

Writing a Research Proposal

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Outlines

- Introduction
- Components
 - Introduction
 - Literature review
 - Methods
 - Expected results
 - Gantt chart

Learning outcomes

- Understand what research proposal is all about
- Able to prepare a sound research proposal in the respective area of research

Introduction

Definition

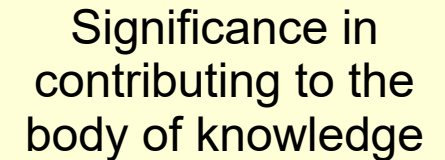
- An academic **research proposal** is “a detailed plan or ‘blueprint’ for [an] intended study, and once it is completed, the research project should flow smoothly” (Sudheesh et al., 2016)
- A **written plan of research** for evaluation by reviewers (i.e. your supervisors, ethics committee etc.)

Purposes

- To serve as the starting point of a planned study
- To guide your research
- To allow evaluation into the **merit** of your research
- To show your competency in planning a study

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Significance in
contributing to the
body of knowledge

Components

- Title
- Introduction
- Literature review
- Methods
- Expected results
- Gantt chart

Title

Title

- Title
 - ✓ Title of the proposed study
 - ✓ Your name, names of supervisors, co-researchers
 - ✓ Affiliations
- Introduction
- Literature review
- Methods
- Expected results
- Gantt chart

Title

- Title
- Introduction
- Literature review
- Methods
- Expected results
- Gantt chart

✓ Title of the proposed study

Reflects objectives of the study

Introduction

Introduction

- Title
- Introduction
 - ✓ Background
 - ✓ Problem statement
 - ✓ Research questions
 - ✓ Objectives
 - ✓ Research hypotheses
- Literature review
- Methods
- Expected results
- Gantt chart

Introduction

- Title
- Introduction
- Literature review
- Methods
- Expected results
- Gantt chart

✓ Background

- Gives an overview of the present research
- Brief descriptions of general terms in the title
- Short LR to link with problem statement

Introduction

- Title
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- Gantt chart

✓ Background

✓ Problem statement

- Issues / gaps / unknowns in the LR
- State selected problems to be solved in the present study
- How those can be solved
- Significance/Justification: Why solving these problems are important

Introduction

- Title
- Introduction
 - ✓ Background
 - ✓ Problem statement
 - ✓ Research questions
 - Whats?
 - Hows?
 - Reflects the selected problems to be solved in problem statements
- Literature review
- Methods
- Expected results
- Gantt chart

Introduction

- Title
- Introduction
- Literature review
- Methods
- Expected results
- Gantt chart

- ✓ Background
- ✓ Problem statement
- ✓ Research questions
- ✓ Objectives

- Reflect the RQs just now

What are the factors ...?

To determine the factors ...

Introduction

- Title
 - Introduction
 - Literature review
 - Methods
 - Expected results
 - Gantt chart
- ✓ Background
 - ✓ Problem statement
 - ✓ Research questions
 - ✓ Objectives
 - ✓ Research hypotheses
- Reflect the Objectives
 - What are the factors ...?
 - To determine the factors ...
 - The hypothesized factors are ...

Literature review

Literature review

- Title
 - ✓ Covers the keywords in the title
- Introduction
 - ✓ What are known?
- Literature review
 - ✓ Appraise the LR (refer 5Cs by Sudheesh et al, 2016)
- Methods
 - ✓ What are unknown / issues / gaps
- Expected results
 - ✓ Give ideas for the **problem statement**
- Gantt chart

Literature review

Table 1: Five 'C's while writing a literature review

Cite	Keep the primary focus on the literature pertinent to your research problem
Compare	The various arguments, theories, methodologies and findings expressed in the literature: What do the authors agree on? Who applies similar approaches to analysing the research problem?
Contrast	The various arguments, themes, methodologies, approaches and controversies expressed in the literature: What are the major areas of disagreement, controversy or debate?
Critique the literature	Which arguments are more persuasive and why? Which approaches, findings, methodologies seem most reliable, valid or appropriate and why? Pay attention to the verbs you use to describe what an author says/does (e.g. asserts, demonstrates, etc.)
Connect	The literature to your own area of research and investigation: How does your own work draw upon, depart from, or synthesise what has been said in the literature?

*Table 1 from Sudheesh et al, 2016, pg 2.

Methods

Methods

- Title
 - Introduction
 - Literature review
 - **Methods**
 - Expected results
 - Gantt chart
- ✓ Study design, setting and participants
 - ✓ Sample size
 - ✓ Sampling method
 - ✓ Variables and measurement tools
 - ✓ Procedures
 - ✓ Statistical analysis
 - ✓ Ethical considerations
 - ✓ Study flowchart

Methods

- Title
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- **Methods**
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- Find suitable reporting guidelines in <https://www.equator-network.org/>

S

Methods

- Title
- Introduction
- Literature review
- **Methods**
- Expected results
- Gantt chart

✓ Study design, setting and participants

- Study designs
 - Observational
 - Experimental

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Methods

- Title
- Introduction
- Literature review
- **Methods**
- Expected results
- Gantt chart

- ✓ Study design, setting and participants

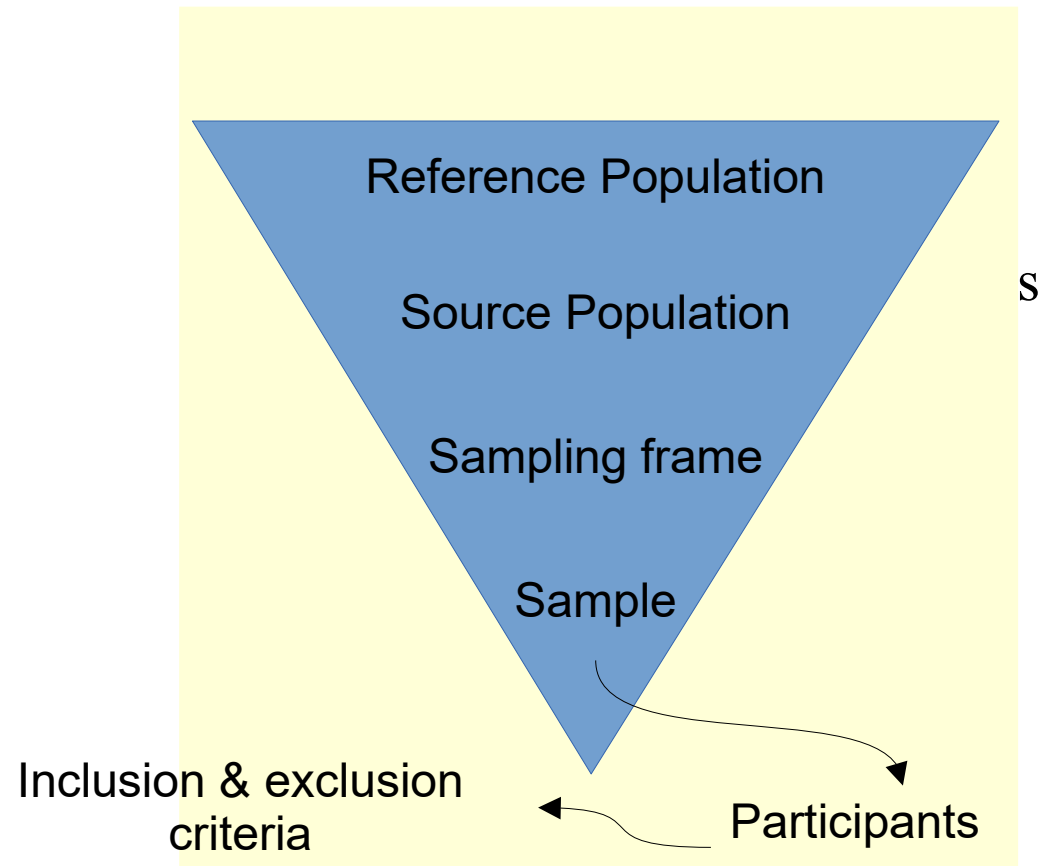
- Settings
 - Location
 - Duration

S

Methods

- Title
- Introduction
- Literature review
- **Methods**
- Expected results
- Gantt chart

- ✓ Study design, setting and participants



Methods

- Title
 - ✓ Study design, setting and participants
- Introduction
 - ✓ Sample size
- Literature review
- **Methods**
 - Dependent on planned statistical analyses
 - Calculated for each objective
 - Important to ensure adequate number of participants is included for statistical analysis (power of the study)
 - Clinical trial – also ensure minimize harms with just enough sample
- Expected results
- Gantt chart

Methods

- Title
- Introduction
- Literature review
- **Methods**
- Expected results
- Gantt chart

- ✓ Study design, setting and participants
- ✓ Sample size
- ✓ Sampling method

- How to sample from sampling frame → sample
- Probability sampling – random
- Non-probability sampling – not random

s

Methods

- Title
 - Introduction
 - Literature review
 - **Methods**
 - Expected results
 - Gantt chart
- ✓ Study design, setting and participants
 - ✓ Sample size
 - ✓ Sampling method
 - ✓ Variables and measurement tools
 - Outcomes / dependent variables
 - Factors / predictors / independent variables
 - Tools
 - Questionnaires
 - Measurement equipment
 - Laboratory investigations
 - Imaging

Methods

- Title
 - Introduction
 - Literature review
 - **Methods**
 - Expected results
 - Gantt chart
- ✓ Study design, setting and participants
 - ✓ Sample size
 - ✓ Sampling method
 - ✓ Variables and measurement tools
 - ✓ Procedures
 - Data collection procedures related to variables and measurement tools
 - Detailed descriptions of the steps
 - Randomization/allocation procedure – in RCT

Methods

- Title
 - Introduction
 - Literature review
 - **Methods**
 - Expected results
 - Gantt chart
- ✓ Study design, setting and participants
 - ✓ Sample size
 - ✓ Sampling method
 - ✓ Variables and measurement tools
 - ✓ Procedures
 - ✓ Statistical analysis
- Generally, software used for data entry and analysis
 - Then list planned statistical analyses by each objective

Methods

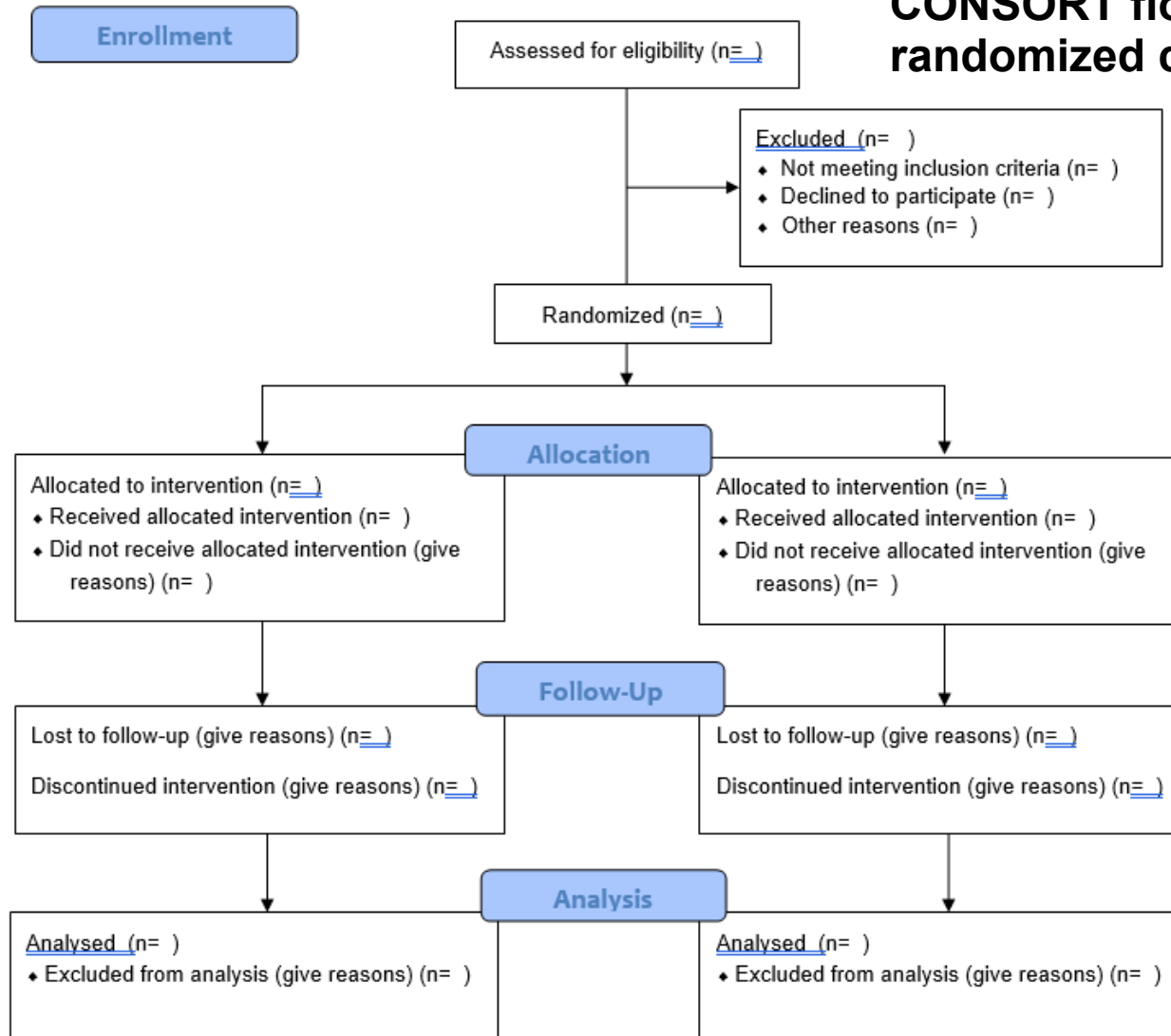
- Title
- Introduction
- Literature review
- **Methods**
 - ✓ Study design, setting and participants
 - ✓ Sample size
 - ✓ Sampling method
 - ✓ Variables and measurement tools
 - Human participants, ensure ethical research
 - Refer to JEPeM research proposal template
 - ✓ Ethical considerations
 - ✓ Study flowchart
- Expected results
- Gantt chart

Methods

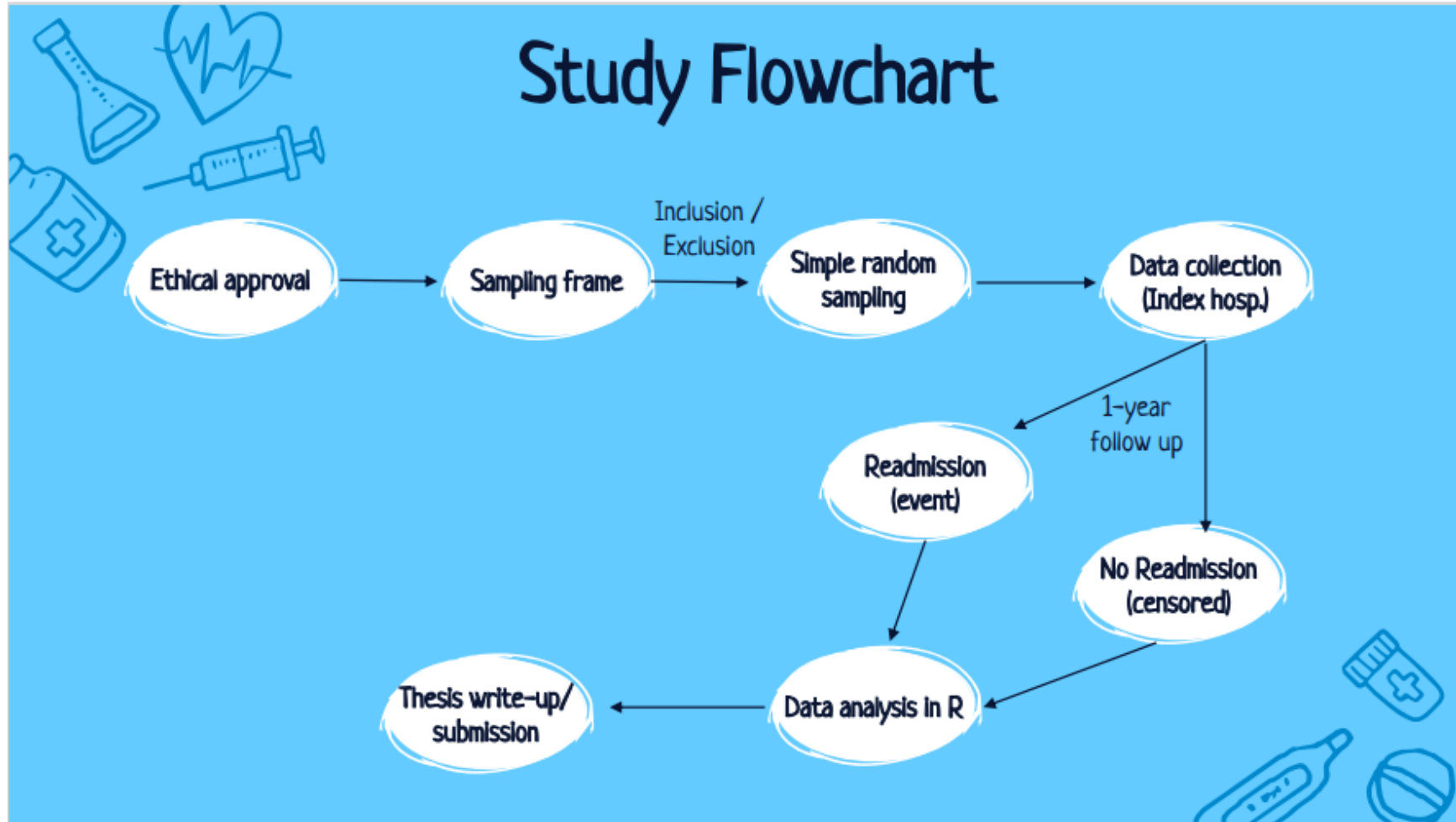
- Title
 - Introduction
 - Literature review
 - **Methods**
 - Expected results
 - Gantt chart
- ✓ Study design, setting and participants
 - ✓ Sample size
 - ✓ Sampling method
 - ✓ Variables and measurement tools
 - ✓ Procedures
 - ✓ Statistical analysis
 - Diagram for the conduct of the study from start to end
 - ✓ Study flowchart

Methods

CONSORT flowchart for randomized controlled trial



Methods



*A nice flowchart, courtesy Mohd Yusran Yusoff, Msc Medical Statistics

Expected results

Expected results

- Title
 - ✓ Empty tables / placeholders for results
- Introduction
 - ✓ Can refer to articles included in LR for sample tables
- Literature review
 - ✓ Can refer to “Reporting Statistical Results in Medical Journals”
<https://doi.org/10.21315/mjms2016.23.5.1>
- Expected results
- Gantt chart

Expected results

Table 1: Patient demographics ($n =$).

Variables		Drug X ($n =$) n (%)	Placebo ($n =$) n (%)	Total n (%)
Age (years) ^a				
Gender	Male			
	Female			
BMI groups	Underweight (BMI < 18.5 kg/m ²)			
	Normal (BMI 18.5 to 24.9 kg/m ²)			
	Overweight (BMI ≥ 25 kg/m ²)			

^a Mean (SD)

Expected results

Table 2: Comparison of systolic blood pressure between intervention and control groups.

Variable	Mean (SD)		Mean difference (95% CI)	<i>t</i> -statistic (df)	<i>P</i> -value ^a
	Intervention <i>n</i> =	Control <i>n</i> =			
SBP (mmHg)					

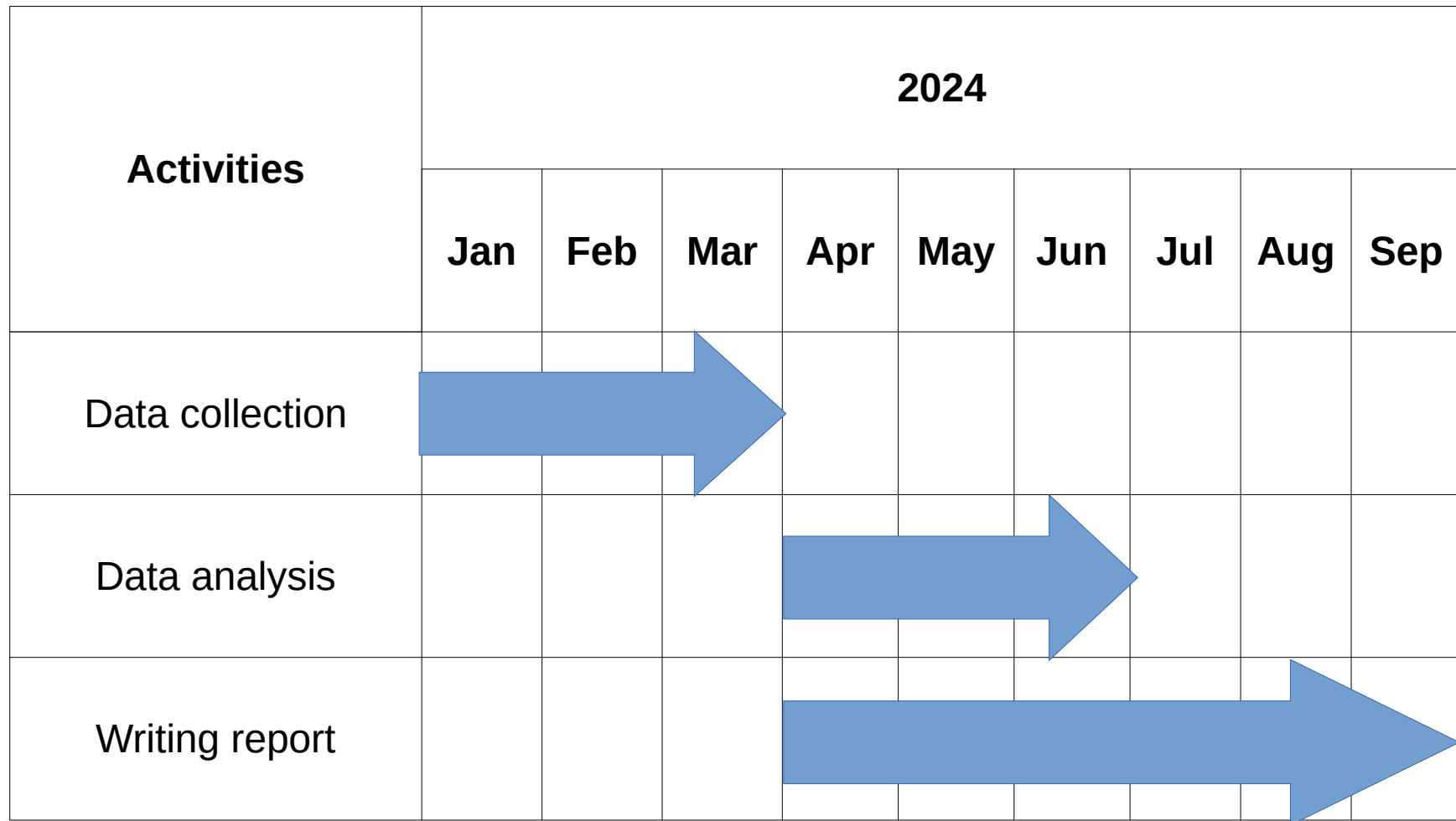
SBP = systolic blood pressure. ^a Independent *t*-test.

Gantt chart

Gantt chart

- Title
 - Introduction
 - Literature review
 - Methods
 - Expected results
 - Gantt chart
- ✓ Timeline for the research
 - ✓ Quick overview of research activities and period of those activities
 - ✓ May add milestones to complement Gantt chart

Gantt chart



Milestones

Time	Activities
<i>March 2024</i>	Completed data collection
<i>June 2024</i>	Completed data analysis
<i>September 2024</i>	Completed writing report

References

- Arifin, W. N., Sarimah, A., Norsa'adah, B., Majdi, Y. N., Imran, M. K., & Naing, L. (2016). Reporting statistical results in medical journals. *The Malaysian journal of medical sciences: MJMS*, 23(5), 1-7.
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