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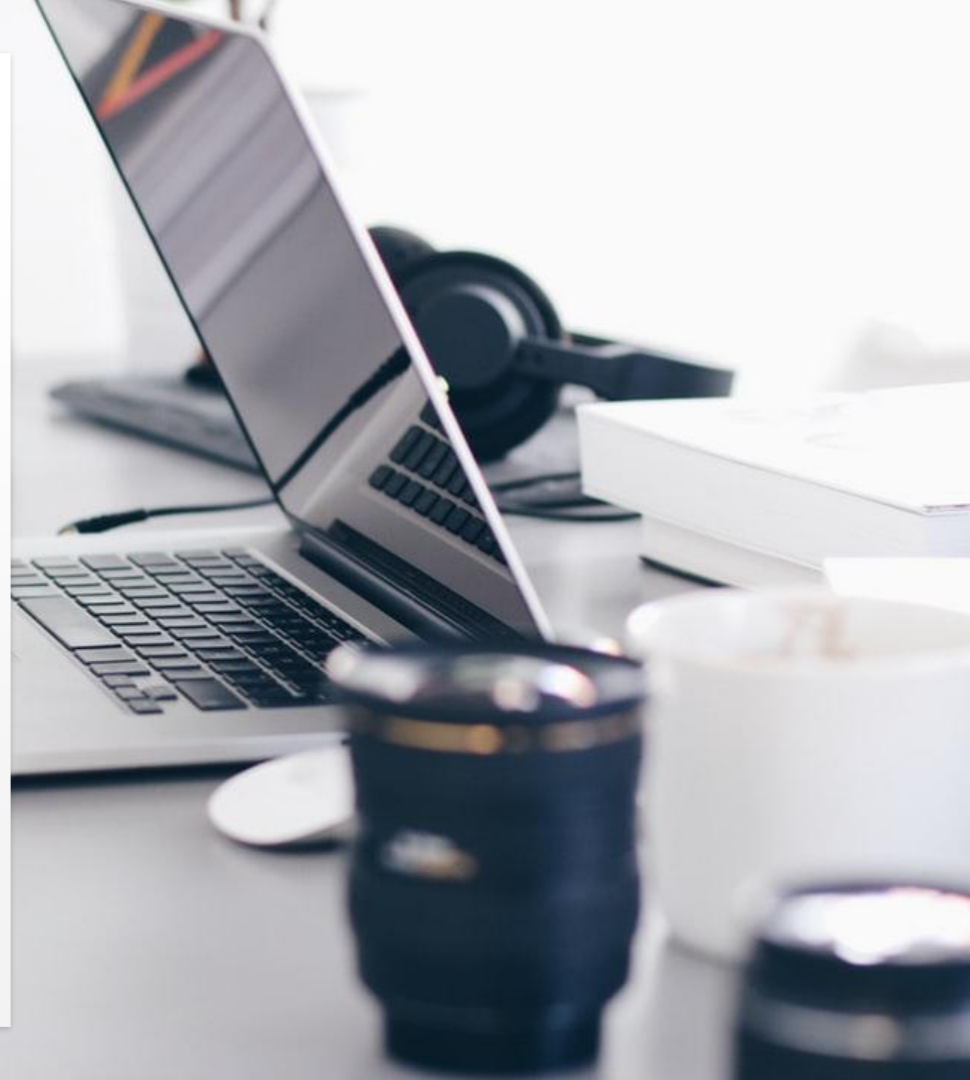
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bismillahi rahmani rahim

National university Sudan  
Faculty of Medical Laboratory Sciences  
Introduction to Research – MLS – RESH -326

# *How to Design Research Question*

Lecture {16}  
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# Objectives

- Introduction.
- Research question .
- What is hypothesis.
- Types of hypothesis.
- Asking clinical question.
  - Types of question.
  - Components of question.
- Importance of RQ.
- Characteristics of good Q



# *Introduction*

- Before researcher can begin to think about how they will go about collecting data for their research study they need to frame a research question and, if appropriate, formulate a hypothesis(es).
- If the research question is not carefully worked out in advance then the wrong kinds of data may be collected.

# *Introduction*

- Posing a research question sets the framework for the whole project, giving it direction and coherence.
- Allow plenty of discussion time when researcher can play around with ideas and discover what is at the heart of what they want to find out.
- This is what is called a ‘funnelling-down’ process and starts with a student's general interest in a particular topic and gradually reduces down by stages to the core of a question.

# *Research question*

- It is the question that we are trying to answer when we do research on a topic.
- More than one research question can be framed on a topic.



# Research question

- The research question can be of different levels:
  - **Descriptive RQ** : seeks description of a phenomenon. It usually covers only one variable.
    - Example:
      1. What is the prevalence of scabies in primary children in South Sudan ?

# Research question

- **Inferential RQ:** aims at drawing inference from a sample of population.
- It involves a min. of two variables- dependent and independent.
- Example:
  1. What is the relationship between socioeconomic status and occurrence of scabies among the students of primary school in South Sudan ?
  2. Is drug A is better than drug B for treating scabies in children?



# *What is hypothesis*

- It is a statement that makes **a prediction** about the result of an experiment.
- **A hypothesis** is very specific and it is based on previous empirical research. Hypothesis is used in quantitative research.

# *Types of hypothesis*

- Hypothesis may be **inductive or deductive** as to how they are derived
- It may be directional or null hypothesis as to how they are stated.
- **The inductive hypothesis** is based on generalization based on specific observations.
  - e.g. less or more anxiety of students in different test types.
  - In contrast **deductive hypothesis** is derived from theory i.e. supports, expands or contradicts the theory



*Asking clinical question  
(PICO format)*

# *Type of clinical question*

## **1. Background questions**

- Ask for general knowledge about a condition or thing.
- Root (what, who, where, when, how. . . )
- Disorder, test, treatment or other aspect of health care.
- Mode of action of drug, mode of action of procedure.

# *Type of clinical question*

## 2. Foreground question

- Ask for specific knowledge to inform clinical decisions or actions
- Examples: Therapy, Prevention, Diagnosis, Prognosis.
- Have four essential components (PICO):
  1. Patient and/or problem (P)
  2. Intervention (or exposure) (I)
  3. Comparison, if relevant. (C)
  4. Clinical Outcomes, including time if relevant. (O)

# Components of clinical question

- **P** patient or problem : can be only one patients or group with a particular condition or health problem.
- **I** Intervention (or exposure) : represent the intervention of interest which can be therapeutic, prevention (vaccine), diagnostic (HB estimation), prognostic, administrative or related to economic issue .



# *Components of clinical question*

- **C** Comparison : define as standard intervention the most used intervention or no intervention.
- **O** Outcome : Expected result .



# *Importance of research question*

- Research questions are said to breath life into the research
- It is like aims of a lesson.
- It suggests that researcher has a workable way to proceed further.
- Research Question has a direct relation with data collection strategies.



# *Importance of research question*

- Focus our learning time on evidence that is relevant to our patients' clinical needs, knowledge needs .
- The Research Questions must be specific and narrow.

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## Example

- In sickle cell anaemia patients, (P) does the blood transfusion (I) compared with supportive treatment (C) reduce the complications of anaemia (O) ?

# *Framing a RQ/Hypothesis*

Choose an interesting broad topic



Do some preliminary research on your general topic



Narrow the topic that suits your



Frame an appropriate RQ / Hypothesis



Check for PICO Elements



Test for goodness: novelty, relevance, clear, ethical. Interesting, feasible, appropriately complex

# Characteristics OF A good RQ

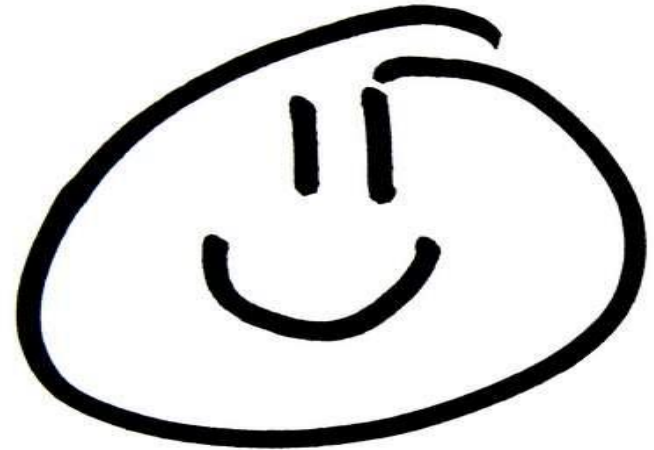
- **FINER** Criteria for a Good Research Question

- **Feasible**

- Adequate number of subjects
- Adequate technical expertise
- Affordable in time and money
- Manageable in scope

- **Interesting**

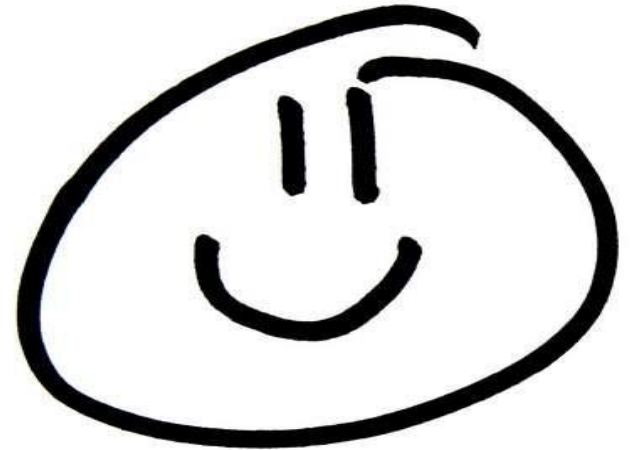
- Interesting enough to engage student, supervisor & research community.



# Characteristics OF A good RQ

## Clear

- Well defined
- focused
- **Appropriately complex**
- Neither very ambitious nor very simple
- Well suited to caliber of student & supervisor
- **Often start with**..... How? Which? Why?



# Characteristics OF A good RQ

## Novel

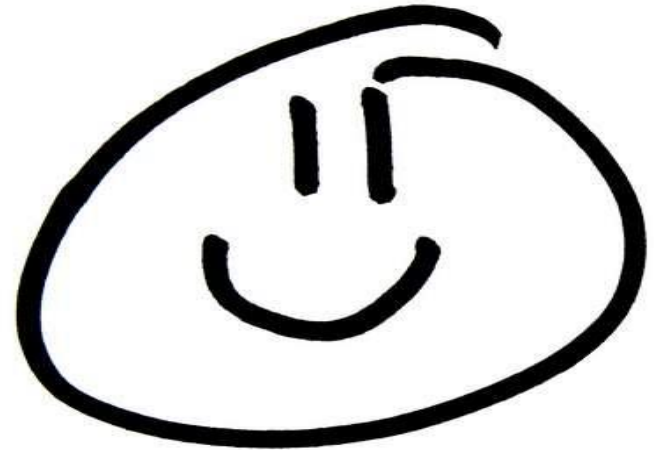
- Addresses a defined gap in knowledge

## Ethical

- Acceptable to study population,
- No potential harm to them

## Relevant

- To scientific knowledge.
- To clinical and health policy.
- To future research.







Thanks