

Nursing Research Series

Essentials of Science: Methods, Appraisal and Utilization



Nursing Research Series

*Essentials of Science:
Methods, Appraisal and Utilization*



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Part 6 of 20

Research Aims, Purpose, Hypotheses



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Introduction

- We frequently ask questions to help us understand the world around us.
- This human ability to ask questions is the first step in the research process.
- If you are interested in:
 - Becoming a better consumer of nursing literature, or
 - Learning how research findings can ultimately be used to make evidence-based changes in nursing practice,
- This presentation will be help you accomplish these goals.

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Objectives

- By the completion of this presentation the participant will be able to:

1. Understand the general purpose of a nursing research topic.
2. Be familiar with terms used in published studies, including research aims and hypotheses.
3. Determine the significance of a study problem or purpose.
4. Evaluate the feasibility of a published study.

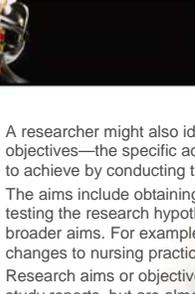
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Research Topic

- A research topic is a concept or broad issue that is important to nursing, such as acute or chronic pain management, coping with illness, or health promotion.
- Each topic contains numerous potential research problems to guide different research studies.
- The research problem guides the type of research methodology (i.e., approach or design) to take when conducting a research study.

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Research Aims

- A researcher might also identify several specific research aims or objectives—the specific accomplishments the researcher hopes to achieve by conducting the study.
- The aims include obtaining answers to the research questions or testing the research hypotheses, but may encompass some broader aims. For example, to develop recommendations for changes to nursing practice based on the study results.
- Research aims or objectives may not be expressed in research study reports, but are almost always found in written research proposals that describe plans for a study before it is started.
(Polit & Hungler, 1997, p. 73).

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Research Purpose

- Many researchers first state their research problem formally as a purpose statement.
- The purpose statement captures—usually in one or two sentences—the essence of the study.
- The purpose statement establishes the general direction of the inquiry and provides a synopsis of its overall goal.
- The words purpose or goal usually appear in a purpose statement.
 - For example, “The purpose of this study was...”, or
 - “The goal of this study was...”

(Polit et al, 1997, p. 73)

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Note: In Scientific Writing, It is Important to Avoid Bias

- The researcher's choice of verbs in a statement of purpose should indicate a certain degree of objectivity.
- A statement of purpose indicating that the intent of a study was to prove, demonstrate, or show something suggests a bias on the part of the researcher.
- For example, words such as *evaluate*, *examine* and *describe* are more objective.



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Research Problem

- **What is a research problem?**
 - A research problem is an area of concern where there is a gap in the knowledge base needed for nursing practice.
 - In a published study, the research problem:
 1. Identifies an area of concern for a particular population
 2. Indicates the significance of the problem
 3. Provides a background for the problem
 4. Outlines the need for additional study in a problem statement
 - Not all published studies include a clearly stated problem statement, but the problem usually can be identified in the first or second paragraph of the article, also referred to as *manuscript*

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Research Designs

- Different types of research designs enable nurses to investigate a variety of research problems and purposes.
- There are two primary types of research designs:
 - **Qualitative Research:** A statement of purpose for a qualitative study may imply a flexible design through the use of verbs such as *understand, discover, and develop*.
 - **Quantitative Research:** In contrast, a purpose statement indicating that the purpose is to *test* the effectiveness of an intervention or to *compare* two alternative nursing strategies suggests using a quantitative methodology and perhaps a design with tight scientific controls.
 - **Mixed Methods or Triangulation:** Using more than one research design

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Qualitative Research



- In qualitative studies, the statement of purpose indicates the nature of the inquiry, the key concept or phenomenon under investigation, and the group, community or setting under study.

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Example: Statement of Purpose in a Qualitative Study



- “The purpose of this study is to describe the decision-making process of adult children with regard to the placement of elderly parents in nursing homes” (Poit & Hungler, 1997, p. 73).
- This purpose statement indicates that the central phenomenon of interest is the decision-making process relating to nursing home placements, and the group under study is adult children with parents in need of care.

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Example: Statement of Purpose in a Quantitative Study

- In a quantitative study, the statement of purpose should identify the key study variables and their possible interrelationships, as well as the nature of the population of interest.
- For example: "The purpose of this research was to investigate the effect of renal transplant patients' dependency level on their rate of recovery." (Polit et al., 1997, p. 72)".
- This purpose statement indicates the population of interest (renal transplant patients), the independent variable (the patients' dependency level), and the dependent variable (rate of recovery).

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For more information

- <http://nursingpathways.kp.org/scal/research/resources/researchseries/index.html>
- Nursing Research Series Essentials of Science: Methods, Appraisal and Utilization
- Part 7 focuses on *variables*
- Part 8 focuses on *qualitative research*
- Part 9 focuses on *quantitative descriptive research*
- Part 10 focuses on *quantitative experimental or interventional research*

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How to Critique a Research Study: Is it Significant?



- A research study is *significant*—that is, *important*—in nursing when it has the potential to generate or refine relevant knowledge for practice.
- While critiquing the significance of the problem and purpose of a published study, you need to determine whether the knowledge generated in the study:
 - Influences nursing practice
 - Builds on previous research
 - Promotes theory testing or development, or
 - Addresses current concerns or priorities in nursing

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Is the Study Feasible?

- A preliminary study, referred to as a *pilot* study or a *feasibility* study, may be conducted to determine a project's viability.
- Feasibility refers to possibility, or that which is achievable. (From Wikipedia, the free online dictionary, accessed January 27, 2010)
 - The feasibility of a study is determined by examining the researchers' expertise, financial commitment, availability of subjects, facilities, and equipment; and
 - The study's ethical considerations.

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Feasibility and Ethical Considerations

- **Researcher Expertise:** The research problem and purpose studied need to be within the area of expertise of the researcher(s).
- **Financial Commitment:** The problem and purpose of a study are influenced by the amount of money available to the researcher.
- **Availability of Participants, Facilities, and Equipment:** Researchers need to have an adequate sample size, facilities, and equipment to implement their study.
- **Ethical Considerations:** The purpose selected for investigation must be ethical, which means that the participants' rights and the rights of others in the setting are protected.

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Variables

- In quantitative studies, concepts are usually called *variables*.
- A variable, as the name implies, is something that varies.
- Pain intensity, anxiety level, heart rate, and weight are all variables—each varies from one person to another.
- In fact, nearly all aspects about human beings are variables.
- It is precisely because people and conditions *do* vary that most research is conducted.



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Hypothesis

- A *hypothesis* is a formal statement of the expected relationship between two or more variables in a specified population.
- The hypothesis translates the research problem and purpose into a clear explanation or prediction of the expected results or outcomes of the study.
- A clearly stated hypothesis includes the variables to be manipulated or measured, identifies the population to be examined, and indicates the proposed outcomes for the study.
- Hypotheses also influence the study design, sampling method, data collection and analysis process, and interpretation of findings.

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Hypotheses: Four Categories

- Different types of relationships and numbers of variables are identified in hypotheses.
- A study may have more than one hypotheses, depending on its complexity.
- The type of hypothesis developed is based on the purpose of the study.
- Hypotheses can be described using four categories:
 1. Associative versus causal
 2. Simple versus complex
 3. Nondirectional or directional, and
 4. Null versus research

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Associative or Causal Hypotheses

- The relationships identified in hypotheses are associative or causal.
- An associative hypothesis proposes relationships among variables that occur or exist together in the real world, so that when one variable changes, the other changes.
 - For example, a decrease in variable X is associated with a decrease in variable Y in a specified population.
 - Or, a decrease in caloric intake is associated with a decrease in weight in middle-aged men.
- Associative hypotheses *identify relationships* among variables in a study, but do not indicate that one variable causes an effect on another variable.

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Causal Hypothesis

- A causal hypothesis proposes a cause-and-effect interaction between two or more variables, which are referred to as *independent* and *dependent* variables.
- The independent variable (i.e., treatment or experimental variable) is manipulated by the researcher to cause an effect on the dependent variable.
- The researcher then measures the dependent variable (i.e., outcome variable) to examine the effect created by the independent variable.
 - For example, Cooke and colleagues (2005) tested the effect of music on anxiety in day surgery patients during a preoperative wait. The group that received the treatment—the opportunity to listen to patient-preferred music—experienced less anxiety than the group that was not given this opportunity.
 - In this example, the researcher *controlled* the independent variable, which in this case was the music treatment.

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Simple versus Complex Hypotheses

- A simple hypothesis states the relationship (associative or causal) between two variables.
- A complex hypothesis states the relationships (associative or causal) among three or more variables.

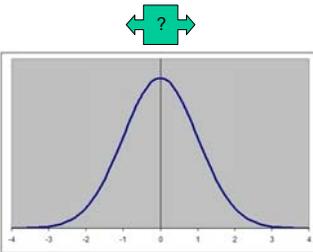


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Nondirectional versus Directional Hypotheses

- A nondirectional hypothesis states that a relationship exists but does not predict the nature of the relationship (e.g., positive or negative).
- If the direction of the relationship being studied is known, the researcher has an indication of the nature of the relationship. Under these circumstances, directional hypotheses are developed.



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How to Critique continued

- **Literature Review:** Does the study include a brief overview of recent literature (i.e., state of the science) regarding the research topic?
- **Variables:** Are there variables? If so, what is the independent variable and what is the dependent variable?
 - Is there a description of *how the treatment/independent variable is delivered?* (e.g., length of time, frequency of intervention, dose of intervention.) How are *data/dependent measures* collected? (e.g., frequency, mailed, interviews, etc.)
- **Research Methodology:**
 - **Setting:** What is the setting for the research? (e.g., acute care hospital, geographic location, etc.)
 - **Participants:** Inclusion criteria, participants (e.g., age, gender, illness/medical condition, etc.)

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How to Critique continued

- **Design:** If quantitative, is it experimental, quasi-experimental, descriptive, or correlational? Are participants assigned to treatment or standard treatment (i.e., control group)
 - **Measurement:** How is the dependent variable being measured? Questionnaires; bio-instrumentation, laboratory values, etc. What is the reliability (consistency) and validity (accuracy) of each? Do the authors report reliability and validity of instruments, questionnaires, etc.?
 - **Procedures:** What method was used to identify and recruit participants?
- **Ethical considerations:** Was the study reviewed by the IRB or was the study found to be exempt from IRB review? Were the subjects informed before they consented to participate in the study, etc.?

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In Conclusion

- In conclusion, we will review the objectives of this presentation, which are summarized as *Key Concepts* on page 131 of Chapter 4, "Research Problems, Purposes, and Hypotheses" in the 4th edition of *Understanding Nursing Research, Building an Evidence-based Practice* by Nancy Burns and Susan K. Grove (2007), which has been the primary resource for this presentation.



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Review of Objectives

Objective 1:

Understand the general purpose of a nursing research topic.

- A research topic is a concept or broad issue that is important to nursing, such as acute and chronic pain management, coping with illness, or health promotion.



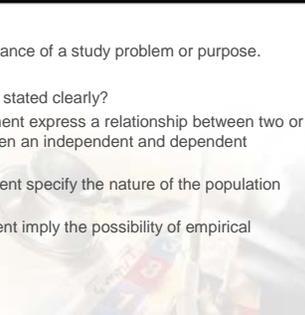
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Review of Objectives

Objective 2

How to determine the significance of a study problem or purpose.

- Is the problem statement stated clearly?
- Does the problem statement express a relationship between two or more variables, or between an independent and dependent variable?
- Does the problem statement specify the nature of the population being studied?
- Does the problem statement imply the possibility of empirical testing?



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Review of Objectives

Objective 3

Understand how to evaluate the feasibility of a published study.

- The feasibility of a study is determined by examining the researchers' expertise, financial commitment, availability of subjects, facilities, and equipment; and
- The study's ethical considerations



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Review of Objectives

OBJECTIVE 4

- A *research topic* is a concept or broad issue that is important to nursing, such as acute or chronic pain management, coping with illness, or health promotion.
- A *research problem* is an area of concern where there is a gap in the knowledge base needed for nursing practice.
- *Variables* are qualities, properties, or characteristics of persons, things, or situation that change or vary.



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Review of Objectives

OBJECTIVE 4 Continued

- A *hypothesis* is a formal statement of the expected relationship(s) between two or more variables in a specified population.
- An *operational definition* is derived from a set of procedures or progressive acts that a researcher performs to receive sensory impressions (such as sound, visual, or tactile impressions) that indicate the existence or degree of existence of a variable.

Reynolds (as cited in Burns & Grove, 2007, p. 129).

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Questions?

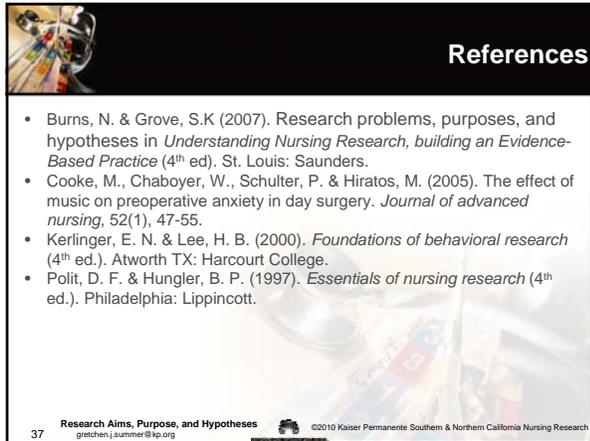


- For a more detailed discussion please see:
 - Part 7 of this research series focuses on *variables*
 - Part 8 of this research series focuses on *qualitative research*
 - Part 9 of this research series focuses on *quantitative descriptive research*
 - Part 10 of this research series focuses on *quantitative experimental or interventional research*

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References

- Burns, N. & Grove, S.K (2007). Research problems, purposes, and hypotheses in *Understanding Nursing Research, building an Evidence-Based Practice* (4th ed). St. Louis: Saunders.
- Cooke, M., Chaboyer, W., Schuller, P. & Hirasos, M. (2005). The effect of music on preoperative anxiety in day surgery. *Journal of advanced nursing*, 52(1), 47-55.
- Kerlinger, E. N. & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Atworth TX: Harcourt College.
- Polit, D. F. & Hungler, B. P. (1997). *Essentials of nursing research* (4th ed.). Philadelphia: Lippincott.

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