

# **How to write research proposal**

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# Objectives

- Definition of Research
- Definition of research proposal
- Variants of Research
- Elements of Research proposal
- Details of each elements
- Format of research proposal
- Take home message

# Research

- Research is a scientific, systematic & ethical search for new knowledge about the unknown in an attempt to find answer to a question & to solve a problem
- Research is **scientific** because it is evidence based
- **Systematic** because there is definite set of procedures and steps which are to follow from beginning to end
- Research is **organised** because it is a planned & structured procedure
- Research is **ethical** because it ensures justice, rights & no harm

# Purpose of research

- Discover new facts
- Verify and test old facts
- Fresh interpretation of known facts
- Solution of problem
- Explanation of mechanism
- Development of tools/concept/theory

# What is research proposal

- A research proposal is an detailed plan by the researcher to conduct a specific scientific study & review the steps of research
- It outlines the objectives, methodology, and expected outcome of a research
- By following a well crafted research proposal researcher can ensure that their study is conducted in a scientific and ethical manner, while producing valid and reliable data
- A Research proposal is a document describing the objectives, design, methodology, statistical considerations and organising of a research project that also covers how the integrity of the data will be ensured ( Fraser sherman)

# Variants of proposal

Proposal for basic research—

Done for academic degree ( MS, FCPS,MD, PhD,)

- It contain one investigator and usually one guide

Proposal for professional researcher or a group of researcher

- It uses funds to generate new information
- It includes one principal investigator and several co investigators

# Aims of research proposal

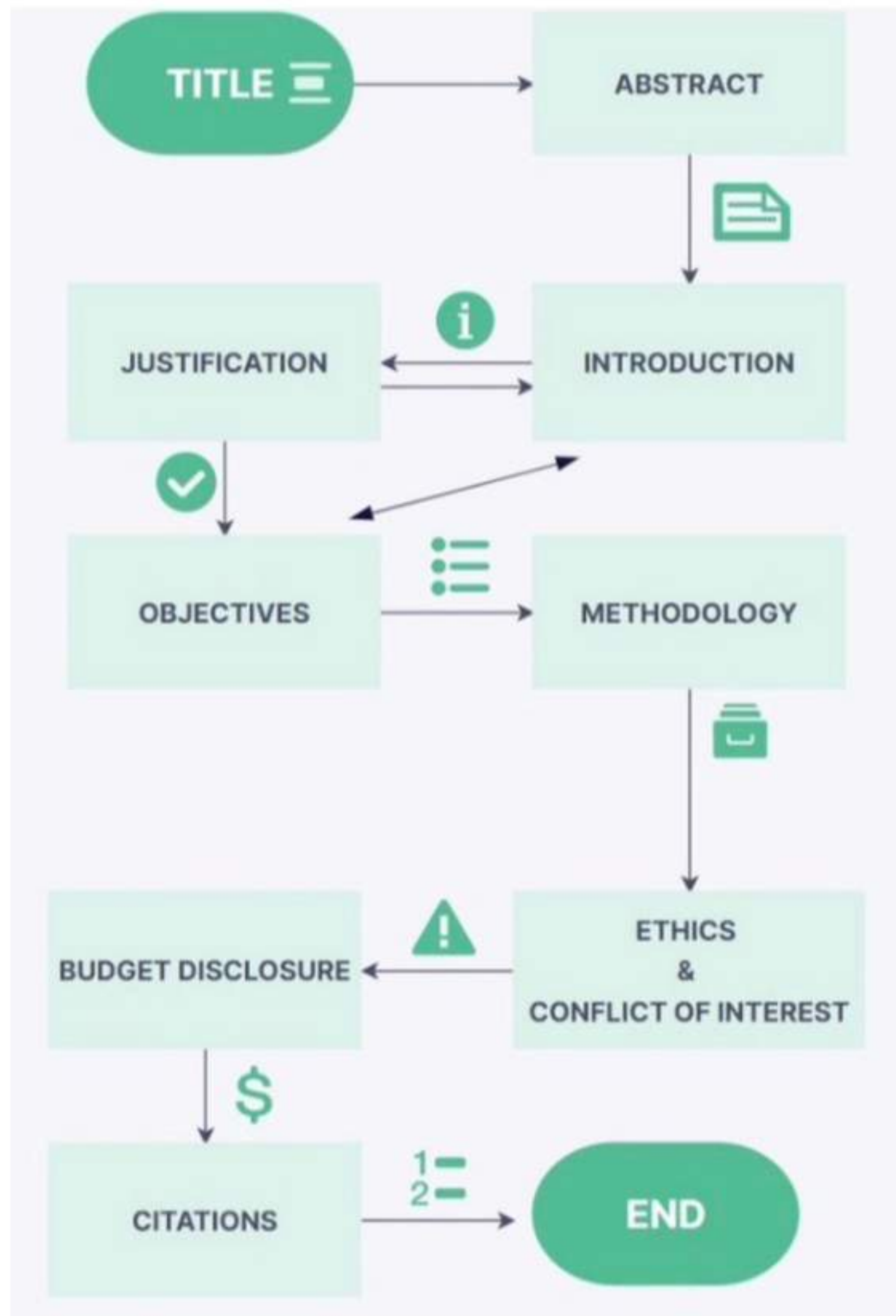
- A research proposal should outline the rationale for the study, the objectives, the methodology and explain the data management and analysis process
- To raise the question to be researched and clarify its importance
- To collect knowledge on previous work by reviewing the literatures
- To formulate a research hypothesis and state the objectives
- To clarify ethical issue
- To discuss the limitations

# Why proposal is a written document

- It is a prerequisite to submit to obtain a degree ( MS, FCPS)
- It forces the investigators to clarify their thoughts and to think about all aspects of the study
- It is a necessary guide if a team is working
- Is essential to get the institutions ethical approval if the study involves research on human subjects or on experimental animals
- Is essential to submit for funding

# Elements of A Research Proposal

- Title
- Investigators detail information
- Abstract or summary
- Background or introduction
- Objectives
- Literature review
- Rationale/ justification/significance
- Research question or hypothesis
- Variables conceptual framework
- Methodology
- Utilisation of results
- Facilities
- Limitations
- Ethical issue
- Budget reference
- Time frame
- Annexure



**Fig. 1** Schematic representation of the critical components of a successful research protocol

# Proposal title

- Title should be descriptive and concise
- There should be no abbreviation
- The optimal length recommended by most journal is between 8 and 15 words
- It must be specific
- Consistent
- Precise
- Directional

# Criteria of a standard research topic

- Relevance—should be a priority problem
- Avoidance of duplication
- Feasibility -in prospect to personnel, time, equipment, money
- Political acceptability
- Applicability
- Urgency of data needed
- Ethical acceptability-( confidentiality, justice, consent)

# Particulars of the investigator

- Academic and contact details of the investigators
- Institutional details

# Abstract or summary

- Summary should be concise
- Sufficient to orient the reader enough to the main purpose of study
- It should includes the justification of doing such research, methods how the result would be obtained
- It should includes how the result may be beneficial for the community and policy makers
- It should summarize all the elements of protocol
- It is placed before the proposal but often written after the proposal

# Introduction or Background

- Background of the study refers to the clear statement of the problem
- The problem of the research should be stated sequentially and logically with authentic reference in this section
- It describes in briefly with references of previous studies and mention the knowledge gap which is identified
- Mention that present research can minimize the gap
- It also contains the specific Aims and objectives of the study
- A brief discussion of the research procedure is stated here
- Mentions the utility and implications of the study findings

# Introduction

- All statements should be in present tense
- All statements should be with reference of previous studies
- No statement should be written in such a way that it indicates one's own opinion

# Example

- “ The reported prevalence of UTI varies from 14%-25% among symptomatic patients attended different hospital of Dhaka city of Bangladesh (Choudhury et al., 2010; Rahman and Islam, 2012; Khan et al., 2011) ” .

# Objectives

- Objectives are goals to be achieved through the Research process
- It address the purpose of the investigation and types of knowledge to be gathered

- **Example**

- 1. To determine the relationship between obesity or hypertension*
- 2. Evaluation of the relationship between obesity and hypertension*

*The result would be compared to the objectives when the study is evaluated*

- **General objective**

It is the final goal of research( e.g. To assess the relationship of obesity with hypertension)

- **Specific objective**

Statement of the research questions to fulfil the general objective

# Example

- **General objective**

To develop a vaccine against salmonella paratyphoid

- **Specific objectives**

1. To isolate salmonella paratyphoid a from blood of patients
2. To immunise animal with subunit of salmonella paratyphoid A
3. To detect protective antibody against salmonella paratyphoid A

*Objective should be **Specific, Measurable, Achievable Actionable ,Reliable and time bound ( SMAART)***

# Example

- **Problem** ;study of anemia in pregnancy
- **Research question;** what is the effect of pregnancy on maternal Hb concentration?
- **Hypothesis;** maternal Hb concentration falls during pregnancy
- **General objective;** To study the changes in maternal hb concentration with duration in pregnancy

**Specific objective;** To determine the duration of pregnancy

To determine the parity

To determine the Hb concentration

- **Ultimate objective** enhance understanding the effect of pregnancy on Hb concentration of mothers and there by guide the physician to correct iron therapy in pregnancy in different trimester

# Literature review

- A systematic review and critical assessment of the published work or articles of a research study
- There is knowledge building about the research problem by review literature
- Literature reviews enable researchers to assess the quality of existing research and identify the gaps in knowledge
- Identify the unanswered question applicable to the research problem
- It is the all out attempt on the part of a researcher to obtain in depth knowledge and insights about the search problem to define and analyse the problem clearly

# Importance of Literature Review

- Find and avoid repetition of work already done
- Discover fallacies, inconsistencies, strength and weakness of other study
- Identify the unanswered questions and gaps
- Find probable difficulties and analytical short coming with their remedial measures
- Develop specific research question, hypothesis & objectives

# Example

- Problem-why mothers do not breast feed their infants for 2 years
- Past observation and preliminary reading states that
- Hypothesis “ Insufficiency of breast milk is the most common reason for failure on the part of mothers to breastfeed infant for full 2 years”
- Many causes can be found as –proper positioning
- Poor attachment
- Maternal behaviour
- Social factors

# Example

1. From the available data find out the information which is lacking in existing knowledge about the topic( knowledge gap)
2. Create question in yr mind about knowledge gap( research question)
3. Assume the probable answer
4. Finally try to find out the answer of the question by planning and doing research

# Example

- Topic select-SARS covid 19 infection in pregnancy
- Literature review of the articles published in journals and news letters
- Many questions arise
  1. How the virus can be affected
  2. What are the clinical features
  3. Which trimester is mostly affected
  4. What are the effects on mother
  5. Is there any congenital effects on foetus
  6. What is the method of termination

# Example

- Create question in your mind about the knowledge gap
- Plan a research to get the answer systemically of the selected unanswered question
- Plan a protocol
- Then collect the information ( data collection)
- Data analysis
- Write the research from methodology, results,
- Draw conclusion

# Rationale or justification

- It establish the problem under study by comparing existing facts, findings and statistics
- Justify the indication of the study with a logical explanation of the implications of the study finding
- This section answer the question of why the research needs to be done and what its relevance is.

# Research question or hypothesis

- Research question is the reflection of the problem under study
- It leads to the formulation of hypothesis
- It is the foundation of a research process
- A good research question is essential to guide a protocol
- A research question is an answerable inquiry into a specific issue
- Research question has more than one probable answers
- It should be
  1. Clear
  2. Focused
  3. Concise
  4. Arguable

# Hypothesis

- These are logical assumed answer to the research question under exploration
- It is a theory which is yet to be established
- Hypothesis are used for analytic study
- Research proposal mainly focus on research hypothesis
- In many biomedical research there should be a new idea and based on new idea there is a hypothesis
- A theory that is established is not a hypothesis

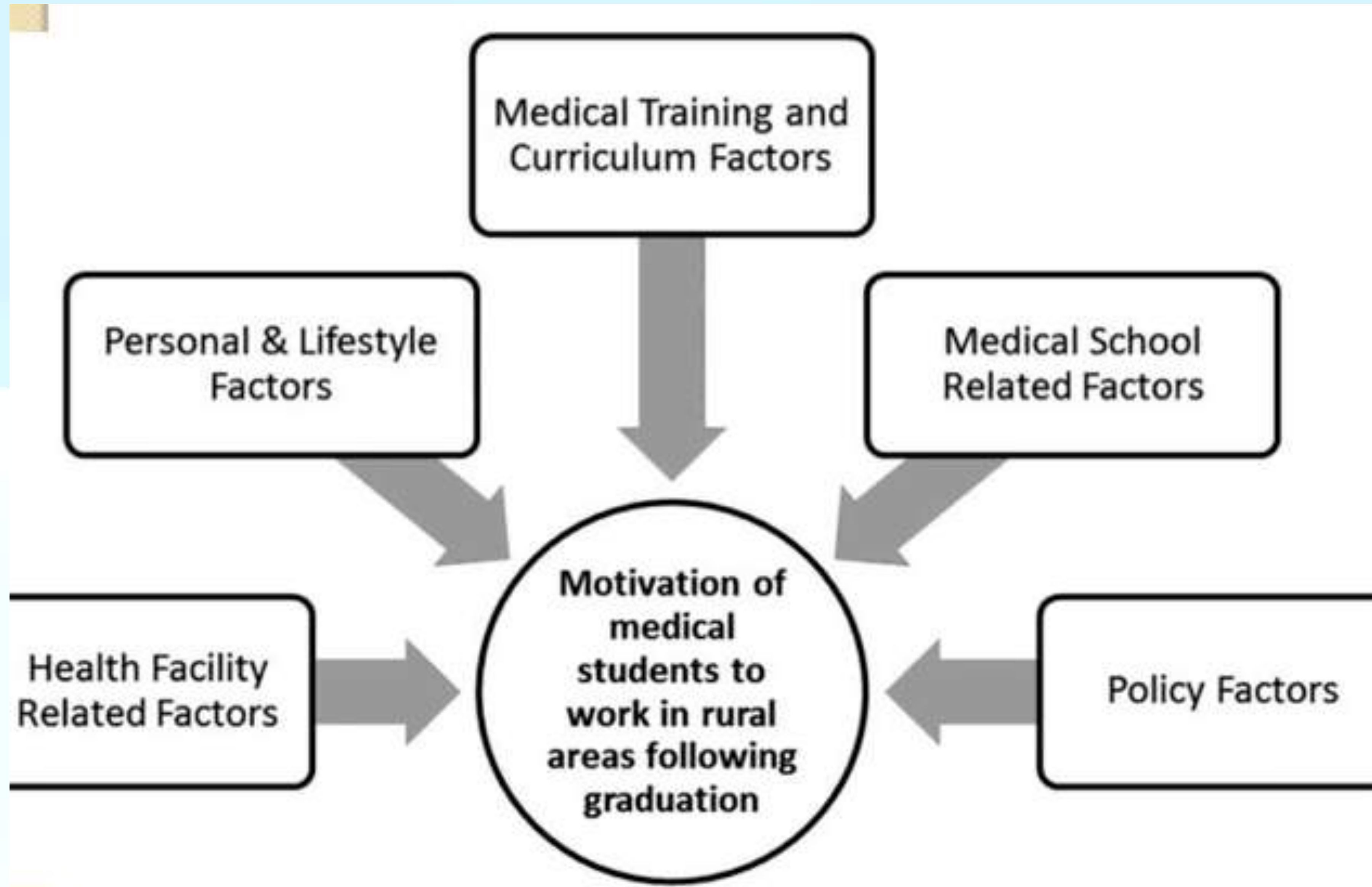
# Variables

- May be defined as a characteristics of a subject, object or a phenomenon that takes on different value, e.g, age, sex, weight, height.
- Variables are the factors that are being studied and manipulated in order to answer research question
- These are the critical component of research protocol and provide the foundation for the research question and guide the development of the study design and methodology

# Conceptual framework

- It is the written or visual presentation that explains either graphically or in narrative form the main concepts to be studied
- The researcher can be able to show the relationships of the different variables graphically he wants to investigate
- It is the researchers own position on the problem and gives direction to the study

# Example of conceptual framework



# Methodology

- This is the heart of a research proposal
- It will explain the procedure and techniques that will be used to achieve the objectives of the study
- It will define the variables and how the variables will be measured
- Shows that researcher understand the principles by using appropriate research design
- Explain how the researcher will analyse the results, with good academic reason for its selections

# Methods

- Study design-( quantitative, qualitative, descriptive, analytic, cross section etc)
- Study period
- Study setting
- Study population
- Selection criteria ( inclusion, exclusion)
- Sample size
- Sampling
- Data collection
- Data processing
- Data analysing

# Utilization of Results

- Describes in brief how research outcomes from the proposed study may contribute to health promotion and health development in Bangladesh
- This section of protocol will explain in which stage(s) of policy making , the research result will be utilised, as
  1. Agenda setting
  2. Policy formulation
  3. Policy implementation

# Limitations

- Any weakness in the planned approach
- How the researcher plan to overcome that

# Ethical issue

- All research protocols involving human or animal subject need ethical approval , usually from the ethical committee, it includes
  - A. written approval of the appropriate ethical review committee
  - B. written form for informed consent
  - C. Cheklist to adress all possible clinical concerns( respect, justice, right to discontinue, privacy, rewards, no harm, alternatives)

# Budget

- An ideal research proposal should contain a budget summary with demarcation of item wise cost
- It should includes all resources to carry out the study
- All resources which are available

# Budget summary ( sample)

Items	Cost
Personal expenditure	
Field expenditure	
Laboratory cost	
Travel cost	
Data processing and analysis	
Printing	

# Time frame or Action plan

- Time frame should be developed in a graphical or tabulated format
- The time required for each steps described in the research protocol will be mentioned in the time frame



# Reference

- During references use one style of references like Vancouver, Harvard, etc
- One should always follow the norms of specific reference style
- Mixture of different style should be avoided
- No hard or fast rule about the no of references in a protocol
- In a standard protocol no may vary from 6-20

# ANNEXURE

- It refers to the supplement or attached document to the protocol
- It includes
  1. Detailed budget
  2. Additional figures
  3. Additional tables
  4. Consent form
  5. Questionnaires
  6. Checklist
  7. Curriculum vitae of the investigators etc

# A Format of Research proposal

- Cover page
- Title of the study
- Abstract
- Introduction and background
- Rationale
- Hypothesis or research question
- Objectives
- Variables conceptual framework
- Operational definitions
- Methods
- Ethical consideration
- Utilisation of result
- References
- Action plan budget
- Annexure

## Take home message

- Every study has its individual hypothesis or Research question and objectives
- The basic elements of the research protocol remains the same
- Protocol should be scientifically sound and self explanatory
- Methods must be organised sequentially indetail
- Evidence and reference should be well documented
- Any study specific terminology must be defined with authentic references.

# Sources

- MZ ISLAM'S RESEARCH METHODOLOGY 3rd edition 2023
- Basics of writing Protocol, Thesis, Article & Research paper 2nd Edition, Professor Dr.S.M shamsuzzaman
- ABC of research methodology & biostatistics, PROF.MD.MOZAMMEL HOQUE
- Planning and Doing Research by prof Dr.Abul Kalam Azad

**Thank you**