سنتمم معاً

الله عليكم رحمةً وبركاتً
Health Research Methodology

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What is Research?

Systematic process, scientific data;

- Collection
- Analysis &
- Interpretation

So as to find **Solutions to a problem.**
Why Is Research Important?

- Changing patterns of diseases
- Success of new approaches and interventions
- Confirmation of findings of previous researches to establish more authentic conclusions
Types of Research

On the basis of type of variable (we may study either QUALITY or QUANTITY of a variable)

- Qualitative Research
- ‘Quantitative Research’ (measureable variables)
✓ Basic Research
✓ ‘Applied Research’

✓ Experimental Research (control over variable)
✓ ‘Non-experimental Research’
Research

*Observational/Non-Experimental Research

Experimental Research

Descriptive

Analytic

Analytic

*Case study, case-series study, cross sectional study, case-control, cohort study
Steps of research
Most Important Step in a Research Project...

A Research Topic!

Select a problem to be addressed
Criteria for Selecting a Research Topic

1. Relevance
2. Interest
3. Innovation
4. Acceptability
5. Cost-effectiveness
6. Ethical consideration
Think about your topic!!
WHAT?
WHERE?
Research Methodology
Finally!! Utilization of results...

- Identifying problem, Prioritizing problems,
- Literature review
- Objectives, Hypothesis
- Research design (materials and methods)
- Work plan, estimation of resources; human and material
- Publishing article, briefing sessions

What is the problem???

What information is available??

What we want to achieve?

How we can achieve our objectives???

Project administration
Research design
(materials and methods)
Questions you should ask:

1. What new information do we need?
   - Selection of variables

2. What approach will we follow to collect this information?
   - Selection of type of study

3. What tools do we need to collect it?
   - Selection and development of data collection techniques

4. Where should we collect it?
   - Sampling

   How many subjects do we include in the study and how do we select them?

5. When and with whom will we collect the data?
   - Plan for data collection

6. What will we do with the collected data?
   - Plan for data processing and analysis

7. Are we likely harming anyone as a result of the study?
   - Ethical considerations

8. How can we determine whether our methods for data collection are correct before implementing the study?
   - Pre-testing the methodology
Study Designs

Flowchart:

1. Did investigator assign exposures?
   - Yes: Experimental study
     - Random allocation?
       - Yes: Randomised controlled trial
       - No: Non-randomised controlled trial
   - No: Observational study
     - Comparison group?
       - Yes: Analytical study
         - Direction?
           - Yes: Cohort study
           - No: Case-control study
       - No: Descriptive study
         - Exposure and outcome at the same time
           - Cross-sectional study
A sample is a sub set of the population, with all its inherent qualities. Inferences about the population can be made from the measurements taken from a sample, if the sample is truly representative of the population. Since a sample is expected to represent the whole population, the sampling procedure has to follow three fundamentals:

1. Should be representative.
2. Large enough.
3. The selected elements should have been properly approached, included and interviewed.
Sampling Techniques

- Non probability
  - Convenience
  - Judgmental
- Probability
  - Quota
  - Snowball

- Simple Random
- Systematic
- Stratified
- Cluster
Sample Size

1. Type of study.

2. Prevalence/Magnitude of the outcome of interest derived from previous studies.

3. Type of statistical analysis required (comparing means or proportions).

4. Level of significance / Power.
Data collection

Various data collection techniques can be used such as:

- Using available records
- Observation
- Interviews (face-to-face) or Focus group discussions
- Questionnaires
# Data Collection Techniques & Tools

<table>
<thead>
<tr>
<th>Data collection techniques</th>
<th>Data collection tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using available information</td>
<td>Checklist; data compilation forms</td>
</tr>
<tr>
<td>Observing</td>
<td>Eyes and other senses, pen/paper, watch, scales, microscope, etc.</td>
</tr>
<tr>
<td>Interviewing</td>
<td>Interview guide, checklist, questionnaire, tape recorder</td>
</tr>
<tr>
<td>Administering written questionnaires</td>
<td>Questionnaire</td>
</tr>
</tbody>
</table>
Data Analysis

- Microsoft Excel

- Analysis Softwares:
  - Minitab
  - SPSS (Statistical Package for Social Sciences); most popular software
Research Objectives

✓ The **OBJECTIVES** of a research project summarize what is to be achieved by the study.

✓ Objectives should be **SMART**
<table>
<thead>
<tr>
<th>SMART Score</th>
<th>Specific</th>
<th>Measurable</th>
<th>Achievable</th>
<th>Relevant</th>
<th>Time bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>No issues - Very specific scope</td>
<td>No issues – lots of good data available and can be collected quickly.</td>
<td>No issues – project scope completely within our control or influence</td>
<td>No issues – very strong business case</td>
<td>No issues – can be completed within 4 months</td>
</tr>
<tr>
<td>4</td>
<td>May be possible to reduce scope further to speed up project but only minor cause of concern</td>
<td>May be some minor delays in collecting data or data might need some cleaning but not a big case of concern</td>
<td>May be some minor elements of project outside our directly control or influence</td>
<td>Business case may not be seen as very strong by all stakeholders but Sponsor believes project is important and will have support from majority of stakeholders</td>
<td>Some minor concerns regarding potential delays that might cause project to run over 4 months but expect to complete within 6 months</td>
</tr>
<tr>
<td>3</td>
<td>Moderate concern that project is broadly scoped but it is possible to reduce scope or increase resources if necessary</td>
<td>Moderate concern regarding data availability or data integrity that may cause delays but can be managed</td>
<td>Moderate concern regarding elements of project that are dependent on others outside our control or influence</td>
<td>Business case may seem weak by some stakeholders but Sponsor is adamant that project is important and will influence others</td>
<td>Moderate concern regarding project timeline but still expect to be able to complete project within 3 months</td>
</tr>
<tr>
<td>2</td>
<td>Strong concern that project is too big and should not proceed without a reduction in scope</td>
<td>Strong concern regarding lack of data or data integrity. Project should not proceed without resolving this issue</td>
<td>Strong concern that project success relies on actions of others. Project should not proceed without getting commitments</td>
<td>Strong concern regarding the business case for this project. Project should not proceed without resolving this issue</td>
<td>Strong concern regarding project timeline taking up to 12 months. Project should not proceed without resolving this concern</td>
</tr>
<tr>
<td>1</td>
<td>Unrealistic scope—would-be a disaster. Do not proceed with project</td>
<td>Complete lack of data. Do not proceed with project</td>
<td>Completely dependent on actions of others. Do not proceed with project</td>
<td>Very weak business case for this project. Even Sponsor does not appear interested. Find another project</td>
<td>Completely unrealistic. Do not expect this project to be completed within 12 months. Do not proceed with project</td>
</tr>
</tbody>
</table>
Why Should Research Objectives Be Developed?

The formulation of objectives will help you to:

- **Focus** the study (narrowing it down to essentials);

- **Avoid** the collection of data which are not strictly necessary for understanding and solving the problem you have identified; and

- **Organize** the study in clearly defined parts or phases.
How to State Objectives

Using proper action verbs like:

✓ To determine,
✓ To compare,
✓ To identify,
✓ To calculate etc.

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

✓ To find the level of awareness possessed by general public about prevention of dengue.
✓ To determine the frequency of anemia in pregnant women visiting Teaching hospitals of Rawalpindi district.
✓ To compare demographic characteristics and clinical spectrum of patients admitted with suspected dengue fever at allied hospitals of RMC.
Operational Definition

Is the definition of the exposure and outcome variables of interest in context to objective in a particular study and their means of measurement/determination e.g.

Level of awareness
Anemia
Demographic characteristics, clinical spectrum
e.g. Misconception about polio vaccine: different objectives

1. To determine the frequency of misconceptions about polio vaccine in people living in Rawalpindi. (quantitative)
2. To determine the types of misconceptions about polio vaccine in people living in Rawalpindi. (qualitative)
3. To determine the frequency of different types of misconceptions about polio vaccine in people living in Rawalpindi. (quantitative)
Variables

1. Frequency of misconceptions
2. Types of misconceptions
3. Frequency of different types of misconceptions
1. OPERATIONAL DEFINITION:

Frequency of Misconception:
In this study a view of a person about polio vaccine will be stated as misconception if it declares polio vaccine as of no benefit or a source of harm to person of any form. Frequency of misconception will be measured by asking people what they think about polio vaccine. If they say its of no use or is harmful, they will be counted among those who have a misconception.
2. OPERATIONAL DEFINITION:

Types of Misconception:
In this study a view of a person about polio vaccine will be stated as misconception if it declares polio vaccine as of no benefit or a source of harm to person of any form. Misconception is measured by questioning the people about their views on polio vaccine. Misconceptions are of different types, which can be known only after detailed interview with people. Different views of people will be recorded and presented in results.
3. OPERATIONAL DEFINITIONS:

**FREQUENCY OF DIFFERENT MISCONCEPTIONS:**

In this study a view of a person about polio vaccine will be stated as misconception if it declares polio vaccine as of no benefit or a source of harm to person which may be medical, social or religious. Misconception is measured by questioning the people about their views on polio vaccine.

Misconceptions are different, frequency of each will be measured; they can be:

- **Frequency of misconception that Vaccine is unnecessary:** In this study if a person declares that vaccine is of no medical benefit to person vaccine is considered unnecessary and measured by intrv. the person.

- **Frequency of misconception that Vaccine is ‘haraam’:** In this study if a person declares that vaccine is containing ingredients that are not halal or religiously not allowed in Islam it will be stated as haraam and measured by questioning the person.

- **Frequency of misconception that Vaccine is a conspiracy of Non-muslims against muslims:** In this study if a person declares that vaccine is made by non-muslims in western countries and they specially add some ingredients to decrease the ability of muslims to reproduce to decrease the muslim population and measured by questioning the person.

- **Frequency of misconception that Vaccine is a conspiracy of government to dec. population:** In this study if a person declares that vaccine has been added with some ingredients by government, which decrease the ability of people to reproduce to stop the population explosion and measured by questioning the person.

- **Frequency of misconception that Vaccine is harmful:** In this study if a person declares that a vaccine has side effects like fever, bloating, or can develop poliomyelitis and measured by questioning the person.
Purposeful and systematic review of information available on the topic of research, through searching articles by researchers or organizations, or information from books etc.
Why Literature Search Is Done?

- To understand your data in the context of what is already known.
- To learn more about some topic.
- To keep up with the latest developments in the topic of interest.
- To document important facts and ideas you wish to research in light of previous work done on it.
- To provide your readers with sources they can consult on their own.
Searching Sources

- Journal articles
- Research organizations
- Conference proceedings
- Database search
- PMRC directory
- Corresponding author
Database Search

   Patterns of p53 mutations separate ovarian serous borderline tumors and low-grade carcinomas and provide support for a new model of ovarian carcinogenesis: a molecular analysis with immunohistochemical correlation.
   PMID: 15644779 [PubMed - indexed for MEDLINE]

2. Singer G, Kurman RJ, McMaster MT, Shih IeM.
   HLA-G immunoreactivity is specific for intermediate trophoblast in gestational trophoblastic disease and can serve as a useful marker in differential diagnosis.
   PMID: 12131159 [PubMed - indexed for MEDLINE]
Writing of literature review

• Introduction:
  • Understanding of problem
  • Magnitude of problem
  • International, national and local studies available (mention if not available)
  • Rationale of study

• Discussion:
  • Comparison of your results with other studies (local, national, international); tell how your results fit into the existing body of knowledge.
INTRODUCTION:

Pakistan is one of the three countries of the world that are left with endemicity of polio. Where WHO has been struggling to eradicate polio, its incidence is on a rise in Pakistan.\(^2\) Progress towards polio eradication had been remarkable in Pakistan in the last decade, reporting only about 1 to 13% of total world’s cases till 2010. In the last 2 years this percentage has increased to 26 to 30%\(^2\), even transmitting some cases to previously polio free country, China\(^3\). This resurgence of polio can be reasoned by problems with preventive measures that is the coverage of immunization with polio vaccine. According to WHO estimates, vaccine coverage has been decreasing in the last 3 to 4 years, down from 83% in 2007 to 75% in 2011, despite the exaggerated efforts through ongoing campaigns run by public health agents\(^4\). Areas specially reporting decreased coverage are Federally Administered Tribal Areas (FATA), Balochistan, and Khyber Pakhtunkhwa in Pakistan\(^5\).

Lack of coverage, as evaluated in a study done in Karachi, owes partly to lack of access to vaccine (22%) and majorly to refusal by parents (74%). Reasons given for refusal were based on misconceptions and distrust of government-run programmes, some considered it unnecessary (7%) and some harmful (58%), some unallowed by elders (40%). Most thought it caused sterility in adulthood, it is a conspiracy against Muslim nations by Western countries to decrease their population, vaccine could contain religiously forbidden “non-halal” ingredients, Majority refusing was from high income areas of Karachi or low income Pashtuns\(^6\). These unfortunate notions are spreading especially in conflict-ridden areas, illiterate community and those under influence of “talibanization”\(^7\).
This accounts for prevailing mistrust in government run campaigns and has promoted negative perceptions about polio vaccine campaigns\textsuperscript{6}. Even to our surprise, some of the killing attacks were focused on people working on polio vaccination campaign had been reported in 2012 in several locations in Pakistan. Such attacks deprived Pakistan’s most vulnerable populations – especially children – of basic life-saving health interventions\textsuperscript{8}.

This study has been designed in the wake of spreading prejudice against polio vaccine. There are no studies yet done on the details about the frequency of myths about polio vaccine in the region of Rawalpindi. This study will be focusing on the details of myths frequency, so that appropriate health education specifically designed to address those myths can be done by the public health authorities.
MATERIALS AND METHODS:

STUDY DESIGN: This is a descriptive study. Cross sectional study

SETTING: This study will be conducted in Rawalpindi

DURATION OF STUDY: 2 weeks.

SAMPLE SIZE: In this study sample size has been calculated using sample size calculator for proportion. Keeping in view absolute precision required as 0.03, anticipated population proportion for the misconception that vaccine is unnecessary as 7%, level of significance as 5%, sample size came out to be 278.

SAMPLING TECHNIQUE:
Persons for questioning will be selected by using the method of probability stratified sampling. Rawalpindi regions will be divided into strata and from every stratum persons will be included in sample by convenience sampling method.

SAMPLE SELECTION: Persons will be included in sample if they are residents of suburban areas of Rawalpindi. Only those residents will be included in sample if they have 1 or more alive children. They are included because they are the population affecting polio. Those residents will not be included whose 1 or more children suffered from Poliomyelitis even being vaccinated to avoid bias in study because their view about vaccine will be based on the observation of an unusual event that may occur in case of live polio vaccine which in immune-compromised children may cause symptoms.
DATA COLLECTION PROCEDURE:
Source of data that is persons fulfilling inclusion criteria will be approached by going in each strata of Rawalpindi that is by house hold survey. Data will be conducted by giving questionnaires with open ended questions to persons fulfilling inclusion criteria to avoid bias and they will fill it if they can read and write. If they can’t read and write, questionnaires will be filled by researcher after asking questions. Study will be done after approval by my supervisor. Confidentiality of information given by a person will be maintained and data will be collected after taking verbal consent from person. Due respect will be given to them.

To avoid confounding factor of illiteracy affecting spread of illogical myths, stratification will be done during analysis of results. Data will be divided in two groups illiterate parents and literate parents and frequency will be calculated separately.

For detail questionnaire has been given in annexure.

DATA ANALYSIS PROCEDURE:
Data will be entered and analyzed by SPSS VERSION 17. Mean and s.dev will be calculated for age, frequency of each gender, socioeconomic status, literacy .frequency of myths and proportion of each type of myth will be calculated and data will be presented in form of tables and charts.
QUESTIONNAIRE

- Close ended
- Open ended
- Structured
- Semi-structured
- Non-structured
1. In paragraph 1 the writers use the words ‘you’, ‘we’ and ‘our’. Suggest a reason for this.

2. In paragraph 3 the writers say that Anglo-Saxons ‘were not people we should patronise’. What do you think he means by this?

3. Paragraphs 4 and 5 begin in a very similar way. Suggest a reason why the writers chose to begin these paragraphs in this way.

4. Why does the writer make repeated references to the year 1000?
Designing Questionnaire

- Attractive and easy for the respondents to fill, overcrowding or clutter should be avoided and all questions and pages clearly numbered
- The questionnaire should not be too long
- To maintain flow of the instrument, questions concerning major areas should be grouped together
- Simple questions about age, birth date etc should be put at the beginning to warm up the respondent
Questions should be close ended, possible answers to close ended questions should be lined vertically, preceded by boxes, brackets or numbers.

Example
How many cigarettes do you smoke daily (check one)
[ ] None
[ ] 1-2
[ ] 3-4
[ ] 5-6
[ ] 7 or more
**Skip or contingency questions:**

- Contingency question is 2 or more than 2 parts question.
- If more details are required pertaining to a question, then filter/skip technique should be used to save time and allow respondents to avoid irrelevant questions.
- Example:

  Have you ever been told that you have hypertension?
  [ ] Yes
  [ ] No

- If yes, how long back were you told that you have hypertension?
Writing References

- VANCOUVER STYLE

- Author name. Topic name. journal indexed name. year of publishing; volume number (issue number):page number.

- All authors should be listed, if there are six or less.

- If more than six authors, List the first six authors followed by et al.
EXAMPLE OF VANCOUVER STYLE:

At the end of this lecture you should be able to tell:

- Sampling
- Literature review
- Data collection techniques and tools
- Variable
- Steps of research
- Criteria for topic selection
- Objective
- Types of study
What is this type of study??? Find their variables..

1. Drug company has new drug, wishes to compare it with current standard treatment

2. Pediatrics department wants to see what parents know about thalassemia

3. A report on clinical presentation of First Ebola case in UK

4. New cases of MERS in Middle East being studied epidemiologically

5. How many smokers will develop lung cancer as compared to non-smokers??

6. How many lung CA patients were smokers in past and how many were non-smokers
THANK YOU FOR NOT DOING RESEARCH THAT HAS ALREADY BEEN DONE