

Researching and Publishing.

1. How to Formulate a Research Question

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Abstract

Introduction: The research question is the genesis of knowledge; it represents the need to answer something unknown or at least suspected about reality. This article aims to show the fundamental elements of a research question for its adequate formulation. **Methods:** A literature review was conducted in search of articles that presented the most valuable and practical steps for formulating a research question. Emphasis was placed on essential words such as *feasible*, *interesting*, *novel*, *ethical*, and *relevant*, summarized in the acronym FINER. **Results:** To adequately structure the question, the following aspects were included: population, patients or problem; intervention or indicator being studied; comparison group; outcome of interest; and time frame of the study, summarized in the acronym PICOT. **Conclusions:** Research questions can be phrased to address essential elements of the study, including the population to be studied, the expected outcomes, and the time it will take to achieve them.

Keywords

Question, research, knowledge.

INTRODUCTION

The progression of humanity's discovery history, its significant advancements, and the comprehension of the universe have predominantly been driven by our intrinsic curiosity about the world. This curiosity has led to formulating questions and systematically gathering information to address these inquiries. This approach has led to monumental discoveries, such as the control of fire and the answers Newton or Copernicus provided to the uncertainties they observed in the world around them. Although questioning is a fundamental aspect of the research process, the specifics of conducting this effectively are not always common knowledge. Therefore, this article aims to encapsulate all necessary information regarding the formulation of a research question for a project.

RESEARCH QUESTION

An illustrative and straightforward example of a research question might be the kind contemplated by children in their early school years: Why do tree leaves fall? Or, why does the sun set only to rise again in the morning? Reflecting on such queries reveals numerous research questions that children, through their curiosity, begin to answer.

The process begins when we pose questions about reality, seek relevant information to answer these questions, reassess reality in light of the information gathered, and formulate new questions. This cycle succinctly encapsulates the scientific method.

Crafting a well-posed research question emerges from the uncertainties encountered in daily clinical practice, where a researcher or physician seeks to resolve these through

observation and measurement in their patients. Another wellspring of research questions can be the observations made previously by the researcher themselves or the findings published in other studies. Thus, the medical literature becomes a rich source of questions, and conferences provide a venue for the introduction of new technologies or advancements in a particular field. In the majority of studies, the question is framed to accentuate various study aspects, including the problem it seeks to address, the target population, and the variables under investigation.

Research questions typically become more defined over the course of the study. Consequently, these questions are dynamic, allowing researchers the flexibility to modify or refine their research question as they review related literature and develop a conceptual framework for their study. Maintaining a creative and observant approach yields productive descriptive studies, which become excellent sources of research questions. Moreover, imagination, creativity, and the perseverance to revisit an unresolved question multiple times are crucial⁽¹⁾.

The primary purpose of formulating a research question is to narrow down a broad area of interest to a specific field of study. Research questions, along with hypotheses, establish a framework that guides the investigative process. These questions also define the study's scope, setting its boundaries and ensuring coherence. Importantly, the research question *influences* the remainder of the study significantly, affecting aspects such as the design, sample size, data collection methods, and the analytical approach.

In this section, we outline the optimal approach for constructing a robust research question, evaluated within the context of achieving an exemplary study design that is feasible, interesting, novel, ethical, and relevant. These criteria are encapsulated in the FINER acronym.

1. Feasible: A research question is feasible if:
 - An adequate number of patients can be accessed; otherwise, the question cannot be satisfactorily answered.
 - Adequate technical expertise is available to gather information, conduct measurements, and assess outcomes.
 - The research can be conducted within reasonable time and financial constraints.
 - The research is practical to carry out, has a focused scope, and does not attempt to measure everything simultaneously; in simple terms, tackle one question at a time.
2. Interesting: The question should captivate attention and spark curiosity upon being posed.

3. Novel: The question should aim to confirm, refute, or expand upon previous findings, necessitating a comprehensive review of existing literature to avoid duplicating efforts. However, exploring whether the same results can be obtained in a different population might be justified.
4. Ethical: The research must adhere to the ethical standards of the institution, aligning with guidelines such as those outlined in the Declaration of Helsinki.
5. Relevant: The question should contribute to scientific knowledge, influence public health policies, enhance clinical practice, and lay the groundwork for future research⁽²⁾.

For a study design to be considered well-constructed, the research question must be well-organized and encompass all necessary aspects. This involves clearly defining the population from which the question arises, the intervention to be applied, the comparison method, and the desired outcomes. This leads to the formulation of the PICO acronym: Population, Intervention, Comparison, and Outcomes.

Employing the PICOT framework enables the construction of research questions that address critical study elements, including the study population, expected outcomes, and the timeframe for achieving these outcomes. The components of this framework are:

- P: Population, patients, or problem being addressed
- I: Intervention or indicator under investigation
- C: Comparison group against which the intervention is evaluated
- O: Outcome of interest
- T: Timeframe for the study

This framework is widely used in clinical research and evidence-based studies, facilitating a systematic approach to study design.

Crafting a cogent descriptive or analytical research question is foundational to determining the study's design. The considerations highlighted by the FINER and PICO acronyms are instrumental in this process but are further refined by specific objectives or goals. For instance, if observations systematically indicate that patients aged 30 to 60 years who had COVID-19 in 2020 are experiencing gastric emptying disorders, the application of the stated principles could be as follows:

- Population (P): Male or female patients with COVID-19 who required hospitalization, aged between 30 and 60 years during 2020.
- Intervention (I): COVID-19 infection.

- Comparison (C): Hospitalized patients during the same period with a diagnosis of gastric emptying without COVID-19 infection.
- Outcome (O): Gastric emptying disorder⁽³⁾.

This approach not only determines the study's design, sample size, and statistical analysis method but also bridges the gap from the enchanting realm of questioning reality to the systematic observation and nurturing of creativity and curiosity. This fosters the development of original research based on the observation of real-world events and entities.

CONCLUSIONS

We propose several essential elements for formulating a well-structured research question. Such a question should be designed with consideration for feasibility, interest, novelty, ethics, and relevance, as summarized by the FINER acronym. Moreover, proper structuring of the question involves incorporating dimensions such as the population, patients or problem, intervention or indicator being studied, comparison group, outcome of interest, and study timeframe, collectively abbreviated as PICOT.

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