CMED 236
Research Methods
Lecture 5: Materials and Methods

By Linet Angwa

LECTURE SCHEDULE

- Introduction
- Study area
- Research Design
- Study population
- Variables
- Sampling Procedures
- Developing research tools and instruments

INTRODUCTION

- The **materials and method section** of a **research study describes procedures** that have **been followed in conducting the research**.

- This involves detailed description of all the steps involved in conducting the research.

- Research methodology is a step by step process geared to ensuring choice of an appropriate research design, understanding of research method, tools and instruments.

- The methods, tools and instruments must be systematic, valid, reliable, neutral and objective.

STUDY AREA

- The study area **defines the limit of the problem**.

- It entails the description of the area in which the research will take place.

- The description should contain empirical or objective knowledge – what other researchers have written about the area. This includes; -

  – A map of the geographical coverage and area in hectares or sq km

- Description of the climate
- Social, economic and demographic description such as population, literacy levels, income levels, religion, occupation

- The details will be pegged on the type of study e.g. if the study is based on health care – describe the health facilities and demographic data relevant to health such as birth rates m, mortality rates and epidemiology of various disease conditions.

- **Study site** – this is detailed, description of places where the research will take place. This includes a description of specific groups, and places e.g. towns and villages.

RESEARCH DESIGN

- Decide on the research design and explain why it is suitable.

- Example – the study can be a **descriptive cross sectional survey.**

STUDY POPULATION

- The study population should be described in detail.

- A population is a complete well-defined set of people/individuals, cases, groups of things/objects, services or events which are being investigated.

- A particular population has some characteristics that differentiate it from other populations.

- Definition of the population ensures that the population is homogenous.

- It is often impossible to study the whole of the **target population** and therefore researchers identify and define an experimentally **accessible population** (survey population).

- The target population is that population to which the researcher wants to generalize the results of a study.

- In defining the accessible population one should avoid being influenced by convenience.

- Define the population as consistently as possible with the purpose of the study.

- Consistency supersedes convenience in research.

- There must be a rationale for defining and identifying the accessible population from the target population. This should be based on some theory, pervious studies or professional experience.

- Make sure that the accessible population is the most representative of the target population.

- Accessible population must be defined accurately so as to determine how far the results can be generalized.

Example

- A researcher wants to study the effects of different teaching methods on the performance of standard 8 pupils in mathematics.

✓ **Target population** – all standard 8 pupils in the country

✓ **Accessible population** – standard 8 pupils in Vihiga district - Western province

- The target population and accessible populations must be comparable on many characteristics which are important to the study (this is called population validity).

VARIABLES

- A variable is a measurable characteristic that assumes different values among subjects.

- Measurement of variables or the operational definition of variables is a very critical step in the research process.

- Two similar studies using exactly the same variables may have completely different results depending on the way each study operationalized the variables.

Independent Variable

➤ the factor that is varied or manipulated.

➤ the "assumed cause" of a problem.

Independent Variable

➤ There can be **only one** independent variable in an experiment.

➤ This is the factor manipulated by the researcher, and it produces one or more results, known as **dependent variables**.

Independent Variable

➢ **If a scientist conducts an experiment to test the theory that a vitamin could extend a person's life-expectancy, then:**

The independent variable is the <u>amount of vitamin that is given to the subjects within the experiment.</u> This is controlled by the experimenting scientist.

Dependent Variable

➢ The factor that is <u>measured</u> or <u>observed</u>; the change that is brought about or is effected by the change in the independent variable.

➢ the "<u>assumed effect</u>" of another variable.

Dependent Variable

➢   If a scientist conducts an experiment to test the theory that a vitamin could extend a person's life-expectancy, then:

The dependent variable, or the variable being affected by the independent variable, is the life span.

Controlled Variable

➢ The factor that is kept constant all throughout the experiment.

Controlled Variable

Are not measured in a particular study. Must be held constant so they will not have biasing effect on the other variables.

- They have no effect on other variables. Researchers might intentionally keep a control variable the same throughout an experiment to prevent bias.

- For example, in an experiment about plant development, control variables might include the amounts of fertilizer and water each plant gets. These amounts are always the same so that they do not affect the plants' growth.

Intervening Variables

➤ Are abstract processes that are not directly observable but that link the independent and dependent variables.

- An intervening variable (a mediator variable) is a theoretical variable the researcher uses to explain a cause or connection between other study variables—usually dependent and independent ones.

- They are associations instead of observations. For example, if wealth is the independent variable, and a long life span is a dependent variable, the researcher might hypothesize that access to quality healthcare is the intervening variable that links wealth and life span.

Moderator Variables

➢ Affect the relationship between the independent and dependent variables by modifying the effect the effect of the intervening variable(s).

- A moderating (moderator) variable changes the relationship between dependent and independent variables by strengthening or weakening the intervening variable's effect.

- For example, in a study looking at the relationship between economic status (independent variable) and how frequently people get physical exams from a doctor (dependent variable), age is a moderating variable. That relationship might be weaker in younger individuals and stronger in older individuals.
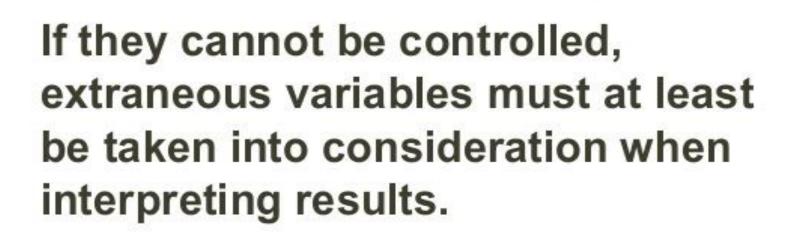
Extraneous Variables

➢   are factors in the research environment which may have an effect on the dependent variable(s) but which are not controlled.

- These unwanted variables can unintentionally change a study's results or how a researcher interprets those results. T
- For example, a study assessing whether private tutoring or online courses are more effective at improving students' Spanish test scores. Extraneous variables that might unintentionally influence the outcome include parental support, prior knowledge of a foreign language or socioeconomic status.

If they cannot be controlled, extraneous variables must at least be taken into consideration when interpreting results.

Confounding Variable

- A confounding variable is one you did not account for that can disguise another variable's effects.

- Confounding variables can invalidate your experiment results by making them biased or suggesting a relationship between variables exists when it does not.

- For example, if you are studying the relationship between exercise level (independent variable) and body mass index (dependent variable) but do not consider age's effect on these factors, it becomes a confounding variable that changes your results.

Composite Variable

- A composite variable is two or more variables combined to make a more complex variable. Overall health is an example of a composite variable if you use other variables, such as weight, blood pressure and chronic pain, to determine overall health in your experiment.

SAMPLING PROCEDURES

Sample of Population

- After identification and definition of both target and accessible population, the next step is to select a **sample** from accessible population.

- The sample must be large enough to represent the salient characteristics of the accessible population and hence target population assuming population validity exists.

- The sample size depends on the number of variables in the study, type of research design, the method of data analysis and size of the accessible population.
- Generally speaking, for correlational research 30 cases or more are required, for descriptive studies 10% of the accessible population is enough and for experimental studies at least 30 cases are required per group.

Sample Size

- The sample size should be as **large as possible.** With a large sample, the results of the study will have more validity.

- Small samples pose the danger of not representing the salient characteristics of the accessible population to an acceptable degree.

- The discrepancy between sample characteristics and population characteristics is called **sampling error.** *The smaller the sample, the bigger the sampling error.*

Large samples are mandatory when: -

1. Many variables are held constant in the study.
2. Hypothesized relationships or differences between variables are very small in real life. The anticipated effect size is small.

3. Study requires the sample to be broken into subgroups e.g. people in different income groups.
4. It is expected that many subjects or cases in the sample will not respond, drop out or die.
5. A very high level of statistical significance is required (e.g. significance level of 0.001).
6. Accessible population is highly heterogeneous on the variable under study.

- The rule of the thumb should be used to obtain as big a sample as possible, but because of various constraints, it becomes prudent to decide on a sample size.

Andrew Fisher's method (1994)

- Sample size, $n = \dfrac{Z^2 - pq}{d^2}$

Where,

n = the desired sample size (target population more than 10, 000).

z = the standard normal deviation at the required level of significance.

p = the proportion in the target population estimated to have the characteristics being measured.

q = $1 - p$

d = the level of statistical significance set

Example 1

- If the proportion of a target population with a certain characteristic is 0.50, the Z statistic is 1.96 and we desire accuracy of 0.05 levels,

- Sample size $=$ $\dfrac{(1.96)^2 \cdot (0.50)\,(0.50)}{(0.05)^2}$

$=$ $\dfrac{(3.8416) - (0.25)}{(0.0025)}$

$=$ $\dfrac{(0.9604)}{(0.0025)}$

$=$ 384.16

$=$ **384**

- If the target population is less than 10,000, the required sample size will be smaller, so calculate the final sample estimate n*f* using the following formula
- n*f* =   n

$$(1 + n)/N$$

- Where,
- ✓ nf = the desired sample size (when the population is less than 10,000)
- ✓ n =   the desired sample size (when the population is more than 10000) Constant = 400
- ✓ N = the estimate of population size

Sampling Procedure

- After determining and deciding the sample size, the researcher formulates a procedure of selecting the subjects or cases to be included in the sample.

- This involves making of a sampling frame and determining the sampling procedure and methods. If the target population is so small, it is meaningless selecting a sample

Sampling Frame

- A sample frame is a list, directory or index of all cases from which a sample can be selected.

- The subjects or cases selected from the sampling frame form the units of observation in a study.

Examples of a sampling frame - students register, registration of motor vehicles (list of car owners) and list of tax payers.

Sampling

- Sampling is the process of selecting a number of individuals for a study in a way that individuals selected represent the large group from which they are selected.

- Methods of sampling (sampling techniques) are random (probability) sampling and non-random (non-probability) sampling.

Probability (Random) Sampling

- Probability sampling is when the probability of each case being included in the sample is known prior to drawing the sample.

- The essential point is that for each case there is some specified probability that it will be included in the sample.

- Probability sampling is the only approach that makes possible representative sampling.

- Randomization is essential to probability sampling.
- The goal of probability sampling is to select a reasonable number of subjects or objects or cases that represent the target population.
- Probability sampling provides accurate information about groups that are too large to study in their entirety.

- It is an efficient system of capturing in a small group the variations or heterogenecity existing in target populations.

- Random sampling is the key to obtaining a representative sample because every sample of a given size in the accessible population has an equal chance of being selected so are the individuals in each sample.

- Random sampling allows generalizations of the results to the larger population with statistically determined margins of error.

- It allows use of inferential statistics and statistical indices calculated on the sample can be evaluated to determine to which extent they accurately represent the population parameters.

Principles of Randomization

a) The population/universe to be sampled and the units comprising it must be clearly defined.

b) A population composed of many small units is preferred to one composed of fewer but larger units.

c) The units should be equal in size.

d) If any unit appears more than once in the population to be sampled all the other units should appear the same number of times.

e) All units should be independent of each other so that if one is drawn it will in no way affect the choice of another.

f) The same unit should be used in sampling and in data processing.

g) The chance of selecting a certain unit in the population must be uniform from one sample to the other.

h) The population must be present or categorized so that every unit is listed or has an identifying symbol to be used during the drawing of a sample.

i) All units in the population should be available at the time the sample is drawn.

j) Every unit drawn must be accessible to the researcher for the collection of information

Methods of Probability/Random Sampling

- Simple random sampling.

- Systematic random sampling.

- Stratified random sampling.

- Cluster random sampling.

- Multistage (multi-cluster) sampling.

– *Simple Random Sampling*

- In simple random sampling each individual in the sampling frame has an equal chance of being selected.

- It involves assigning a number to every subject or member of the accessible population, placing the numbers in a container and picking any number at random.

- The subjects corresponding to the numbers picked are included in the sample.

- You can also use tables of random numbers usually included in statistics books or generate the numbers using the computer programmes.

– *Systematic Random Sampling*

- In systematic sampling, individuals or subjects or items/objects are chosen at regular intervals but the first subject/object is chosen randomly.

- In systematic random sampling every K^{th} case in the population frame is selected for inclusion in the sample.

- The list of all the members in the sampling frame must be randomized.

- A list arranged in alphabetical order or numerical order is not random. If such an arrangement is used it introduces a systematic sampling error.

- For example; choosing from the Kenyan population a sample using names arranged in alphabet.

Stratified Random Sampling

- Stratified random sampling is geared to achieve desired representation from various subgroups in the population.

- In a stratified sample, researchers divide a population into homogeneous subpopulations called strata (the plural of stratum) based on specific characteristics (e.g., race, gender, location, etc.). Every member of the population should be in exactly one stratum.

- The sample consists of two or more subgroups.

- Subjects are selected in such a way that the existing subgroups in the population are more or less reproduced in the sample.

- Each stratum is then sampled using another probability sampling method, such as cluster or simple random sampling, allowing researchers to estimate statistical measures for each sub-population.

- Researchers rely on stratified sampling when a population's characteristics are diverse and they want to ensure that every characteristic is properly represented in the sample.

Cluster Random Sampling

- Cluster sampling is used when it is not possible to obtain a sampling frame because either the population is too large or scattered over a large geographical area.

- It involves selection of an intact group and all members are included in the sample where each member becomes a unit of observation.

- Example selecting 1 district hospital to study the efficacy of antimalarials.
- Selection of the clusters or groups has to be random.

Examples of clusters

- Schools
- Towns
- Estates
- Hospitals
- Large scale industries
- Government ministries

- Cluster sampling may involve many stages hence it is referred to as **multi-stage cluster sampling**.
- For example, you can randomly select one province as a cluster, the select one district in that province, then a division and location. This involves 4 stages of cluster sampling.

NON-PROBABILITY (BIASED) SAMPLING

- Non-probability sampling is used when the researcher is not interested in selecting a sample that is representative of the population.

- Most of the qualitative studies use non-probability samples because the focus is on in-depth information and not making inferences or generalizations.

- Non-probability sampling include: -
a) Accidental
b) Quota
c) Judgemental/Purposive sampling
d) Maximum variation
e) Homogenous
f) Snowball
g) Convenient sampling

Accidental Sampling

- Accidental sampling involves selecting cases or subjects that are easily available. It is also called "volunteer sampling"

Purposive sampling

- Purposeful sampling is a sapling technique that allows a researcher to use cases that have the required information with respect to the objectives of the study. The subjects are hand-picked.

- It is also called judgement sampling. Subjects must be rich in information.
- The researcher must explain the criteria for the choices e.g. a certain age group, religious sect or educational level. Purposeful sampling may be used as part of multi-stage sampling.

Quota Sampling

- This technique is similar to stratified random sampling and the objective is to include various groups or quotas of the population in the study based on some criteria.

- It selects categories of study units with specific characteristics.

- The sample is purposively selected.

Snowball Sampling

- In snowball sampling, initial subjects with desired characteristics are identified using purposeful sampling technique.

- The few identified subjects name other they know have the characteristics until the researcher gets the number of cases desired.

Maximum Variation Sampling

- A maximum variation sample contains cases that are purposefully as different from each other as possible. This type of sampling is useful for examining range in large national or global programs.

- Maximum variation enables the researcher establish where characteristics of a certain phenomenon that cut across the units of observation with maximum variation.

- It takes effort to get a sample containing very varied cases.

- One is interested in a variety of attributes and traits.

Homogenous Sampling

- In homogeneous sampling, all the items in the sample are chosen because they have similar or identical traits.

- For example, people in a homogeneous sample might share the same age, location or employment.

- The selected traits are ones that are useful to a researcher.

- It is a type of purposive sampling and is the opposite of maximum variation sampling.

Extreme/Deviant Sampling

- Extreme Case Sampling focuses on participants with unique or special characteristics.

- An extreme case (or deviant case) can be thought of as an **outlier** —an observation that takes on an extremely high or extremely low value.

- The general idea is that if you study extremes of the population, it could garner some valuable insights that can be generalized to the population as a whole.

- For example, if you were studying inner city violence, you could study a city with high violence and compare it to a city with low violence.

DEVELOPING RESEARCH TOOLS AND INSTRUMENTS

- A researcher requires developing instruments and tools with which to collect the necessary data/information. The most commonly used instruments are: -
- ✓ questionnaires,
- ✓ interview schedules,
- ✓ observational forms and
- ✓ standard tests.

QUESTIONNAIRES

- Questionnaires are commonly used to collect information about a population.

- Each item in the questionnaire is developed to address a specific objective, research question or hypothesis of the study.

- It is important for the researcher to know how the information obtained from each questionnaire item will be analysed.

- Questionnaire is the heart of a survey and should be very carefully constructed.

Essentials of a good questionnaire

- Short and simple (minimum size)
- Questions proceed in a logical sequence
- Personal and intimate questions put at the end
- Avoid technical terms and vague expressions
- Questions may be dichotomous (yes or no answers), multiple choice (alternative answers listed) or open-ended

A poorly thought or constructed questionnaire may: -

- Confuse respondents as to the nature of information required

- Discourage respondents to the extent of discarding the questionnaire

- Leave out important information required in the study

Kinds of Questions

- There are two broad kinds of questions used in questionnaires

a) **structured** (close-ended) questions and

b) **unstructured** (open-ended questions).

Structured (Closed-Ended) Questions

- Closed-ended questions are questions which are accompanied by a list of all possible alternatives from which respondents select the answer that best describes their situation.

- If the list is inexhaustible include a category called "other" to take care of other responses.

- These questions then become **partially closed** questions.

Example: *Question*: What is your religion?

- Catholic
- Protestant
- Islam
- Hindu
- Others (specify) …………………………………….

Advantages

- Easier to analyse

- Easier to administer

- Economical to use in terms of time and money

Disadvantages

- Difficult to construct because categories must be well thought out

- Responses are limited and the respondent is compelled to answer questions according to the researcher's choices

Unstructured (Open-Ended) Questions

- These are questions which give the respondent complete freedom of response. The freedom allows an individual to respond in his or her own words.

Example: Question: What are the side effects of aspirin?…………………………………………………
……

Advantages

- Permit greater depth of response
- Simple to formulate
- Respondent's responses may give an insight into his/her feelings, background, hidden motivation, interests, decisions
- Stimulate a person to think about his/her feelings or motives and to express self freely on what he/she considers to be most important

Disadvantages

- Tendency to provide information which does not answer the stipulated research questions or objectives

- Responses given may be difficult to categorise and hence difficult to analyse quantitatively

- Time consuming and may put off some respondents
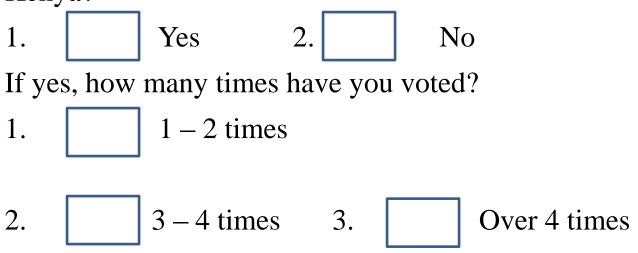
Contingency Questions

- In some cases, certain questions are applicable to certain groups of respondents.

- In such cases, follow up questions are needed to get further information from relevant subgroups only.

- These subsequent questions which are asked after the initial questions re called "**contingency questions**" or "**filter questions**".

- These questions are designed to probe for more information.

Format 1

Please put a tick (√) in the box to the right of the response

- *Question* 1: Have you ever voted in a presidential election in Kenya?

1. ☐ Yes   2. ☐ No

If yes, how many times have you voted?

1. ☐ 1 – 2 times

2. ☐ 3 – 4 times   3. ☐ Over 4 times

If no, why?

……………………………………………………………………………
……………………………………………………

Format 2

- Please put a tick (√) in the box to the right of the response

Question 2: Have you ever used condoms?

1. ☐ Yes (please Go to questions 3 – 6)

2. ☐ No (please Go directly to question 7)

Matrix Questions

- Matrix questions share the same set of response categories.

- They are common when scales (e.g. Likert type scales) are being used.

Example

About the statements below, please circle the appropriate response for each statement.

Question: How satisfied are you with your……………..

a)	Finacial status	1	2	3	4	5
b)	Education level	1	2	3	4	5
c)	Level of investment	1	2	3	4	5
d)	Ability to save	1	2	3	4	5

Key:

a) 1 -   Extremely dissatisfied

b) 2 -   Dissatisfied

c) 3 -   Neutral

d) 4 -   Satisfied

e) 5 -   Extremely satisfied

Advantages

- Questions are easier to complete and hence respondent is unlikely to be put off

- Space is used effectively

- Easy to compare responses given to different items

Disadvantages

- Misuse by researchers when other forms of questions are more preferable

- Respondents may follow or establish a pattern of responding to questions

Scales Used In Questionnaires

- Several scales are used in questionnaires and interview schedules.

- The Likert type scale is the most commonly used rating scale.

- Rating scales are used to measure perception, attitudes, values and behaviour.

- Rating scales consist of numbers and descriptions which are used to rate or rank the subjective and intangible components in research.

- The numerical scales help to minimise the subjectivity and makes it possible to use quantitative analysis.

Example

Direction: Please circle the number that best describes your feelings about pathology. The numbers represent the following responses

        1   -   Strongly disagree

        2   -   Disagree

        3   -   Neutral

        4   -   Agree

        5   -   Strongly agree

Questions

1. Pathology is a very difficult course

1   2   3   4   5

2. Pathology is the basis of understanding medicine

1   2   3   4   5

Rules for Constructing Questionnaires and Questionnaire Items

1. List all objectives that you want the questionnaire to accomplish because each item must relate to a certain objective

2. Determine how information obtained from each questionnaire item will be analysed

3. Make clear statements with precise meaning. Avoid words such as "several" or "most"

4. Define every concept used in a question to avoid misinterpretation of the question

5. Short questions are preferred to long because short items are easier to understand

6. State the items as positively as possible. Negatively stated items are usually misread by many respondents who in most cases overlook the negative word.

7. Avoid double-barrelled questions (2 separate items in one question)

8. Avoid leading or biased questions which give hints to preferred answers

9. Avoid very personal and sensitive questions as many respondents may be naturally dishonest in answering

10. Use simple words that are easily understood. Difficult words discourage many respondents

11. Avoid questions that assume facts with no evidence because they offend and discourage respondents

12. Avoid psychologically threatening questions

13. Include enough information in each item so that it is meaningful to the respondent

Order of Items in a Questionnaire

- Items in a questionnaire should be arranged in a logical sequence.

- A well organized questionnaire allows respondents to find their way around with much easy.

- Well organized questionnaires are easy to code.

1. Begin with non-threatening, interesting questions. Put sensitive and very touchy questions at the end

2.   Put important questions at the beginning to avoid being overlooked

3.   Put items in a logical sequence with related items following each other

4.   Arrange questions according to the themes being studied

5. If the questionnaire is arranged into content sub-sections, each section should be introduced with a short statement concerning its content and purpose

6. Socio-economic questions are better placed at the end

7. Each questionnaire should be given an identification number (ID)

Presentation of the Questionnaire

1. Make the questionnaire attractive using good quality paper and prints to increase the response rate

2. Organise and lay out the questionnaire so that it is easy to complete. Haphazardly organized questionnaire is irritating and time consuming and so many respondents may discard it

3. Number all pages and items to make the questionnaire easy to follow

5. Give brief but clear instructions for the items

6. Make your questionnaire short. Very long questionnaires discourage respondents. The items should be well spread out.

Administration of Questionnaires

- Questionnaires are mainly administered by three methods

a) Self-administered questionnaires

- Respondents are asked to complete the questionnaires themselves

- The questionnaires are sent to respondents through the mail or hand-delivery

b) Researcher administered questionnaire – the researcher uses the questionnaire to interview the respondents

c) Use of internet

Transmittal Letter (Cover letter)

- A letter of transmittal or cover letter accompanies every questionnaire.

- The letter must be brief but must contain an adequate brief about the research.

- A letter signed personally instead of a photocopied letter adds a personal touch that makes a lot of difference.

- It is advisable to include a stamped, addressed return envelope.

The letter should: -

a) Explain the purpose, importance and significance of the study (brief)

b) Commit to sharing of the results of the study

c) Assure of confidentiality

d) If the study is affiliated to a certain institution or organization, it is advisable to have an endorsement from such an institution or organization

e) In sensitive studies, assure the anonymity of respondents

f) Contain specific deadline date by which the completed questionnaire is to be returned. Enough time should be given to the respondents

Follow-up Techniques

- After expiry of the time allowed for sending back the questionnaires, follow up the non-respondents by sending a follow-up letter or sending a new copy of the questionnaire plus a follow up letter.

- A follow up letter should also thank all participants in the study.

PILOT STUDY

- Pilot study involves pre-testing the questionnaire. Try out the questionnaire in the field.

- The questionnaire should be pre-tested to a selected sample which is similar to the actual sample which the researcher plans to use in the study.

- Do not use subjects in the actual sample.

- Procedures used in "pre-testing" should be identical to those which will be used during the actual data collection.

- This will allow the researcher makes meaningful observations.

- Pre-test sample is between 1% and 10% depending on the sample size (the bigger the sample, the smaller the percentage).

- **Importance of Pilot Study**
  - Reveal vague questions – replace, paraphrase to convey the same meaning
  - Comments and suggestions given by respondents help improve the questionnaire
  - Reveal deficiencies in the questionnaire
  - Analysis of the few questionnaires to see if the methods of analysis are appropriate

RESPONSE RATE AND NO-RESPONDENTS

Response Rate

- Response rate is the percentage of subjects who respond to questionnaires.

- A response rate of 50% is adequate for analysis and reporting. A response rate of 60% is good and a response of 70% and over is very good.

Non-respondents

- Non-respondents are subjects who do not respond to the questionnaire.

- If 30% or more respondents fail to return questionnaires, there should be concern as this could affect the results of the study.

INTERVIEWS

- An interview is an oral administration of a questionnaire or an interview schedule. Interviews are face to face encounters and there is need to have maximum cooperation from the respondents in order to obtain accurate information.

- The researcher must therefore establish a friendly relationship with the respondents prior to conducting the interview.

Advantages

1. Provide in-depth data which is not possible to get using a questionnaire

2. It is possible to obtain data required to meet specific objectives of the study

3. Guard against confusing questions – interviewer can clarify questions helping the respondent to give relevant information

4. More flexible than questionnaires as the interviewer can adapt to the situation and get much information

5. Honest and personal interaction between interviewer and respondent allows extraction of very sensitive and personal information

6. Interviewer can clarify and elaborate the purpose of research and effectively convince respondents on the importance of the study hence the respondents give more complete and honest information

7. Get more information by using probing questions
8. Can expose the negative aspects of respondents through interaction and genuine conversation
9. Yields higher response rates because it is difficult for respondents to completely refuse to answer questions or ignore the interviewer.

Disadvantages

1. Expensive – cost of travel and accommodation
2. Misused to get factual information that could be obtained more accurately through other methods
3. Interviewing requires a high level skill
4. Interviewers need to be trained to avoid bias

5. Introduce bias – concern for human interaction and eager of respondents to please the interviewers
6. Small samples because they are time consuming
7. Responses may be influenced by the respondent's reactions the interviewer

Rules for Interviews

The interviewer: -

1. Must be pleasant
2. Must show genuine interest in getting to know respondents without appearing like spies
3. Must create good rapport
4. Should be relaxed and friendly
5. Should be very familiar

6. Should have a guide which indicates what question to be asked and in what order
7. Should interact with the respondent as an equal
8. Should pretest the interview guide before using it to check for vocabulary, language level and how well the questions will be understood

9. Should inform the respondent about the confidentiality of the information given
10. Should not ask leading questions
11. Should remain neutral in an interview situation in order to be as objective as possible

An Interview Schedule

- An interview schedule is a set of questions that the interviewer asks when interviewing.

- The schedule makes it possible to obtain data required to meet specific objectives of the study.

- It standardizes the interview situation when many interviewers are involved.

Types of interview schedules

- Structured

- Semi-structured

- Unstructured

Structured

- Has structured questions with responses and the interviewer simply checks respondent's responses

- Answers not followed up to obtain greater depth of information

Unstructured

- Also called interview guides
- Have a general plan that the interviewer follows
- Interviewer asks questions or makes comments intended to lead the respondent towards giving data
- No specific questions
- Open in nature and allows probing
- Disadvantage – time consuming (probing) and subjective because a lot of freedom is given to the interviewer

Semi-structured

- Marries the two schedules
- Most commonly used

Note Taking During Interviews

- Note taking is the method of recording the respondent's responses during an interview.

- The answers should be recorded very carefully and exactly as expressed by the respondent.

- Do not attempt to summarize, paraphrase or correct bad grammar.

- The interviewer should note the gestures and interpret the meaning e.g. to portray anger, uncertainty, embarrassment or sadness.

Advantages

- Noting of responses as the interview progresses facilitates data analysis because the information is readily accessible and already classified into appropriate categories by the interviewer.

- No information will be left out due to forgetfulness or omission

Disadvantages

- May interfere with communication between the respondent and the interviewer

- Interruptions destabilize rapport

- May upset the respondent if the answers are personal and sensitive

- If delayed, important details may be forgotten

- Makes interview lengthy and boring

Tape Recording

- Interviewer's questions and the respondent's answers are recorded on tape – audio or video. Tape recorder is more commonly used.

Advantages

- Reduces tendency for the interviewer to make unconscious selection of data in the course of the recording

- Can be played back and studied more thoroughly

- Possible to re-analyse the data in order to test objectives or hypothesis
- Any other person other than the interviewer can evaluate and categorize responses. This makes it possible to establish the reliability of the data.
- Speeds up the interview process as there is no writing involved
- Communication is not interrupted

Disadvantages

- Initial nervousness (wanes as process progresses)
- Respondents will be reluctant to give sensitive and personal information if they are being tapped
- Transcribing the tapes and then analysing the information is time-consuming and tedious

Communication during Interviews

1. Language used must ensure effective communication between the interviewer and the respondent.

2. Technical terms must be avoided when talking to lay people. Simplify or clarify all technical terms.

3. Explain the purpose of the study and if possible the purpose of each question.

- Interviewer must be honest with the respondents because any element of suspicion among respondents will lead to unhonest answers.

4. Establish rapport, put the respondent at ease and inspire confidence

5. Monitor interview situation and adjust appropriately e.g. when dealing with personal and sensitive questions

6. Avoid harsh and discriminatory words as well as negative approaches

7. Tactfully control over-enthusiastic respondents without embarrassing them

Training of Interviewers

- In order to obtain objective and reliable information it is a must to train interviewers.

- They should study the interview schedule in detail so as to familiarise themselves with interview conditions, logistics, controls, safeguards and variables.

- This will assist them conduct interviews fluently without hesitating, back tracking or re-reading the interview guide.

- Allow the interviewers to practice interviewing and receive constructive feedback until they attain the required standard to attain objectivity and reliability.

Training

1. Train interviewers in groups rather than individuals to make the training uniform and standard.

2. Trainer should explain the study, its purpose, general guidelines and procedures.

3. Go through the schedule question-by-question and critically analyse possible responses.

4. Prepare specifications (explanatory comments) on various ways of handling difficult situations during the interviews.

5. Demonstrate to interviewers how to carry out interviews properly

6. After the demonstration, interviewers should be paired for practice

7. Pre-test the interview schedules (do not use people in the actual sample)

8. During fieldwork, interviewers should check with the researchers on how they progress from time to time

9. Give interviewers enough latitude to deal with unforeseen circumstances during fieldwork

Interview Methods

- The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses.

a) Personal interviews

b) Telephone interviews

Personal Interview

- Personal interview method requires a person (interviewer) asking questions to generally have face-to-face contact with the other person or persons.

Telephone Interview

- This method involves collecting information by contacting respondents on telephone. It is a widely used method in developed states.

Advantages

- More flexible than mailing

- Faster

- Cheaper than personal interviewing

- Recall is easy – call backs are simple and economical

- Higher rate of response

- Replies can be recorded without causing embarrassment to the respondent

- Interviewer can explain requirements more easily
- Easy access to respondents
- No field staff required
- Representative and wider distribution of sample is possible

Disadvantages

- Little interview time
- Restricted to respondents with telephone facilities
- Extensive geographical coverage may be restricted by cost considerations
- Not suitable for intensive survey where comprehensive answers are desired

- Possibility of bias by the interviewer is relatively more

- Questions are short and to the point so probes are difficult to handle

Differences Between Questionnaires And Schedules

- Questionnaire is generally mailed to informants to be answered as specified in a covering letter and schedule is generally filled by the researcher or enumerators who can interpret questions when necessary.

- Data collection through questionnaires is cheap and economical

- Non-response is usually high in case of questionnaires compared to schedules

- Respondent is always known as is the case with schedules

- Schedules may have higher incidence of interviewer bias and cheating

- Questionnaire method is slow because of the process of sending the questionnaires and responses by post

- Questionnaires can only be used by literate and cooperative respondents

- Questionnaires can enable wide and more representative distribution of sample

- Questionnaires run a high risk of collecting incomplete and wrong information

- Success of the questionnaire method depends on the quality of the questionnaire itself while that of schedules depends on the honesty and competence of enumerators
- Physical appearance of questionnaire must be quite attractive to capture the attention of the respondents. This is not the case with schedules

- Observation method of data collection can be used along with schedules but not with questionnaires
- Personal contact is not possible with questionnaires but with schedules, personal contact is established with respondents

OBSERVATION METHOD

- The observation method is the most commonly used method especially in studies relating to behavioural sciences and scientific studies.

- Observation becomes a scientific tool and method of data collection for the researcher when it is systematically planned and recorded to serve the formulated research purpose.

- It must be subjected to checks and controls on validity and reliability.

- A researcher utilizes an observation **check** list to record what he/she observes during data collection.

- First, the researcher must define the behaviours to be observed and then develop a detailed list of behaviours e.g. steps in palpation of the trachea. During data collection, the researcher checks off each behaviour as it occurs.

- Some studies require Likert scales which allow the researcher to observe and evaluate that behaviour on a rating scale.

- The most commonly used scales are the Likert scales with 3 or 5 responses categories.

- This type of procedure requires a higher level of inference on the part of the observer since it involves observation and evaluation.

When using observation forms: -

- Pre-test the form

- Limit behaviours to be observed

- Control the number of subjects

- Define behaviours to be studied in sufficient details

- Where more than one observer is needed, training is necessary in order to master the observation form and standardize observation procedures

Standardized And Non-standardized Tests

Standardized Tests

- A standard test has consistency and uniform procedures for administering, scoring and interpreting the behaviour of subjects.

- Standardized tests can be norm referenced or criterion referenced tests.

- The **norm referenced tests** compare a subject's performance to that of others who have taken the same test.

- **Criterion referenced tests** describe s subject's performance without reference to performance of others but to some set criterion of performance instead of a set of norms e.g. typing – words/minute

Non- Standardized Tests

- These are tests with no established procedure of construction and process to minimise errors. E.g. classroom tests

Inclusion And Exclusion Criteria

- State why some subjects are included while other are excluded from the sample

- State how you have eliminated /reduced the chances of bias. This can be through: -

a) Random sampling

b) Use of rating scales

c) Use of check lists

d) Training of assistants

e) Excluding oneself from observation processes

Logistical Issues

- Logistics in research refers to all those processes, activities or actions a researcher must address or carry out to ensure that successful completion of the research project.

- Logistics of conducting a research fall into three categories namely: -

a) Pre-field work logistics

b) Filed work logistics

c) Post filed work logistics

Pre-field Work Logistics

- Terms of reference

- Obtain a research permit (e.g from office of the President and Ministry of Education, ethical clearence etc)

- Develop work plans – give details of dates, tasks and action people, time frame

- Train enumerators or assistants

- Pretest instrument
- Sampling
- Distribution of instruments

Field Work logistics

- Most important part of the research process
- Problems encountered
  - » Transport
  - » Enumerators may walk for long distances
  - »Climate – rain
  - »Language constraints

» Length of the instrument – may be too long leading to fatigue (researcher and respondent)

» Hostility of respondents

» Diseases – malaria prone areas

» Suspicion of strangers by residents

Post field Work

- Getting completed instruments from the field to the office

- Coding and entry of data

- Transfer of data from the instruments to the computer

- Storage of instruments

RELIABILITY AND VALIDITY

- When collecting data it is important to use tools/instruments that ensure that data yielded can be used accurately to answer the research questions.

- That is why in research it is important to maximise the **reliability** and **validity** of data collected.

- Reliability and validity are measures of "**relevance**" and "**correctness**" and only exist where data collection instruments/tools yield correct and relevant information.

Reliability

- Reliability is a ***measure of the degree to which an instrument yields consistent results*** or data after repeated trials.

- Reliability in research is influenced by **random error** which is the deviation from a true measurement.

- As the random error increases reliability decreases. If the measurement deviations are smaller, the data is more reliable.

These errors may arise form: -

- Inaccurate coding
- Ambiguous instructions to respondents/subjects
- Interviewer fatigue
- Interviewees fatigue
- Interviewer bias

Examples

- Taking blood pressure with faulty blood pressure machine

- Taking weight with a faulty scale

- Taking a patient's blood pressure repeatedly, blood pressure readings may vary due to factors such as anger, joy, anxiety

Validity

- Validity is the ***accuracy and meaningfulness of inferences which are based o***n research result.

- Validity is the degree to which results obtained from the analysis of data actually represent the phenomenon under study.

- Validity is largely determined by the presence or absence of systematic (non-random) **error**.

THE END