Polit & Beck's NURSING RESEARCH

Generating and Assessing Evidence for Nursing Practice

Jane Flanagan
Cheryl Tatano Beck

TWELFTH EDITION

Wolters Kluwer

Quick Guide to Bivariate Statistical Tests

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Polit and Beck's
NURSING RESEARCH

Generating and Assessing Evidence for Nursing Practice

Twelfth Edition

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Acknowledgments

We must start this 12th edition of the book by acknowledging the tremendous loss of Dr. Denise Polit—not only for her family but also for the discipline of nursing. Dr. Polit was not a nurse, but how extremely fortunate our discipline has been to have had her devote her career to supporting the learning, knowledge, and professional development of nurses, specifically in the field of nursing research. Since Denise wrote the first edition of this book in 1978, there has been no other individual who we believe has had more of an impact on the development of generations of nurses in regard to nursing research than Dr. Denise Polit. Denise would often call this book "her baby," which she tenderly cared for throughout each of the first 11 editions. She will be deeply missed!

This 12th edition, like the previous 11 editions, depended on the contributions of dozens of people. Many faculty and students who used the text have made invaluable suggestions for its improvement, and to all of you who have, we are very grateful. In addition to all those who assisted us over the past 40 plus years with the earlier editions, the following individuals deserve special mention.

We would like to acknowledge the comments of reviewers of the previous edition of this book, anonymous to us initially, whose feedback influenced our revisions. We would like to thank Dr. Carrie Morgan Eaton at the University of Connecticut who provided regular feedback and updates to computer-assisted qualitative data analysis software.

We also extend our thanks to those who helped to turn the manuscript into a finished product. The staff at Wolters Kluwer has been of great assistance to us over the years. We are indebted to Joyce Berendes, Jacquelyn Saunders, Janet Jayne, Wendy Mears, Matthew West, and all the others behind the scenes for their fine contributions.

Finally, we thank our family and friends. Our husbands Richard Nangle and Chuck and children Curt and Lisa have become accustomed to our demanding schedules, but we recognize that their support involves a lot of patience and many sacrifices.

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Preface

Research methodology is a dynamic enterprise. Even after 11 editions of this book, we have continued to draw new material and inspiration from ground-breaking advances in research methods and in nurse researchers' use of those methods. It is thrilling to share many of those developments in this new edition. We expect that many of the new methodologic and technological enhancements will be translated into powerful evidence for nursing practice. We are pleased that that this 12th edition has built on the foundation of the previous versions We have retained many features that made this book a classic textbook and resource, including its focus on research as a support for evidence-based nursing; but as with other editions, we have introduced important information that we hope will help to shape the future of nursing research.

NEW TO THIS EDITION

New and Added Content

Throughout the book, we have included up-to-date information on methodologic innovations that have arisen in nursing, medicine, and the social sciences during the past 4 to 5 years. These changes reflect the 2022–2026 NINR Strategic Plan and the AACN Essentials. The many additions and changes are too numerous to describe here, so here are just two examples. In Chapter 2 we included a discussion regarding the importance of original research in the practice setting. We have added information about the role of the PhD-prepared nurse in developing new knowledge and working in collaboration with DNP-prepared nurses who will implement this knowledge in care settings. In Chapter 25 there is an expanded and updated CAQDAS computer software for managing qualitative data. Also added is a large section on secondary qualitative data analysis. Braun and Clarke's reflexive thematic analysis and Kyngas et al.'s qualitative content analysis method have also been added to this chapter.

Every chapter has an online supplement (and some chapters in this edition have two supplements), which gave us the opportunity to add a considerable amount of new material.

Here is a complete list of the supplements for the 33 chapters of the textbook:

1. The History of Nursing Research
2. A. Evaluating Clinical Practice Guidelines—AGREE II
   B. Evidence-Based Practice in an Organizational Context
3. Deductive and Inductive Reasoning

4. Complex Relationships and Hypotheses
5. A. Finding Evidence for a Clinical Query
   B. Literature Review Summary Tables
6. Prominent Conceptual Models of Nursing Used by Nurse Researchers, and a Guide to Middle-Range Theories
7. Historical Background on Unethical Research Conduct
8. Research Control
9. Randomization Strategies
10. A. Selected Experimental and Quasi-Experimental Designs: Diagrams, Uses, and Drawbacks/Validity Threats
    B. Plausibility Assessments and Other Strategies When Randomization is Not Possible
11. Other Specific Types of Research
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13. Sample Recruitment and Retention
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30. A. Publication Bias in Systematic Reviews
    B. Supplementary Resources for Qualitative Evidence Synthesis
31. The RE-AIM Framework
32. A. Tips for Publishing Reports on Pilot Intervention Studies
    B. Impact Factor and Publication Information for Selected Nursing Journals
33. Proposals for Pilot Intervention Studies

Another feature of this edition concerns readers' access to references we cited. To the extent possible, the studies we have chosen as examples of research methods are published as open-access articles. These studies are identified in the reference list at the end of each chapter.

We hope that our many revisions will help users of this book to maximize their learning experience.

ORGANIZATION OF THE TEXT

The content of this edition is organized into six main parts.

- **Part 1—Foundations of Nursing Research and Evidence-Based Practice** introduces fundamental concepts in nursing research. Chapter 1 briefly summarizes the history and future of nursing research, discusses the philosophical underpinnings of qualitative research versus quantitative research, and describes the major purposes of nursing research. In this chapter, nursing research is discussed in light of the Institute of Medicine 2020–2030 report, The National Institute of Nursing Research Strategic Plan (2020–2026), the AANC Essentials, and the 2021 Magnet Application Manual. Chapter 2 offers guidance on using research to support evidence-based practice. Chapter 3 introduces readers to key research terms and presents an overview of steps in the research process for both qualitative and quantitative studies.
- **Part 2—Conceptualizing and Planning a Study to Generate Evidence for Nursing** further sets the stage for learning about the research process by discussing issues relating to a study's conceptualization: the formulation of research questions and hypotheses (Chapter 4), the review of relevant research (Chapter 5), the development of theoretical and conceptual contexts (Chapter 6), and the fostering of ethically acceptable approaches in doing research (Chapter 7). Chapter 8 provides an overview of important issues that researchers must attend to during the planning of any study.
- **Part 3—Designing and Conducting Quantitative Studies to Generate Evidence for Nursing** presents material on undertaking quantitative nursing studies. Chapter 9 describes fundamental principles of quantitative research design, and Chapter 10 focuses on methods to enhance the rigor of a quantitative study, including mechanisms of research control. Chapter 11 examines research with different and distinct purposes, such as noninferiority trials, realist evaluations, surveys, and outcomes research. Chapter 12 is devoted to methods used in quality improvement and improvement science. Chapter 13 presents strategies

for sampling study participants in quantitative research. Chapter 14 describes structured data collection methods that yield quantitative information. Chapter 15 discusses the concept of measurement and then focuses on methods of assessing the quality of formal measuring instruments. We describe methods to assess the properties of point-in-time measurements (reliability and validity) and longitudinal measurements—that is, change scores (reliability of change scores and responsiveness). Chapter 16 presents material on how to develop high-quality self-report instruments. Chapters 17–19 present an overview of univariate, bivariate, and multivariate statistical analyses, respectively. Chapter 20 describes the development of an overall analytic strategy for quantitative studies, including material on handling missing data. Chapter 21 discusses the issue of interpreting results and making inferences about clinical significance.

- **Part 4—Designing and Conducting Qualitative Studies to Generate Evidence for Nursing** presents material on undertaking qualitative nursing studies. Chapter 22 is devoted to research designs and approaches for qualitative studies, including information on critical theory, feminist, and participatory action research. Chapter 23 discusses strategies for sampling study participants in qualitative inquiries. Chapter 24 describes methods of gathering unstructured self-report and observational data for qualitative studies. Chapter 25 discusses methods of analyzing qualitative data, with specific information on grounded theory, phenomenologic, and ethnographic analyses. Greater guidance on coding qualitative data has been added to this edition. Chapter 26 elaborates on methods qualitative researchers can use to enhance (and assess) integrity and trustworthiness throughout their inquiries.
- **Part 5—Designing and Conducting Mixed Methods Studies to Generate Evidence for Nursing** presents material on mixed methods nursing studies. Chapter 27 discusses a broad range of issues, including asking mixed methods questions, designing a study to address the questions, sampling participants in mixed methods research, and analyzing and integrating qualitative and quantitative data. Chapter 28 presents information about using mixed methods approaches in the development of complex nursing interventions. In Chapter 29, we provide suggestions for designing and conducting pilot studies and using data from the pilots to make decisions about "next steps."
- **Part 6—Building an Evidence Base for Nursing Practice** provides additional information on linking research and clinical practice. Chapter 30 offers an overview of methods of conducting systematic reviews that support EBP. In this chapter, we provide guidance on conducting the integrative review, meta-analyses (and an evaluation of confidence in the evidence using the GRADE system), metasyntheses, qualitative evidence syntheses using meta-aggregation, and mixed studies reviews. Chapter 31 offers cutting-edge advice on strategies to enhance the *applicability* of practice-based evidence to clinical decisions for individuals and subgroups. Chapter 32 discusses the dissemination of evidence—how to prepare a research report (including theses and dissertations) and how to publish research findings. The concluding chapter (Chapter 33) offers suggestions on developing research proposals to obtain financial support; it includes information about developing a proposal for a pilot intervention study.

KEY FEATURES

This textbook was designed to be helpful to those who are learning how to do research, to those who are learning to appraise research reports critically, and to use research findings in practice. Many of the features successfully used in previous editions have been retained in this 12th edition. Among the basic principles that helped to shape this and earlier editions of this book are (1) an unswerving conviction that the development of research skills is critical to the nursing profession, (2) a fundamental belief that research is intellectually and professionally rewarding, and (3) a steadfast opinion that learning about research methods does not need to be intimidating nor dull. Consistent with these principles, we have tried to present the fundamentals of research methods in a way that both facilitates understanding and arouses curiosity and interest. Key features of our approach include the following:

- **Research examples** Each chapter concludes with one or two actual research examples designed to highlight methodologic features described in the chapter and to sharpen the reader's critical thinking skills. In addition, many research examples are used throughout the book to illustrate key points and to stimulate ideas for a study. Many examples used in this edition are published as open-access articles that can be used for further learning and classroom discussion.
- **Specific practical tips on doing research** The textbook is filled with practical suggestions on how to translate the abstract notions of research methods into realistic strategies for conducting research. Every chapter includes several tips for applying the chapter's lessons to real-life situations. These tips are an acknowledgment that there is often a gap between what gets taught in research methods textbooks and what a researcher needs to know to conduct a study.
- **Critical appraisal guidelines** Almost all chapters include guidelines for conducting a critical appraisal of various aspects of a research report.
- **A comprehensive index** We have crafted an exceptionally thorough index. We know that our book is used as a reference book as well as a textbook, and we recognize how crucial it is to access needed information efficiently.
- **Aids to student learning** This book includes several additional features designed to enhance and reinforce learning, including the following: succinct, bulleted summaries at the end of each chapter; tables and figures that provide examples and graphic materials in support of the text discussion; and a detailed glossary.
- **Clear, user-friendly style** Our writing style is designed to be easily digestible and nonintimidating. Concepts are introduced carefully and systematically, difficult ideas are presented clearly, and readers are assumed to have no prior exposure to technical terms.

A Note About Language Used In This Book

Wolters Kluwer recognizes that people have a diverse range of identities, and we are committed to using inclusive and nonbiased language in our content. In line

with the principles of nursing, we strive not to define people by their diagnoses, but to recognize their personhood first and foremost, using as much as possible the language diverse groups use to define themselves and including only information that is relevant to nursing care.

We strive to better address the unique perspectives, complex challenges, and lived experiences of diverse populations traditionally underrepresented in health literature. When describing or referencing populations discussed in research studies, we will adhere to the identities presented in those studies to maintain fidelity to the evidence presented by the study investigators. We follow best practices of language set forth by the *Publication Manual of the American Psychological Association*, *7th edition*, but acknowledge that language evolves rapidly, and we will update the language used in future editions of this book as necessary.

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It is our hope that the content, style, and organization of *Nursing Research,* 12th Edition continue to meet the needs of a broad spectrum of nursing students and nurse researchers. We also hope that the book will help to foster enthusiasm for the kinds of discoveries that research can produce and for the knowledge that will help support an evidence-based nursing practice.

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Jane Flanagan is an Associate Professor and department chairperson at the William F. Connell School of Nursing, Boston College. Jane is a certified nurse practitioner and holds appointments as a nurse scientist at the Massachusetts General Hospital (MGH) Yvonne Munn Center for Nursing Research and as an associate clinical scientist at the Phyllis Cantor Center at the Dana-Farber Cancer Institute. Jane serves on the Board of Directors at the Sherrill House in Boston and as an advisor to the Board at Fox Hill Village in Westwood, MA.

Jane is the editor of the *International Journal of Nursing Knowledge* and *Visions,* the official journal of the Society of Rogerian Scholars in *Advances in Nursing Science*. Jane also serves on the editorial board for the *International Journal for Human Caring*. She is an appointed fellow in NANDA-I, the National Academy of Practice, and the American Academy of Nursing. She is the immediate past president of the Eastern Nursing Research Society (ENRS). Jane's funded research using mixed methods is focused on strategies to improve the experience of older adults—especially dementia caregivers and those with chronic health conditions.

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Dr. Beck is a Distinguished Professor at the University of Connecticut, School of Nursing. She also has a joint appointment in the Department of Obstetrics and Gynecology at the School of Medicine. She received her master's degree in maternal-newborn nursing and her certificate in nurse-midwifery from Yale University. Her Doctor of Nursing Science degree is from Boston University. She is a fellow in the American Academy of Nursing and is inducted into the Sigma Theta Tau International Nurse Researcher Hall of Fame and Sigma XI, the Scientific Research Honor Society. She was awarded the Marcé Medal by the International Marcé Society for Perinatal Mental Health for the significant contributions of her research program. She has received numerous other awards such as the Association of Women's Health, Obstetric and Neonatal Nursing's Distinguished Professional Service Award, the Distinguished Alumna Award from Yale University, and Eastern Nursing Research Society's Distinguished Researcher Award.

Over the past 40 years, Cheryl has focused her research efforts on developing a research program on postpartum mood and anxiety disorders. Her Postpartum Depression Screening Scale is based on her series of qualitative studies. She has published over 195 journal articles. In addition to coauthoring award-winning research methods textbooks with Denise Polit, Cheryl coauthored with Dr. Jeanne Watson Driscoll *Postpartum Mood and Anxiety Disorders: A Clinician's Guide*, which received the *2006 American Journal of Nursing Book of the Year Award*. Other books Cheryl has written include *Traumatic Childbirth*, *Developing a Program of Research in Nursing*, *Secondary Qualitative Data Analysis in the Health and Social Sciences*, and *Introduction to Phenomenology: Focus on Methodology.*

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Part 1

FOUNDATIONS OF NURSING RESEARCH AND EVIDENCE-BASED PRACTICE

Chapter 1 Introduction to Nursing Research in an Evidence-Based Practice Environment

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1

Introduction to Nursing Research in an Evidence-Based Practice Environment

Learning Objectives

1. Describe the importance of nursing research to clinical practice.
2. Recognize the historical trends and future directions of nursing research.
3. Identify the sources of evidence for nursing practice.
4. Outline the two paradigms of nursing research and the research methods associated with them.
5. Describe the difference between basic and applied nursing research.

NURSING RESEARCH IN PERSPECTIVE

Many factors have contributed to a heightened awareness of the need for nurses at all levels to recognize their role in designing, creating opportunities for, implementing, and disseminating knowledge for practice. While technical skill acquisition and competency remain essential to nursing academic and practice settings alike, there is a greater appreciation of the need for nurses to develop, translate, and implement the most trustworthy and sound evidence for practice. **Evidence-based practice (EBP)** is a process that considers not only the best evidence, but also patient preferences and circumstances, social determinants of health, and nurses' clinical judgment, to make informed patient care decisions. Given the nursing focus on health, healing and holism, the best evidence that guides nursing practice is informed by nurses and others with whom they collaborate.

What Is Nursing Research?

Research inquiry relies on a variety of methods to answer questions or solve problems. Nurses are increasingly engaged in research intended to improve patient care. **Nursing research** is designed to generate evidence about issues of importance to the delivery and outcomes of patient care and as a result, may include work focused on the nursing profession, practice, education, and administration. In this

book, we emphasize **clinical nursing research** aimed at guiding nursing practice that improves the health and quality of life of the patients, families/supports, and communities nurses serve.

Nursing research has experienced remarkable growth in the past few decades, providing nurses with a growing evidence base on which to practice. Yet many questions persist, and mechanisms for incorporating research innovations into nursing practice still are in development.

Examples of Nursing Research Questions

- What are the impact and effectiveness of telehealth-delivered psychoeducational and behavioral interventions among persons with dementia and their caregivers? (Saragih, et al., 2022)
- What is the effect of a web-based self-care program for patients with primary hypertension on cardiovascular risk-factors, self-efficacy, and self-care behaviors? (Chen et al., 2022)

The Importance of Research in Nursing

Findings from rigorous research provide evidence for informing nurses' decisions. Nurses have come to accept the desirability of incorporating research evidence into their actions, if the evidence shows that the actions are clinically appropriate and result in positive patient outcomes.

In some countries, research plays an important role in nursing credentialing and status. For example, the American Nurses Credentialing Center—an arm of the American Nurses Association and a prestigious credentialing organization in the United States—developed a Magnet Recognition Program to acknowledge healthcare organizations that provide high-quality nursing care. The 2023 Magnet application manual incorporates a perspective that recognizes global issues in nursing and healthcare. In addition to the 2017 revisions that strengthen evidence-based requirements, the 2021 manual calls for an example with supporting evidence of a clinical nurse who implemented a new or revised EBP practice within the organization (ANCC, 2023; Graystone, 2017). Applicants must now submit at least three nursing studies reflecting varied types of scholarship: Magnet hospitals must not only be involved in implementing EBP but also in the creation of original nursing research and the dissemination the new knowledge generated. Although it can be challenging to make direct correlations, there is evidence to suggest that Magnet hospitals with their focus on research and EBP may lead to some improved patient outcomes. For example, Aamodt et al. (2021) found that in patients with Parkinson disease, Magnet hospitals had lower rates of mortality and several nurse-sensitive outcomes than those admitted to non-Magnet hospitals, even when differences in other hospital characteristics were taken into account. Also Dierkes et al. (2021) reported that hospitals with Magnet status had 30% lower odds of value-

based purchasing penalties suggesting they had fewer hospital readmissions and hospital-acquired conditions in relation to non-Magnet hospitals.

The primary focus of the literature on hospital-based research nurse scientists prepared with a PhD and advanced practice nurses prepared as DNPs is about describing the role in practice. Future work will likely be focused on the impact of the nurse scientist generating original research and the DNP implementing the findings into practice with a focus on the impact on patient care outcomes.

Example of Evidence-Based Practice

The Fall TIPS Program (Dykes et al. (2020); Dykes & Hurley (2021) aimed at reducing the risk of falls in hospitalized patients is now routinely practiced nationwide in hospitals and other patient care facilities such as nursing home settings, but prior to its early development, there were no evidence-based options for preventing falls in the hospital settings despite the known risks to patients and extensive costs of care. Expanded adoption of this nurse-led program reflects mounting evidence that the Fall Tips Program prevents falls in hospitalized patients.

The Consumer–Producer Continuum in Nursing Research

Most nurses are likely to engage in research activities along a continuum of participation. At one end are consumers of nursing research, who read research reports or research summaries to keep up-to-date on findings that might affect their practice. EBP depends on well-informed research consumers.

At the other end of the continuum are producers of nursing research: nurses who conduct research. At one time, most nurse researchers were academics who taught in nursing schools, but research is increasingly being conducted by clinical nurses who seek solutions to recurring problems in patient care.

Between these end points on the continuum lie a variety of research activities that are undertaken by nurses. Even if you never personally carry out a study, you may (1) contribute to an idea for a clinical study; (2) gather information for a study; (3) advise clients about participating in research; (4) seek answers to a clinical problem by searching for and appraising research evidence; or (5) discuss the implications of a study in a **journal club** in your practice setting, which involves meetings (in groups or online) to discuss research articles. Understanding research can improve the depth and breadth of every nurse's professional practice.

TIP

The Cochrane Collaboration, an important organization for EBP, offers an online journal club resource with podcasts, slides, and discussion questions

(https://www.cochranelibrary.com/cdsr/journal-club). Journal clubs, including virtual ones, may help to create an environment of lifelong learning, foster a commitment to EBP, and stimulate nursing research (Rosen & Ryan, 2019).

Nursing Research in Historical Perspective

Table 1.1 summarizes some of the key events in the historical evolution of nursing research.

TABLE 1.1 • Historical Landmarks in Nursing Research

YEAR	EVENT
1859	Nightingale's Notes on Nursing is published.
1900	*American Journal of Nursing* begins publication.
1923	Columbia University establishes first doctoral program for nurses. Goldmark Report with recommendations for nursing education is published.
1936	Sigma Theta Tau awards first nursing research grant in the United States.
1948	Brown publishes report on inadequacies of nursing education.
1952	The journal *Nursing Research* begins publication.
1955	Inception of the American Nurses' Foundation to sponsor nursing research.

YEAR	EVENT
1957	Establishment of nursing research center at Walter Reed Army Institute of Research.
1963	*International Journal of Nursing Studies* begins publication.
1965	American Nurses' Association (ANA) sponsors nursing research conferences.
1969	*Canadian Journal of Nursing Research* begins publication.
1972	ANA establishes a Commission on Research and Council of Nurse Researchers.
1976	Stetler and Marram publish guidelines on assessing research for use in practice. *Journal of Advanced Nursing* begins publication.
1982	Conduct and Utilization of Research in Nursing (CURN) project publishes report.
1983	*Annual Review of Nursing Research* begins publication.
1985	ANA Cabinet on Nursing Research establishes research priorities.
1986	National Center for Nursing Research (NCNR) is established within U.S. National Institutes of Health.

YEAR	EVENT
1988	Conference on Research Priorities is convened by NCNR.
1989	The U.S. Agency for Health Care Policy and Research (AHCPR) is established.
1993	NCNR becomes a full institute, the National Institute of Nursing Research (NINR).
	The Cochrane Collaboration is established.
	Magnet Recognition Program makes first awards.
1995	Joanna Briggs Institute, an EBP collaborative, is established in Australia.
1997	Canadian Health Services Research Foundation is established with federal funding.
1998	The European Academy of Nursing Science (EANS) is launched.
1999	AHCPR is renamed Agency for Healthcare Research and Quality (AHRQ).
2000	NINR's annual funding exceeds $100 million. The Canadian Institute of Health Research is launched. Council for the Advancement of Nursing Science (CANS) is established.
2005	The Quality & Safety Education for Nurses (QSEN) initiative is inaugurated.

YEAR	EVENT
2006	NINR issues strategic plan for 2006–2010.
2010	The Institute of Medicine publishes a report, *The Future of Nursing*, that includes research priorities and recommendations for lifelong learning.
2011	NINR celebrates 25th anniversary and issues a new strategic plan.
2016	NINR issues *The NINR Strategic Plan: Advancing Science, Improving Lives*.
2019	NINR budget exceeds $145 million.
2022	NINR issues the 2022–2026 Strategic Plan with this mission: to lead nursing research to solve pressing health challenges and inform practice and policy-optimizing health and advancing health equity into the future.

Florence Nightingale is credited as the first nursing researcher. Her most well-known research contribution involved an analysis of factors affecting soldier mortality and morbidity during the Crimean War (1853–1856). Based on skillful analyses, she was successful in effecting changes in nursing care—and, more generally, in public health. After Nightingale's work, research was absent from the nursing literature until the early 1900s, but most early studies concerned nurses' education rather than patient care.

In the 1950s, research by nurses began to accelerate. For example, the American Nurses' Foundation, which is devoted to the promotion of nursing research, was founded. The surge in the number of studies conducted in the 1950s created the need for a new journal; *Nursing Research* came into being in 1952. As shown in Table 1.1, dissemination opportunities in professional journals grew steadily thereafter.

In the 1960s, nursing leaders expressed concern about the shortage of research on practice issues. Professional nursing organizations, such as the Western Interstate Council for Higher Education in Nursing, established research priorities,

and practice-oriented research on various clinical topics began to emerge in the literature.

During the 1970s, improvements in client care became a more visible research priority, and guidance on assessing research for application in practice settings emerged. Also, nursing research expanded internationally. For example, the Workgroup of European Nurse Researchers was established in 1978 to develop greater communication and opportunities for partnerships among 25 European National Nurses Associations.

In the United States, the National Center for Nursing Research (NCNR) at the National Institutes of Health (NIH) was established in 1986. Several forces outside of nursing also helped to shape the nursing research landscape in the 1980s. A group from the McMaster Medical School in Canada designed a clinical learning strategy that was called evidence-based medicine (EBM). EBM, which promulgated the view that research findings were superior to the opinions of authorities as a basis for clinical decisions, constituted a profound shift for medical education and practice, and has had a major effect on all healthcare professions.

Nursing research was strengthened and given more visibility when NCNR was promoted to full institute status within the NIH. In 1993, the **National Institute of Nursing Research (NINR)** was established, helping to put nursing research more into the mainstream of health research. Funding opportunities for nursing research expanded in other countries as well.

Current and Future Directions for Nursing Research

Nursing research continues to develop at a rapid pace and will undoubtedly flourish throughout the 21st century. Broadly speaking, the priority for future nursing research will be the promotion of excellence in nursing science. Toward this end, nurse researchers and practicing nurses will be sharpening their research skills and using those skills to address emerging issues of importance to the profession and its clientele. Among the trends we foresee for the early 21st century are the following:

- *Strengthening of* ***interprofessional collaboration*** *through team science.* Collaboration of nurses with researchers in related fields has expanded in the 21st century as researchers address fundamental healthcare problems with each member bringing their own disciplinary perspective to the design and implementation of the research. In turn, such collaborative efforts could lead to nurse researchers playing a more prominent role in national and international healthcare policies. One major recommendation in the Institute of Medicine's (IOM) influential 2010 report, *The Future of Nursing*, reiterated and expanded upon in the 2021 report, *The Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity* (Wakefield et al., 2021), was that nurses should be full partners with physicians and other healthcare professionals in redesigning healthcare with the goal of achieving health equity for all.
- *A new emphasis on health equity.* Along with the IOM, the NINIR Strategic Plan 2020–2026 calls for emphasis on health equity. NINR has embraced research focused on health equity, social determinants of health, population and

community health prevention and health promotion, systems, and models of care (NINR, 2020).

- *Continued focus on EBP.* Encouragement for nurses to engage in evidence-based patient care and lifelong learning is sure to continue. In turn, improvements will be needed both in the quality of studies and in nurses' skills in locating, understanding, critically appraising, and using relevant study results. Relatedly, there is an emerging interest in **translational research**, which involves research on how findings from studies can best be translated into practice.
- *Continued emphasis on research synthesis with an appreciation of the **systematic and narrative reviews***. Research syntheses that integrate research evidence across studies are the cornerstone of EBP. However, all types of reviews are critical to EBP. A systematic review is important because it uses a well-defined process to integrate research findings on a narrowly defined research question and includes a rating appraisal of the evidence. Clinical practice guidelines typically rely on such systematic reviews. We offer some guidance on how to create, as well as how to appraise, research syntheses in this book. Narrative reviews are equally important to nursing science as they provide perspective, highlight gaps in what is known, result in a deep understanding and a critique of the topic while often sparking the need for original research (Flanagan, 2022).
- *Expanded local research and quality improvement efforts in healthcare settings.* Projects designed to solve local problems are increasing. This trend will be reinforced as more nurses earn terminal degrees in nursing (DNP, PhD) and as hospitals apply for (and are recertified for) Magnet status in the United States and in other countries. Mechanisms need to be developed to ensure that evidence from these projects becomes available to others facing similar problems.
- *Increased emphasis on patient-centeredness.* **Patient centeredness** has become a central concern in healthcare, as well as in research. In the United States, the Patient-Centered Outcomes Research Institute funds research focused on assisting communities, patients, and their caregivers to make well-informed healthcare decisions with an enhanced commitment to diversity, equity, and inclusion. Efforts are increasing to ensure that research is relevant to patients and that patients play a role in setting research priorities. **Comparative effectiveness research**, which involves direct comparisons of alternative treatments, has emerged as an important tool for patient-centered research.
- *Relatedly, greater interest in the **applicability** of research.* More attention is being paid to figuring out how study results can be applied to individual patients or groups of patients. A limitation of the current EBP model is that standard strategies offer evidence on average effects of healthcare interventions under ideal circumstances. Ideas are emerging about how best to enhance the applicability of research in real-world settings.
- *Growing interest in defining and ascertaining **clinical significance***. Research findings increasingly must meet the test of being clinically significant, and patients have taken center-stage in efforts to define clinical significance.
- *Focusing on what nurses are likely to be studying in the future.* Although there is rich diversity in research interests—as we will illustrate throughout this book in the

research examples—research priorities have been articulated by several nursing organizations, including NINR, Sigma Theta Tau International, and other nursing organizations throughout the world. Change is a given as nursing must keep up with the trends that influence research agendas, but with a focus on the person, care partner, and community nursing is able to be nimble and respond to the demands.

SOURCES OF EVIDENCE FOR NURSING PRACTICE

Nurses make clinical decisions based on knowledge from many sources, including coursework, textbooks, and their own personal and clinical experiences. Because evidence is constantly evolving, learning about best practice nursing will persist throughout your career.

Some of what you have learned is based on systematic research, but some is not. What are the sources of evidence for nursing practice? Until recently, knowledge primarily was handed down from one generation to the next based on experience, trial and error, tradition, and expert opinion. A brief discussion of some alternative sources of evidence shows how research-based information is different.

Tradition and Authority

Decisions are sometimes based on custom or tradition. Certain "truths" are accepted as given, and such "knowledge" is so much a part of a common heritage that few seek validation. Some nursing interventions are based on custom and "unit culture" rather than on sound evidence. Indeed, one analysis suggested that some "sacred cows" (ineffective traditional habits) persisted even in a healthcare center recognized as a leader in EBP (Hanrahan et al., 2015).

Another common source of information is an authority, a person with specialized expertise. Reliance on authorities (such as faculty or textbook authors) is unavoidable but imperfect: authorities are not infallible, particularly if their expertise is based primarily on personal experience or out-of-date materials.

Clinical Experience and Trial and Error

Clinical experience is a functional source of knowledge and plays an important role in EBP. Yet personal clinical experience has some limitations as a knowledge source because each nurse's experience is too narrow to be generally useful. Moreover, the same objective event is often perceived differently by different nurses.

Trial and error involve trying alternatives successively until a solution to a problem is found. Trial and error may offer a practical means of securing knowledge, but the method tends to be haphazard and solutions may be idiosyncratic.

Logical Reasoning

Solutions to some problems are developed by logical reasoning, which combines experience, the intellect, and formal systems of thought. **Inductive reasoning** involves developing generalizations from specific observations. For example, a nurse may observe the anxious behavior of (specific) hospitalized children and conclude that (in general) children's separation from their parents is stressful. **Deductive reasoning** involves developing specific predictions from general principles. For example, if we assume that separation anxiety occurs in hospitalized children (in general), then we might predict that (specific) children in a hospital whose parents do not room-in will manifest symptoms of stress. Both types of reasoning are useful for understanding phenomena, and both play a role in research. Logical reasoning by itself, however, is limited because the validity of reasoning depends on the accuracy of the initial premises.

Assembled Information

In making clinical decisions, healthcare professionals rely on information that has been assembled for various purposes. For example, local, national, and international *benchmarking data* provide information on such issues as infection rates or the rates of various procedures (e.g., cesarean births) and can facilitate evaluations of clinical practices. Cost data—information on the costs associated with certain procedures, policies, or practices—are sometimes used as a factor in clinical decision-making. *Quality improvement and risk data*, such as medication error reports, can be used to assess the need for practice changes. Such sources are useful, but they do not provide a mechanism for making clinical decisions or guiding improvements.

Disciplined Research

Research conducted in a disciplined framework is the best method of acquiring knowledge. Nursing research combines logical reasoning with other features to create evidence that, although fallible, tends to be especially reliable. Carefully synthesized findings from rigorous research are especially valuable. The current emphasis on EBP requires nurses to base their clinical practice to the greatest extent possible on research-based findings rather than on tradition, authority, intuition, or personal experience—although nursing will always remain a rich blend of art and science.

PARADIGMS AND METHODS FOR NURSING RESEARCH

A **paradigm** is a world view, a general perspective on the complexities of the world. Paradigms for human inquiry are often characterized in terms of the ways in which they respond to basic philosophical questions, such as, "What is the nature of reality?" and "What is the relationship between the inquirer and those being studied?"

Disciplined inquiry in nursing has been conducted mainly within two broad paradigms, *positivism* and *constructivism*. This section describes these two paradigms and outlines the research methods associated with them. In later

chapters, we describe the transformative paradigm that underpins critical theory research (Chapter 22) and a pragmatism paradigm that underlies mixed methods research (Chapter 27).

The Positivist Paradigm

The paradigm that dominated healthcare research for decades is called **positivism** (or *logical positivism*). Positivism is rooted in 19th century thought, guided by such philosophers as Newton and Locke. Positivism reflects a broader cultural phenomenon (*modernism*) that emphasizes the rational and the scientific.

A fundamental assumption of positivists is that there is a reality *out there* that can be studied and known. (An **assumption** is a basic principle that is believed to be true without proof.) Adherents of positivism assume that nature is basically ordered and regular and that reality exists independent of human observation (Table 1.2). The related assumption of **determinism** refers to the positivists' belief that phenomena are not haphazard but rather have antecedent causes. If a person has a cerebrovascular accident, a positivist assumes that there must be a reason that can be potentially identified. Within this paradigm, much research activity is aimed at understanding the underlying causes of phenomena.

TABLE 1.2 • Major Assumptions of the Positivist and Constructivist Paradigms

PHILOSOPHICAL QUESTION	POSITIVIST PARADIGM ASSUMPTION	CONSTRUCTIVIST PARADIGM ASSUMPTION
What is the nature of reality?	Reality exists; there is a real world driven by real natural causes	Reality is multiple and subjective, mentally constructed by individuals
In what way is the researcher related to those being researched?	The researcher is independent from those being researched; findings are not influenced by the researcher	The researcher interacts with those being researched; findings are the creation of the interactive process
What is the role of values in the inquiry?	Values and biases are to be held in check; objectivity is sought	Subjectivity and values are inevitable and desirable
What are the best methods for obtaining evidence?	Deductive processes → hypothesis testing	Inductive processes → hypothesis generation
	Emphasis on discrete, specific concepts	Emphasis on entirety of a phenomenon, holistic
	Focus on the objective and quantifiable	Focus on the subjective and nonquantifiable

PHILOSOPHICAL QUESTION	POSITIVIST PARADIGM ASSUMPTION	CONSTRUCTIVIST PARADIGM ASSUMPTION
	Outsider knowledge—researcher is external, separate	Insider knowledge—researcher is part of the process
	Fixed, prespecified design	Flexible, emergent design
	Controls over context	Context-bound
	Large, representative samples	Small, information-rich samples
	Measured (quantitative) information	Narrative (unstructured) information
	Statistical analysis	Qualitative analysis
	Seeks generalizations	Seeks in-depth understanding

Positivists value objectivity and attempt to hold personal beliefs and biases in check. The positivists' scientific approach involves using orderly procedures with tight controls of the research situation to test hunches about the phenomena being studied.

Strict positivist thinking has been challenged, and few researchers adhere to the tenets of pure positivism. In the **post positivist paradigm**, there is a belief in reality and a desire to understand it, but post positivists recognize the impossibility of total objectivity. They do, however, see objectivity as a goal and strive to be as neutral as possible. Post positivists also recognize the obstacles to knowing reality with certainty and therefore seek *probabilistic* evidence—i.e., learning what the true state of a phenomenon *probably* is. This modified positivist position remains a dominant force in healthcare research. For the sake of simplicity, we refer to it as positivism.

The Constructivist Paradigm

The **constructivist paradigm** (also called the *naturalistic paradigm*) began as a countermovement to positivism with writers such as Weber and Kant. Just as positivism reflects the cultural phenomenon of modernism that burgeoned after the industrial revolution, naturalism is an outgrowth of the cultural transformation called postmodernism. Postmodern thinking emphasizes the value of deconstruction, taking apart old ideas and structures, and reconstruction, putting ideas and structures together in new ways. The constructivist paradigm represents a major alternative system for conducting disciplined research in nursing. Table 1.2 compares the major assumptions of the positivist and constructivist paradigms.

For the naturalistic inquirer, reality is not a fixed entity but rather is a construction of the people participating in the research; reality exists within a context, and many constructions are possible. Naturalists thus take the position of relativism: if there are multiple interpretations of reality that exist in people's minds, then there is no process by which the ultimate truth or falsity of the constructions can be determined.

The constructivist paradigm assumes that knowledge is maximized when the distance between the researcher and those under study is minimized. The voices and interpretations of study participants are crucial to understanding the phenomenon of interest. Findings in a constructivist inquiry are the product of the interaction between the inquirer and the participants.

Paradigms and Methods: Quantitative and Qualitative Research

Research methods are the techniques researchers use to structure a study and to gather and analyze information relevant to the research question. The two alternative paradigms correspond to different approaches to developing evidence. A key methodologic distinction is between **quantitative research**, which is most closely allied with positivism, and **qualitative research**, which is associated with constructivist inquiry—although positivists sometimes undertake qualitative studies and constructivist researchers sometimes collect quantitative information. This section provides an overview of the methods associated with the two paradigms.

The Scientific Method and Quantitative Research

The traditional **scientific method** refers to a set of orderly, disciplined procedures used to acquire information. Quantitative researchers use deductive reasoning to generate predictions that are tested in the real world. They typically move in a systematic fashion from the definition of a problem and the selection of concepts on which to focus, to the solution of the problem. By **systematic**, we mean that the investigator progresses logically through a series of steps, according to a prespecified plan of action.

Quantitative researchers use various control strategies. **Control** involves imposing conditions on the research situation so that biases are minimized and validity is maximized. Control mechanisms are discussed at length later in this book.

Quantitative researchers gather **empirical evidence**—evidence that is rooted in objective reality and gathered through the senses (e.g., through sight or hearing). Observations of the presence or absence of skin inflammation, patients' agitation, or infant birth weight are all examples of empirical observations. Reliance on empirical evidence means that findings are grounded in reality rather than in researchers' personal beliefs.

Evidence for a study in the positivist paradigm is gathered according to an established plan, using structured methods to collect needed information. Usually

the information gathered is **quantitative**—that is, numeric information that is obtained through a formal *measurement* and is analyzed statistically.

A traditional scientific study strives to go beyond the specifics of a research situation. For example, quantitative researchers are typically not as focused on understanding why a particular person has a stroke as in understanding what factors generally influence its occurrence in people. The degree to which research findings can be generalized to individuals other than those who participated in a study is called **generalizability**.

The scientific method has enjoyed considerable stature as a method of inquiry and has been used productively by nurse researchers studying a wide range of nursing problems. This approach cannot, however, solve all nursing problems. One important limitation—common to both quantitative and qualitative research—is that research cannot be used to answer moral or ethical questions. Many intriguing questions about humans fall into this area—questions such as whether euthanasia should be practiced or abortion should be legal.

The traditional research approach also must address measurement challenges. To study a phenomenon, quantitative researchers try to measure it using numeric values that express quantity. For example, if the phenomenon of interest is patient stress, researchers would want to assess if patients' stress is high or low. Physiologic phenomena like blood pressure can be measured with great accuracy and precision, but measuring psychological phenomena (e.g., stress, resilience, depression) is challenging.

Another issue is that nursing research focuses on humans, who are inherently complex and diverse. Quantitative studies typically concentrate on relatively few concepts (e.g., weight gain, fatigue, pain). Complexities tend to be controlled and, if possible, eliminated, rather than studied directly, and this narrowness of focus can sometimes obscure insights. Quantitative research within the positivist paradigm has been accused of an inflexibility of vision that fails to capture the full breadth of human experience.

Constructivist Methods and Qualitative Research

Researchers in constructivist traditions emphasize the inherent complexity of humans, their ability to shape and create their own experiences, and the idea that truth is a composite of realities. Constructivist studies focus on understanding the human experience as it is lived, usually through the collection and analysis of qualitative materials that are narrative and subjective.

Researchers who criticize the scientific method believe that it is overly reductionist—that is, it reduces human experience to the few concepts under investigation, and those concepts are defined in advance by the researcher rather than emerging from the perspective of those under study. Constructivist researchers tend to emphasize the dynamic and holistic aspects of human life and attempt to capture those aspects in their entirety.

Researchers use flexible, evolving procedures to capitalize on findings that emerge during the study. Constructivist inquiry often takes place in the **field** (i.e., in naturalistic settings), sometimes over an extended time period. In constructivist

research, the collection of information and its analysis typically progress concurrently; as researchers sift through information, they gain insights, new questions emerge for them, and they seek further evidence to amplify or confirm the insights. Through an inductive process, researchers integrate information to develop a theory or description that helps illuminate the phenomenon of interest.

Constructivist studies yield rich, in-depth information that can elucidate varied dimensions of a complicated phenomenon. Findings from qualitative research are typically grounded in the real-life experiences of people with first-hard knowledge of a phenomenon. Nevertheless, the approach has several limitations. Human beings are used directly as the instrument through which information is gathered, and humans are extremely intelligent and sensitive—but fallible—tools. The subjectivity that enriches the analytic insights of skillful researchers can yield trivial and obvious "findings" among less competent ones.

Another potential limitation involves the subjectivity of constructivist inquiry, which sometimes raises concerns about the idiosyncratic nature of the conclusions. Would two constructivist researchers studying the same phenomenon in similar settings arrive at similar conclusions? The situation is further complicated by the fact that most constructivist studies involve a small group of participants. Thus, the generalizability of findings from constructivist inquiries is sometimes a potential concern.

Multiple Paradigms and Nursing Research

Paradigms should be viewed as lenses that help to sharpen our focus on phenomena, not as blinders that limit intellectual curiosity. Nursing knowledge would be thin if there were not a rich array of methods available within the two paradigms—methods that are often complementary in their strengths and limitations. We believe that intellectual pluralism is advantageous.

We have emphasized differences between the two paradigms and associated methods so that distinctions would be easy to understand. Subsequent chapters of this book elaborate further on differences in terminology, methods, and research products. It is equally important to note, however, that the two main paradigms have many features in common, only some of which are mentioned here:

- *Ultimate goals.* The aim of disciplined research, regardless of paradigm, is to answer questions and solve problems. Both quantitative and qualitative researchers seek to capture the truth about an aspect of the world in which they are interested, and both groups can make meaningful contributions to evidence for nursing practice.
- *External evidence.* Although the word *empiricism* has come to be associated with the classic scientific method, researchers in both traditions gather and analyze evidence empirically, that is, through their senses.
- *Reliance on human cooperation.* Human cooperation is essential in both qualitative and quantitative research. To understand people's circumstances and experiences, researchers must persuade them to participate in the investigation *and* to speak and act candidly.

- *Ethical constraints.* Research with human beings is guided by ethical principles that sometimes are at odds with research goals. Ethical dilemmas sometimes confront researchers, regardless of paradigm or method.
- *Fallibility of disciplined research.* Virtually all studies have limitations. Every research question can be addressed in many ways, and inevitably there are tradeoffs. The fallibility of any single study makes it important to understand and critically appraise researchers' methodologic decisions when evaluating evidence quality.

Thus, researchers using traditional scientific or constructivist methods face many similar challenges despite philosophic and methodologic differences. The selection of an appropriate method depends on researchers' personal philosophy and on the research question. If a researcher asks, "What are the effects of cryotherapy on nausea and oral mucositis in patients undergoing chemotherapy?" the researcher needs to study effects by carefully measuring patient outcomes. On the other hand, if a researcher asks, "What is the process by which parents learn to cope with the death of a child?" the researcher would be hard pressed to quantify such a process. Personal world views of researchers help to shape their questions.

In reading about the alternative paradigms for nursing research, you likely were more attracted to one of the two paradigms. It is important, however, to learn about both approaches to disciplined inquiry and to recognize their respective strengths and limitations. In this textbook, we describe methods associated with both qualitative and quantitative research to assist you in becoming methodologically bilingual. This is especially important because large numbers of nurse researchers are now undertaking **mixed methods research** that involves the collection and analysis of both qualitative and quantitative data (Chapters 27–29).

THE PURPOSES OF NURSING RESEARCH

The general purpose of nursing research is to answer questions and solve problems of relevance to nursing. Specific purposes can be classified in various ways. For example, a distinction sometimes is made between basic and applied research. **Basic research** is undertaken to discover general principles of human behavior and biophysiologic processes. Some basic research (*bench research*) is performed in laboratory settings and focuses on the molecular and cellular mechanisms that underlie disease. **Applied research** is aimed at examining how basic principles can be used to solve practice problems. Nurse researchers undertake both types of research.

Another way to classify research purposes concerns the extent to which studies provide explanatory information. Specific study goals can range along a descriptive/explanatory continuum, but a fundamental distinction is between studies whose primary intent is to describe phenomena and those that are **cause-probing**—that is, designed to illuminate the underlying causes of phenomena. The descriptive/explanatory continuum includes studies whose purposes are identification, description, exploration, prediction/control, and explanation of health-related phenomena. For each purpose, various types of questions are addressed—some more amenable to qualitative than to quantitative inquiry, and vice versa. Table 1.3 gives examples of questions asked for these purposes.

TABLE 1.3 • Research Purposes and Questions on the Description/Explanation Continuum

PURPOSE	TYPES OF QUESTIONS: QUANTITATIVE RESEARCH	TYPES OF QUESTIONS: QUALITATIVE RESEARCH
Identification		What is this phenomenon? What is its name?
Description	How prevalent is the phenomenon? How often does the phenomenon occur? How intense is the phenomenon?	What are the dimensions or characteristics of the phenomenon? What is important about the phenomenon?
Exploration	What factors are related to the phenomenon? What are the antecedents of the phenomenon?	What is the full nature of the phenomenon? What is really going on here? How is the phenomenon experienced? What is the process by which the phenomenon evolves?
Explanation	What is the underlying cause of the phenomenon? Does the theory explain the phenomenon?	How does the phenomenon work? What does the phenomenon mean? How did the phenomenon occur?
Prediction	If phenomenon X occurs, will phenomenon Y follow? What will happen if we modify a phenomenon or introduce an intervention?	–
Control	Can the occurrence of the phenomenon be prevented or controlled?	–

In both nursing and medicine, researchers have written several books to facilitate EBP, and these books categorize studies in terms of the types of information needed by clinicians (Guyatt et al., 2015; Melnyk & Fineout-Overholt, 2022). These writers focus on several types of clinical purposes:

Therapy/intervention; Diagnosis/assessment; Prognosis; Etiology (causation)/prevention of harm; Description; and Meaning/process.

Therapy/Intervention

Therapy/intervention questions are addressed by healthcare researchers who want to learn about the effects of specific actions, products, or processes. Typically, researchers addressing this type of question are evaluating whether a new treatment or a practice change has beneficial effects.

The name "Therapy" for this category originates from promoters of EBP in medicine who focused on studies of the effects of "therapeutic" medical interventions, such as new drugs or surgical procedures. However, this category should be thought of more broadly to include research on the effects of alternative ways of doing things, usually with the intent of testing strategies for making improvements. Therapy questions are foundational for evidence-based decision-making. Evidence for changes to nursing practice, nursing education, and nursing administration comes from studies that have specifically tested the effects of intervening in a particular way. Table 1.4 provides some examples of studies in which nurse researchers addressed diverse Therapy/intervention questions. If such questions are answered in a rigorous fashion, the evidence might suggest a practice change or the implementation of an institutional innovation.

TABLE 1.4 • Examples of Therapy/Intervention Questions

THERAPY/INTERVENTION QUESTION	AREA OF FOCUS
Does an education intervention improve teenagers' knowledge and behaviors relating to contraception? (Pivatti et al., 2019)	Nursing practice
Do muscle relaxation or nature sounds reduce fatigue in patients with heart failure? (Seifi et al., 2018)	Nursing practice
Does a nurse-led phone follow-up education program reduce cardiovascular risk among patients with cardiovascular disease? (Zhou et al., 2018)	Nursing practice
Does a simulation-based palliative care communication skill workshop improve self-perception of skills in expressing empathy and discussing spiritual issues among healthcare workers and students? (Brown et al., 2018)	Interprofessional education
Does simulation improve the ability of first year nursing students to learn vital signs? (Eyikara & Baykara, 2018)	Nursing education
Does a bundle of interventions to support nurses' engagement in evidence-based practice (EBP) increase their knowledge, attitudes, and use of library resources? (Carter et al., 2018)	Nursing administration

Studies in this category range from evaluations of highly specific treatments (e.g., comparing two types of cooling blankets for febrile patients) to assessments of complex multisession interventions designed to change behaviors (e.g., nurse-led health promotion programs). **Intervention research** is essential for EBP, and nurses are increasingly engaging in this type of research. Research addressing Therapy questions is inherently cause-probing: the researcher wants to know if a certain intervention will cause improved outcomes.

Diagnosis/Assessment

A burgeoning number of nursing studies concern the rigorous development and evaluation of formal instruments to screen, diagnose, and assess patients and to measure important clinical outcomes—that is, they address **Diagnosis/assessment questions**. High-quality instruments with documented accuracy are essential for both clinical practice and research. Typically, the question being addressed is "Does this new instrument yield reliable and valid information about an outcome, situation, or condition of importance to nursing?" Studies addressing Diagnosis questions are not cause-probing.

Example of a Study Aimed at Diagnosis/Assessment

Banister et al. (2022) examined the nursing assessment and documentation recorded in the electronic health records of patients admitted over 1 month during the height of the COVID-19. Using a nursing assessment framework, they captured the clinical decision-making, nursing diagnoses, and key social determinant of health.

Prognosis

Researchers who ask **Prognosis questions** strive to understand the outcomes that are associated with a disease or a health problem (i.e., its consequences), to estimate the probability the outcomes will occur, and to predict the types of people for whom the outcomes are most likely. Such studies facilitate the development of long-term care plans for patients and can suggest the need for appropriate interventions. For example, Prognosis studies provide valuable information for guiding patients to make lifestyle choices or to be vigilant for key symptoms. Prognosis questions are typically cause-probing; the researcher wants to know if, for example, a certain disease or behavior causes subsequent adverse outcomes.

Example of a Study Aimed at Prognosis

Lazard et al. (2020) studied a peer-to-peer app aimed at promoting social support in young cancer survivors to determine their preferences for such a

tool.

Etiology (Causation)/Prevention of Harm

Nurses encounter patients who face potentially harmful exposures as a result of environmental agents or because of personal behaviors or characteristics. Providing information to patients about such harms and how best to avoid them depends on the availability of accurate evidence about factors that contribute to health risks. For example, there would be no smoking cessation programs if research had not provided strong evidence that smoking cigarettes causes or contributes to a wide range of health problems. Thus, identifying factors that affect or cause illness, mortality, or morbidity is an important purpose of many nursing studies. **Etiology questions** are inherently cause-probing—the purpose is to understand factors that cause health problems.

Example of a Study Aimed at Identifying and Preventing Harm

Wang et al. (2023) conducted a randomized clinical control trial to compare a midwife-led weight management program to a control group. Findings indicated that the nurse midwife-led weight management program encouraged appropriate gestational weight gain, health literacy, and improved the experience of antenatal care.

Description

Description questions are not in a category typically identified in EBP-related classification schemes, but so many nursing studies have a descriptive purpose that we include it here. Examples of phenomena that nurse researchers have described include patients' pain, physical function, confusion, and levels of depression. Quantitative description focuses on the prevalence, size, intensity, and measurable attributes of phenomena. Qualitative researchers, by contrast, describe the dimensions or the evolution of phenomena.

Example of a Quantitative Study Aimed at Description

Schoenfisch et al. (2019) did a study to describe hospital nursing staff's use of lift or transfer devices. They found that only 40% of the nurses used equipment for at least half of lifts/transfers.

Example of a Qualitative Study Aimed at Description

Dickins et al. (2021) undertook a study among low-income midlife and older women to describe the patterns of healthcare use, facilitators, barriers, and opportunities to optimize primary/preventive care engagement.

Meaning/Process

Designing effective interventions, motivating people to comply with treatments and health promotion activities, and providing sensitive advice to patients are among the many healthcare activities that can benefit from understanding clients' perspectives. Research that provides evidence about what health and illness mean to clients, what barriers to positive health practices they face, and what processes they experience in a transition through a healthcare crisis are important to evidence-based nursing practice. Studies that address **Meaning/process questions** are seldom focused on identifying the underlying causes of phenomena but might offer important clues.

Example of a Study Aimed at Understanding Meaning/Process

Mattson and coresearchers (2024) studied the process by which women use self-management of opioid recovery through pregnancy and early parenting.

Study Purposes and Evidence-Based Practice

Studies that address therapy/intervention questions provide the most direct evidence for EBP. If we want to know, for example, whether wedge-shaped foam cushions are more effective in preventing heel pressure ulcers than standard foam pillows, we would need to look for rigorous studies that have addressed this therapy question. However, other questions also play a role in improving the quality of nursing care, albeit in different ways.

Table 1.5 presents examples of different types of questions relating to cigarette smoking, using the study purpose categories we just described. Only one of these questions is directly actionable—the Therapy question. If there is strong evidence that nurse-led smoking cessation programs are effective in reducing smoking among young adults, we might consider initiating such a program in our own community.

TABLE 1.5 • Different Categories of Questions Related to Cigarette Smoking

TYPE OF QUESTION	EXAMPLE OF A RELATED RESEARCH QUESTION ON CIGARETTE SMOKING
Therapy/interv ention	Does a nurse-led smoking cessation program for young adults reduce smoking?
Diagnosis/asses sment	Is our Smoking Susceptibility Index a valid and reliable measure of propensity to initiate smoking in teenagers?
Prognosis	Is a diagnosis of smoking-related lung cancer associated with increased risk of suicidal ideation?
Etiology (causation)/pre vention of harm	Does being poor increase the risk that a person will smoke cigarettes?
Description	What percentage of high school students smoke 1+ packs of cigarettes/week, and what percentage of smokers have tried to quit?
Meaning/proce ss	What is it like for long-term smokers to attempt and fail at quitting?

If the other questions in Table 1.5 were answered in rigorous studies, the evidence could also play a role in guiding efforts to improve nursing practice—but not as directly. Answers to some of these questions might help target those most in need of an intervention. For example, based on studies addressing the Diagnosis question, we could launch a prevention effort aimed at teenagers with high scores on the evidence-based Smoking Susceptibility Index, or results from an Etiology study might lead us to offer a smoking-cessation initiative in low-income neighborhoods. Evidence from the Prognosis question might prompt us to develop a strong program of emotional support for patients with lung cancer. We might be motivated to implement an intervention for high school students if we knew that rates of smoking were high (the Description question). And, if we knew that a high percentage of smokers in our community had been unsuccessful in efforts to quit, we might design an intervention with that information in mind. The stories from long-term smokers who failed to quit despite efforts to do so (the Meaning question) could lead us to involve them in the design of an intervention for hardened smokers.

Nurse researchers are making strides in addressing all types of questions about important health problems—but evidence regarding what “works” to address problems comes from studies focused on Therapy questions. Evidence about the scope of a problem, factors affecting the problem, the consequences of the problem, and the meaning of the problem can, however, play a crucial role in efforts to design better interventions, to aim our resources at those in greatest need, and to provide appropriate guidance to clients in everyday practice.

ASSISTANCE FOR USERS OF NURSING RESEARCH

This book is designed primarily to help you develop skills for conducting research, but in an environment that stresses EBP, it is extremely important to hone your skills in reading, evaluating, and using nursing studies. We provide specific guidance to consumers in most chapters by including guidelines for critically appraising aspects of a study covered in the chapter. The questions in Box 1.1 are designed to assist you in using the information in this chapter in an overall preliminary assessment of a research report.

BOX 1.1 Questions for a Preliminary Overview of a Research Report

1. How relevant is the research question in this study to the actual practice of nursing? Does the study focus on a topic that is a priority area for nursing research?
2. Was the research quantitative or qualitative?
3. What was the underlying purpose (or purposes) of the study—identification, description, exploration, explanation, or prediction and control? Does the purpose correspond to an EBP focus such as therapy/intervention, diagnosis/assessment, prognosis, etiology (causation)/prevention of harm, description, or meaning/process?
4. Is this study fundamentally cause-probing?
5. What might be some clinical implications of this research? To what type of people and settings is the research most relevant? If the findings are valid, how might I use the results of this study in my clinical work?

RESEARCH EXAMPLES

Each chapter of this book presents brief descriptions of studies conducted by nurse researchers, focusing on aspects emphasized in the chapter. Read the full journal articles to learn more about the methods and results of these studies.

Research Example of a Quantitative Study

Study: Psychosocial predictors of adverse outcomes in rural heart failure (HF) caregivers (Grant et al., 2021).

Study purpose: The purpose of the study was to examine whether social support, problem solving, and family function predicted depressive symptoms, caregiving-related life changes, self-care, and caregiver burden in rural HF caregivers and (2) to compare the findings related to these variables to those in urban caregivers.

Study methods: The sample was recruited using multiple strategies including social media and face-to-face strategies. There was a total sample of 540 (rural = 114, urban = 426) participants who completed online surveys that captured demographic information and measures related to social support, problem-solving, self-care, family functioning, depressive symptoms, caregiver burden, and life changes. A secondary analysis was conducted to compare the two groups.

Key findings: Rural caregivers experienced significantly less social support, had fewer problem-solving skills and more family functioning challenges, and had greater depressive symptoms and more subjective burden than the urban participants. There were no significant differences in caregiver self-care or perceived life changes between the two groups.

Conclusions: Grant and colleagues concluded that social support and problem solving have significant effects on depressive symptoms in rural HF caregivers. Problem solving and family function also affect caregiver burden, while social support and family functioning influence caregiver life changes.

Research Example of a Qualitative Study

Study: Perspectives of Maternal Mortality Among Women Who Live in Indiana (Renbarger et al., 2023).

Study purpose: The purpose of this descriptive qualitative study was to explore the perspectives of women in the lay public in Indiana on the topic of maternal mortality.

Study methods: Twenty women were recruited from Facebook groups aimed at women with children. Researchers used semi-structured phone interviews and asked participants to describe their understanding of maternal mortality and their related experiences.

Key findings: Analysis of the interviews revealed three main themes: (1) Women are not worried about mortality until they experience pregnancy complications, (2) Women have limited information on maternal mortality, and (3) Women often feel dismissed during maternity care.

Conclusions: Nurses and other clinicians need to increase their efforts to effectively communicate about maternal morbidity and to follow evidence-based guidelines for respectful maternity care.

SUMMARY POINTS

- **Nursing research** is systematic inquiry undertaken to develop evidence on problems of importance to nurses. Nurses are adopting an **evidence-based practice (EBP)** that incorporates research findings into their clinical decisions.
- Nurses can participate in a range of research-related activities that span a continuum from being consumers of research (those who read and evaluate

studies) to being producers of research (those who design and undertake studies). Engagement with research often occurs in practice settings through participation in a **journal club**.

- Nursing research began with Florence Nightingale but developed slowly until its rapid acceleration in the 1950s. Since the 1980s, the focus has been on **clinical nursing research**—that is, on problems relating to clinical practice.
- The **National Institute of Nursing Research (NINR)**, established at the U.S. National Institutes of Health in 1993, affirms the stature of nursing research in the United States.
- Contemporary issues in nursing research include the growth of EBP, expansion of local research and quality improvement efforts, research synthesis through **systematic reviews**, **interprofessional** studies, **patient-centeredness** in both clinical care and in research, interest in the **applicability** of research to individual patients or groups, interest in precision healthcare and symptom science, and efforts to measure the **clinical significance** of research results.
- Disciplined research stands in contrast to other knowledge sources for nursing practice, such as tradition, authority, personal experience, trial and error, and logical reasoning.
- Nursing research is conducted mainly within one of two broad **paradigms**—world views with underlying **assumptions** about reality: the positivist and the constructivist paradigms.
- In the **positivist paradigm**, it is assumed that there is an objective reality and that natural phenomena are orderly. The assumption of **determinism** is the belief that phenomena result from prior causes and are not haphazard.
- In the **constructivist** (naturalistic) **paradigm**, it is assumed that reality is not fixed, but it is a construction of human minds; "truth" is a composite of multiple constructions of reality.
- The positivist paradigm is associated with **quantitative research**—the collection and analysis of numeric information. Quantitative research is typically conducted within the traditional **scientific method**, which is a systematic, controlled process. Quantitative researchers gather and analyze **empirical evidence** (evidence collected through the human senses) and strive for **generalizability** of their findings.
- Researchers within the constructivist paradigm emphasize understanding the human experience as it is lived through the collection and analysis of subjective, narrative materials using flexible procedures that evolve in the **field**; this paradigm is associated with **qualitative research**.
- **Basic research** is designed to extend the knowledge base for the sake of knowledge itself. **Applied research** focuses on discovering solutions to immediate problems.
- A fundamental distinction, especially relevant in quantitative research, is between studies whose primary intent is to describe phenomena and those that are **cause-probing**—i.e., designed to illuminate underlying causes of phenomena.

Specific research purposes on the description/explanation continuum include identification, description, exploration, prediction/control, and explanation.

- Nursing studies can be classified in terms of several EBP-related aims: **Therapy/intervention**; **Diagnosis/assessment**; **Prognosis**; **Etiology** (causation)/prevention of **harm**; **Description**; and **Meaning/process**. Rigorous answers to Therapy questions are foundational for EBP.

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2

Evidence-Based Nursing: Translating Research Evidence Into Practice

Learning Objectives

1. Define evidence-based practice and its importance to nursing.
2. Identify various types of reviews conducted to synthesize research findings.
3. Describe the pros and cons of clinical guidelines.
4. Describe the common features of the various models of evidence-based practice.

INTRODUCTION

Evidence-based practice (EBP) has been a major force in the health professions for the past few decades. In nursing, many organizations and initiatives have promoted EBP. For example, EBP has been named as one of the six core competencies in the Quality and Safety Education for Nurses initiative (Tracy & Barnsteiner, 2021).

This book will help you to develop skills to generate, and to evaluate, research evidence for nursing practice. Before we delve into the "how-tos" of research, we discuss key aspects of EBP to clarify the key role that research plays in EBP.

BACKGROUND OF EVIDENCE-BASED NURSING PRACTICE

This section provides a context for understanding evidence-based nursing practice and closely related concepts.

Definition of Evidence-Based Practice

Dozens of definitions of EBP have been proposed. Here is the one offered by Melnyk and Fineout-Overholt (2019) in their textbook on EBP: "A paradigm and lifelong problem-solving approach to clinical decision making that involves the conscientious use of the best available evidence (including a systematic search for and critical appraisal of the most relevant evidence to answer a clinical question) with one's own clinical expertise and patient values and preferences to improve outcomes for individuals, communities, and systems" (p. 753). This definition, like many others, declares that EBP is a *decision-making* (or *problem-solving*) *process*. Most definitions also include the idea that EBP is built on a "three-legged stool," each "leg" of which is essential to the process: *best evidence, clinical expertise*, and *patient preferences and values.* Figure 2.1 depicts these concepts.

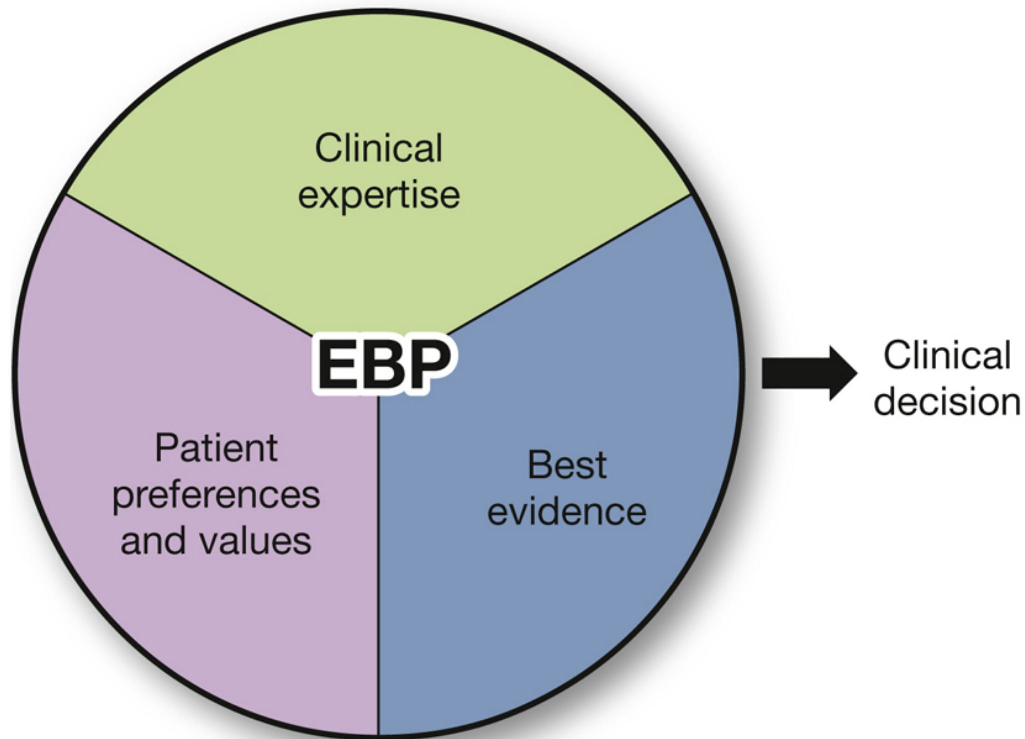

FIGURE 2.1 Evidence-based practice components.

TIP

Huo et al. (2022) conducted a concept analysis of evidence-based practice (EBP). They identified 11 core elements related to the process. They propose that EBP is a transformative process involving dynamic capabilities informing leadership and educators alike in the implementation of EBP aimed at improving patient care outcomes.

Best Evidence

A basic feature of EBP as a clinical problem-solving strategy is that it de-emphasizes decisions based on tradition or expert opinions. The emphasis is on identifying and evaluating the best available research evidence as a tool for solving problems.

TIP

The consequences of *not* using research evidence can be devastating. For example, from 1956 through the 1980s, Dr. Benjamin Spock—who was considered an expert on the care of infants—published a top-selling book, *Baby and Child Care*. Spock advised putting babies on their stomachs to sleep. In their systematic review, Gilbert et al. (2005) wrote, “Advice to put infants to sleep on the front for nearly half a century was contrary to evidence from 1970 that this was likely to be harmful” (p. 874). They estimated that if medical advice had been guided by research evidence, over 60,000 infant deaths might have been prevented.

There continues to be debate about what qualifies as "*best*" evidence. Numerous organizations and authors have created *evidence hierarchies* that rank evidence sources according to the degree to which they provide unbiased evidence to guide clinical decisions. We discuss evidence hierarchies in more detail later in this chapter. Evidence, however, whether "best" or not, is never by itself a sufficient basis for clinical decision-making.

Patient Values and Preferences

Patient-centered care has been defined by the Institute of Medicine (2001) as "providing care that is respectful of and responsive to individual patient preferences, needs and values, and ensuring that patient values *guide* all clinical decisions." Patient-centered care is an important feature of EBP.

"Patient preferences" encompass several concepts, including patient preferences for type of treatment; preferences for being involved in decision-making; patients' social or cultural values; preferences about involving family members in healthcare decisions; patients' priorities regarding quality-of-life issues; and their spiritual or religious values. Decisions also require understanding patients' circumstances, such as the resources at their disposal. Nurses thus need the skills to elicit and understand patient preferences—and to communicate information about "best evidence" to patients.

Clinical Expertise and Experiential Evidence

Decision-making in clinical practice ultimately relies on clinicians' expertise, which is an amalgam of academic knowledge gained during training and continuing education, experiences with patient care, and interdisciplinary sharing of new knowledge. David Sackett, the pioneer of evidence-based medicine, strongly advocated for the importance of clinical expertise in making decisions because even very strong research evidence may not be appropriate or applicable for individual patients.

Newhouse (2007) stressed the importance of *experiential evidence*, which is internal evidence from local monitoring or evidence-gathering efforts, such as quality improvement projects. Clinical expertise and experiential evidence, combined with patient preferences, guide how "best evidence" can be used to make healthcare decisions.

Evidence-Based Practice and Related Concepts

During the 1980s, concern about research utilization began to emerge. **Research utilization (RU)** is the use of findings from a study in a practical application. In RU, the emphasis is on translating new knowledge into real-world applications. EBP is a broader concept than RU because it integrates research findings with other factors, as just noted. Also, whereas RU begins with the research itself (How can I put this new knowledge to use in my clinical setting?), the start-point in EBP typically is a clinical question (What does the evidence suggest is the best approach to solving this clinical problem?).

During the 1980s and 1990s, RU projects were undertaken by numerous hospitals and nursing organizations. These projects were institutional attempts to implement changes in nursing practice based on research findings. During the 1990s, however, the call for research utilization was superseded by the push for EBP.

The EBP movement originated in the fields of medicine and epidemiology during the 1990s. British epidemiologist Archie Cochrane criticized healthcare practitioners for failing to incorporate research evidence into their decision-making. His work led to the establishment of the **Cochrane Collaboration**, an international partnership with centers established in 43 countries. The Collaboration prepares and disseminates reviews of research evidence and has a goal of making Cochrane "the home of evidence" relating to healthcare decision-making.

TIP

The Cochrane Collaboration publishes systematic reviews, protocols, and editorials: https://www.cochranelibrary.com/browse-by-review-group. Cochrane Reviews provide the most recent systematic reviews by topic. For example, Wilfling et al. (2023) reviewed the evidence of nonpharmacological interventions for sleep disturbances in people with dementia. The findings are also presented in plain language format so that they are accessible to the general public.

Also during the 1990s, a group from McMaster Medical School in Canada (led by Dr. David Sackett) developed a clinical learning strategy, which they called *evidence-based medicine*. The evidence-based medicine movement has shifted to a broader conception of using best evidence by all healthcare practitioners (not just physicians) in a multidisciplinary team. EBP is considered a major shift for healthcare education and practice. In the EBP environment, a skillful clinician can no longer rely on a repository of memorized information but rather must be a lifelong learner who is adept in accessing, evaluating, and using new evidence.

TIP

A debate has emerged concerning whether the term "evidence-based practice" should be replaced with "*evidence-informed practice*" (EIP). Those who advocate for EIP have argued that the word "based" suggests a stance in which patient preferences are not sufficiently considered in clinical decisions (e.g., Glasziou, 2005). Yet, as noted by Melnyk and Newhouse (2014), all current models of EBP incorporate clinicians' expertise and patients' preferences. They argued that "Changing terms now…will only create confusion at a critical time where progress is being made in accelerating EBP" (p. 348). We concur and use the term EBP throughout this book.

Knowledge translation (KT) is a related term that is often associated with efforts to enhance systematic change in clinical practice. The term was coined by the Canadian Institutes of Health Research (CIHR), which defined KT as "the exchange, synthesis, and ethically-sound application of knowledge—within a complex system of interactions among researchers and users—to accelerate the capture of the benefits of research for Canadians through improved health, more effective services and products, and a strengthened healthcare system" (CIHR, 2004). The World Health Organization (WHO) (2005) adapted the CIHR's definition and defined KT as "the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health." Institutional projects aimed at KT often use methods and models that are similar to organizational EBP projects.

Translational research has emerged as a discipline devoted to developing methods to promote KT and the use of evidence. Translational science involves the study of interventions, implementation processes, and contextual factors that affect the uptake of new evidence in healthcare practice (Titler, 2014). In nursing, the need for translational research was an important impetus for the development of the Doctor of Nursing Practice degree. We discuss translational research in Chapter 11.

EBP can be undertaken by individual nurses working with patients or as a project taken on by a team within a healthcare organization. Organizational EBP projects share certain features with **quality improvement (QI)** efforts. We describe methodologic strategies for quality improvement in Chapter 12.

TIP

EBP is widely endorsed in nursing, but its adoption often faces many challenges. Some of the obstacles include nurses' lack of research appraisal skills; their misperceptions about EBP; heavy patient loads and lack of time; nurses' and administrators' resistance to change; and lack of autonomy about practice decisions. Factors that facilitate EBP include strong organizational support; the availability of EBP mentors and resources; collaboration among healthcare professionals; and participation in journal clubs (Gardner et al., 2016; Newhouse & Spring 2010).

RESOURCES FOR EVIDENCE-BASED PRACTICE IN NURSING

Although EBP can present challenges to nurses, resources to support EBP are increasingly available. We offer some guidance and urge you to explore other ideas with your colleagues, mentors, and health information experts.

Preprocessed and Preappraised Evidence

Searching for best evidence requires skill, especially because of the accelerating pace of evidence production. Thousands of studies of relevance to nurses are published each month in professional journals. These **primary studies** are not preappraised for quality or clinical utility.

Fortunately, finding evidence useful for practice is often facilitated by the availability of evidence sources that are preprocessed (synthesized) and sometimes pre appraised. DiCenso et al. (2009) have created a "6S" hierarchy of evidence sources, which is intended as a guide to evidence retrieval. The 6S hierarchy, typically shown as a pyramid, places five types of preprocessed evidence at the top, and individual studies at the bottom. The hierarchy is intended to help you see how to proceed with an evidence search. A clinician seeking evidence would start at the top of the hierarchy and work downward if appropriate evidence was lacking at a given level. Table 2.1 shows the **6S hierarchy** and provides examples at each level. In this section, we describe each evidence source, starting at the bottom of the hierarchy because higher levels build on the ones that precede them.

TABLE 2.1 • The "6S" Hierarchy of Evidence Sources[a]

EVIDENCE SOURCE	DESCRIPTION/EXAMPLES	EXAMPLES OF RESOURCES
1. Systems ↓	• Computerized decision support systems	• In some electronic health records systems
2. Summaries ↓	• Evidence-based clinical practice guidelines • Online EBP summary resources	• U.S. National Guidelines Clearinghouse • Registered Nurses Association of Ontario Best Practices • EBSCO Nursing Reference Center; JBI COnNECT+; UpToDate
3. Synopses of syntheses ↓	• Synopses published in evidence-based abstraction journals or compiled by organizations	• *Evidence-Based Nursing* • DARE Database of Reviews of Evidence • The Centre for Reviews and Dissemination (CRD)

EVIDENCE SOURCE	DESCRIPTION/EXAMPLES	EXAMPLES OF RESOURCES
4. Syntheses ↓	• Systematic reviews • Rapid reviews	• Joanna Briggs Institute Database • Cochrane Database • AHRQ Evidence Reports • *BMC Systematic Reviews*
5. Synopses of studies ↓	• Brief summaries of single studies, often with commentary on clinical applicability	• *Evidence-Based Nursing* • *ACP Journal Club*
6. Single original studies	• Not preprocessed, primary studies published in journals	• PubMed (MEDLINE) • CINAHL

AHRQ, Agency for Healthcare Research and Quality; EBP, evidence-based practice.

[a]The "6S" hierarchy depicting the efficiency of evidence retrieval for different sources was proposed by DiCenso et al., 2009.

TIP

The 6S hierarchy does not imply a gradient of evidence in terms of *quality*, but rather in terms of ease in retrieving relevant evidence to address a clinical question. At all levels, the evidence should be assessed for quality and relevance.

Level 6 in the 6S Hierarchy: Single Studies

Reports describing a single original study are at the base of the 6S hierarchy because single studies are not ready for immediate use in making EBP decisions. At a minimum, individual primary studies need to be critically appraised for their rigor and their relevance to clinical problems. Clinicians searching for best evidence for a clinical query would start with a single study *only* if evidence from higher levels was unavailable or was judged to be flawed. We describe the major source of research reports (journal articles) in Chapter 3 and provide guidance in searching for studies in Chapter 5.

Level 5 in the 6S Hierarchy: Synopses of Single Studies

A synopsis of a study provides a brief overview of the research, often with sufficient detail to understand the evidence. As noted by DiCenso et al. (2009), a synopsis offers three advantages over the original report: (1) the brevity of the synopsis makes it more readily accessible to practitioners; (2) the study was likely chosen for abstraction because an expert believed the study was important; and (3) the synopsis is sometimes accompanied by commentary about the clinical utility of the evidence (i.e., preappraised). Several evidence-based journals include synopses of original studies, including *Evidence-Based Nursing*, *Evidence-Based Midwifery*, *ACP Journal Club*, and *The Online Journal of Knowledge Synthesis for Nursing*.

Level 4 in the 6S Hierarchy: Syntheses

EBP relies on meticulous integration and synthesis of research evidence on a topic. The importance of such syntheses has given rise to many different types of research review (Grant & Booth, 2009), but the most familiar type of synthesis is the systematic review. A systematic review is not a literature review, which is described further in Chapter 5. A systematic review is a methodical, scholarly inquiry that follows many of the same steps as those for primary studies. It yields a summary of the current best evidence at the time the review was written. Chapter 30 offers guidance on conducting and critically appraising systematic reviews and describes a few other types of synthesis, such as *scoping reviews*, *realist reviews*, and *umbrella reviews*.

Systematic reviewers sometimes integrate findings from quantitative studies using statistical methods, in what is called a **meta-analysis**. Meta-analysts treat the findings from a study as one piece of information. The findings from multiple studies on the same topic are combined and analyzed statistically. Instead of individual people being the **unit of analysis** (the basic entity of a statistical analysis) as in most primary studies, meta-analysts use findings from individual studies as the unit of analysis. Meta-analysis is an objective method of integrating a body of findings and of observing patterns that might otherwise have gone undetected.

Example of a Meta-Analysis

Meng and colleagues (2022) conducted a systematic review and meta-analysis of the effectiveness of coaching on lifestyle modification and hypertension. In their analysis of 12 randomized controlled trials, they found that health coaching reduces blood pressure, improves dietary behaviors, and increases self-efficacy among patients with high blood pressure. The most common and effective health coaching was delivered by nurses via telephone. They conclude that there is a need for policies to implement these interventions into practice.

Systematic reviews of qualitative studies often take the form of metasyntheses, which are rich resources for EBP (Beck, 2009). A **metasynthesis**, which involves integrating qualitative research findings on a topic, is less about reducing information and more about amplifying and interpreting it. For certain qualitative questions, an approach to systematic synthesis called **meta-aggregation** may be appropriate, as we describe in Chapter 30. Strategies have also been developed for **systematic mixed studies review** (also called *mixed research syntheses*), which are efforts to integrate and synthesize both quantitative and qualitative evidence on a topic (Heyvaert et al., 2017; Sandelowski et al., 2013).

Example of a Mixed Studies Review

Beck and Vo (2020) conducted a mixed studies review on fathers' stress related to their infants' NICU hospitalization. They synthesized a total of 21 studies: 10 were quantitative and 11 were qualitative.

Many systematic reviews are published in professional research journals that can be accessed using standard literature search procedures; others are available in dedicated databases. A major example is the Cochrane Database of Systematic Reviews, which contains thousands of systematic reviews. Most Cochrane reviews involve meta-analyses, and most of them relate to healthcare interventions—but the Cochrane Collaboration now also includes qualitative evidence syntheses. Cochrane reviews are done with great rigor and have the advantage of being checked and updated regularly.

Rapid reviews have become increasingly important for health policy decisions and in under-resourced countries facing critical health problems that require immediate intervention (Tricco, et al., 2022). This type of review exploded with the emergence of COVID-19 as the world sought evidence about how to diagnose and treat this deadly disease. These streamlined reviews are less rigorous than

systematic reviews but are typically completed in weeks rather than months or years. Rapid reviews are described in Chapter 30.

TIP

Many resources are available for finding systematic reviews. For example, the Joanna Briggs Institute in Australia (http://joannabriggs.org/) and the Centre for Reviews and Dissemination at the University of York in England (http://www.york.ac.uk/inst/crd/index.htm) produce useful systematic reviews.

Level 3 in the 6S Hierarchy: Synopses of Syntheses

Synopses of systematic reviews make rigorously integrated evidence even more handy for practitioners seeking answers to clinical queries. Many abstract journals mentioned in connection with Level 5 synopses of studies (e.g., *Evidence-Based Nursing, Evidence-Based Midwifery*) also include synopses of selected systematic reviews.

Level 2 in the 6S Hierarchy: Summaries

For some clinical questions, best evidence may be conveniently available in "Summaries," which include online EBP summary resources and clinical practice guidelines.

Dozens of evidence-based, point-of-care (PoC) resources for healthcare professionals have become available. These web-based resources are designed to provide rapidly accessible evidence-based information (and, sometimes, guidance) that is periodically updated. Nickum and colleagues (2022) created a rubric to evaluate PoC summary resources for nurses. The rubric considered the content, coverage of nursing-based topics, transparency of the evidence, user perception, and customization of the PoC for supporting nursing practice. They reported that no PoC resource met all five criteria. However, for nursing, they found Lippincott's Advisor had the highest coverage of diagnoses, while ClinicalKey for Nursing had strong content focused on nursing interventions and outcomes. Kwag and colleagues (2016), who focused on evidence summaries for physicians, also came to the conclusion that UpToDate and BMJ Best Practice were two of the best and most reliable resources out of the 23 they evaluated.

Evidence-based **clinical practice guidelines**, like systematic reviews, represent efforts to distill a large body of evidence into a manageable form, but guidelines differ from reviews in a number of respects. First, clinical practice guidelines, which are usually based on systematic reviews, give specific recommendations for evidence-based decision-making. Second, guidelines attempt to address all issues relevant to a clinical decision, including balancing benefits and risks. Third, systematic reviews are evidence-driven—that is, they are undertaken when a body of evidence has been produced and needs to be synthesized. Guidelines, by contrast, are developed to guide clinical practice—even when available evidence is limited or of unexceptional quality (Straus et al., 2018). Fourth, systematic reviews are done by researchers, but guideline development typically involves the consensus of a group of researchers, experts, and clinicians. For this reason, guidelines based on the same evidence may result in different recommendations. Differences across guidelines sometimes reflect genuine contextual factors—for example, guidelines that are appropriate in the United States may be unsuitable in India.

It can be challenging to find clinical practice guidelines because there is no single guideline repository. One approach is to search for guidelines in comprehensive guideline databases. For example, in the United States, nursing and other healthcare guidelines are maintained by the National Guideline Clearinghouse (www.guideline.gov), and similar databases are available in other countries. An important nursing guideline resource comes from the Registered Nurses Association of Ontario (www.rnao.org/bestpractices).

In addition to looking for guidelines in national clearinghouses and in the websites of professional organizations, you can search bibliographic databases such as MEDLINE or EMBASE. Search terms such as the following can be used: *practice guideline*, *clinical practice guideline*, *best practice guideline*, *evidence-based guideline*, and *consensus statement*. Be aware, though, that a standard search for guidelines

in bibliographic databases will yield many references—but often a frustrating mixture of citations to not only the actual guidelines, but also to commentaries, anecdotes, implementation studies, and so on.

Example of a Nursing Clinical Practice Guideline

In 2022, the Registered Nurses Association of Ontario (RNAO) published the second edition of a best practice guideline called "*Promoting smoking reduction and cessation with indigenous peoples of reproductive age and their communities*." The guideline is intended for use "by nurses and other members of the interprofessional healthcare team to enhance the quality of their practice pertaining to the assessment and management of adult asthma."

There are many topics for which practice guidelines still need to be developed, but the opposite problem is also true: the dramatic increase in the number of guidelines means that there are sometimes multiple guidelines on the same topic. Worse yet, because of variations in the rigor of guideline development and in interpretations of the evidence, different guidelines sometimes offer different and even conflicting recommendations. Thus, those who wish to adopt clinical practice guidelines to address a clinical problem are urged to critically appraise them to identify ones that are based on the strongest and most up-to-date evidence, have been meticulously developed, are user-friendly, and are appropriate for local use.

Several guideline appraisal instruments are available, but the one that has gained the broadest support is the Appraisal of Guidelines Research and Evaluation Instrument, now in its second version (Brouwers et al., 2010). This tool has been translated into many languages and has been endorsed by the WHO. A shorter and simpler tool for evaluating guideline quality is called the iCAHE Guideline Quality Checklist (Grimmer et al., 2014). A "mini-checklist" for assessing guideline quality for daily practice use has also been proposed (Siebenhofer et al., 2016).

TIP

The U.S. Agency for Healthcare Research and Quality offers "guideline syntheses" that provide systematic comparisons of agreement and disagreement among selected guidelines on the same topic (https://www.guidelines.gov/syntheses/index).

One final issue is that guidelines change more slowly than original research or syntheses. If a high-quality guideline is not recent, it is advisable to determine whether more up-to-date evidence would alter (or strengthen) the guideline's recommendations. It has been recommended that, to avoid obsolescence, guidelines should be reassessed every 3 years.

TIP

In addition to clinical guidelines, evidence-based **care bundles** are being developed. The concept of care bundles, developed by the Institute for Healthcare Initiatives (www.ihi.org), refers to a set of interventions to treat or prevent a specific cluster of symptoms. There is evidence that a bundle of strategies produces better outcomes than a single intervention.

Level 1 in the 6S Hierarchy: Systems

In a perfect world, evidence-based clinical information systems would link rigorous, up-to-date evidence (e.g., from summaries or syntheses) about a problem with information about a *particular* patient from the patient's electronic health record. Clinicians would then, with best evidence in hand,

incorporate their own expertise and patient preferences in arriving at a course of action. Although few current systems match this ideal, some computerized decision support systems have been developed for particular problems, including decisional support tools available on laptops and smartphones. We can expect progress on such systems in the years ahead.

Example of a Clinical Decision Support Systems

Gengo e Silva and colleagues (2018) described an electronic decision support system in a Brazilian hospital that links nursing diagnoses, outcomes, and interventions performed by nurses caring for medical and surgical patients.

Evidence Hierarchies and Level of Evidence Scales

The EBP movement has led to a proliferation of different **evidence hierarchies,** which are intended to show a ranking of evidence sources in terms of their risk of bias. (These are distinct from the 6S hierarchy discussed in the previous section, which rank evidence sources in terms of the ease and efficiency of finding answers to clinical questions.) Evidence hierarchies are often presented as pyramids, with the highest-ranking sources—those presumed to have the least bias for making inferences about the effects of an intervention—at the top.

The hierarchies form **level of evidence (LOE) scales** that rank order types of evidence. Level I evidence usually is considered the best (least biased) type of evidence, and almost all leveling schemes put systematic reviews at the top level. Some LOE scales have only three levels, while others have 10 or more levels.

Figure 2.2 shows our eight-level evidence hierarchy for Therapy/intervention questions. This hierarchy ranks sources of evidence with respect to the *readiness* of an intervention to be put to use in practice. In our scheme, the Level I evidence source is a systematic review of a type of study called a *randomized controlled trial* (RCT), which is the “gold standard” type of study for Therapy questions. An individual RCT is a Level II evidence source in our hierarchy. Going down the “rungs” of the evidence hierarchy for Therapy questions results in evidence with a higher risk of bias in answering questions about “what works.” For example, Level III evidence comes from a type of study called quasiexperiments (the terms in Figure 2.2 are explained later in the book). Of course, there continue to be clinical practice questions for which there is relatively little research evidence. In such situations, nursing practice must rely on other sources, including internal evidence from pathophysiologic data, local projects, and expert opinion (Level VIII). As Straus et al. (2018) have noted, one benefit of the EBP movement is that a new research agenda can emerge when clinical questions arise for which there is no satisfactory evidence.

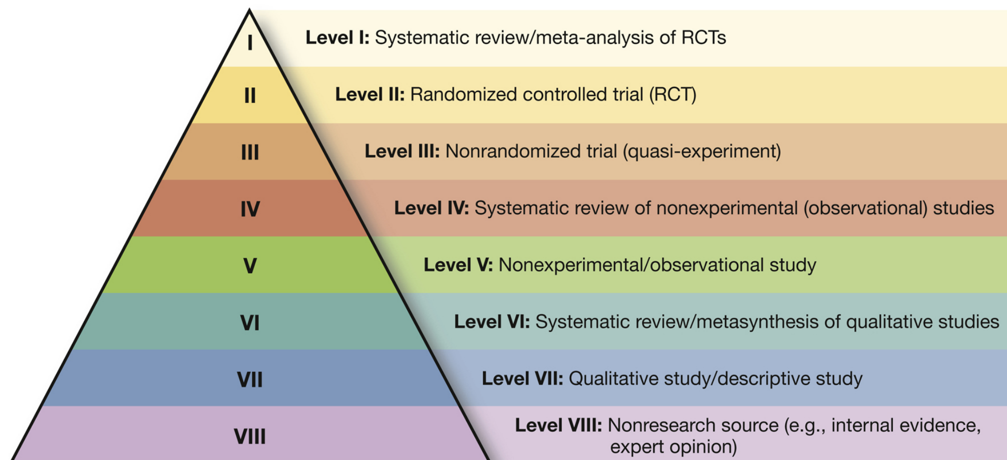

FIGURE 2.2 Polit–Beck evidence hierarchy/levels of evidence scale for therapy questions.

Hierarchies and Level of Evidence Scales: Some Caveats

Although evidence hierarchies are intended as an EBP resource, considerable confusion exists regarding LOE scales. The fact that there are dozens from which to choose exacerbates this confusion.

One important issue that needs to be acknowledged is that different types of questions require different hierarchies. For example, an evidence hierarchy for prognosis questions differs from the hierarchy for therapy questions. The concept of evidence hierarchies arose in medicine to inform decisions about medical interventions—thus, early evidence hierarchies explicitly ranked evidence for Therapy/intervention questions. Few currently published hierarchies make this point clear, the major exceptions being the LOE hierarchies created by the Oxford Centre for Evidence-Based Medicine (http://www.cebm.net/ocebm-levels-of-evidence/) and the Joanna Briggs Institute (http://joannabriggs.org/jbi-approach.html). We also provide LOE scales in this book for different types of questions (see Chapter 9). As we noted in Chapter 1, evidence for non-Therapy questions can play a role in EBP, but such evidence does not directly support practice changes.

TIP

As an example, if we wanted to know whether drinking alcohol during pregnancy puts females at higher risk of a miscarriage (an etiology question), we would not find "best evidence" from a systematic review of RCTs. Pregnant females would never be assigned at random to a "drinking" vs. nondrinking condition to assess whether miscarriage rates are higher in the drinking group.

A second issue is that LOE scales have been used for different purposes. Some writers suggest that LOE scales are similar to the 6S hierarchy—the highest level offers the best starting place in a search for evidence. Others, however, use evidence hierarchies to "level" or grade evidence sources, implying that higher levels provide better quality evidence. As pointed out by Levin (2014), an evidence hierarchy "is not meant to provide a quality rating for evidence retrieved in the search for an answer" (p. 6). The Oxford Centre for Evidence-Based Medicine concurs: the levels in their scheme are "NOT intended to provide you with a definitive judgment about the quality of evidence. There will inevitably be cases where 'lower level' evidence…will provide stronger evidence than a 'higher level' study" (Howick et al., 2011, p. 2). A critical appraisal of each study or evidence source, regardless of level, is needed to determine the *quality of evidence*.

Related to this second issue is the fact that some LOE scales conflate risk of bias levels with terms implying quality. For example, in Melnyk and Fineout-Overholt's (2019) evidence hierarchy (Box 1.3),

Level II is defined as *well-designed* RCTs.

Another word of caution: evidence hierarchies need to be sufficiently detailed to include the full range of possible evidence sources. Users of LOE scales often must “read between the lines” and use some judgment. For example, in our hierarchy, if a systematic review included both RCTs *and* nonrandomized trials, we would still consider this Level I evidence. However, if a systematic review included several nonrandomized trials but no RCTs, we might consider this to be evidence somewhere between Levels I and II. As another example, in the Melnyk and Fineout-Overholt (2019) hierarchy, there is no level specified for RCTs that are not especially “well-designed.”

As noted by Levin (2014), those who wish to use an LOE scale must choose one that matches their needs from the many that exist, keeping in mind that “leveling” a study based on the chosen scale is not a substitute for a critical appraisal of the evidence.

TIP

Evidence hierarchies and LOE scales are rather firmly entrenched in the EBP literature, but they are not without controversy. Concern was expressed initially by critics who felt that qualitative evidence was being undervalued. For example, for therapy questions, qualitative studies are typically near the bottom of the hierarchy. Another criticism of these ranking systems is that they focus exclusively on the risk of certain types of bias, rather than on biases that might undermine the applicability of evidence in real-world settings (e.g., Goodman, 2014). We discuss this important concern about EBP in Chapter 31.

Systems for a Body of Evidence

It is important to note that LOE scales are typically used to “level” an individual piece of evidence, such as a single study. Other systems exist, however, for grading an entire body of evidence with regard to the *strength of evidence*. By far the most widely used system is the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system (Guyatt et al., 2008). The GRADE system involves two components—grading the quality of an overall body of evidence and ranking the strength of recommendations based on that evidence. GRADE is used with increasing frequency in systematic reviews and in the development of clinical practice guidelines. We discuss GRADE at some length in Chapter 30.

Models for Evidence-Based Practice

Models of EBP are important resources for designing and implementing EBP projects in practice settings. Some models focus on the use of research from the perspective of individual clinicians (e.g., the Stetler Model), but most focus on institutional EBP efforts (e.g., the Iowa Model). Another way to categorize existing models is to distinguish process-oriented models (e.g., the Iowa Model) and models that are explicitly mentor models, such as the ARCC-E (Advanced Research and Clinical Practice Through Close Collaboration in Education) model.

The many worthy EBP models are too numerous to list comprehensively, but a few are shown in Box 2.1. Melnyk and Fineout-Overholt (2019) provide a good synthesis of several EBP models, and Schaffer and colleagues (2013) identify features to consider in selecting a model to plan an EBP project. Although each model offers different perspectives on translating research findings into practice, several steps and procedures are similar across the models. Figure 2.3 shows a diagram of one prominent EBP model, the revised **Iowa Model** of EBP (Buckwalter et al., 2017).

BOX 2.1 Selected Models for Evidence-Based Practice

- ACE Star Model of Knowledge Transformation (Stevens, 2012)

- Advancing Research and Clinical Practice Through Close Collaboration in Education (ARCC-E) Model (Melnyk & Fineout-Overholt, 2019)
- Diffusion of Innovations Model (Rogers, 1995)
- Iowa Model of Evidence-Based Practice to Promote Quality Care (Buckwalter et al., 2017; Titler et al., 2001)
- Johns Hopkins Nursing EBP Model (Dearholt & Dang, 2012)
- Promoting Action on Research Implementation in Health Services (PARiHS) Model (Harvey & Kitson, 2016; Rycroft-Malone et al., 2013)
- Stetler Model of Research Utilization (Stetler, 2010)

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Healthcare

Identify Triggering Issues / Opportunities
- Clinical or patient identified issue
- Organization, state, or national initiative
- Data / new evidence
- Accrediting agency requirements / regulations
- Philosophy of care

State the Question or Purpose

Is this topic a priority? — No → Consider another Issue / opportunity

Yes

Form a Team

Assemble, Appraise and Synthesize Body of Evidence
- Conduct systematic search
- Weigh quality, quantity, consistency, and risk

Reassemble

Is there sufficient evidence? — No → Conduct research

Yes

Design and Pilot the Practice Change
- Engage patients and verify preferences
- Consider resources, constraints, and approval
- Develop localized protocol
- Create an evaluation plan
- Collect baseline data
- Develop an implementation plan
- Prepare clinicians and materials
- Promote adoption
- Collect and report postpilot data

Redesign

Is change appropriate for adoption in practice? — No → Consider alternatives

Yes

Integrate and Sustain the Practice Change
- Identify and engage key personnel
- Hardwire change into system
- Monitor key indicators through quality improvement
- Reinfuse as needed

Disseminate Results

◆ = a decision point

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FIGURE 2.3 (Revised Iowa Model of Evidence-Based Practice to Promote Quality Care Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: revisions and validation. *Worldviews on Evidence-Based Nursing*, *14*(3), 175–182. doi:10.1111/wvn.12223. Used/reprinted with permission from the University of Iowa Hospitals and Clinics, copyright 2015. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at 319-384-9098.)

Example of Using an Evidence-Based Practice Model

Sage-Rockoff and colleagues (2018) used the Iowa Model in their EBP project designed to improve thermoregulation for trauma patients in the emergency department.

INDIVIDUAL AND ORGANIZATIONAL EVIDENCE-BASED PRACTICE

Individual nurses make many decisions and convey important healthcare information and advice to patients, and so they have ample opportunity to put research into practice. Here are three clinical scenarios that provide examples of such opportunities:

- Clinical Scenario 1. You work in an allergy clinic and notice how difficult it is for many children to undergo allergy scratch tests. You wonder if an interactive distraction intervention would help reduce children's anxiety when they are being tested.
- Clinical Scenario 2. You work in a rehabilitation hospital, and one of your older patients, who had total hip replacement, tells you she is planning a long airplane trip to visit her daughter after rehabilitation treatments are completed. You know that a long plane ride will increase her risk of deep vein thrombosis and wonder if compression stockings are an effective in-flight treatment for her. You decide to look for the best evidence to answer this question.
- Clinical Scenario 3. You are caring for a hospitalized cardiac patient who tells you that he has sleep apnea. He confides in you that he is reluctant to undergo continuous positive airway pressure (CPAP) treatment because he worries it will hinder intimacy with his wife. You wonder if there is any evidence about what it is like to experience CPAP treatment so that you can better address your patient's concerns.

In these and thousands of other clinical situations, research evidence can be put to good use to improve the quality of nursing care. Thus, individual nurses need to have the skills to personally search for, appraise, and apply evidence in their practice.

For some clinical scenarios that trigger an EBP effort, individual nurses have sufficient autonomy to implement research-informed actions on their own (e.g., answering patients' questions about experiences with CPAP). In other situations, however, decisions are best made among a team of nurses (or with an interprofessional team) working together to solve a common clinical problem. Institutional EBP efforts typically result in a formal policy or protocol affecting the practice of many nurses and other staff.

Many of the steps in institutional EBP projects are the same as those we describe in the next section, but additional issues are of relevance at the organizational level. For example, as shown in the Iowa Model (Figure 2.3), some of the activities include assessing whether the question is an organizational priority, forming a team, and conducting a formal evaluation.

MAJOR STEPS IN EVIDENCE-BASED PRACTICE

In this section, we provide an overview of how research evidence can be put to use in clinical settings. In describing the basic steps in the EBP process, we use a mnemonic device (the 5 As) that we have adapted from several sources (e.g., Guyatt et al., 2015; EBP blogs by nurse educator Cathy Thompson [https://nursingeducationexpert.com]).

- Step 1: **Ask**—Ask a well-worded clinical question that can be answered with research evidence;
- Step 2: **Acquire**—Search for and retrieve the best evidence to answer the clinical question;
- Step 3: **Appraise**—Critically appraise the evidence for validity and applicability to the problem and situation;
- Step 4: **Apply**—After integrating the evidence with clinical expertise, patient preferences, and local context, apply it to clinical practice; and
- Step 5: **Assess**—Evaluate the outcome of the practice change.

The EBP process cannot be undertaken in a vacuum, however. A precondition for the entire undertaking is to have an openness to change and a desire to provide the best possible care, based on evidence showing benefits to patient outcomes. Melnyk and Fineout-Overholt (2019) call this Step 0: Cultivating a spirit of inquiry. Johnston and Fineout-Overholt (2005) noted that "getting from zero to one" involves having nurses be reflective about their clinical practice. An additional step after Step 5 is to disseminate information about the EBP project.

Step 1: Ask a Well-Worded Clinical Question

A crucial first step in EBP involves converting information needs into well-worded clinical questions that can be answered with research evidence. Where do the questions come from? Some EBP models distinguish two types of "triggers" for an EBP undertaking: (1) *problem-focused triggers*—a clinical practice problem in need of solution, or (2) *knowledge-focused triggers*—readings in the research literature. Problem-focused triggers may arise in the normal course of clinical practice and include both patient-identified and clinician-identified issues. The Iowa Model (Figure 2.3) includes examples of both types of triggers in the top box.

EBP experts distinguish between background and foreground questions. *Background questions* are foundational questions about a clinical issue, for example: What is cancer cachexia (progressive body wasting), and what is its pathophysiology? Answers to such background questions are typically found in textbooks. *Foreground questions,* by contrast, are those that can be answered based on current research evidence on diagnosing, assessing, or treating patients, or on understanding the meaning or prognosis of their health problems. For example, we may wonder, is a fish oil–enhanced nutritional supplement effective in stabilizing weight in patients with advanced cancer? The answer to such a Therapy question may provide direction on how to address the needs of patients with cachexia. In other words, foreground questions seek the specific information needed to make clinical decisions.

Most guidance for EBP uses the acronyms PIO and PICO to help practitioners develop well-worded questions. In the PICO form, the clinical question is worded to identify four components:

1. P: the *Population* or *patients* (What are key characteristics of the patients or people?)
2. I: the *Intervention*, *influence*, or *exposure* (What is the intervention or therapy of interest? Or what is a potentially harmful or beneficial influence?)
3. C: an explicit *Comparison* to the "I" component (With what is the intervention or influence being compared?)
4. O: the *Outcome* (What is the outcome or consequence in which we are interested?)

Applying this scheme to our question about cachexia, our *population* (P) is cancer patients with cachexia; the *intervention* (I) is fish oil–enhanced nutritional supplements; and the *outcome* (O) is weight stabilization. In this question, the *comparison* is not formally stated, but the implied "C" is the *absence* of fish oil–enhanced supplements—the question is in a PIO format. However, when there is an explicit comparison of interest, the full PICO question is required. For example, we might be interested in learning whether fish oil–enhanced supplements (I) are better than melatonin (C) in stabilizing weight (O) in patients with cancer (P).

For questions that can best be answered with qualitative information (e.g., about the meaning of an experience or health problem), two components are most relevant:

1. the *population* (What are the characteristics of the patients or clients?) and
2. the *situation* (What conditions, experiences, or circumstances are we interested in understanding?)

For example, suppose our question was "What is it like to suffer from cachexia?" In this case, the question calls for rich qualitative information; the *population* is patients with advanced cancer, and the *situation* is the experience of cachexia.

In addition to the basic PICO components, other components may be used in an evidence search. For example, some EBP experts suggest adding a "T" component (PICOT) to designate a time frame. For example, take the following question: Among caregivers of people with dementia (P), what is the effect of participation in a caregiver intervention (I), compared with not participating in the

intervention (C) on quality of life (O) 6 months after enrollment (T)? Other experts, however, consider the time frame as part of the outcome: e.g., quality of life 6 months after enrollment (O). Still others prefer to search for the PICO elements without filtering out evidence from studies that used a different period of follow-up, such as 4 months after enrollment.

TIP

The Cochrane Collaboration has launched a PICO project—a *Strategy to 2020* initiative—to annotate its systematic reviews with PICO component identification to facilitate retrieval efforts.

Table 2.2 offers question templates for asking well-framed clinical foreground questions for specific types of questions. The right-hand column includes questions with an explicit comparison (PICO questions), while the middle column does not (PIO). The questions are categorized in a manner similar to that discussed in Chapter 1 (EBP purposes), as featured in Table 1.3. Note that although there are some differences in components across question types, there is always a P component.

TABLE 2.2 • Question Templates for Selected Clinical Foreground Questions: PIO and PICO

TYPE OF QUESTION	PIO QUESTION TEMPLATE (QUESTIONS WITHOUT AN EXPLICIT COMPARISON)	PICO QUESTION TEMPLATE (QUESTIONS WITH AN EXPLICIT COMPARISON)
Therapy/treatment/intervention	In _________ (**P**opulation), what is the effect of _________ (**I**ntervention) on _________ (**O**utcome)?	In _________ (**P**opulation), what is the effect of _________ (**I**ntervention), in comparison to _________ (**C**omparative/alternative intervention), on _________ (**O**utcome)?
Diagnosis/assessment	For _________ (**P**opulation), does _________ (**I**dentifying tool/procedure) yield accurate and appropriate diagnostic/assessment information about _________ (**O**utcome)?	For _________ (**P**opulation), does _________ (**I**dentifying tool/procedure) yield more accurate or more appropriate diagnostic/assessment information than _________ (**C**omparative tool/procedure) about _________ (**O**utcome)?
Prognosis	In _________ (**P**opulation), does _________ (**I**nfluence/exposure to disease or condition) increase the risk of _________ (**O**utcome)?	In _________ (**P**opulation), does _________ (**I**nfluence/exposure to disease or condition), relative to _________ (**C**omparative disease/condition OR absence of the disease/condition) increase the risk of _________ (**O**utcome)?
Etiology/harm	In _________ (**P**opulation), does _________ (**I**nfluence/exposure/characteristic) increase the risk of _________(**O**utcome)?	In _________(**P**opulation), does _________ (**I**nfluence/exposure/characteristic) compared to _________(**C**omparative influence/exposure OR lack of influence or exposure) increase the risk of _________(**O**utcome)?

TYPE OF QUESTION	PIO QUESTION TEMPLATE (QUESTIONS WITHOUT AN EXPLICIT COMPARISON)	PICO QUESTION TEMPLATE (QUESTIONS WITH AN EXPLICIT COMPARISON)
Description (prevalence/incidence)	In ________(**P**opulation), how prevalent is ________(**O**utcome)?	*Explicit comparisons are not typical, except to compare different populations*
Meaning or process	What is it like for ________(**P**opulation) to experience (condition, illness, circumstance)? OR What is the process by which ________(**P**opulation) cope with, adapt to, or live with (condition, illness, circumstance)?	*Explicit comparisons are not typical in these types of questions*

Step 2: Acquire Research Evidence

By asking clinical questions in a well-worded form, you should be able to search the research literature for the information you need. Using the templates in Table 2.2, the information inserted into the blanks constitutes *keywords* for undertaking an electronic search.

Earlier in this chapter, we described resources to facilitate an efficient search for evidence. As shown in the 6S hierarchy (Table 2.1), there is a range of preappraised evidence sources that can help you acquire evidence regarding your question. Starting with preappraised evidence might lead you to a quick answer—and potentially to a better answer than would be possible if you had to start at the bottom rung with individual studies. Researchers who prepare systematic reviews and synopses usually have excellent research skills and use established standards to evaluate the evidence. Thus, when preprocessed evidence is available to answer a clinical question, you may not need to look any farther, unless the review is not recent or is of poor quality. When high-quality preprocessed evidence cannot be located or is old, you will need to look for best evidence in primary studies, using strategies we describe in Chapter 5.

TIP

In Chapter 5, we describe the free internet resource, PubMed, which offers a special tool for those seeking evidence for clinical decisions. Another important database, CINAHL, allows users to restrict a search with an “EBP” limiter.

Step 3: Appraise the Evidence

The evidence acquired in Step 2 of the EBP process should be appraised before taking clinical action. Critical appraisal for EBP may involve several types of assessments. Various criteria have been proposed for EBP appraisals, including the following:

1. *Quality:* To what extent is the evidence valid—that is, how serious is the risk of bias?
2. *Magnitude:* How large is the effect of the intervention or influence (I) on the outcome (O) in the population of interest (P)? Are the effects clinically significant?
3. *Quantity:* How much evidence is there? How many studies have been conducted, and did those studies involve a large number of study participants?
4. *Consistency:* How consistent are the findings across various studies?
5. *Applicability:* To what extent is the evidence relevant to my clinical situation and patients?

Evidence Quality

The first appraisal issue is the extent to which the findings in a research report are valid. That is, were the study methods sufficiently rigorous that the evidence has a low risk of bias? Melnyk and Fineout-Overholt (2019) propose the following formula: LOE (e.g., Figure 2.2) + quality of evidence = strength of evidence. Thus, in coming to a conclusion about the quality of the evidence, it is insufficient to simply "level" the evidence using an LOE scale—it must also be appraised. We offer guidance on appraising the quality of evidence from primary studies throughout this book, and Chapter 5 includes an appraisal worksheet.

If there are several primary studies and no existing systematic review, you would need to draw conclusions about the body of evidence taken as a whole. The previously mentioned GRADE system (Guyatt et al., 2008) is being used increasingly to summarize evidence quality for a body of evidence in systematic reviews (Chapter 30).

Magnitude of Effects

The appraisal criterion relating to magnitude considers how powerful the effects of an intervention or influence are. Estimating the magnitude of the effect for quantitative findings is especially important when an intervention is costly or when there are potentially negative side effects. If, for example, there is good evidence that an intervention is only marginally effective in improving a health problem, it is important to consider other factors (e.g., evidence regarding its effects on quality of life). There are various ways to quantify the magnitude of effects, such as an *effect size index* that we describe later in this book.

The magnitude of effects also has a bearing on *clinical significance*. We discuss how to assess the clinical significance of study findings in Chapter 21.

Quantity and Consistency of Evidence

A rigorously conducted primary study of a RCT offers especially strong evidence about the effect of an intervention on an outcome of interest. But *multiple* RCTs are better than a single study. Moreover, large-scale studies (such as multisite studies) with a large number of study participants are especially desirable.

If there are multiple studies that address your clinical query, however, the strength of the evidence is likely to be diminished if there are inconsistent results across studies. In the GRADE system, inconsistency of results leads to a lower quality-of-evidence grade. When the results of different studies do not corroborate each other, it is likely that further research will have an impact on confidence about an intervention's effect.

Applicability

It is also important to appraise the evidence in terms of its relevance for the clinical situation at hand—that is, for *your* patient in a specific clinical setting. Best practice evidence can most readily be applied to an individual patient in your care if they are similar to people in the study or studies under review. Would your patient have qualified for participation in the study—or is there some factor such as age, illness severity, or comorbidity that would have excluded the patient? Practitioners must reach conclusions about the applicability of research evidence, but researchers also bear some responsibility for enhancing the applicability of their work. As we discuss in Chapter 31, concerns about the fact that "best evidence" is usually about "average" patients from restricted populations has made the issue of applicability increasingly salient.

TIP

An appraisal of evidence for use in your practice may involve additional factors. In particular, costs are likely to be an important consideration. Some interventions are expensive, and so the

amount of resources needed to put best evidence into practice would need to be factored into any decision. Of course, the cost of *not* taking action is also important.

Actions Based on Evidence Appraisals

Appraisals of the evidence may lead you to different courses of action. You may reach this point and conclude that the evidence is not sufficiently sound, or that the likely effect is too small, or that the cost of applying the evidence is too high. The evidence may suggest that "usual care" is the best strategy—or it may lead you to pose an alternative clinical query. You may also consider the possibility of undertaking your own study to add to the body of evidence relating to your original clinical question. If, however, the initial appraisal of evidence suggests a promising clinical action, then you can proceed to the next step.

Step 4: Apply the Evidence

As the definition for EBP implies, research evidence needs to be integrated with your own clinical expertise and knowledge of your clinical setting. You may be aware of factors that would make implementation of the evidence, no matter how sound or promising, inadvisable. Patient preferences and values are also important. A discussion with the patient may reveal negative attitudes toward a potentially beneficial course of action, contraindications (e.g., comorbidities), or possible impediments (e.g., lack of health insurance).

Armed with rigorous evidence, your own clinical know-how, and information about your patient's circumstances, you can use the resulting information to make an evidence-based decision or provide research-informed advice. Although the steps in the process, as just described, may seem complicated, in reality the process can be efficient—*if* there is an adequate evidence base and especially if it has been skillfully preprocessed. EBP is most challenging when findings from research are contradictory, inconclusive, or "thin"—that is to say, when better quality evidence is needed.

One final issue is the importance of integrating evidence from qualitative research, which can provide rich insights into how patients experience a problem, or about barriers to complying with treatment. A new intervention with strong potential benefits may fail to achieve desired outcomes if it is not implemented with sensitivity and understanding of patients' perspectives. As Morse (2005) so aptly noted, evidence from an RCT may tell you whether a pill is effective, but qualitative research can help you understand why patients may not swallow the pill.

Step 5: Assess the Outcomes of the Practice Change

One last step in many EBP efforts concerns evaluating the outcomes of the practice change. Did you achieve the desired outcomes? Were patients satisfied with the results?

Straus et al. (2018) remind us that part of the ongoing evaluation involves how well you are performing EBP. They offer self-evaluation questions that relate to the EBP steps, such as asking answerable questions (Am I asking any clinical questions at all? Am I asking well-formulated question?) and acquiring external evidence (Do I know the best sources of current evidence? Am I becoming more efficient in my searching?).

TIP

Every nurse can play a role in using research evidence. Here are some strategies:

- *Read widely and critically.* Professionally accountable nurses keep abreast of important research developments relating to their specialty by reading professional journals.
- *Attend professional conferences.* Conference attendees have opportunities to meet researchers and to explore practice implications of new research.

- *Insist on evidence that a procedure is effective.* Every time nurses or nursing students are told about a standard nursing procedure, they have a right to ask: Why? Nurses need to develop expectations that the clinical decisions they make are based on sound, evidence-based rationales.
- *Become involved in a journal club.* Many organizations that employ nurses sponsor journal clubs that review studies with potential relevance to practice.
- *Pursue and participate in EBP projects.* Several studies have found that nurses who are involved in research activities (e.g., an EBP project or data collection activities) develop more positive attitudes toward research and better research skills.

RESEARCH EXAMPLE

Thousands of EBP projects are underway in practice settings. Many that have been described in the nursing literature offer information about planning and implementing such an endeavor.

Study: Implementation of the MEDFRAT to promote quality care and decrease falls in community hospital emergency rooms (McCarty et al., 2018).

Purpose: An interprofessional team undertook an EBP implementation project at a large healthcare delivery system with 12 emergency departments (EDs). The focus of the project was to decrease falls in community hospital EDs.

Framework: The project used the Iowa Model as its guiding framework. The EBP team identified a problem-focused trigger—the inconsistent use of fall-risk assessments and variation in falls in the EDs.

Approach: The project team assembled relevant literature to identify an appropriate assessment tool for use in EDs. The team selected the Memorial Emergency Department Fall-Risk Assessment Tool (MEDFRAT) because it was simple to use (only six questions) and had been validated for use in EDs (i.e., it had evidence-based utility). The tool creates two risk-stratification levels, and each has suggested fall-risk prevention interventions. For example, possible interventions included hourly rounding, bed in low position, bedside alarms, and locating patients into view of the nurses' station. Information systems staff built the MEDFRAT into the electronic medical record. The team then created and implemented a 1-hour education session about falls for nurses in the EDs. The EDs in the project were visited over a 4-month period, with 60 nurses attending the sessions. The participating nurses offered feedback and further suggestions. Several nurses mentioned the lack of bedside alarms, and so portable alarms were ordered. Another suggestion concerned the use of different colored grip socks to identify patients at high risk of a fall. Overall, the nurses' reactions to MEDFRAT were unanimously positive.

Evaluation: The MEDFRAT has been implemented in all 12 EDs in the system. Baseline levels of falls in the ED over a 4-year period ranged from 0 (in EDs with under 10 beds) to 76 in the ED with the most beds. Data regarding the effectiveness of the intervention were not available when the report was written, but short-term outcomes and longer-term outcomes (decrease in ED falls) are being monitored.

Conclusions: The authors of the report concluded that the Iowa Model was a useful framework. They were optimistic about the outcomes and about using the Iowa Model to implement other evidence-based nursing interventions in their setting.

SUMMARY POINTS

- **Evidence-based practice (EBP)** is the conscientious integration of current best evidence and other factors in making clinical decisions. The three main components of EBP are (1) best research evidence; (2) your own clinical experience and knowledge; and (3) patient preferences, values, and circumstances.
- Two underpinnings of the EBP movement are the **Cochrane Collaboration** (which is based on the work of British epidemiologist Archie Cochrane) and the clinical learning strategy called *evidence-based*

medicine developed at the McMaster Medical School.

- **Research utilization (RU)** and EBP are overlapping concepts that concern efforts to use research as a basis for clinical decisions, but RU *starts* with a research-based innovation that gets evaluated for possible use in practice.
- **Knowledge translation (KT)** is a term used primarily about system-wide efforts to enhance systematic change in clinical practice or policies. **Translational research** is a discipline devoted to developing methods to promote KT and the use of evidence.
- Resources to support EBP are growing at a phenomenal pace. Preprocessed (synthesized) and preappraised evidence is especially useful and efficient in addressing clinical queries. The **6S hierarchy** of preappraised evidence offers a guide for efficient evidence searches. This hierarchy includes (6) systems at the pinnacle; (5) summaries; (4) synopses of syntheses; (3) syntheses; (2) synopses of single studies; and (1) individual primary studies, which are not preappraised, at the base.
- Systematic reviews (Syntheses) have been considered the cornerstone of EBP. **Systematic reviews** are rigorous integrations of research evidence from multiple studies on a topic. Systematic reviews can involve either narrative approaches to integration (including **metasynthesis** and **meta-aggregation** of qualitative studies) or quantitative methods (**meta-analysis**) that integrate findings statistically by using individual studies as the **unit of analysis.** The emergence of **rapid reviews** reflects the need for less rigorous, but more timely, syntheses of evidence.
- Evidence-based **clinical practice guidelines** are a major example of preappraised evidence in the "Summaries" category of the 6S hierarchy. These guidelines combine a synthesis and appraisal of research evidence from a systematic review with specific recommendations for clinical decision-making. Clinical practice guidelines should be carefully and systematically appraised, for example, using the Appraisal of Guidelines Research and Evaluation (*AGREE II*) instrument.
- The EBP movement has given rise to a proliferation of **evidence hierarchies** that provide a preliminary guidepost for finding "best" evidence—evidence with the lowest risk of bias. Evidence hierarchies reflect **LOE scales** that rank order types of evidence source. Most published LOE scales are appropriate only for Therapy/intervention questions. In LOEs for Therapy questions, systematic reviews of RCTs are considered Level I sources. However, at every level, the quality of the evidence must be appraised: Strength of evidence = level + quality.
- Many models of EBP have been developed, including models that provide a framework for individual clinicians (e.g., the **Stetler model**) and others for organizations or teams of clinicians (e.g., the **Iowa Model** of Evidence-Based Practice to Promote Quality Care).
- Although organizational projects include additional steps, the most basic steps in EBP for both individuals and team are as follows (the 5 As): *Ask* a well-worded clinical question; *Acquire* the best evidence to answer the question; *Appraise* and synthesize the evidence; *Apply* the evidence, after integrating it with patient preferences and clinical expertise; and *Assess* the effects of the practice change.
- A widely used scheme for asking well-worded clinical questions involves four primary components, an acronym for which is **PICO**: Population or patients (P), Intervention or influence (I), Comparison (C), and Outcome (O).
  - An appraisal of the evidence involves such considerations as the quality of the evidence, in terms of the risk of bias; the magnitude of the effects and their clinical importance; the quantity of evidence; the consistency of evidence across studies; and the applicability of the evidence to particular settings and patients.

STUDY ACTIVITIES

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3

Key Concepts and Steps in Qualitative and Quantitative Research

Learning Objectives

1. Provide examples of independent and dependent variables.
2. Discuss the difference between experimental from nonexperimental research.
3. Identify three main disciplinary traditions for qualitative nursing research.
4. Describe the flow and sequence of activities in quantitative and qualitative research and discuss how and why they differ.

INTRODUCTION

This chapter covers a lot of ground—but, for many of you, it is familiar ground. If you have taken an earlier research course, this chapter will be a review of key terms and steps in the research process. If you have no previous exposure to research methods, this chapter offers basic grounding in research terminology.

Research, like any field of study, has its own *jargon*. Some terms are used by both qualitative and quantitative researchers, but others are used mainly by one or the other group. Also, some nursing research jargon has its roots in the social sciences, but sometimes different terms for the same concepts are used in medical research; we cover both.

FUNDAMENTAL RESEARCH TERMS AND CONCEPTS

When researchers address a problem—regardless of the underlying paradigm—they undertake a **study** (or an **investigation**). Studies involve people cooperating with each other in different roles.

The Faces and Places of Research

Studies with humans involve two groups: those doing research and those providing the information. In a quantitative study, the people being studied are

called **subjects** or **study participants** (Table 3.1). In a qualitative study, those under study are called study participants or **informants**. Collectively, study participants comprise the **sample**.

TABLE 3.1 • Key Terms in Quantitative and Qualitative Research

CONCEPT	QUANTITATIVE TERM	QUALITATIVE TERM
Person contributing information	Subject	–
	Study participant	Study participant
	–	Informant, key informant
Person undertaking the study	Researcher	Researcher
	Investigator	Investigator
That which is being investigated	–	Phenomena
	Concepts	Concepts
	Constructs	–
	Variables	–
System of organizing concepts	Theory, theoretical framework	Theory
	Conceptual framework, conceptual model	Conceptual framework, sensitizing framework
Information gathered	Data (numerical values)	Data (narrative descriptions)
Connections between concepts	Relationships (cause-and-effect, associative)	Patterns of association
Logical reasoning processes	Deductive reasoning	Inductive reasoning

The person who conducts a study is the **researcher** or **investigator**. Studies are often done by a team; the person directing the study is the **principal investigator (PI)**. Increasingly nurses are embracing team science in which nurse researchers are either working together in large groups or as part of interdisciplinary research teams. In large-scale projects, dozens of individuals may be involved in planning and conducting the study.

Research can be undertaken in a variety of *settings*—the specific places where information is gathered. Some studies take place in *naturalistic settings* in the field, such as in people's homes, but some studies are done in laboratory or clinical

settings. Qualitative researchers are especially likely to engage in **fieldwork** in natural settings because they are interested in the contexts of people's experiences. The *site* is the overall location for the research—it could be an entire community (e.g., a Haitian neighborhood in Miami) or an institution (e.g., a hospital in Toronto). Researchers sometimes undertake **multisite studies** because the use of multiple sites offers a larger or more diverse sample of participants.

The Building Blocks of Research

Phenomena, Concepts, and Constructs

Research involves abstractions. For example, *pain*, *fatigue*, and *obesity* are abstractions of human characteristics. These abstractions are called **concepts** or, in qualitative studies, **phenomena**.

Researchers also use the term **construct**, which refers to an abstraction inferred from situations or behaviors—but often one that is deliberately invented or constructed. For example, *self-care* in Orem's model of health maintenance is a construct. The terms *construct* and *concept* are sometimes used interchangeably, but by convention, a construct typically refers to a more complex abstraction than a concept.

Theories and Conceptual Models

A **theory** is a systematic explanation of some aspect of reality. Theories, which knit concepts together into a coherent system, play a role in both qualitative and quantitative research.

Quantitative researchers may start with a theory or *conceptual model* (distinctions are discussed in Chapter 6). Based on theory, researchers predict how phenomena will behave in the real world *if the theory is true.* Researchers use *deductive reasoning* to go from a theory to specific predictions, which are tested through research; study results are used to support, reject, or modify the theory.

In qualitative research, theories may be used in various ways. Sometimes conceptual or **sensitizing frameworks**, derived from qualitative research traditions we describe later in this chapter, offer an orienting world view. In such studies, the framework helps to guide the inquiry and to interpret the findings. In other qualitative studies, theory is the *product* of the research: the investigators use information from participants *inductively* to develop a theory rooted in the participants' experiences.

Variables

In quantitative studies, concepts often are called **variables**. A variable, as the name implies, is something that varies. Weight, fatigue, and stress are variables—each varies from one person to another. In fact, most aspects of humans are variables. If everyone weighed 150 lb, weight would not be a variable but rather would be a *constant*. It is because people and conditions *do* vary that most research is

conducted. Quantitative researchers seek to understand how or why things vary and to learn if differences in one variable are related to differences in another. For example, lung cancer research focuses on the variable of lung cancer, which is a variable because not everyone has this disease. Researchers have studied factors that might be linked to lung cancer, such as cigarette smoking. Smoking is also a variable because not everyone smokes. A variable, then, is any quality of a person, group, or situation that takes on different values.

When an attribute is highly varied in the group under study, the group is **heterogeneous** with respect to that variable. If the amount of variability is limited, the group is **homogeneous**. For example, for the variable height, a sample of 2-year-old children would be more homogeneous than a sample of 21-year-olds.

Characteristics of Variables

Variables may be inherent characteristics of people, such as their age or blood type. Sometimes, however, researchers *create* a variable. For example, if a researcher tests the effectiveness of patient-controlled analgesia as opposed to intramuscular analgesia in relieving pain after surgery, some patients would be given patient-controlled analgesia and others would receive intramuscular analgesia. In the context of the study, method of pain management is a variable because different patients get different analgesic methods.

Some variables take on a wide range of values that can be represented on a continuum. For example, a person's age is a *continuous variable* that can, in theory, assume an infinite number of values between two points. For example, between 1 and 2 lb for the variable *weight*, the number of values is limitless (e.g., 1.05, 1.3333, and so on). Other variables take on only a few values. *Discrete variables* convey quantitative information (e.g., number of children), but *categorical variables* involve placing people into categories (e.g., gender, blood type). Categorical variables with only two categories (e.g., alive/dead) are *dichotomous variables.*

Dependent and Independent Variables

Many studies seek to unravel and understand causes of phenomena. Does a nursing intervention *cause* improvements in patient outcomes? Does smoking *cause* lung cancer? The presumed cause is the **independent variable**, and the presumed effect is the **dependent variable** (or the **outcome variable**). The dependent variable corresponds to the "O" (outcome) of the PICO scheme discussed in Chapter 2. The independent variable corresponds to the "I" (the intervention, influence, or exposure), *plus* the "C" (the comparison). In doing an evidence search, you might want to learn about the effects of an intervention or influence (I), compared with *any* alternative, on an outcome (O). In a study, however, researchers must always specify the comparator (the "C") that they will investigate.

Variation in the dependent variable is presumed to *depend on* variation in the independent variable. For example, researchers study the extent to which lung cancer (the dependent variable) depends on smoking (the independent variable). Or, investigators might study the extent to which patients' pain (the dependent variable) depends on certain nursing actions (the independent variable). The dependent variable is the outcome that researchers want to understand, explain, or predict.

The terms *independent variable* and *dependent variable* are also used to indicate *direction of influence* rather than a causal link. For example, suppose a researcher studied the role of gender in the mental health (O) of spousal caregivers of patients with dementia (P) and found lower depression for wives than for husbands (I and C). We could not conclude that depression was *caused* by gender. Yet the direction of influence clearly runs from gender to depression: patients' level of depression does not influence their gender. Even without a cause-and-effect connection, it is appropriate to consider depression as the outcome variable and gender as an independent variable.

Most outcomes have multiple causes or influences. If we were studying factors that influence obesity, as measured by people's body mass index (the dependent variable), we might consider height, physical activity, and diet as independent variables in this Etiology question. Two or more *dependent* variables also may be of interest. For example, a researcher may compare the effects of alternative nursing interventions for children with cystic fibrosis (a Therapy question). Several dependent variables could be used to assess treatment effectiveness, such as length of hospital stay, number of recurrent respiratory infections, and so on. It is common to design studies with multiple independent and dependent variables.

Variables are not *inherently* dependent or independent. A dependent variable in one study could be an independent variable in another. For example, a study might examine the effect of an exercise intervention versus no intervention (the independent variable) on osteoporosis (the dependent variable) to answer a Therapy question. Another study might investigate the effect of osteoporosis versus no osteoporosis (the independent variable) on bone fracture incidence (the dependent variable) to address a Prognosis question. In short, whether a variable is independent or dependent is a function of the role that it plays in a particular study.

Example of Independent and Dependent Variables

Research question (Etiology/Harm question): Does a nurse-led intervention reduce the incidence and duration of delirium among adults admitted to the intensive care unit? (Lynch et al., 2020)

Independent variable: Nurse-led intervention versus no intervention.

Dependent variable: Delirium incidence and duration.

Conceptual and Operational Definitions

Concepts are abstractions of observable phenomena, and researchers' world views shape how those concepts are defined. A **conceptual definition** presents the abstract or theoretical meaning of concepts under study. Even seemingly straightforward terms need to be conceptually defined. The classic example is the concept of *caring*. Morse et al. (1990) examined how researchers and theorists defined *caring* and identified five classes of conceptual definition: as a human trait; a moral imperative; an affect; an interpersonal relationship; and a therapeutic

intervention. Smith (2019) identified eight sources in the nursing literature that described caring as core to the discipline of nursing. Further, Smith synthesizes the definition of caring as “the intentions, expressions, behaviors, actions, and experiences, grounded in a moral-ethical-spiritual foundation, that nurture humanization, health, healing, and well-being? (Smith, 2019, p. 11).

In qualitative studies, conceptual definitions of key phenomena may be a major end product, reflecting an intent to have the meaning of concepts defined by those being studied. In quantitative studies, however, researchers must define concepts at the outset because they must decide how the variables will be observed and measured. An **operational definition** specifies what the researchers must do to measure the concept and collect needed information.

Variables differ in the ease with which they can be operationalized. The variable weight, for example, is easy to define and measure. We might operationally define weight as the amount that an object weighs, to the nearest half pound. This definition designates that weight will be measured using one system (pounds) rather than another (grams). We could also specify that weight will be measured using a digital scale with participants fully undressed after 10 hours of fasting. This operational definition clarifies what we mean by the variable *weight*.

Few variables are operationalized as easily as weight. Most variables can be measured in different ways, and researchers must choose the one that best captures the variables as they conceptualize them. Take, for example, *anxiety*, which can be defined in terms of both physiologic and psychological functioning. For researchers choosing to emphasize physiologic aspects, the operational definition might involve a measurement of salivary cortisol. If researchers conceptualize anxiety as a psychological state, the operational definition might be people’s scores on a patient-reported test such as the State Anxiety Scale. Readers of research articles may not agree with how variables were conceptualized and measured, but definitional precision is important for communicating exactly what concepts mean within the study.

TIP

Operationalizing a concept is often a two-part process that involves deciding (1) how to accurately measure the variable and (2) how to represent it in an analysis. For example, a person’s age might be obtained by asking them to report their birthdate but operationalized in an analysis in relation to a threshold (e.g., younger than 65 vs. 65 years or older).

Example of Conceptual and Operational Definitions

Zhai et al. (2023) tested the relationship between organizational culture and thriving at work. In their study, they defined four concepts: thriving at work, culture of care, affective commitment, and work engagement. Each of the

concepts was operationalized through existing reliable and valid tools that measured the concepts. Their findings indicated that nurses' work engagement and affective commitment mediated the relationship between the nurses' perceived nursing culture and their thriving at work.

Data

Research **data** (singular, datum) are the pieces of information obtained in a study. In quantitative studies, researchers define their variables and then collect relevant data from study participants. Quantitative researchers collect primarily **quantitative data**—data in numeric form. For example, suppose *depression* was a key variable in a quantitative study. We might ask participants, "Thinking about the past week, how depressed would you say you have been on a scale from 0 to 10, where 0 means 'not at all' and 10 means 'the most possible'?" Box 3.1 presents quantitative data for three fictitious people. Subjects provided a number along a 0 to 10 continuum representing their degree of depression—*9* for subject 1 (a high level of depression), *0* for subject 2 (no depression), and *4* for subject 3 (mild depression). The numeric values for all participants, collectively, would comprise the data on depression in this study.

BOX 3.1 Example of Quantitative Data

Question: Thinking about the past week, how depressed would you say you have been on a scale from 0 to 10, where 0 means "not at all" and 10 means "the most possible"?

Data:
9 (Subject 1)
0 (Subject 2)
4 (Subject 3)

In qualitative studies, researchers collect **qualitative data**, that is, narrative descriptions. Narrative information can be obtained by having conversations with participants, by making detailed notes about how people behave, or by obtaining narrative records, such as diaries. Suppose we were studying depression qualitatively. Box 3.2 presents qualitative data for three people responding conversationally to the question, "Tell me about how you've been feeling lately—have you felt sad or depressed at all, or have you generally been in good spirits?" The data consist of rich narrative descriptions of participant's emotional state.

BOX 3.2 Example of Qualitative Data

Questio n:	Tell me about how you've been feeling lately—have you felt sad or depressed at all, or have you generally been in good spirits?
Data:	"Well, actually, I've been pretty depressed lately, to tell you the truth. I wake up each morning and I can't seem to think of anything to look forward to. I mope around the house all day, kind of in despair. I just can't seem to shake the blues, and I've begun to think I need to go see a shrink." (Participant 1)
	"I can't remember ever feeling better in my life. I just got promoted to a new job that makes me feel like I can really get ahead in my company. And I've just gotten engaged to a really great guy who is very special." (Participant 2)
	"I've had a few ups and downs the past week, but basically things are on a pretty even keel. I don't have too many complaints." (Participant 3)

Relationships

Researchers are rarely interested in isolated concepts, except in descriptive studies. For example, a researcher might describe the percentage of patients receiving intravenous (IV) therapy who experience IV infiltration. In this example, the variable is IV infiltration versus no infiltration. Usually, however, researchers study phenomena in relation to other phenomena—that is, they focus on relationships. A **relationship** is a bond or a connection between phenomena. For example, researchers repeatedly have found a *relationship* between cigarette smoking and lung cancer. Both qualitative and quantitative studies examine relationships, but in different ways.

In quantitative studies, researchers examine the relationship between the independent and dependent variables. Researchers ask whether variation in the dependent variable (the outcome) is systematically related to variation in the independent variable. Relationships are usually expressed in quantitative terms, such as *more than*, *less than*, and so on. For example, let us consider a person's weight as our dependent variable. What variables are related to (associated with) body weight? Some possibilities are height, caloric intake, and exercise. For each independent variable, we can make a prediction about its relationship to the outcome variable:

Height: Taller people will weigh more than shorter people.

Caloric intake: People with higher caloric intake will be heavier than those with lower caloric intake.

Exercise: The lower the amount of exercise, the greater the person's weight.

Each statement expresses a predicted relationship between weight (the dependent variable) and a measurable independent variable. Terms like *more than* and *heavier than* imply that as we observe a change in one variable, we are likely to observe a change in weight. If Alex is taller than Tom, we would predict (in the absence of other information) that Alex is heavier than Tom.

Quantitative studies can address one or more of the following questions about relationships:

- Does a relationship between variables *exist*? (e.g., Is cigarette smoking related to lung cancer?)
- What is the *direction* of the relationship between variables? (e.g., Are people who smoke *more* likely or *less* likely to develop lung cancer than those who do not?)
- How *strong* is the relationship between the variables? (e.g., How great is the risk that smokers will develop lung cancer?)
- What is the *nature* of the relationship between variables? (e.g., Does smoking *cause* lung cancer? Does some other factor *cause* both smoking and lung cancer?)

Variables can be related in different ways. One type of relationship is a **cause-and-effect** (or **causal**) **relationship**. Within the positivist paradigm, natural phenomena have antecedent causes that are presumably discoverable. In our example about a person's weight, we might speculate that there is a causal relationship between caloric intake and weight: we might predict that consuming more calories causes weight gain. Many quantitative studies are *cause-probing*—they seek to illuminate the causes of phenomena.

Example of a Study of Causal Relationships

Lee et al. (2021) evaluated the effect of California's safe patient handling legislation and changes in the experiences of musculoskeletal injury by hospital characteristics.

Not all relationships between variables can be interpreted as causal ones. There is a relationship, for example, between a person's pulmonary artery and tympanic temperatures: people with high readings on one tend to have high readings on the other. We cannot say, however, that pulmonary artery temperature *caused* tympanic temperature, nor vice versa. This type of relationship is a **functional** (or **associative**) **relationship** rather than a causal one.

Example of a Study of Associative Relationships

Khang et al. (2022) examined the symptomatic experiences of patients receiving immunotherapy for lung cancer to determine if symptoms reported

during immunotherapy were associated with survival outcomes. They identified 47 symptoms in those receiving immunotherapy. The symptoms of musculoskeletal pain, shortness of breath, lack of appetite, and drowsiness were associated with mortality within 2 years.

Qualitative researchers are not concerned with quantifying relationships nor in testing causal relationships. Qualitative researchers seek patterns of association as a way to illuminate the underlying meaning and dimensionality of phenomena. Patterns of interconnected themes and processes are identified as a means of understanding the whole.

Example of a Qualitative Study of Patterns

You & Yang (2020) explored the patterns and the meaning of health in 21 married Korean immigrant women from various sociocultural circumstances. They identified three patterns: (1) the cultural clash phase: your world; (2) the cultural assimilation phase: our world; and (3) the cultural recreation phase: expanded my world.

MAJOR CLASSES OF QUANTITATIVE AND QUALITATIVE RESEARCH

Researchers usually work within a paradigm that is consistent with their world view and that gives rise to questions that excite their curiosity. The maturity of the focal concept also may lead to one or the other paradigm: when little is known about a phenomenon, a qualitative approach may be more fruitful than a quantitative one. In this section, we briefly describe broad categories of quantitative and qualitative research.

Quantitative Research: Experimental and Nonexperimental Studies

A basic distinction in quantitative studies is between experimental and nonexperimental research. In **experimental research**, researchers actively introduce an intervention or treatment—most often, to address Therapy questions. In **nonexperimental research**, researchers are bystanders—they collect data without intervening (most often, to address Etiology, Prognosis, or Description questions). For example, if a researcher gave bran flakes to one group of people and prune juice to another to evaluate which method facilitated elimination more effectively, the study would be experimental because the researcher intervened in the normal course of things. If, on the other hand, a researcher compared elimination patterns of two groups whose regular eating patterns differed, the study would be

nonexperimental because there is no intervention. In medical research, an experimental study usually is called a **clinical trial** and a nonexperimental inquiry is called an **observational study**. A *randomized controlled trial* or RCT is a particular type of clinical trial.

TIP

On the evidence hierarchy shown in Figure 2.1, the two levels directly below systematic reviews (RCTs and quasiexperiments) involve interventions.

Experimental studies are explicitly cause-probing—they test whether an intervention *causes* changes in the dependent variable. Sometimes nonexperimental studies also explore causal relationships, but the resulting evidence is usually less conclusive. Experimental studies offer the possibility of greater control over confounding influences than nonexperimental studies, and so causal inferences are more plausible.

Example of Experimental Research

Tz-Han et al. (2022) studied the efficacy of a reminiscence music intervention on cognitive, depressive, and behavioral symptoms in older adults with dementia. They found that the experimental group who received the intervention experienced a significant reduction in depressive symptoms but did not experience a significant change in cognition or behavioral symptoms.

Example of Nonexperimental Research

Riman et al. (2023) found that operational failures were associated with decreased patient satisfaction scores, increased nurse-reported quality and safety issues, and poor nurse job outcomes, and that variation in the hospital work environments explained the relationship.

In this nonexperimental study to address an Etiology/Harm question, the researchers did not intervene in any way—they did not have control over nurse staffing. Their intent was to examine existing relationships rather than to test a potential solution to a problem.

Qualitative Research: Disciplinary Traditions

The majority of qualitative nursing studies can best be described as **qualitative descriptive research**. Many qualitative studies, however, are rooted in research traditions that originated in anthropology, sociology, and psychology. Three such traditions that are prominent in qualitative nursing research are briefly described here. Chapter 22 provides a fuller discussion of these traditions and the methods associated with them.

Grounded theory research, with roots in sociology, seeks to describe and understand the key social psychological processes that occur in social settings. Most grounded theory studies focus on a developing social experience—the social and psychological processes that characterize an event or episode. A major component of grounded theory is the discovery of not only the basic social psychological problem but also a *core variable* that is central in explaining what is going on in that social scene. Grounded theory researchers strive to generate explanations of phenomena that are grounded in reality. Grounded theory was developed in the 1960s by two sociologists, Glaser and Strauss (1967).

Example of a Grounded Theory Study

Vogel et al. (2021) conducted a grounded theory study in Sweden to explore patients' patterns of behavior over the period of becoming critically ill to recovery at home.

Phenomenology is concerned with the lived experiences of humans. Phenomenology is an approach to thinking about what life experiences of people are like and what they mean. The phenomenological researcher asks the questions: What is the *essence* of this phenomenon as experienced by these people? Or, what is the meaning of the phenomenon to those who experience it?

Example of a Phenomenologic Study

Nolan et al. (2022) conducted in-depth interviews with 15 young African American females to explore their experiences in their lives after surviving breast cancer.

Ethnography, the primary research tradition in anthropology, provides a framework for studying the patterns, lifeways, and experiences of a defined cultural group in a holistic manner. Ethnographers typically engage in extensive fieldwork, often participating in the life of the culture under study. Ethnographic research can be concerned with broadly defined cultures (e.g., Syrian refugee communities), but sometimes focuses on more narrowly defined cultures (e.g., the

culture of an intensive care unit). Ethnographers strive to learn from members of a cultural group, to understand their world view, and to describe their customs and norms.

Example of an Ethnographic Study

Hirani and Wagner (2022) conducted an ethnographic study with 27 women who were refugees and mothering young children aged 2 years and under in Canada during COVID-19.

MAJOR STEPS IN A QUANTITATIVE STUDY

In quantitative studies, researchers move from the beginning of a study (posing a question) to the end point (obtaining an answer) in a reasonably linear sequence of steps that is broadly similar across studies. In some studies, the steps overlap; in others, some steps are unnecessary. Still, a general flow of activities is typical in a quantitative study (see Figure 3.1). This section describes that flow, and the next section explains how qualitative studies differ.

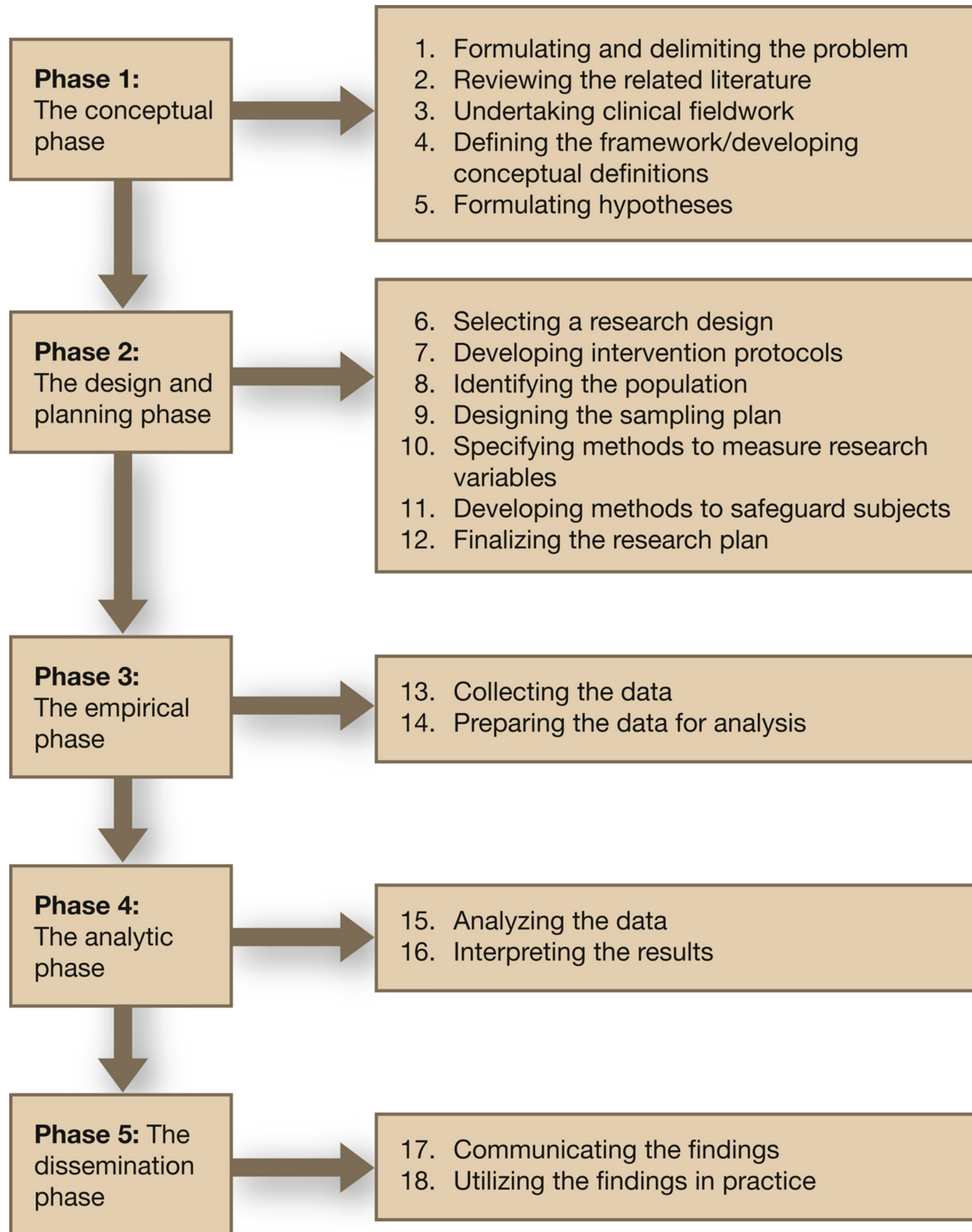

FIGURE 3.1 Flow of steps in a quantitative study.

Phase 1: The Conceptual Phase

Early steps in a quantitative study typically have a strong conceptual element. Activities include reading, conceptualizing, theorizing, and reviewing ideas with colleagues or advisers. During this phase, researchers call on such skills as

creativity, deductive reasoning, and a firm grounding in previous research on a topic of interest.

Step 1: Formulating and Delimiting the Problem

Quantitative researchers begin by identifying an interesting, significant research problem and formulating **research questions**. Good research requires starting with good questions. In developing research questions, nurse researchers must attend to substantive issues (What kind of new evidence is needed?); theoretical issues (Is there a conceptual context for understanding this problem?); clinical issues (How could evidence from this study be used in clinical practice?); methodologic issues (How can this question best be studied to yield high-quality evidence?); and ethical issues (Can this question be rigorously addressed in an ethical manner?)

TIP

A critical ingredient in developing good research questions is personal interest. Begin with topics that fascinate you or about which you have a passionate interest.

Step 2: Reviewing the Related Literature

Quantitative research is conducted in a context of previous knowledge. Quantitative researchers typically strive to understand what is already known about a topic by undertaking a literature review. A thorough **literature review** provides a foundation on which to base new evidence and usually is conducted before data are collected. For clinical problems, it may also be necessary to learn the "status quo" of current procedures and to review existing practice guidelines.

Step 3: Undertaking Clinical Fieldwork

Unless the research problem originated in a clinical setting, researchers embarking on a clinical nursing study benefit from spending time in relevant clinical settings, discussing the problem with clinicians and administrators, and observing current practices. Clinical fieldwork can provide perspectives on recent clinical trends, diagnostic procedures, and relevant healthcare delivery models; it can also help researchers better understand clients and the settings in which care is provided. Such fieldwork can also be valuable in gaining access to an appropriate site or in developing research strategies. For example, during clinical fieldwork, researchers might discover the need for research staff who are bilingual.

Step 4: Defining the Framework and Developing Conceptual Definitions

Theory transcends the specifics of a particular time, place, and group and characterizes regularities in the relationships among variables. When quantitative research is performed within the context of a theoretical framework, the findings often have broader significance and utility. Even when the research question is not embedded in a theory, researchers should have a conceptual rationale and a clear vision of the concepts under study.

Step 5: Formulating Hypotheses

Hypotheses state researcher's predictions about relationships between study variables. The research question identifies the study concepts and asks how the concepts might be related; a hypothesis is the predicted answer. For example, the research question might be: Is preeclamptic toxemia related to stress during pregnancy? This might be translated into the following hypothesis: Females with high levels of stress during pregnancy will be more likely than females with lower stress to experience preeclamptic toxemia. Most quantitative studies involve testing hypotheses through statistical analysis.

Phase 2: The Design and Planning Phase

In the second major phase of a quantitative study, researchers decide on the methods they will use to address the research question. Researchers make many methodologic decisions, which have important implications for the integrity and generalizability of the resulting evidence.

Step 6: Selecting a Research Design

The **research design** is the plan for obtaining answers to the research questions. In designing the study, researchers select a specific design from the many experimental and nonexperimental research designs that are available. Research designs specify how often data will be collected, what types of comparisons will be made, and where the study will take place. Researchers also identify strategies to minimize biases and to maximize the *applicability* of their research to real-life settings. The research design is the architectural backbone of the study.

Step 7: Developing Protocols for the Intervention

In experimental research, researchers create an intervention (the independent variable) and need to articulate its features. For example, if we were interested in testing the effect of biofeedback on hypertension, the independent variable would be exposure to biofeedback compared with either an alternative treatment (e.g., relaxation) or no treatment. An **intervention protocol** for the study must be developed, specifying exactly what the biofeedback treatment would entail (e.g.,

what type of feedback, who would administer it, how frequently and over how long a period the treatment would last, and so on) *and* what the alternative condition would be. The goal of such protocols is to ensure that all people in each group are treated in the same way. (In nonexperimental research, this step is not necessary.)

Step 8: Identifying the Population

Quantitative researchers need to clarify the group to whom study results can be generalized—that is, they must identify the population to be studied. A **population** is *all* the individuals or objects with common, defining characteristics (the "P" component in PICO questions). For example, the population of interest might be all patients undergoing chemotherapy in Atlanta.

Step 9: Designing the Sampling Plan

Researchers collect data from a sample, which is a subset of the population. Using samples is more feasible than collecting data from an entire population, but the risk is that the sample might not reflect the population's traits. In a quantitative study, a sample's adequacy is assessed by its size and **representativeness**. The quality of the sample depends on how typical, or representative, the sample is of the population. The **sampling plan** specifies how the sample will be selected and recruited and how many subjects there will be.

Step 10: Specifying Methods to Measure Research Variables

Quantitative researchers must identify methods to measure their research variables. The primary methods of data collection are *self-reports* (e.g., interviews), *observations* (e.g., observing the sleep-wake state of infants), and *biophysiologic measurements (biomarkers)*. Self-reports from patients are the largest class of data collection methods in nursing research. The task of selecting measures of research variables and developing a **data collection plan** is complex and challenging.

Step 11: Developing Methods to Safeguard Human/Animal Rights

Most nursing research involves humans, and so procedures need to be developed to ensure that the study adheres to ethical principles. A formal review by an ethics committee is usually required.

Step 12: Reviewing and Finalizing the Research Plan

Before collecting their data, researchers often take steps to ensure that plans will work smoothly. For example, they may evaluate the *readability* of written materials to assess if participants with low reading skills can comprehend them, or they may

pretest their measuring instruments to see if they work well. Normally, researchers also have their research plan critiqued by peers, consultants, or other reviewers before implementing it. Researchers seeking financial support submit a **proposal** to a funding source, and reviewers usually suggest improvements.

TIP

For major studies, researchers often undertake a small-scale pilot study to test their research plans. Strategies for designing effective pilot studies are described in Chapter 29.

Phase 3: The Empirical Phase

The empirical phase of quantitative studies involves collecting data and preparing the data for analysis. Often, the empirical phase is the most time-consuming part of the investigation. Data collection typically requires months of work.

Step 13: Collecting the Data

The actual collection of data in quantitative studies often proceeds according to a preestablished plan. A *data collection protocol* typically spells out procedures for training data collection staff; for actually collecting data (e.g., the location and timing of gathering the data); and for recording information. Technologic advances have expanded possibilities for automating data collection.

Step 14: Preparing the Data for Analysis

Data collected in a quantitative study must be prepared for analysis. One preliminary step is *coding*, which involves translating verbal data into numeric form (e.g., coding gender as "1" for females, "2" for males, and "3" for other). Another step may involve transferring the data from written documents onto computer files for analysis.

Phase 4: The Analytic Phase

Quantitative data must be subjected to analysis and interpretation, which occur in the fourth major phase of a project.

Step 15: Analyzing the Data

Quantitative researchers analyze their data through **statistical analyses**, which include simple procedures (e.g., computing an average) as well as ones that are complex. Some analytic methods are computationally formidable, but the underlying logic of statistical tests is fairly easy to grasp. Computers have eliminated the need to get bogged down with mathematic operations.

Step 16: Interpreting the Results

Interpretation involves making sense of study results and examining their implications. Researchers attempt to explain the findings in light of prior evidence, theory, and their own clinical experience—and in light of the adequacy of the methods they used in the study. Interpretation also involves drawing conclusions about the *clinical significance* of the results, envisioning how the new evidence can be used in nursing practice, and suggesting what further research is needed.

Phase 5: The Dissemination Phase

In the analytic phase, the researcher comes full circle: questions posed at the outset are answered. Researchers' responsibilities are not completed, however, until study results are disseminated.

Step 17: Communicating the Findings

A study can only contribute evidence to nursing practice if the results are shared. Another—and often final—task of a study is the preparation of a **research report** that summarizes the study. Research reports can take various forms: dissertations, journal articles, conference presentations, and so on. Journal articles—reports appearing in professional journals such as *Nursing Research*—usually are the most useful because they are available to a broad, international audience. We discuss journal articles later in this chapter.

Step 18: Utilizing the Findings in Practice

Ideally, the concluding step of a high-quality study is to plan for the use of the evidence in practice settings. Although nurse researchers may not themselves be able to implement a plan for using research findings, they can contribute to the process by making recommendations for utilizing the evidence, by ensuring that adequate information has been provided for a systematic review, and by pursuing opportunities to disseminate the findings to clinicians.

ACTIVITIES IN A QUALITATIVE STUDY

Quantitative research involves a fairly linear progression of tasks—researchers plan the steps to be taken to maximize study integrity and then follow those steps as faithfully as possible. In qualitative studies, by contrast, the progression is closer to

a circle than to a straight line—qualitative researchers continually examine and interpret data and make decisions about how to proceed based on what has already been discovered (Figure 3.2).

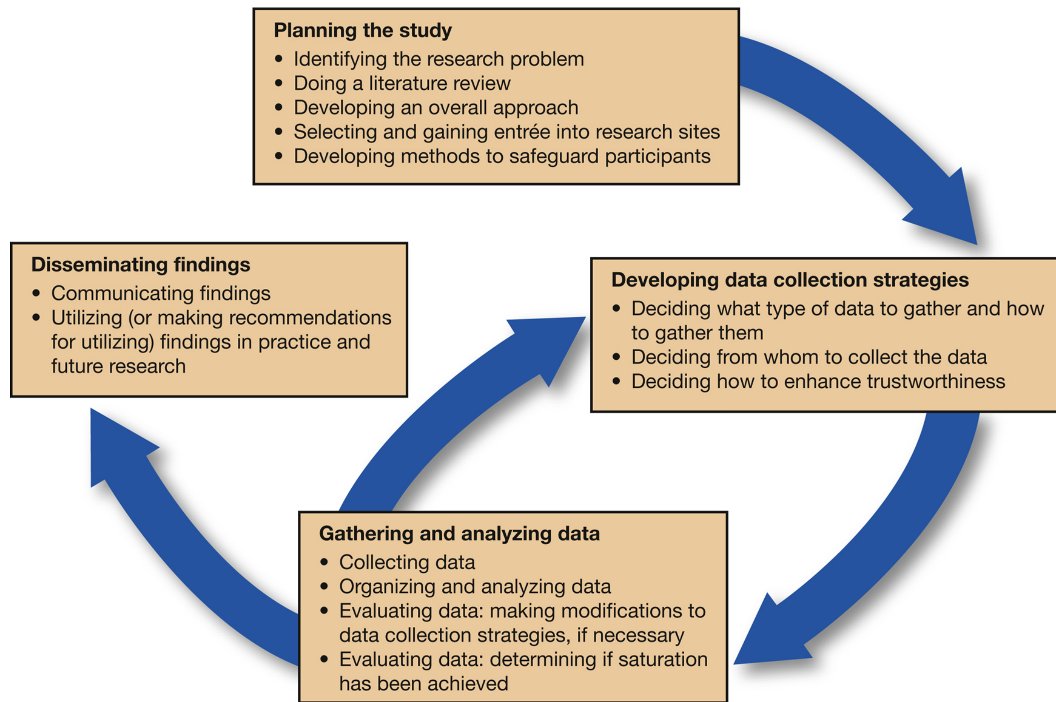

FIGURE 3.2 Flow of activities in a qualitative study.

Because qualitative researchers have a flexible approach, we cannot show the flow of activities precisely—the flow varies from one study to another, and researchers themselves do not know exactly how the study will unfold. We provide a sense of how qualitative studies are conducted, however, by describing major activities and indicating when they might be performed.

Conceptualizing and Planning a Qualitative Study

Identifying the Research Problem

Qualitative researchers usually begin with a broad topic area, focusing on an aspect of a topic that is poorly understood and about which little is known. Qualitative researchers often proceed with a fairly broad initial question, which may be narrowed and clarified on the basis of self-reflection and discussion with others. The specific focus and questions are usually delineated more clearly once the study is underway.

Doing a Literature Review

Qualitative researchers do not all agree about the value of doing an upfront literature review. Some believe that researchers should not consult the literature before collecting data because prior studies could influence conceptualization of the focal phenomenon. In this view, the phenomena should be explicated based on participants' viewpoints rather than on prior knowledge. Those sharing this opinion often do a literature review at the end of the study. Other researchers conduct a brief preliminary review to get a general grounding. Still others believe that a full early literature review is appropriate. In any case, qualitative researchers typically find a small body of relevant previous work because of the types of question they ask.

Selecting and Gaining Entrée Into Research Sites

Before going into the field, qualitative researchers must identify an appropriate site. For example, if the topic is the health beliefs of the urban population living below the poverty threshold, an inner-city neighborhood with low-income residents must be identified. Researchers may need to engage in anticipatory fieldwork to identify a suitable and information-rich environment for the study. In some cases, researchers have ready access to the study site, but in others, they need to **gain entrée**. A site may be well suited to the needs of the research, but if researchers cannot "get in," the study cannot proceed. Gaining entrée typically involves negotiations with **gatekeepers** who have the authority to permit entry into their world.

TIP

The process of gaining entrée is usually associated with doing fieldwork in qualitative studies, but quantitative researchers often need to gain entrée into sites for collecting data as well.

Developing an Overall Approach in Qualitative Studies

Quantitative researchers do not collect data until they have finalized their research design. Qualitative researchers, by contrast, use an **emergent design** that materializes during the course of data collection. Certain design features may be guided by the qualitative research tradition within which the researcher is working, but few qualitative studies follow rigidly structured designs that prohibit changes while in the field. Although qualitative researchers do not always know in advance exactly how the study will progress, they nevertheless must have some sense of how much time is available for fieldwork and must also arrange for and test needed equipment, such as laptop computers or cameras.

Addressing Ethical Issues

Qualitative researchers, like quantitative researchers, must also develop plans for addressing ethical issues—and, indeed, there are special concerns in qualitative studies because of the more intimate nature of the relationship that typically develops between researchers and study participants. Chapter 7 describes these concerns.

Conducting a Qualitative Study

In qualitative studies, the tasks of sampling, data collection, data analysis, and interpretation typically take place iteratively. Qualitative researchers begin by talking with or observing a few people who have first-hand experience with the phenomenon under study. The discussions and observations are loosely structured, allowing for the expression of a full range of beliefs, feelings, and behaviors. Analysis and interpretation are ongoing, concurrent activities that guide choices about the kinds of people to sample next and the types of questions to ask or observations to make.

The process of data analysis involves clustering together related types of narrative information into a coherent scheme. As analysis and interpretation progress, researchers begin to identify **themes** and categories (or stages in a process), which are used to build a rich description or theory of the phenomenon. The kinds of data obtained and the people selected as participants tend to become increasingly purposeful as the conceptualization is developed and refined. Concept development shapes the sampling process—as a conceptualization or theory emerges, the researcher seeks participants who can confirm and enrich the theoretical understandings, as well as participants who can potentially challenge them and lead to further theoretical development.

Quantitative researchers decide upfront how many people to include in a study, but qualitative researchers' sampling decisions are guided by the data. Qualitative researchers use the principle of **data saturation**, which occurs when themes and categories in the data become repetitive and redundant, such that no new information can be gleaned by further data collection.

Quantitative researchers seek to collect high-quality data by measuring their variables with methods that have been found to be reliable and valid. Qualitative researchers, by contrast, are the main data collection instrument and must take steps to demonstrate the *trustworthiness* of the data. The central feature of these efforts is to confirm that the findings accurately reflect the experiences and viewpoints of participants rather than the researcher's perceptions. One confirmatory activity, for example, involves going back to participants and sharing interpretations with them so that they can evaluate whether the researcher's thematic analysis is consistent with their experiences.

Disseminating Qualitative Findings

Qualitative nurse researchers also share their findings with others at conferences and in journal articles. Regardless of researchers' positions about *when* a literature review should be conducted, a summary of prior research is usually offered in qualitative reports as a means of providing context for the study.

Quantitative reports almost never contain **raw data**—that is, data in the form they were collected, which are numeric values. Qualitative reports, by contrast, are usually filled with rich verbatim passages directly from participants. The excerpts are used in an evidentiary fashion to support or illustrate researchers' interpretations and thematic construction.

Example of Raw Data in a Qualitative Report

Ryan et al. (2022) did an in-depth study of nurses' caring for older patients who are dying from traumatic injuries in the emergency department. Here is an illustrative quote: "Do you go further down the path and expose the patient to unnecessary insult to have the same outcome, or do you give them dignified pain relief and just let them pass?" (pp. 565–566)

Like quantitative researchers, qualitative nurse researchers want their findings used by others. Qualitative findings sometimes are the basis for formulating hypotheses that are tested by quantitative researchers, for developing measuring instruments for both research and clinical purposes, and for designing effective nursing interventions. Qualitative studies help to shape nurses' perceptions of a problem or situation, their conceptualizations of potential solutions, and their understanding of patients' concerns and experiences.

RESEARCH JOURNAL ARTICLES

Research **journal articles**, which summarize the background, design, and results of a study, are the primary method of disseminating research evidence. This section reviews the content and style of research journal articles to ensure that you will be equipped to delve into the research literature. A more detailed discussion of the structure of journal articles is presented in Chapter 32, which provides guidance on writing research reports.

Content of Journal Articles

Many quantitative and qualitative journal articles follow a conventional organization called the **IMRAD format**. This format involves organizing material into four main sections—**I**ntroduction, **M**ethods, **R**esults, **a**nd **D**iscussion. The text of the report is usually preceded by an abstract and followed by cited references.

The Abstract

The **abstract** is a brief description of the study placed at the beginning of the article. The abstract answers, in about 250 words, the following: What were the research questions? What methods did the researcher use to address the questions? What

did the researcher find? What are the implications? Readers review abstracts to assess whether the entire report is of interest. Some journals have moved from traditional abstracts—single paragraphs summarizing the study's main features—to longer, structured abstracts with specific headings. For example, in the journal *Nursing Research*, abstracts are organized under the following headings: Background, Objectives, Method, Results, and Discussion.

The Introduction

The introduction communicates the research problem and its context. The introduction, which often is not specifically labeled as "Introduction," follows immediately after the abstract. This section typically describes the following: (1) the central phenomena, concepts, or variables under study; (2) the population of interest; (3) the current state of evidence, based on a brief literature review; (4) the theoretical framework; (5) the study purpose, research questions, or hypotheses to be tested; and (6) the study's significance. Thus, the introduction sets the stage for a description of what the researcher did and what was learned. The introduction corresponds roughly to the conceptual phase of a study.

The Method Section

The method section describes the methods used to answer the research questions. This section lays out methodologic decisions made in the design and planning phase and may offer rationales for those decisions. In a quantitative study, the method section usually describes the following: (1) the research design; (2) the sampling plan for selecting participants from the population of interest; (3) methods of data collection and specific instruments used; (4) study procedures (including ethical safeguards); and (5) analytic procedures and methods.

Qualitative researchers discuss many of the same issues, but with different emphases. For example, a qualitative study often provides more information about the research setting and the study context, and less information on sampling. Also, because formal instruments are not used to collect qualitative data, there is less discussion about data collection methods. Reports of qualitative studies may also include descriptions of the researchers' efforts to enhance the trustworthiness of the study.

The Results Section

The results section presents the **findings** from the data analyses. The text summarizes key findings, and (in quantitative reports) tables provide greater detail. Virtually all results sections contain a description of the participants (e.g., their average age, percentage male/female).

In quantitative studies, the results section provides information about the **statistical tests** used to test hypotheses and to evaluate the believability of the findings. For example, if the percentage of smokers who smoke two packs or more daily is computed to be 40%, how *probable* is it that the percentage is accurate? If the

researcher finds that the average number of cigarettes smoked weekly is lower for those in an intervention group than for those not getting the intervention, how *probable* is it that the intervention effect is *real*? Statistical tests help to answer such questions. Researchers typically report the following:

- *The names of statistical tests used.* Different tests are appropriate for different situations but are based on common principles. You do not have to know the names of all statistical tests—there are dozens of them—to comprehend the findings.
- *The value of the calculated statistic.* Computers are used to calculate a numeric value for the statistical test used. The value allows researchers to draw conclusions about the results. The *actual* numeric value of the statistic, however, is not inherently meaningful and need not concern you.
- *The statistical significance.* A critical piece of information is whether the value of the statistic was significant (not to be confused with important or clinically relevant). When researchers say that results are **statistically significant**, it means the findings are probably reliable and replicable with a new sample. Research reports indicate the **level of significance**, which is an index of how probable it is that the findings are reliable. For example, if a report says that a finding was significant at the 0.05 level, this means that only five times out of 100 ($5 \div 100 = 0.05$) would the result be spurious. In other words, 95 times out of 100, similar results would be obtained with a new sample. Readers can have a high degree of confidence—but not total assurance—that the result is reliable.

Example From the Results Section of a Quantitative Study

Jones et al. (2023) examined the pain experience in relation to unique cancer-specific psychosocial factors in 41 cancer survivors after they completed cancer treatment. Using linear regression models and likelihood ratio testing, the team tested the individual and collective contribution of cancer-specific psychosocial factors on the experience of pain. Findings suggest that pain catastrophizing and multisite pain explained a significant degree of variance in pain interference scores ($P < .001$) and pain severity ($P = .005$). However, psychosocial factors specific to cancer did not predict variability in pain interference ($P = .313$) or pain severity ($P = .668$) beyond pain catastrophizing and the number of sites of pain.

Results sections of qualitative reports often have several subsections, the headings of which correspond to the themes, processes, or categories identified in the data. Excerpts from the raw data are presented to support and provide a rich description of the thematic analysis. The results section of qualitative studies may also present the researcher's emerging theory about the phenomenon under study.

The Discussion Section

In the discussion section, researchers draw conclusions about what the results mean, and how the evidence can be used in practice. The discussion in both qualitative and quantitative reports may include the following elements: (1) the degree to which results are consistent with previous research; (2) an interpretation of the results and their clinical significance; (3) implications for clinical practice and for future and research; and (4) study limitations and ramifications for the integrity of the results. Researchers are in the best position to point out sample deficiencies, design problems, weaknesses in data collection, and so forth. A discussion section that presents these limitations demonstrates to readers that the author was aware of these limitations and probably took them into account in interpreting the findings.

The Style of Research Journal Articles

Research reports tell a story. However, the style in which many research journal articles are written—especially reports of quantitative studies—makes it difficult for many readers to figure out the story or become intrigued by it. To unaccustomed audiences, research reports may seem stuffy, pedantic, and overwhelming. Four factors contribute to this impression:

- *Compactness.* Journal space is limited, so authors compress a lot of information into a short space. Interesting, personalized aspects of the study are not reported. Even in qualitative studies, only a handful of supporting quotes can be included.
- *Jargon.* The authors of research reports use terms that may seem esoteric.
- *Objectivity.* Quantitative researchers tell their stories objectively, in a way that may make them sound impersonal. For example, most quantitative reports are written in the passive voice (i.e., personal pronouns are avoided), which tends to make a report less lively than use of the active voice. Qualitative reports, by contrast, are more personal and written in a more conversational style.
- *Statistical information.* Quantitative reports summarize the results of statistical analyses. Numbers and statistical symbols can intimidate readers who do not have statistical training.

In this textbook we try to assist you in dealing with these issues and strive to encourage you to tell *your* research stories in a manner that makes them accessible to practicing nurses.

Tips on Reading Research Reports

As you progress through this book, you will acquire skills for evaluating research reports critically. Some preliminary hints on digesting research reports follow.

- Grow accustomed to the style of research articles by reading them frequently, even though you may not yet understand all the technical points.

- Read from an article that has been downloaded and printed so that you can highlight portions and write marginal notes (or use software that allows you to do this in PDF files).
- Read articles slowly. Skim the article first to get major points and then read it more carefully a second time.
- On the second reading of a journal article, train yourself to be an *active* reader. Reading actively means that you constantly monitor yourself to assess your understanding of what you are reading. If you have problems, go back and reread difficult passages or make notes so that you can ask someone for clarification. In most cases, that "someone" will be your research instructor, but also consider contacting researchers themselves via email.
- Some people find it helpful to use a structured reading method when reading research reports. One such method is called the SQ3R Reading Technique, which involves five steps: *Survey, Question, Read, Recite, and Review.*
- Keep this textbook with you as a reference while you are reading articles so that you can look up unfamiliar terms in the glossary or index.
- Try not to get "turned off" by statistical information. Try to grasp the gist of the story without letting numbers frustrate you.
- Until you become accustomed to research journal articles, you may want to "translate" them by expanding compact paragraphs into looser constructions, by translating jargon into familiar terms, by recasting the report into an active voice, and by summarizing findings with words rather than numbers.

GENERAL QUESTIONS IN REVIEWING A RESEARCH STUDY

Most chapters of this book contain guidelines to help you evaluate different aspects of a research report critically, focusing primarily on the researchers' methodologic decisions. Box 3.3 presents some further suggestions for performing a preliminary overview of a research report, drawing on concepts explained in this chapter. These guidelines supplement those presented in Box 1.1, Chapter 1.

BOX 3.3 Additional Questions for a Preliminary Review of a Research Report

1. What is the study all about? What are the main phenomena, concepts, or constructs under investigation?
2. If the study is quantitative, what are the independent and dependent variables? What are the PICO elements—and for what type of question (Therapy, Prognosis, etc.)?

3. Do the researchers examine relationships or patterns of association among variables or concepts? Does the report imply the possibility of a causal relationship?
4. Are key concepts clearly defined, both conceptually and operationally?
5. What type of study does it appear to be, in terms of types described in this chapter: Quantitative—experimental? nonexperimental? Qualitative—descriptive? grounded theory? phenomenological? ethnographic?
6. Does the report provide any information to suggest how long the study took to complete?
7. Does the format of the report conform to the traditional IMRAD format? If not, in what ways does it differ?

RESEARCH EXAMPLES

In this section, we illustrate the progression of activities and discuss the time schedule of two studies (one quantitative and the other qualitative) conducted by the author of this book.

Project Schedule for a Quantitative Study

Study: One of the authors of this textbook conducted a study: A predictive model of intrinsic factors associated with long-stay nursing home care after hospitalization (Flanagan et al., 2021).

Study purpose: Flanagan and colleagues aimed to build a predictive model with intrinsic factors measured upon admission to skilled nursing facilities (SNFs) postacute care to identify older adults transferred from SNFs to long-term care (LTC) instead of home.

Study methods: This study required a little more than 3 years to complete. Key activities and methodologic decisions included the following:

Phase 1. Conceptual Phase: 6 Months. The team obtained Medicare Provider Analysis and Review data and Resident Assessment Instrument Minimum Data Set 3.0. This was acquired through a Data Use Agreement with the Research Data Assistance Center, which provides Medicare, Medicaid, and Medicare Current Beneficiary Survey data for research. This first phase of obtaining the IRB approval, the data, and safely securing it through HIPPA-protected systems was an involved process that took several months.

Phase 2. Design and Planning Phase: 5 Months. Although the research questions had been formalized during the grant process, the team met several times to discuss the overall aim of the study and to identify which of the hundreds of variables we would focus on to answer our question about developing a predictive model.

Phase 3. Empirical Phase: 0 Months. In this study, the data from 23,662 community-dwelling persons admitted to skilled nursing facilities (SNFs) had already been collected.

Phase 4. Analytic Phase: 12 months. Several statistical analyses were performed. (1) A logistic regression applied to evaluate LTC admission vs. other discharge status, e.g., death considering variables such as dementia, severity of cognitive impairment, gender, race, marital status, diagnoses, vision loss, hearing loss, delirium, depressive symptoms, and pain frequency and severity. (2) The Hosmer-Lemeshow Goodness of Fit test was also performed to assess how well the final model fit the data. (3) To evaluate the predictive accuracy of the final logistic regression model, we generated the receiver operating characteristic (ROC) curve and the AUROC (area under the ROC curve) for the logistic regression model. (4) To assess overfitting, we evaluated the predictive logistic regression using cross-validation ROC Curve and its AUROC. (5) Descriptive statistics were used to describe the sample.

Phase 5. Dissemination Phase: 11 Months. The team submitted a paper to the *Journal of Clinical Nursing*. After peer review and revisions, it was accepted in December of 2020 and published in June 2021.

Project Schedule for a Qualitative Study

Study: Effects of fourth-degree perineal lacerations on women's physical and mental health (Beck, 2021).

Study Purpose: The purpose of this study was to describe the physical and emotional effects of fourth degree perineal lacerations that occurred during childbirth on mothers' daily lives.

Study Methods: This study required a little more than 1 and a half years to complete. Key activities and methodologic decisions included the following:

Phase 1. Conceptual phase: 2 months. This was Beck's first study on fourth degree perineal tears, so she needed time to review relevant studies.

Phase 2. Design and planning phase: 3 months. Beck, one of the authors of this nursing research textbook, chose a phenomenologic design for this study. She had conducted a number of phenomenologic studies so designing this new study did not require a lengthy time period. Once her proposal was finalized, it was submitted to the university's committee on ethics for approval.

Phase 3. Empirical/analytic phrases: 7 months. A recruitment notice was placed on the Facebook support group Mothers with Fourth Degree Tears. Eighteen mothers sent narratives about the impact their fourth-degree perineal tears from a traumatic birth had on their daily lives to Beck's university email address. It took 5 months to recruit the sample. Analysis of the mothers' stories took an additional 2 months. Seven themes emerged from the data analysis: (1) Why wasn't I informed I had this injury? (2) The unthinkable: fecal incontinence and so much more; (3) It has cost me so much; (4) Seeking relief: enduring surgery after surgery; (5) Why didn't anyone ask me about my mental health? (6) To have more children, that is the question; and (7) Are there any positives in all of this?

Phase 4. Dissemination phase: 9 months. It took approximately 2 months to prepare the manuscript reporting this study. It was submitted to the *Journal of Obstetric, Gynecologic, and Neonatal Nursing* (JOGNN) on July 27, 2020. This journal had a rapid response, and 2 months later Beck received a "revise and resubmit" decision from the journal. After Beck submitted her revised manuscript, 1 month later she received notification that her manuscript had been accepted for publication. The article was first published online 2 months later in January 2021 and then it was published in the March 2021 issue of JOGNN.

SUMMARY POINTS

- The people who provide information to the **researchers** (*investigators*) in a study are called **subjects** or **study participants** (in quantitative research) or study participants or **informants** in qualitative research; collectively the participants comprise the **sample.**
- The *site* is the overall location for the research; researchers sometimes engage in **multisite studies.** *Settings* are the types of places where data collection occurs. Settings can range from totally naturalistic environments to formal research locations.
- Researchers investigate **concepts** (or **constructs**) and **phenomena**, which are abstractions or mental representations inferred from behavior or characteristics.
- Concepts are the building blocks of **theories**, which are systematic explanations of some aspect of the real world.
- In quantitative studies, concepts are called variables. A **variable** is an attribute that takes on different values (i.e., that varies from one person to another). Groups that vary with respect to an attribute are **heterogeneous**; groups with limited variability are **homogeneous.**
- The **dependent** (or **outcome**) **variable** is the behavior or characteristic the researcher is interested in explaining, predicting, or affecting (the "O" in the PICO scheme). The **independent variable** is the presumed cause of, antecedent to, or influence on the dependent variable. The independent variable corresponds to the "I" and the "C" components in the PICO scheme.
- A **conceptual definition** describes the abstract or theoretical meaning of a concept being studied. An **operational definition** specifies how the variable will be measured.
- **Data**—information collected during a study—may take the form of narrative information (**qualitative data**) or numeric values (**quantitative data**).
- A **relationship** is a bond or connection between two variables. Quantitative researchers examine the relationship between the independent variable and dependent variable.

- When the independent variable is a cause of the dependent variable, the relationship is a **cause-and-effect** (or **causal**) **relationship.** In an **associative** (*functional*) **relationship**, variables are related, but in a noncausal way.
- A key distinction in quantitative studies is between **experimental research**, in which researchers introduce an intervention, and **nonexperimental** (or **observational) research**, in which researchers observe existing phenomena without intervening.
- Qualitative research sometimes is rooted in research traditions that originate in other disciplines. Three such traditions are grounded theory, phenomenology, and ethnography.
- **Grounded theory** seeks to describe and understand key social psychological processes that occur in social settings.
- **Phenomenology** focuses on the lived experiences of humans and is an approach to learning what the life experiences of people are like and what they mean.
- **Ethnography** provides a framework for studying the meanings, patterns, and lifeways of a culture in a holistic fashion.
- Quantitative researchers usually progress in a fairly linear fashion from asking research questions to answering them. The main phases in a quantitative study are the conceptual, planning, empirical, analytic, and dissemination phases.
- The *conceptual phase* involves (1) defining the problem to be studied; (2) doing a **literature review;** (3) engaging in **clinical fieldwork** for clinical studies; (4) developing a framework and conceptual definitions; and (5) formulating **hypotheses** to be tested.
- The *planning phase* entails (6) selecting a **research design**; (7) developing **intervention protocols** if the study is experimental; (8) specifying the **population**; (9) developing a **sampling plan**; (10) specifying methods to measure research variables; (11) developing strategies to safeguard the rights of participants; and (12) finalizing the research plan (e.g., *pretesting* instruments).
- The *empirical phase* involves (13) collecting data and (14) preparing data for analysis.
- The *analytic phase* involves (15) analyzing data through **statistical analysis** and (16) interpreting the results.
- The *dissemination phase* entails (17) communicating the findings in a **research report** and (18) promoting the use of the study evidence in nursing practice.
- The flow of activities in a qualitative study is more flexible and less linear. Qualitative studies typically involve an **emergent design** that evolves during data collection.
- Qualitative researchers begin with a broad question regarding a phenomenon, often focusing on a little-studied aspect. In the early phase of a qualitative study, researchers select a site and seek to **gain entrée** into it, which typically involves enlisting the cooperation of **gatekeepers.**

- Once in the field, qualitative researchers select informants, collect data, and then analyze and interpret them in an iterative fashion. Knowledge gained during data collection helps to shape the design of the study and the selection of participants.
- Early analysis in qualitative research leads to refinements in sampling and data collection, until **data saturation** (redundancy of information) is achieved.
- Both qualitative and quantitative researchers disseminate their findings, often in **journal articles** that concisely communicate what the researchers did and what they found.
- Journal articles typically consist of an **abstract** (a brief synopsis) and four major sections in an **IMRAD format**: an **I**ntroduction (explanation of the study problem and its context); **M**ethod section (the strategies used to address the problem); **R**esults section (study findings); **a**nd **D**iscussion (interpretation of the findings).
- Research reports can be difficult to read because they are dense and contain a lot of jargon. Quantitative research reports may be intimidating at first because, compared with qualitative reports, they are more impersonal and include statistical information.
- **Statistical tests** are procedures for testing research hypotheses and evaluating the believability of the findings. Findings that are **statistically significant** are ones that have a high probability of being "real."

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Part 2

CONCEPTUALIZING AND PLANNING A STUDY TO GENERATE EVIDENCE FOR NURSING

Chapter 4 Research Problems, Research Questions, and Hypotheses

Chapter 5 Literature Reviews: Finding and Critically Appraising Evidence

Chapter 6 Theoretical Frameworks

Chapter 7 Ethics in Nursing Research

Chapter 8 Planning a Nursing Study

4

Research Problems, Research Questions, and Hypotheses

Learning Objectives

1. Provide examples of the sources of research problems.
2. Describe the steps in the research process.
3. Identify issues related to the feasibility of a study design.
4. Articulate the difference between the purpose statement in a quantitative study as compared to a qualitative study.

OVERVIEW OF RESEARCH PROBLEMS

Studies begin, much like evidence-based practice (EBP) efforts, with a problem that needs to be solved or a question that needs to be answered. This chapter discusses the development of research problems. We begin by clarifying some relevant terms.

Basic Terminology

At a general level, a researcher selects a *topic* or a *phenomenon* on which to focus. Examples of research topics are claustrophobia during MRI tests, pain management for sickle cell disease, and nutrition during pregnancy. Within broad topic areas are many potential research problems. In this section, we illustrate various terms using the topic *side effects of chemotherapy.*

A **research problem** is an enigmatic or troubling condition. Researchers identify a research problem within a broad topic of interest. The purpose of research is to "solve" the problem—or to contribute to its solution—by generating relevant, high-quality evidence. Researchers articulate the problem in a **problem statement** that also presents a rationale for the study.

Many reports include a **statement of purpose** (or purpose statement), which summarizes the goal of the study. **Research questions** are the specific queries researchers want to answer in addressing the problem. Research questions guide the types of data to collect in a study. Researchers who make predictions about answers to research questions pose **hypotheses** that are tested in the study.

These terms are not always consistently defined in research methods textbooks, and differences among them are often subtle. Table 4.1 illustrates the terms as we define them.

TABLE 4.1 • Example of Terms Relating to Research Problems

TERM	EXAMPLE
Topic/focus	Side effects of chemotherapy
Research problem (simple problem statement)	Nausea and vomiting are common side effects among patients on chemotherapy, and interventions to date have been only moderately successful in reducing these effects. One issue concerns the efficacy of alternative means of administering antiemetic therapies.
Statement of purpose	The purpose of the study is to test an intervention to reduce chemotherapy-induced side effects—specifically, to compare the effectiveness of patient-controlled and nurse-administered antiemetic therapy for controlling nausea and vomiting in patients on chemotherapy.
Research questions	What is the relative effectiveness of patient-controlled antiemetic therapy versus nurse-controlled antiemetic therapy with regard to (1) medication consumption and (2) control of nausea and vomiting in patients on chemotherapy?
Hypotheses	Patients receiving antiemetic therapy by a patient-controlled pump will (1) be less nauseous, (2) vomit less, and (3) consume less medication than patients receiving the therapy by nurse administration.

Research Problems and Paradigms

Some research problems are better suited to qualitative vs. quantitative methods. Quantitative studies usually focus on concepts that are fairly well developed, about which there is existing evidence, and for which reliable methods of measurement have been (or can be) developed. For example, a quantitative study might be undertaken to explore whether older people with chronic illness who continue working are less (or more) depressed than those who retire. There are relatively good measures of depression that would yield quantitative information about the level of depression in a sample of employed and retired seniors who are chronically ill.

Qualitative studies are often undertaken because a researcher wants to develop a rich and context-bound understanding of a poorly understood phenomenon. Researchers often initiate a qualitative study to heighten awareness and create a dialogue about a phenomenon. Qualitative methods would not be well suited to comparing levels of depression among employed and retired seniors, but they would be ideal for exploring, for example, the meaning or experience of depression among chronically ill retirees. Thus, the nature of the research question is linked to paradigms and to research traditions within paradigms.

Sources of Research Problems

Where do ideas for research problems come from? At a basic level, research topics originate with researchers' interests. Because research is a time-consuming enterprise, curiosity about and interest in a topic are essential. Research reports rarely indicate the source of researchers' inspiration, but a variety of explicit sources can fuel their interest, including the following:

- *Clinical experience.* Nurses' everyday clinical experience is a rich source of ideas for research inquiries. Immediate problems that need a solution—analogous to problem-focused triggers discussed in Chapter 2—may generate enthusiasm and have high potential for clinical relevance.
- *Patients' involvement.* Increasingly, researchers are turning to patients and other key stakeholders for input in identifying important issues for research. *Patient-centered outcomes research (PCOR)* has become increasingly prominent.
- *Quality improvement efforts.* Important clinical questions sometimes emerge in the context of findings from quality improvement studies. Personal involvement on a quality improvement team can sometimes lead to ideas for a study. In Chapter 12, we discuss a process called *root cause analysis* that can suggest a research focus.
- *Nursing literature.* Ideas for studies sometimes come from reading the nursing literature. Research articles may suggest problems indirectly by stimulating the reader's curiosity and directly by pointing out needed research.
- *Social issues.* Topics are sometimes suggested by global social or political issues of relevance to the healthcare community. For example, the feminist movement raised questions about such topics as gender equity in healthcare. Public awareness about health disparities has led to research on healthcare access and culturally sensitive interventions.
- *Ideas from external sources.* External sources and direct suggestions can sometimes provide the impetus for a research idea. For example, ideas for studies may emerge from brainstorming with other nurses.

Additionally, researchers who have developed a program of research on a topic area may get inspiration for "next steps" from their own findings or from a discussion of those findings with others.

Example of a Problem Source in a Program of Research

Beck, one of this book's authors, conducted a study with two collaborators (Beck et al., 2015) on secondary traumatic stress among certified nurse midwives (CNMs). Beck has developed a strong research program on postpartum depression and traumatic births. She and Gable had previously conducted a study with labor and delivery nurses and their experiences of secondary traumatic stress caring for females during traumatic births. When Beck presented the findings of this study at conferences, certified CNMs in the audience often said "You should research us too. We are also traumatized."

TIP

Personal experiences in clinical settings are a provocative source of research ideas and questions. Here are some hints:

- Watch for a recurring problem and see if you can discern a pattern in situations that lead to the problem. Example: Why do so many patients complain of being tired after being transferred from a coronary care unit to a progressive care unit?
- Think about aspects of your work that are frustrating or do not result in the intended outcome—then try to identify factors contributing to the problem that could be changed. Example: Why is suppertime so frustrating in a nursing home?
- Critically examine your own clinical decisions. Are they based on tradition, or are they based on systematic evidence that supports their efficacy? Example: What would happen if you used the return of flatus to assess the return of GI motility after abdominal surgery, rather than listening to bowel sounds?

DEVELOPING AND REFINING RESEARCH PROBLEMS

Procedures for developing a research problem are difficult to describe. The process is rarely a smooth and orderly one; there are likely to be false starts, inspirations, and setbacks. The few suggestions offered here are not intended to imply that there are techniques for making this first step easy but rather to encourage you to persevere in the absence of instant success.

Selecting a Topic

Developing a research problem is a creative process—and it is a process that is sometimes best done in teams. The teams can include other nurses, mentors, interdisciplinary partners, patients, or other community members.

In the early stages of initiating research ideas, try not to be too self-critical. It is better to relax and jot down topics of interest as they come to mind. It does not

matter if the ideas are abstract or concrete, broad or specific, technical or colloquial—the important point is to put ideas on paper.

After this first step, ideas can be sorted in terms of interest, knowledge about the topics, and the perceived feasibility of turning the ideas into a study. When the most fruitful topic area has been selected, the list should not be discarded; it may be necessary to return to it.

TIP

The process of selecting and refining a research problem usually takes longer than you might think. The process involves starting with some preliminary ideas; having discussions with colleagues, advisers, or stakeholders; perusing the research literature; looking at what is happening in clinical settings; and a lot of reflection.

Narrowing the Topic

Once you have identified a topic of interest, you can begin to ask some broad questions that can lead you to a researchable problem. Examples of question stems that might help to focus an inquiry include the following:

- What is going on with ...?
- What is the process by which ...?
- What is the meaning of ...?
- What would happen if ...?
- What influences or causes ...?
- What are the consequences of ...?
- What factors contribute to ...?

Early criticism of ideas can be counterproductive. Try not to jump to the conclusion that an idea sounds trivial or uninspired without giving it more careful consideration or exploring it with others. Another potential danger is that new researchers sometimes develop problems that are too broad in scope. The transformation of a general topic into a workable problem often is accomplished in uneven steps. Each step should result in progress toward the goals of narrowing the scope of the problem and sharpening the concepts.

As researchers move from general topics to more specific ideas, several possible research problems may emerge. Consider the following example. Suppose you were working on a medical unit and were puzzled by that fact that some patients always complained about having to wait for pain medication when certain nurses were assigned to them. The general problem is discrepancy in patient complaints regarding pain medications. You might ask: What accounts for the discrepancy? How

can I improve the situation? These are not research questions, but they may lead you to ask such questions as the following: How do the two groups of nurses differ? or What characteristics do the complaining patients share? At this point, you may observe that the cultural and ethnic background of the patients and nurses could be relevant. This may lead you to search the literature for studies about culture and ethnicity in relation to nursing care, or it may prompt you to discuss your observations with others. These efforts may result in several research questions, such as the following:

- What is the nature of patient complaints among patients of different cultural backgrounds?
- Is the cultural background of nurses related to the frequency with which they dispense pain medication?
- Does the number of patient complaints increase when patients are of dissimilar cultural backgrounds as opposed to when they are of the same cultural background as nurses?
- Do nurses' dispensing behaviors change as a function of the similarity between their own cultural background and that of patients?

These questions stem from the same problem, yet each would be studied differently. Some suggest a qualitative approach and others suggest a quantitative one. A quantitative researcher might be curious about cultural or ethnic differences in nurses' dispensing behaviors. Both ethnicity and nurses' dispensing behaviors are variables that can be operationalized. A qualitative researcher would likely be more interested in understanding the *essence* of patients' complaints, their *experience* of frustration, or the *process* by which the problem got resolved.

Researchers choose a problem to study based on several factors, including its inherent interest and its compatibility with a paradigm of preference. In addition, tentative problems vary in their feasibility and worth. A critical evaluation of ideas is appropriate at this point.

Evaluating Research Problems

Although there are no rules for selecting a research problem, four important considerations to keep in mind are the problem's significance, researchability, feasibility, and interest to you.

Significance of the Problem

A crucial factor in selecting a problem is its significance to nursing. Evidence from the study should have potential to contribute meaningfully to nursing; the new study should be the right "next step" in building an evidence base. The right next step could be an original study, but it could also be a *replication* to answer previously asked questions with greater rigor or with a different population.

TIP

In evaluating the significance of an idea, ask the following kinds of questions: Is the problem important to nursing and its clients? Will patient care benefit from the evidence? Will the findings challenge (or lend support to) existing practices? If the answer to all these questions is "no," then the problem probably should be abandoned.

Researchability of the Problem

Not all problems are amenable to research inquiry. Questions of a moral or ethical nature, although provocative, cannot be researched. For example, should assisted suicide be legalized? There are no *right* or *wrong* answers to this question, only points of view. Of course, related questions could be researched, such as: Do patients living with high levels of pain hold more favorable attitudes toward assisted suicide than those with less pain? What moral dilemmas are perceived by nurses who might be involved in assisted suicide? The findings from studies addressing such questions would have no bearing on whether assisted suicide should be legalized, but they could be useful in developing a better understanding of key issues.

Feasibility of the Problem

A third consideration concerns feasibility, which encompasses several issues. Not all the following factors are universally relevant, but they should be kept in mind in making a decision.

Time. Most studies have deadlines or completion goals, so the problem must be one that can be studied in the allotted time. It is prudent to be conservative in estimating time for the various tasks because research activities typically require more time than anticipated.

Researcher experience. Ideally, the problem should relate to a topic about which you have some prior knowledge or experience. Also, beginning researchers should avoid problems that might require the development of a new measuring instrument or that demand complex analyses.

Availability of study participants. In any study involving humans, researchers need to consider whether people with the desired characteristics will be available and willing to cooperate. Researchers may need to put considerable effort into recruiting participants or may need to offer a monetary incentive.

Cooperation of others. It may be necessary to gain entrée into an appropriate community or setting and to develop the trust of gatekeepers. In institutional settings (e.g., hospitals), access to clients, personnel, or records requires authorization.

Ethical considerations. A research problem may be unfeasible if the study would pose unfair or unethical demands on participants. The ethical issues discussed in Chapter 7 should be reviewed when considering a study's feasibility.