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A Literature Review: How to write research question and aim in a research paper?

Abstract

Aim: To describe the development of a research question aim and aim.
Background: The first steps of any kind of research study are developing the research question, aim. There is an increasing familiarity with the principles of evidence-based medicine in research. Clear, succinctly posed research aims and objectives are essential if studies are to be successful.
Discussion: Researchers developing their research question, aims generally experience difficulties. They are often overwhelmed trying to convert what they see as a relevant issue from practice into research. This necessitates engaging with the relevant published literature and knowledgeable people.
Conclusion: This paper identifies the issues during developing a research question, aim. Understanding these considerations will enable researchers to effectively present their research question and aim in a precise manner.
Implications for practice: To conduct practical based successful studies, researchers need to develop clear research question, aim.
Keywords: researchers, research question, research aim, study

Introduction

In a thesis or dissertation, all applicable elements are usually included. The most important are research question, research aim. Hence in this article, I have discussed important considerations in the development of a research question and aims for research. By the end of this article, the reader will be able to appreciate the significance of constructing a good research question and developing aim for the successful design of a research study. The article has been divided into 2 sections: research question, research aim.

Research Question

Interest in a particular topic usually begins the research process, but it is the familiarity with the subject that helps define an appropriate research question for a study(1). Questions then arise out of a perceived knowledge deficit within a subject area or field of study(2). Indeed, Haynes suggests that it is important to know “where the boundary between current knowledge

and ignorance lies (1).”The most precise research question can be developed by need of the society and also rationalizing the need for the investigation. Researcher or investigator may learn more about any topic by using different methods. Some good ways are looking through research and writt en material carefully, talking in detail with patients. In addition, awareness of current trends and technological advances can assist with the development of research questions(2).

A research question is a clear, focused question that a study aims to answer. It guides the research process by helping determine what will be studied, how it will be studied, and what type of data needs to be collected. It is typically framed to address a specific gap in existing knowledge. A good research question should be specific, answerable through research, and relevant to the field. It should not be too broad or vague; instead, it should clearly define the problem the study(3). In-depth knowledge about a subject may generate a number of questions. It then becomes necessary to ask whether these questions can be answered through one study or if more than one study needed.Additional research questions can be developed, but several basic principles should be taken into consideration(1). All questions, primary and secondary, should be developed at the beginning and planning stages of a study. Any additional questions should never compromise the primary question because it is the primary research question that forms the basis of the hypothesis and study objectives. It must be kept in mind that within the scope of one study, the presence of a number of research questions will affect and potentially increase the complexity of both the study design and subsequent statistical analyses, not to mention the actual feasibility of answering every question(1).

In a study, the primary research question should be clearly stated at the end of the introduction of the grant proposal, and it usually specifies the population to be studied, the intervention to be implemented and other circumstantial factors(4).

Hulley and colleagues(2) have suggested the use of the FINER criteria in the development of a good research question (Box 1). The FINER criteria highlight useful points that may increase the chances of developing a successful research project.

Box 1

FINER Criteria for a Good Research Question		
F	Feasible	• Adequate number of subject • Adequate technical expertise • Affordable in time and money • Manageable in scope
I	Interesting	• Getting the answer intrigues the investigator, peers, and community
N	Novel	• Confirms, refutes, or extends previous findings
E	Ethical	• Amenable to a study that Institutional Review Board will approve
R	Relevant	• To scientific knowledge • To clinical and health policy • To future research

a. Feasible
b. Interesting
c. Novel
d. Ethical
e. Relevant
f. Socially useful

a. Feasible
- Adequate number of subjects
- Adequate technical expertise
- Affordable in time
- Affordable in money
- Manageable in scope

b. Interesting
- To the investigator, peers and community.
- Of course to the patients
- Subjective aspect
- Persuasion aspect(process or techniques used to influence someone's attitudes, beliefs, actions, behaviours through communication, not through force)
- Involvement
- Urge
- **Example-** Does taking estrogen after menopause reduce the likelihood of bone density loss in women over 60 years of age, compared to women not taking estrogen?

c. Novel
- May not be “out of this world”!
- May not be extra ordinary or unique
- Confirms or refutes previous findings
- Extends previous findings

- Provides new findings
- **Example-**Does an entirely plant based (vegan) diet reduce blood serum cholesterol levels in men over 50 years old?

d. Ethical
   - In line with morality
   - In line with human value system
   - Fulfilling requirements of ethical committees
   - No animals are sacrificed
   - Maximum benefits and minimum risk
   - Voluntary, well-informed, understanding consent of participants

e. Relevant
   - To scientific knowledge
   - To clinical understanding
   - To health policy
   - To future research directions
   - To social needs

f. Socially useful
   - Serving larger interest of the society
   - Betterment of human life
   - Friendly to the environment

FINER criteria outline the important aspects of the question in general, a useful format to use in the development of a specific research question is the PICOT format (5).

PICOT (Box 2) stands for,

a. Population/ Patient Problem
b. Intervention
c. Comparison
d. Outcome
e. Time

Box 2

PICOT Criteria		
P	Population (patients)	What specific patient population are you interested in?
I	Intervention (for interventions studies only)	What is your investigational intervention?
C	Comparison group	What is the main alternative to compare with the intervention?
O	Outcome of interest	What do you intend to accomplish, measure, improve, or affect?
T	Time	What is the appropriate follow-up time to assess outcome?

P, **I**, and **O** components must be present but **C** and **T** may or may not be present, depending on the question.

a. Population/ Patient problem
- Specific group of patients or the problem being studied
- Example: overweight adult with hypertension, patients with chronic neck pain

b. Intervention
- Intervention such as a treatment or diagnostic test or surgical procedure
- Example: diet and lifestyle changes, daily vitamin D supplement

c. Comparison or Control
- Identify the main alternative treatment for comparison
- Intervention could be standard care, no intervention, a placebo, or another treatment
- Example: no change in diet or exercise

d. Outcome
- Desired effect or outcome for the patient
- The outcome MUST be measureable
- Example: “feeling better" would not be a measurable outcome as it is subjective criteria
- Example: weight loss and reduction in blood pressure

e. Time
- Time frame for the intervention, follow-up, or observation
- Example : within three months," "during a 6-week period

A poorly formulated research topic could influence the choice of study design, eventually result in challenging circumstances, and ultimately hinder the overall study by decreasing clinical significance, which would subsequently have an impact on publication. The quality of the study and its outcomes are jeopardized if sufficient resources are not allocated to formulating the research topic. Therefore, it is crucial to develop a research topic that is both clinically relevant and answerable at the outset of any study.

Research Aim

From the statistical perspective, a clear description of the study aim and hypothesis is pivotal because it is the back bone of the entire article and serves as a roadmap to the study design and data analysis(6). All study aims must be defined a priori and must not change till the completion of the study. If it changes it suggest that authors are unclear about what they actually aimed to study which is unacceptable.

A research study's aim outlines the goals the investigator expects to accomplish by the study's conclusion. It typically outlines the overarching purpose or final goal of the study and is broad, generic, and abstract. There is usually only one primary goal, and it is typically expressed with an infinitive verb (e.g., to explore, to examine, to evaluate). The goal is the main reason for doing the research; it represents what researcher wish to learn or comprehend. Even though it is ambitious, it should be doable and reasonable. It shouldn't be too general and unfocused, as this could come out as unrealistic. Essentially, the goal defines the course of the entire investigation.

Examples of well-defined aim are(7)**:**

Study 1: “To explore whether cognitive-behavioural therapy is better than behavioural activation in major depressive disorder.”

Study 2: “To evaluate if childhood trauma is related to the development of borderline personality disorder.”

Study 3: “To examine the impact of early diagnosis on long-term outcome in schizophrenia.”

How to plan and write, and what to avoid

a. Avoid formulating multiple aims. Ideally, a research study should have a single, broad aim that outlines the overall purpose of research or study. Sometimes, two distinct aims may be justified like primary and secondary. But this is generally avoided, as it can reduce the study’s focus and clarity.
b. Avoid unrealistic and over broad aims which are vague and unable to achieve. For example, the aim “To improve the treatment of schizophrenia” is too general, lacks specificity and unable to achieve. A more appropriate and focused aim would be: “To evaluate the effectiveness of psychological education in patients with first episode psychosis.”
c. Avoid using terms inappropriately. For example, “efficacy” refers to the effects of an intervention under ideal and controlled conditions, whereas “effectiveness” refers to its effects in real-world clinical settings which may be practical. Also, the term “impact” is typically used to describe long-term effects, often over several months or years, and should not be used to refer to short-term outcomes.
d. The aims should be aligned to the research which is to be conducted including study design.
e. Pose a research question properly. Some researchers may find a “tested-the-hypothesis” statement to be pedantic, artificial, and not reflective of clinical language. Often, it is preferable to present the research purpose as a question, which can feel more natural and realistic.
f. Mention only the central question, even if several other questions have been addressed (e.g. in the cross-sectional study only mention to determine whether condition X is associated with risk factor Y”).

Conclusion

In conclusion, the aim of a research study represents its broad goal or overall purpose; what the researcher is going to achieve at the end of research. Research questions are specific, answerable inquiries to help achieve the aim researcher has mentioned. Understanding the proper difference and purpose between the aim, research questions leads to develop a clear and structured research plan and ensuring that the study remains focused and aligned with its intended purpose. This ultimately leads to impact the work of researcher and benefits the society.

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