELECTION...

5. Applicability

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

6. Urgency/timeliness

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

TOPIC SELECTION...

7. Ethical acceptability

1 = Major ethical problems

2 = Minor ethical problems

3 = No ethical problems

N.B. The above rating should be based on the existing data and not on mere assumptions.

STATEMENT OF THE PROBLEM

Learning objectives

- *After completing this chapter, the student should be able to*
- Describe the importance of a clear statement of a problem
- Enumerate the points that should be included in the statement of a problem

STATEMENT OF THE PROBLEM

what is a problem?

- A problem is a gap or a difference between what is expected or desired to be and the actual condition exists.
- A problem statement is a concise, precise, well documented, and detailed description of the nature ,scope, causes, severity and the effect or impact of a problem to be addressed and the need for the proposed project or research.
- Thus a problem statement is the specific description of a problem which is essential to understand it properly.

STATEMENT OF ...

- A problem statement is the **initial step before undertaking into any kind of research.**
- A well formulated and effective problem statement ensures the research success.
- A good problem statement is **always specific and focused to a particular issue (restrictive and would express one major idea).**
- A confused or vague problem statement will raise a question on the importance of the research.

STATEMENT OF ...

- The first major section in a research proposal is the ‘statement of the problem’.

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

- Because you will find that a clear statement of the problem:
 - Is ***the foundation*** for the further development of the research proposal (research objectives, methodology, work plan, budget, etc.).

STATEMENT OF ...

Information in the statement of the problem

- ✓ A brief description of socio-economic and cultural characteristics and an overview of health status and the health-care system in the country/district as far as these are relevant to the problem.
- ✓ Include a few illustrative statistics, if available, to help describe the **context** in which the problem occurs.

STATEMENT OF ...

- ✓ Analysis of the **major factors that may influence the problem** and a discussion of why certain factors need more investigation if the problem is to be fully understood.
- ✓ A brief description of any solutions to the problem that have been tried in the past, how well they have worked, and why further research is needed (**justification** for your study).

STATEMENT OF ...

- ✓ A description of the type of information expected to result from the project and how this information will be used to help solve the problem.
- ✓ If necessary, a short list of **definitions** of crucial concepts used in the statement of the problem.

Sources of Research Problem

- The sources of a research problem could be
 - Observations
 - Experts/from experience
 - Literature reviews
 - Professional conferences

When dose a research problem exists?

□ A potential research situation arises when three conditions exist:

1. A **perceived discrepancy** exists between what is and what should be
2. The **reason(s) for this difference** should be **unclear**
3. At **least two possible** and **plausible answers** exist to the question

When does a research problem exist---

- NB. If there is **only one possible** and **plausible answer** to the question about the discrepancy, then **a research situation does not exist**

Exercises

1. Why do we need to analyze the research problem?
2. What are the points required to justify the selected research problem?
3. What information should be included in the statement of a problem?

LITERATURE REVIEW

Learning objectives

After completing this chapter, the student should be able to:

- Describe the **reasons** for reviewing available literature and other information during the preparation of a research proposal.
- Describe the **resources that are available** for carrying out such a review.
- **Record (organize) information** obtained from literature on an index card.

LITERATURE REVIEW

What is a literature review?

- In the terms of a literature review, "the literature" means the works you consult in order to understand and investigate your research problem.
- A description or account of the literature that has been published relevant to a particular field or topic.
- an overview of significant literature published on a topic.

LITERATURE REVIEW...

- Should first be skimmed or read.
- Then summaries of important information in each of the references should be recorded on separate index cards or as computer entries.
- These should then be classified so that the information can easily be retrieved.
- Finally the literature should be included in your protocol.

LITERATURE REVIEW...

- Not necessarily an analysis (review) of the sources, but specifies which literature makes **significant contributions** to the understanding of the topic.
- Does not mean you are reviewing or giving your personal opinion on the works
- Classification, analysis, and evaluation of scholarly work on a specific, purposefully chosen, topic communicated formally in an organized manner.

LITERATURE REVIEW...

- Consists of published and unpublished research that others have conducted in a number of areas that are relevant to your own research question.
- will likely include articles in journals, books or chapters in edited books, conference papers, documents published on the web
- A good literature review will draw on both practical and theoretical literature about a particular problem as well as the methods used to explore it.

LITERATURE REVIEW...

Use of literature review

- It prevents duplication of work that has been done before.
- It increases your knowledge on the problem you want to study and this may assist you in refining your "statement of the problem"
- It gives you confidence why your particular research project is needed
- To be familiar with different research methods
- It helps you to find out what others have learned and reported on the problem you want to study.

- To refine your statement of the problem.

LITERATURE REVIEW...

What are the possible sources of information?

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

LITERATURE REVIEW...

Organization of LR:

- Plan your organization
 - Introduction
 - Body – organization within the body/subsections
 - Conclusion

Also

- from global to local e.g. Global, Africa, Ethiopia, local
 - from broader to focused
 - from past to current

LITERATURE REVIEW...

- what is the most effective way of presenting the information?
- What are the most important topics, subtopics, etc., that your review needs to include?
- And in what order should you present them?
- organizational pattern
- *Introduction:* Gives a quick idea of the topic of the LR, such as the central theme or

LITERATURE REVIEW...

- *Body*: Contains your discussion of sources and is organized either **chronologically, trend, thematically, or methodologically**
- *Conclusions/Recommendations*: Discuss what you have drawn from reviewing literature so far.
- Where might the discussion continue?

LITERATURE REVIEW...

In conclusion, all what is known about the study topic should be summarized with the relevant references.

This review should answer

- *How much is known?*
- *What is not known?- the gap to be filled*
- *What should be done based on what is lacking?*

LITERATURE REVIEW...

- Overall, the LR should be *adequate, relevant and critical*
- give emphasis to *both positive and negative findings and avoid any distortion of information* to suit your own study objectives.
- Finally, after exhaustive literature review, summarize the findings and write *a coherent discussion* by indicating the research gap which supports the undertaking of your study.

RESEARCH OBJECTIVES

Learning objectives

After completing this chapter, the student should be able to:

- Describe **the need** for the development of research objectives
- Differentiate between **general** and **specific objectives**
- Formulate specific objectives

RESEARCH OBJECTIVES

Objectives

- A research objective summarizes **what is to be achieved by the study.**
- Commonly, research objectives are classified into **general objectives and specific objectives.**
- **General objective:** **aim of the study in general terms**
 - summarizes what is to be achieved by the study
 - should be clearly related to the statement of the problem

RESEARCH OBJECTIVES...

Specific objectives:

- are logically connected parts of the general objective
- measurable statements on the specific questions to be answered by the study.
- Use action verbs specific enough to be measured:

e.g. -to determine -to verify -to identify
 -to describe - to assess -to compare
 -to calculate - to establish -to explore

RESEARCH OBJECTIVES...

Avoid the use of vague non-action verbs such as;

- to appreciate
- to understand
- to study
- to believe

Importance of developing objectives

- Focus the study
- Avoid the collection of data which are not strictly necessary
- Properly formulated specific objectives facilitate the development of research methodology and help to orient the collection, analysis, interpretation and utilization of data.
- Helps for evaluating the project

Formats used for stating research objectives?

Research objectives can be stated as:

- A) **Questions**: “The objectives of this study are to answer the following questions ...”
- B) **Positive sentence**: “The objectives of this study are to determine ...” – *commonly used*
- C) **Hypothesis**: “The objective of this study is to verify the following hypothesis...”

- The format chosen depends on the type of study that will be undertaken.
- If the study is descriptive or exploratory in nature, then objectives are stated in the form of questions or positive sentences.
- If the researcher knows enough to make predictions concerning what s/he is studying, then hypotheses may be proposed.

objectives in the form of Research questions: formulated when insight into the problem being studied is **not sufficient**.

- **Research question should:**
 - **Be focused**, each covering a single point
 - **Be ordered** in a logical sequence
 - **Be realistic** and feasible to answer
 - **Have measurable** outcomes at the end of the research
- Eg of research question. Does post-menopausal hormone replacement therapy predispose women to develop endometrial cancer?

METHODOLOGY

After completing this chapter, the student should be able to:

1. Identify the pertinent questions to consider when developing the methodology of a proposal
2. Describe and understand various components of the methods section in a proposal
3. Explain the cyclical nature of the different steps in designing the methodology.
4. Analyze circumstances for appropriate use of the different study designs
5. Use appropriate study designs which properly answer the research question/ objective

METHODOLOGY...

Subsections

- the study design
- Setting
- Source/study population
- variables
- sample size and sampling techniques
- Data collection
- Data quality control
- Data management: coding, entering, cleaning, storing, recoding (software to be used)
- Data analysis: choice of statistical methods
- Ethical Concerns

METHODOLOGY...

Design options

Broadly:

- ◆ Quantitative
- ◆ Qualitative/exploratory
- ◆ Mixed/both

METHODOLOGY...

Criteria for selecting a research design

- 1) the research problem
- 2) personal experience
- 3) Audience/users
- 4) Resources available for the study

METHODOLOGY...

1) the research problem

Research problems call for specific approaches

Eg. If the problems calls for:

- a) the identification of factors that influence an outcome
- b)) the evaluation of an intervention

Then a quantitative approach is best

METHODOLOGY...

If a concept or phenomenon needs to be understood because little research has been done on it before,

qualitative approach is preferred

Qualitative research is exploratory and is useful when the researcher does not know the important variables to examine

METHODOLOGY...

A mixed methods design is useful when either the quantitative or qualitative approach by itself is inadequate to best understand a research problem

The strength of both quantitative and qualitative research can provide the best understanding in this case

METHODOLOGY...

2) personal experience

- Researcher's personal training and experience influence the choice of the approach/the 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

METHODOLOGY...

- 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

METHODOLOGY...

3) Audience

- Researchers write for audiences that will accept their research
- These audiences may be journal editors, journal readers, conference attendees, or colleagues in the field

METHODOLOGY...

- Diff. types of study design are not considered equal in the strength of evidence they provide
- **Hierarchy:**
 - Randomized controlled trial (High strength)
 - Cohort, case control study
 - Observational descriptive studies

METHODOLOGY...

- 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

METHODOLOGY...

- Mixed methods are becoming popular
- The problems addressed by social & health science researchers are complex, and the use of either quantitative or qualitative approaches by themselves is inadequate to address this complexity
- Mixed methods utilize the strengths of both qualitative & quantitative research

METHODOLOGY...

Quantitative designs include

- ❖ Cross sectional – the commonest of all
- ❖ Cohort / prospective or retrospective/
- ❖ Case control
- ❖ Experimental

Qualitative designs include

- ❖ Focus Group discussion
- ❖ In-depth interview
- ❖ Observation

METHODOLOGY...

Cross sectional study design:

- A cross-sectional study is a study in which disease and exposure statuses are measured simultaneously in a given population.
- Cross-sectional studies can be thought of as providing a "**snapshot**" of the frequency and characteristics of a disease in a population at a particular point in time.
- it provides a prevalence rate at a particular point in time (point prevalence) or over a period of time (period prevalence).

METHODOLOGY...

Strength

- relatively quick and inexpensive
- Shows relative distribution of conditions
- Often provides early clues for hypothesis generation.

Limitation :

- Weakness for establishing causation since uncertainty on whether exposure presided disease.
- Not effective if disease is rare

METHODOLOGY...

Cohort:

definition of “cohort”

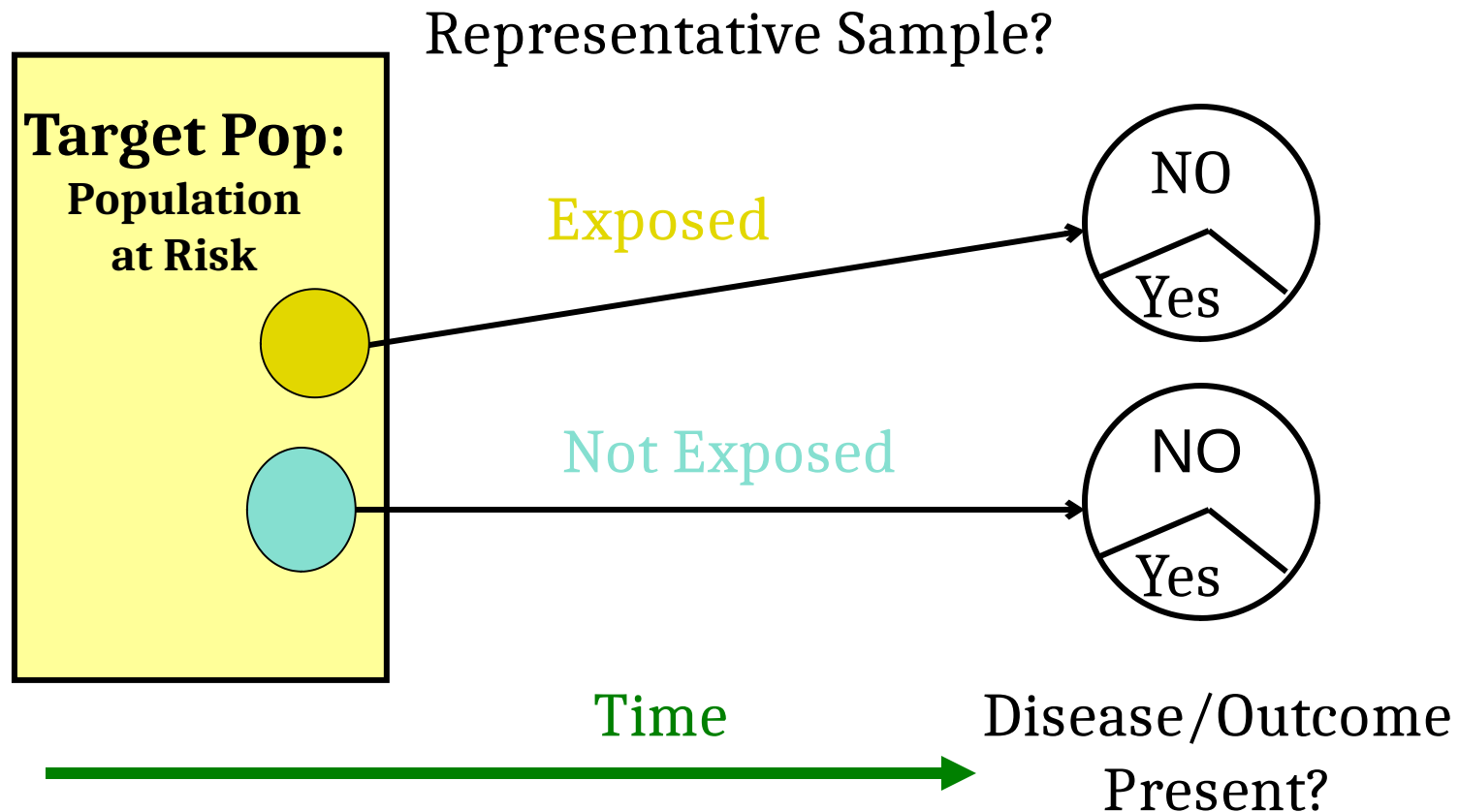
- Group of people who have something in common when they are assembled.
- A group of individuals that are all **similar in some trait and move forward together** as a unit
- Designated group of people who are followed or traced for a particular period of time

METHODOLOGY...

- Cohort study is **the observation of a cohort / cohorts, over time, to measure outcome's**
 - Also called longitudinal, follow-up studies
- Groups are defined on the basis of exposure to risk factors.
- At the beginning free from the disease

Defined Population

Study Sample



METHODOLOGY...

❖ Case control:

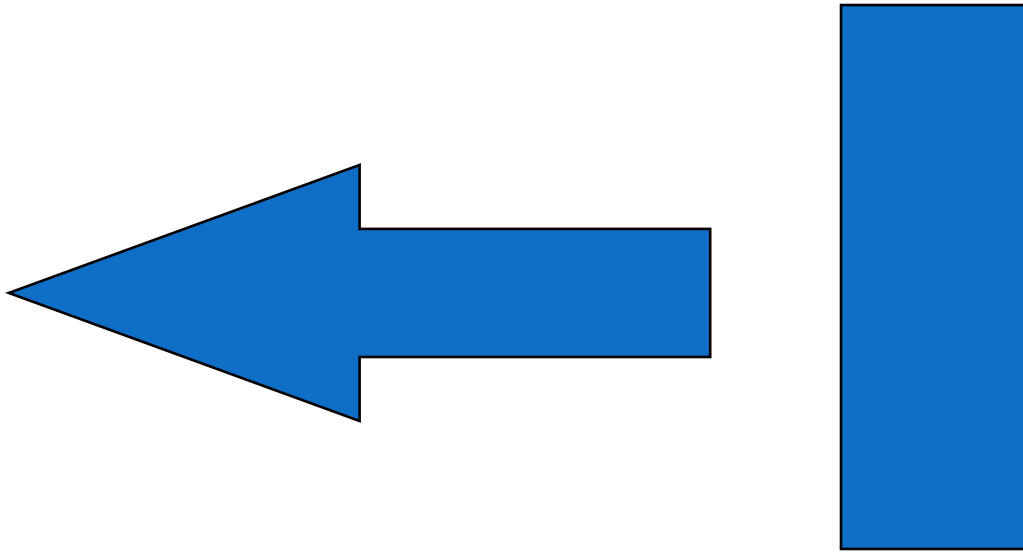
- It is usually **retrospective/ backward in direction**
- Identify one group of subjects with disease (cases) and one group without disease (controls), then look back historically to identify differences in predictor variables [exposure (s)]

METHODOLOGY...

- Mostly cannot provide estimates of prevalence or incidence
 - (diseased are sampled)
- Rather, provide estimate of association between presence or absence of disease and predictor variables

METHODOLOGY...

Cases: Disease
Controls: No disease



METHODOLOGY...

Experimental

- A method where: -
 - Investigator can “control” the exposure
- Similar to laboratory experiments except living populations are the subjects
- Generally involves random assignment to groups

METHODOLOGY...

- Clinical trials are the most well known experimental design
- The ultimate step is testing causal hypotheses
- In an experiment, we are interested in the consequences of some treatment on some outcome.
- The subjects in the study who actually receive the treatment of interest are called the **treatment group**.
- The subjects in the study who receive no treatment or a different treatment are called the **comparison group**.

METHODOLOGY...

Source population: target population from which we drive sample population

- Also called target population (reference population)

Study Population: sample population included in the study

- The population of individual units (whether persons, households, etc.) to be investigated.

E.g.

- source population, all food handlers working in AU.

- Study population representative of food handlers selected by sampling technique

❖ Inclusion and exclusion criteria

METHODOLOGY...

Sample size & Sampling technique

- Sample size determination depends on
 - objective of the study;
 - design of the study;
 - plan for statistical analysis;
 - accuracy of the measurements to be made;
 - degree of precision required for generalization;
 - degree of confidence with which to conclude.

METHODOLOGY...

- the minimum sample size required, for a very large population ($N \geq 10,000$) is calculated as:

$$n = Z_{\frac{\alpha}{2}}^2 \frac{\sigma^2}{d^2}$$

- n – the required sample size
- z – the standard normal distribution usually taken as 1.96
- ∂ - the **proportion** of the problem to be studied taken from previous similar studies.
- If no previous similar studies, take maximum value i.e. 50%
- d – width or margin of error, usually 5%.

To estimate a single population proportion

$$n = Z_{\frac{\alpha}{2}}^2 \frac{P(1 - P)}{d^2}$$

METHODOLOGY...

Variables

A **VARIABLE** - a characteristic of a person, object or phenomenon which can take on different values.

-it may be in the form of numbers (e.g., age) or non-numerical characteristics (e.g., sex).

- it is important to make a distinction between **dependent** and **independent variables**.
- The variable that is used to describe or measure the problem under study is called the *DEPENDENT* variable.

METHODOLOGY...

- The variables that are used to describe or measure the factors that are assumed to cause or at least to influence the problem are called the *INDEPENDENT* variables.
- **Background variables**, such as age, sex, educational level, socio-economic status, marital status and religion, should be considered.
- Also called socio demographic variables.
- These background variables are often related to a number of **independent variables**

METHODOLOGY...

Operationalizing variables (operational definitions)

- Many variables can easily be measured
- For some variables it is some times 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

METHODOLOGY...

Ex1- determining level of knowledge

- There is a need to develop a series of questions to assess knowledge
- The **answer** to these questions form an indicator of someone's knowledge on the issue, which can then be categorized

E.g. 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 reasonable, and
- 7 to 10 correct answers is good

METHODOLOGY...

Data collection technique and tools

Different data collection techniques like:

- Observation
- Telephone
- Postal
- Self administered questionnaire
- Face to face interview

METHODOLOGY...

Tools can be

- Questionnaire
- Checklist
- Recorded logbooks
- Microscope etc

E.g. A structured questioner was prepared by principal investigator for a face to face interview.

METHODOLOGY...

Data Quality Control Issues

Describe/provide:

- Operational definitions of crucial concepts
- Selection and training of field workers/research staff
- Field testing the research methods and tools
- Supervision and quality control

METHODOLOGY...

Pretesting

- **Pretest** – usually refers to a small-scale trial of particular research components
- **Pilot study** – is the process of carrying out a preliminary study, going through the entire research procedure with a small sample

Why pretest or pilot study?

- It serves as a trial run that allows to identify potential problems in the proposed study as a result:-
 - Time, effort and money can be saved in the long run

METHODOLOGY...

What aspects can be evaluated during pretesting?

- 1) reaction of the respondents to the research procedure.
 - Availability of the study population
 - Acceptability of the methods
 - Acceptability of the questions asked
 - Willingness of respondents to answer the questions and collaborate with the study

METHODOLOGY...

2) the data collection tools

- Whether the tools allow you to collect the information you need and whether these tools are reliable
- How much time is needed
- Whether there is **any need to revise** the format or presentation of interview guide/ questionnaires, including whether:
 - The sequence of questions is logical
 - The wording of questions is clear

METHODOLOGY...

3) Sampling procedures

- Whether the instructions concerning **how to select** the sample are followed in the same way by all staff involved
- **How much time is needed** to locate individuals to be included in the study

Ethical Considerations

- Professional obligation to safeguard the safety of study subjects
- Refer to national and international guidelines
- Describe potential ethical concerns and mechanisms to minimize harm and maximize benefits

Consent must be obtained from the relevant authorities, individuals and the community.

Every research can potentially cause ethical concerns!!

Dissemination of Results

- Briefly describe the dissemination plan
 - Feedback to the community
 - Feedback to local authorities
 - Identify relevant agencies that need to be informed
 - Scientific publication
 - Presentation in meetings/conferences
- Briefly describe how the study results can be best translated into application

Work plan

- A WORK PLAN is a **schedule, chart or graph** that summarizes the different components of a research project and how they will be implemented in a coherent way within a specific time-span.
- Includes:
 - Tasks to be performed
 - When the task will be performed
 - Who will perform the task (identify HR needed for each task)
 - Number of staff needed to perform the task

Work plan cont..

Ways of presenting a work plan

Work schedule(table form)

GANNT chart - the commonest

Work plan cont..

The GANTT Chart

- Depicts graphically the order in which **various tasks** must be completed and their **duration** of activity.

A typical Gantt chart includes the following information:

- The tasks to be performed
- Who is responsible for each task; and
- The time each task is expected to take.
- The length of each task is shown by a bar that extends over the number of days, weeks or months the task is expected to take.
- *The Gantt chart doesn't show how various tasks are related.*

GANNT CHART

Example of a GANNT Chart

		Responsibility	Month 1	Month 2	Month 3	Month 4	Month 5
1.	Prepare proposal and submit to donors	PI	■	■			
2.	Obtain fund and discuss arrangement with local government	PI		■	■		
3.	Preparation of study tool	PI			■		
4.	Prepare for field Work	PI			■	■	
5.	Travel to data collection site	PI				■	
6.	Select data collectors and research assistants	PI				■	
7.	Conducting training for data collectors and supervisors	PI				■	
8.	Pre-testing of the survey instrument	PI+RA+DC				■	
9.	Data collocation	PI+RA+DC				■	■
10.	Data entry and cleaning	PI+RA+DEC					■
11.	Data analysis and write up	PI					■
12.	Prepare workshop on findings	PI+RA					■
13.	Hold workshop	PI+RA					■

P.I. =Principal Investigator

R.A. = Research Assistant

D.C. = Data Collectors

DEC = Data entry clerk

Budget

How should a budget be prepared?

- It is necessary to use the work plan as a starting point.
- Specify, for each activity in the work plan, what resources are required.
- Determine for each resource needed, the **unit cost** and the **total cost**.
- The budget for the fieldwork component will include funds for *personnel, transport and supplies*.

Budget cont...

The Budget Format and Justification

- The type of budget format to be used may vary
- Most donor organizations have **their own** special project forms, which include a budget format.

Budget cont...

Advice on budget preparation

- Include a 5%-10% contingency fund
- If inclusion of a contingency fund is not allowed, an alternative is to **slightly over-budget** in major categories.

Budget cont...

Budget justification

- It is not sufficient to present a budget without explanation.
- The budget justification follows the budget as an explanatory note justifying briefly why the various items in the budget are required.
- Make sure you give clear explanations concerning why items that may seem questionable or that are particularly costly are needed.

Referencing/citation

What is Referencing?

- Referencing is a **standardized method of acknowledging sources of information** and ideas that you have used in your project.
- Direct quotations, facts, and figures, as well as ideas and theories, from both published and unpublished works, must be referenced.
- There are many acceptable forms of referencing. **The Vancouver style of referencing is predominantly used in the medical field.**
 - *You are also expected to use the Vancouver style.*

Referencing...

- When referencing your work in the **Vancouver style**, it is very important that you use the **right punctuation** and that the **order of details** in the reference is also correct.
- A reference list at the end of the assignment contains the full details of all the in-text citations.

Why Reference?

- It is necessary to **avoid plagiarism**, to verify quotations, and to enable readers to follow-up and read more fully the cited author's arguments.

Referencing/citation

Methods of citations :

A) **Vancouver system:** This system have been adopted as standard by over 300 biomedical journals

1. For an article the following information should be noted:

Author(s)' Surname followed by initials. Title of article.
Name of Journal. Year, Volume(number): page numbers of article.

Example:

Louria DB. Emerging- and re-emerging infections: The societal variables. International Journal of Infectious Disease. 1996, 1(2):59-62.

Referencing cont...

2. For a book the following information should be noted:

- Author(s)' Surname followed by initials. *Title of book. Place: Publisher, Year, Edition.*

Example:

Abramson JH. *Survey methods in community medicine.*
Edinburgh: Churchill Livingstone, 1990, 4th ed.

Referencing cont..

B) the Harvard System

- *In other journals and books it is common to put the year, between brackets, straight after the name of the author(s).*
- This is called the Harvard system.
- **Name of the author(s) (year). Title. Place of Publication: Publisher**

Ex-

Abramson JH (1990), 4th ed. *Survey methods in community medicine*. Edinburgh: Churchill Livingstone.

- *There are more systems in use for referencing to literature.*
- Always carefully look what system is used in the journal **you are submitting an article to** and follow it systematically.

Referencing cont...

- At present many journals use as few punctuation marks as possible.
- **Examples:** In Harvard style, this looks as follows:
- Abramson JH (1990) 4th ed. *Survey methods in community medicine*. Edinburgh: Churchill Livingstone.

Referencing cont...

- When you use the Vancouver system, you will use **consecutive numbers** in the text to indicate your references
- In Harvard System, put the surname of the author, year of publication and number(s) of page(s) referred to between brackets, (E.g. Shiva 1998:15-17)
- If this system of citation is used, the references at the end of the proposal, should be listed in **Alphabetical order**.

Annex

- Include in the appendices of your proposal any additional information you think helpful to a proposal reviewer.
- For example, include:
 - Data collection instruments
 - The consent form.
 - A copy of the approval from the Institutional Review Board.
 - Dummy tables

***THANK YOU,
ALL!***