

RESEARCH QUESTION

**Dr K T Shenoy
Dept. Gastroenterology,
Medical College Hospital,
Trivandrum**

The Research Question

The research question is the uncertainty about something in the population /study sample that the investigator wants to resolve by making measurements on his study subjects

CRITERIA FOR A GOOD RESEARCH QUESTION

- Feasible
- Interesting to the investigator
- Novel

Confirms or refutes previous findings

Extends previous findings

Provides new findings

- Ethical
- Relevant

To scientific knowledge

To clinical and health policy

To future research directions

FINER

Feasible

Adequate number of subjects

Adequate technical experience

Affordable in time and money

Manageable in scope

The research question and study plan

Problems and solutions

Potential problem

Vague or inappropriate

Solutions

Write the research.
question at an early
stage

Get specific in the 1 page

- how the subjects will be sampled
- how the variables will be measured

Problems and solutions

- Not feasible
- Too broad
- Not enough subjects
- Specify a smaller set of variables
- Narrow the question
- Expand the inclusion criteria available
- Eliminate exclusion criteria
- Add other sources of subjects
- Lengthen the time frame for entry

Methods inadequate or
beyond the skills

Consult experts and review
literature for alternative
methods

Learn the skills

Collaborate with colleagues
who have the skills

Too expensive

Consider less costly study
designs and measurement
methods

Not relevant or novel

Modify the research question

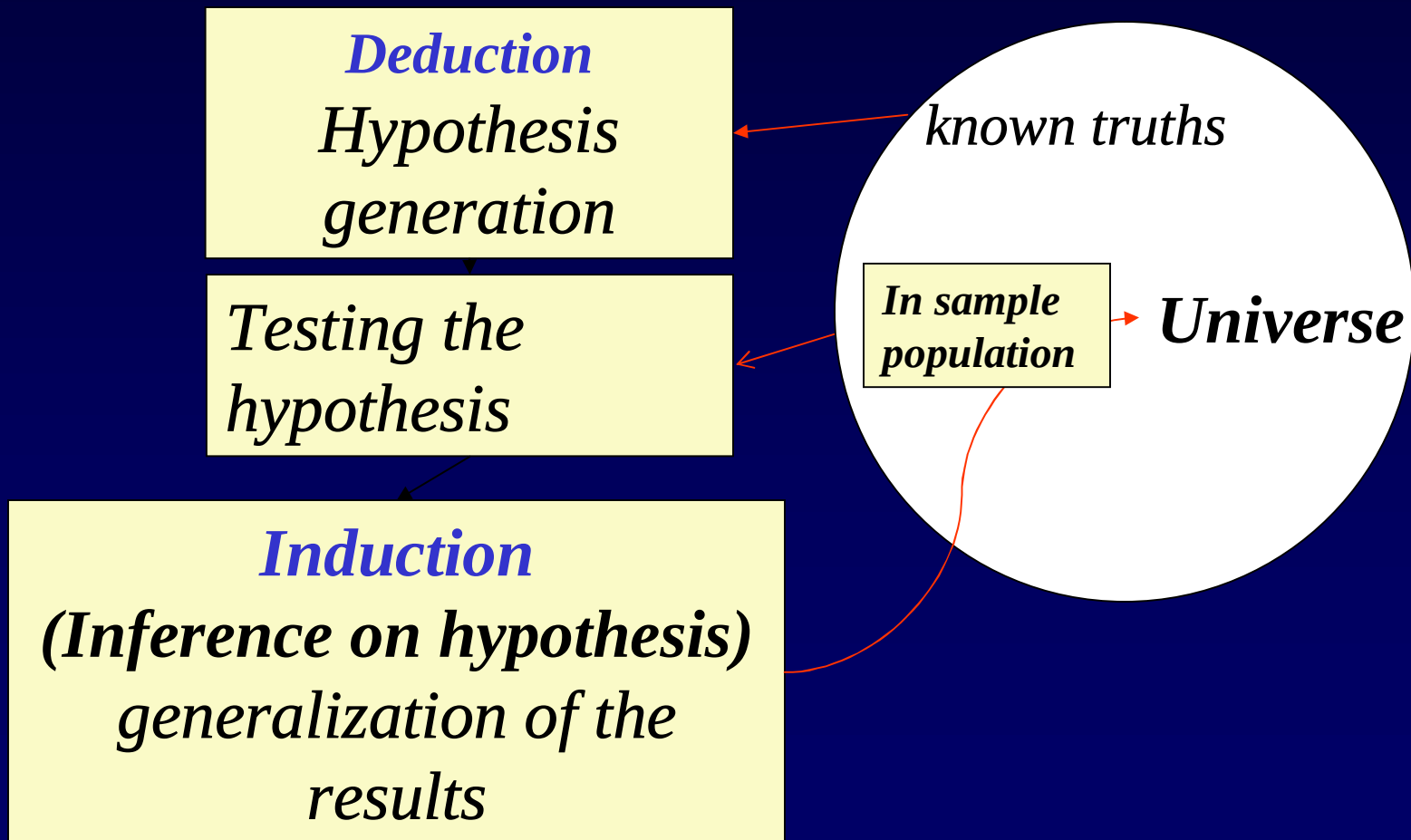
Uncertain ethical

Consult with institutional
review board

Modify the research question

Formulating a Research Question

is an integrated approach of deduction and induction



Steps in conduct of research

**Designing
Planning
Execution**

The first and foremost is
formulating a research question,
the most challenging part

Why Research question?

*to communicate &
convince*

*the need and nature of
the study*

*in a simple but single
sentence*

- Scientific community
- Health professionals
- Funding agency
- Journal editors
- Administrators, health policy makers
- Lay public
- Ethical committee

Essential components of RQ

- Define population under the study
- Outcome variable clearly stated
- Clarity on the study design

Choosing a topic

- *Should be interesting – to investigator, funding agency, journal editors, consumers (colleagues, public, medical community), etc.*
- *Relevance- add new information to the scientific world*
- *Simple and manageable in scope (feasibility in terms of money, time, manpower)*
- *Expected results likely to alter clinical or health policy decisions in future*
- *New interventions chosen for trial should have some supportive evidence to its superiority over the conventional treatment in one way or other*

Steps in formulating research question

- 1. Choose a topic**
- 2. Literature review**
- 3. Conceive the conceptual hypothesis (broad idea)**
- 4. Identify the specific objective of the study**
- 5. Decide the study population & setting**
- 6. Consider the feasibility (time, resources)**
- 7. Decide on the study design & methodology**

Availability of resources (funding)

Infrastructure

Technical expertise (subject expert, methodological expert & statistical expert)

No extra stress to the patients or existing system (in terms of money, manpower or other resources)

No Ethical violation

Feasibility- Study subjects

- *What is the estimated sample size?*
- *Who is the study subject (case definition)?*
- *Selection criteria (inclusion & exclusion)*
- *How they are sampled ? (sampling)*
- *Time span for meeting the sample size*

Can we meet the sample size?

- *Extend of the problem in target population*
- *Knowledge of biological behavior of disease & study subjects*
- *Pilot study required ?*

Research Designs

<i>Purpose</i>	Study Design
<i>To determine frequency & burden of a disease</i>	* Cross sectional survey (Prevalence) * Cohort study
<i>To identify the risk factors</i>	* Cohort study * Case-Control study
To determine prognosis of a disease	* Cohort study
<i>To determine efficacy/ effectiveness of new treatment</i>	* Clinical trials * Community intervention
<i>To evaluate community programmes</i>	* Evaluation

Fully refined RQ

- *The fully refined research question should indicate the **objective** of the study,*
- *specify the major **outcome and predictive variables***
- *the **setting** and the intended study **subjects**.*
- *The **implied biological rationale** and **study design** should be explicit in the research question.*

Fully refined Research Question

“Do beta-carotenoids protect against human cancer?”

Is the risk of developing lung cancer low among cohorts with high beta-carotenoid dietary intake, compared to cohorts with low beta-carotenoid dietary intake among male smokers residing in Trivandrum District?

Cohort Study

Refining Research Question

Fully refined Research Questions

- *Is there an association between serum retinoic acid level and development of lung cancer among male smokers residing in Trivandrum District? - A case-control study*
- *Does administration of beta-carotenoid (specify dose, route and duration) reduce the risk of developing lung cancer among male smokers residing in Trivandrum District? – A randomized placebo controlled trial.*

RQ- Check List

If the answer to any of the questions is

‘NO’

it needs further modification

Repeat the process till all questions yield

“YES”

RQ- Check List

1	<i>Does your question reflect a sound rationale?</i>	<i>Yes/No</i>
2	<i>Does your question specify the study population ?</i>	<i>Yes/No</i>
3	<i>Does your question refer to the exposure variable?</i>	<i>Yes/No</i>
4	<i>Does the question reflect the outcome of interest?</i>	<i>Yes/No</i>
5	<i>Does your question specify the nature of comparisons to be made?</i>	<i>Yes/No</i>
6	<i>Does your question provide sufficient information to suggest the study design?</i>	<i>Yes/No</i>
7	<i>Is your study relevant?</i>	<i>Yes/No</i>
8	<i>Is your study feasible?</i>	<i>Yes/No</i>
9	<i>Is your study ethical?</i>	<i>Yes/No</i>