Introduction to Evidence-Based Practice

UNIT 1

Without evidence, clinical practice cannot advance scientifically.

CHAPTER 1

What Is Evidence-Based Practice?

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It is not uncommon for students to question the need to study a textbook such as this. To many students, it seems much more exciting and important to be with patients in various settings. It is often hard for beginning practitioners to appreciate the value of learning the research process and the importance of evidence in providing patient care. To appreciate the importance of *evidence*, imagine that a family member required nursing care. Would it not be much more desirable to have care based on evidence rather than on tradition, trial and error, or an educated guess? To be competent, a nurse must have the ability to provide care based on evidence. A journey through this textbook will assist you with developing your skills and talents for providing patients with care based on evidence so that the best possible outcomes can be achieved.

1.1 EBP: What Is It?

At the end of this section, you will be able to:

‹ Define evidence-based practice (EBP)
‹ List sources of evidence for nursing practice
‹ Identify barriers to the adoption of EBP and pinpoint strategies to overcome them
‹ Explain how the process of diffusion facilitates moving evidence into nursing practice

Overview of EBP

When examining the literature about *evidence-based practice (EBP)*, one will find a variety of definitions. Most definitions include three components: research-based information, clinical expertise, and patient preferences. Ingersoll's (2000) definition succinctly captures the essence of EBP, defining it as "the conscientious, explicit, and judicious use of theory-derived, research-based information in making decisions about care delivery to individuals or groups of patients and in consideration of individual needs and preferences" (p. 152). What does this mean? EBP is a process involving the examination and application of research findings or other reliable evidence that has been integrated with scientific theories. For nurses to participate in this process, they must use their critical thinking skills to review research publications and other sources of information. After the information is evaluated, nurses use their clinical decision-making skills to apply evidence to patient care. As in all nursing care, patient preferences and needs are the basis of care decisions and therefore essential to EBP.

EBP has its roots in medicine. Archie Cochrane, a British epidemiologist, admonished the medical profession for not critically examining evidence (Cochrane, 1971). He contended that individuals should pay only for health care based on scientific evidence (Melnyk & Fineout-Overholt, 2011), and he believed that random clinical trials were the "gold standard" for generating reliable and valid evidence. He suggested that rigorous, systematic reviews of research from a variety of disciplines be conducted to inform practice and policy making. As a result of his innovative idea, the Cochrane Center established a collaboration "dedicated to making up-to-date, accurate information about the effects of health care readily available worldwide. It [the Cochrane Center] produces and disseminates systematic reviews of healthcare interventions and promotes the search for evidence in the form of clinical trials and other studies of interventions" (Cochrane Collaboration, n.d.). Others built on Dr. Cochrane's philosophy, and the definition of EBP in medicine evolved to include clinical judgment and patient preferences (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996; Straus, Glasziou, Richardson, & Haynes, 2011).

During this time, nursing was heavily involved in trying to apply research findings to practice, a process known as *research utilization*. This process involves changing practice from the results of a single research study (Barnsteiner & Prevost, 2002). Nursing innovators recognized that shifting from this model to an EBP framework would be more likely to improve patient outcomes and provide more cost-effective methods of care (Ingersoll, 2000; Levin, Fineout-Overholt, Melnyk, Barnes, & Vetter, 2011; Melnyk, 1999; Schifalacqua, Mamula, & Mason, 2011; Youngblut & Brooten, 2001). Why? Many nursing questions cannot be answered by a single study, and human

CRITICAL THINKING EXERCISE 1-1

Look carefully at the steps in each EBP model cited in **Table 1-1**. Are you reminded of a similar process?

conditions are not always amenable to clinical trials. Also, the research utilization process does not place value on the importance of clinical decision making, nor is it noted for being patient focused.

These nursing innovators recognized that the EBP framework allows for consideration of other sources of evidence relevant to nursing practice.

There are many different models for EBP. Three models that are especially well known in nursing are shown in **Table 1-1**. While each is unique, they have commonalities. For example, each one begins with a question or need for the identification of acquiring knowledge about a question. All involve appraisal of evidence and making a decision about how to use evidence. These models conclude by closing the loop through evaluation to determine that the practice change is actually meeting the expected outcomes.

Sources of Evidence

Over the years, a variety of sources of evidence has provided information for nursing practice. Although it would be nice to claim that all nursing practice is based on substantial and reliable evidence, this is not the case. Evidence

TABLE 1-1 Models of EBP

ACE Star Model of Knowledge Transformation	Iowa Model of EBP	Model of Diffusion of Innovations
1. Discovery research	1. Ask clinical question	1. Acquisition of knowledge
2. Evidence summary	2. Search literature	2. Persuasion
3. Translation to guidelines	3. Critically appraise evidence	3. Decision
4. Practice integration	4. Implement practice change	4. Implementation
5. Process, outcome evaluation	5. Evaluate	5. Confirmation
Stevens (2012)	Titler et al. (2001)	Rogers (2003)

derived from tradition, authority, trial and error, personal experiences, intuition, borrowed evidence, and scientific research are all used to guide nursing practice. Just as you know from your own life, some sources are not as dependable as others.

Tradition has long been an accepted basis for information. Consider this: Why are vital signs taken routinely every 4 hours on patients who are clinically stable? The rationale for many nursing interventions commonly practiced is grounded in the phrase "This is the way we have always done it." Nurses can be so entrenched in practice traditions that they fail to ask questions that could lead to changes based in evidence. Consistent use of tradition as a basis for practice limits effective problem solving and fails to consider individual needs and preferences.

How often have you heard the phrase "Because I said so"? This is an example of authority. Various sources of authority, such as books, articles, web pages, and individuals and groups, are perceived as being meaningful sources of reliable information; yet, in reality, the information provided may be based in personal experience or tradition rather than scientific evidence. Authority has a place in nursing practice as long as nurses ascertain the legitimacy of the information provided.

Trial and error is another source of evidence. Although we all use this approach in our everyday problem solving, it is often not the preferred approach for delivering nursing care. Because trial and error is not based on a systematic scientific approach, patient outcomes may not be a direct result of the intervention. For example, in long-term care the treatment of decubitus ulcers is often based on this haphazard approach. Nurses frequently try a variety of approaches to heal ulcers. After some time, they settle on one approach that is more often than not effective. This approach can lead to reduced critical thinking and wasted time and resources.

Nurses often make decisions about patient care based on their personal experiences. Although previous experience can help to build confidence and hone skills, experiences are biased by perceptions and values that are frequently influenced by tradition, authority, and trial and error. Personal intuition has also been identified as a source of evidence. It is not always clear what is meant by intuition and how it contributes to nursing practice. Intuition is defined as "quick perception of truth without conscious attention or reasoning" (Read et al., 2005, p. 668). Whereas on very rare occasions a "gut feeling" may be reliable, most patients would prefer health care that is based on stronger evidence. Thus, intuition is not one of the most advantageous sources of evidence for driving patient care decisions because nurses are expected to use logical reasoning as critical thinkers and clinical decision makers.

Because of the holistic perspective used in nursing and the collaboration that occurs with other healthcare providers, it is not uncommon for nurses to borrow evidence from other disciplines. For example, pediatric nurses rely heavily on theories of development as a basis for nursing interventions. Borrowed evidence can be useful because it fills gaps that exist in nursing science and provides a basis on which to build new evidence; it can be a stronger type of evidence than are sources not based on theory and science. When nurses use borrowed evidence, it is important for them to consider the fit of the evidence with the nursing phenomenon.

Because nursing offers a unique perspective on patient care, nurses cannot rely solely on borrowed evidence and must build their own body of evidence through scientific research. Scientific research is considered to yield the best source of evidence. Nurses can use many different research methods to describe, explain, and predict phenomena that are central to nursing care. To have an EBP, whenever possible nurses must emphasize the use of *theory*-derived, research-based information over the use of evidence obtained through tradition, authority, trial and error, personal experience, and intuition.

Not all scientific research is equal. Some types of studies are designed in ways that yield results that nurses can use with confidence. For example, experiments are considered more strongly designed than are studies that use surveys. When multiple studies have been conducted about a particular topic, the findings of the studies can be combined into a synthesis. Syntheses provide results that can be used with even more confidence. To rank evidence from strongest to weakest, nurses refer to the *pyramid of evidence*. You will find the need to frequently refer to this figure as you learn about appraising evidence and research designs.

Adopting an Evidence-Based Practice

One would think that when there is compelling scientific evidence, findings would quickly and efficiently transition to practice. However, most often this is not the case. Many *barriers* complicate the integration of findings into practice. In fact, it can take as many as 200 years for an innovation to become a standard of care. Consider the history of controlling scurvy in the British Navy.

> In the early days of long sea voyages, scurvy killed more sailors than did warfare, accidents, and other causes. In 1601 an English sea captain, James Lancaster, conducted an experiment to evaluate the effectiveness of lemon juice in preventing scurvy. He commanded four ships that

KEY TERMS

theory: A set of concepts linked through propositions to explain a phenomenon

pyramid of evidence: A model showing how evidence can be categorized from strong to weak

barriers: Factors that limit or prevent change

sailed from England on a voyage to India. Three teaspoonfuls of lemon juice were served every day to the sailors in one of his four ships. These men stayed healthy. The other three ships constituted Lancaster's "control group," as their sailors were not given any lemon juice. On the other three ships, by the halfway point in the journey, 110 out of 278 sailors had died from scurvy.

The results were so clear that one would have expected the British Navy to promptly adopt citrus juice for scurvy prevention on all ships. But it did not become accepted practice. In 1747, about 150 years later, James Lind, a British Navy physician who knew of Lancaster's results, carried out another experiment on the HMS *Salisbury*. To each scurvy patient on this ship, Lind prescribed either two oranges and one lemon, or one of five other supplements. The scurvy patients who got the citrus fruits were cured in a few days and were able to help Dr. Lind care for the other patients.

Certainly, with this further solid evidence of the ability of citrus fruits to combat scurvy, one would expect the British Navy to have quickly adopted this innovation for all ships' crews on long sea voyages. Yet it took another 48 years for this to become standard practice, and scurvy was finally wiped out.

Why were the authorities so slow to adopt the idea of citrus for scurvy prevention? Other competing remedies for scurvy were also being proposed, and each cure had its champions. For example, the highly respected Captain Cook reported that during his Pacific voyages there was no evidence that citrus fruits cured scurvy. In contrast, the experimental work by Dr. Lind, who was not a prominent figure in the field of naval medicine, did not get much attention. This leads one to wonder if the British Navy was typically hesitant to adopt new innovations. But, while it resisted scurvy prevention for years, other innovations, such as new ships and new guns, were readily accepted. (Adapted with the permission of Simon & Schuster Publishing Group from the Free Press edition of DIFFUSION OF INNOVATIONS, 5th Edition by Everett M. Rodgers. Copyright ©1995, 2003 by Everett M. Rodgers. Copyright © 1962, 1971, 1983 by The Free Press. All rights reserved.)

Even when the benefits and advantages of an *innovation* have been made evident, adoption can be slow to occur. Even today, studies demonstrate that nurses do not use nursing research in their practice. In 2005, Pravikoff, Tanner, and Pierce conducted a large survey of registered nurses (RNs) from across the United States. Of the clinical nurses who responded to the survey, more than 54% were not familiar with the term *EBP*.

CRITICAL THINKING EXERCISE 1-2

Consider your last clinical experience. How much was your practice based on scientific research? What other sources of evidence did you use? Divide a circle into sections (like a pie chart) to show how much influence each of the sources of evidence had on the patient care you provided.

The typical source of information for 67% of these nurses was a colleague. Alarmingly, 58% of the respondents had never used research articles to support clinical practice. Only 18% had ever used a hospital library. Additionally, 77% had never received instruction in the use of electronic resources. In contrast, a survey conducted at a Magnet hospital found that 96% of nurses were aware that EBP was being implemented at their institution (White-Williams et al., 2013). Although this shows a significant improvement over 7 years, one must keep in mind that the inclusion of only a Magnet facility may present a bias because to earn Magnet Recognition, EBP must be inherent in the organization.

Overcoming Barriers

Studies demonstrate that the reasons nurses do not draw on research are related to individual and organizational factors. Individual factors are those characteristics that are inherent to the nurse. Organizational factors are related to administration, resources, facilities, and culture of the system. Major barriers to nurses using research findings at the point of care are nurses not valuing research, nurses being resistant to change, and lack of time and resources to obtain evidence (Shivnan, 2011). In addition, the communication gap between researcher and clinician (Brown, 1995; Paris, Callahan, & Pierson, 2011), organizational culture, and the inability of individuals to evaluate nursing research have been identified as barriers by registered nurses (Carroll et al., 1997; Funk, Champagne, Wiese, & Tornquist, 1991; Kajermo, Nordstrom, Krusebrant, & Bjorvell, 2000; Majid et al., 2011; Melnyk, Fineout-Overholt, Gallagher-Ford, & Kaplan, 2012; Solomons & Spross, 2011; Van Patter Gale & Schaffer, 2009), healthcare administrators (Funk, Champagne, Tornquist, & Wiese, 1995), and oncology nursing staff (Rutledge, Ropka, Greene, Nail, & Mooney, 1998).

Strategies that do not overcome these barriers do little to promote EBP. To overcome barriers related to individual factors, strategies need to be aimed at instilling an appreciation for EBP, increasing knowledge, developing necessary skills, and changing behaviors. Strategies to overcome organizational barriers must be directed toward creating and maintaining an environment where EBP can flourish. Research has focused on strategies to overcome both individual and organizational factors to bring about change (Aitken et al., 2011; Fitzsimons & Cooper, 2012; Hauck, Winsett, & Kuric, 2013; Melnyk, Fineout-Overholt, Giggleman, & Cruz, 2010; Ogiehor-Enoma, Taqueban, & Anosike, 2010; Pennington, Moscatel, Dacar, & Johnson, 2010; Reicherter, Gordes, Glickman, & Hakim, 2013; Valente, 2010). Practical strategies for successfully overcoming these barriers are summarized in **Table 1-2**.

TABLE 1-2 Strategies for Overcoming Barriers to Adopting an EBP

Barrier	Strategy
Lack of time	Devote 15 minutes per day to reading evidence related to a clinical problem. Sign up for emails that offer summaries of research studies in your area of interest. Use a team approach to equitably distribute the workload among members. Bookmark websites that have clinical guidelines to promote faster retrieval of information. Evaluate available technologies (i.e., tablets) to create time-saving systems that allow quick and convenient retrieval of information at the bedside. Negotiate release time from patient care duties to collect, read, and share information about relevant clinical problems. Search for already established clinical guidelines because they provide synthesis of existing research.
Lack of value placed on research in practice	Make a list of reasons why healthcare providers should value research, and use this list as a springboard for discussions with colleagues. Invite nurse researchers to share why they are passionate about their work. When disagreements arise about a policy or protocol, find an article that supports your position and share it with others. When selecting a work environment, ask about the organizational commitment to EBP. Link measurement of quality indicators to EBP. Participate in EBP activities to demonstrate professionalism that can be rewarded through promotions or merit raises. Provide recognition during National Nurses Week for individuals involved in EBP projects.
Lack of knowledge about EBP and research	Take a course or attend a continuing education offering on EBP. Invite a faculty member to a unit meeting to discuss EBP. Consult with advanced practice nurses. Attend conferences where clinical research is presented and talk with presenters about their studies. Volunteer to serve on committees that set policies and protocols. Create a mentoring program to bring novice and experienced nurses together.
Lack of technological skills to find evidence	Consult with a librarian about how to access databases and retrieve articles. Learn to bookmark important websites that are sources of clinical guidelines. Commit to acquiring computer skills.

Barrier	Strategy
Lack of resources to access evidence	Write a proposal for funds to support access to online databases and journals. Collaborate with a nursing program for access to resources. Investigate funding possibilities from others (i.e., pharmaceutical companies, grants).
Lack of ability to read research	Organize a journal club where nurses meet regularly to discuss the evidence about a specific clinical problem. Write down questions about an article and ask an advanced practice nurse to read the article and assist in answering the questions. Clarify unfamiliar terms by looking them up in a dictionary or research textbook. Use one familiar critique format when reading research. Identify clinical problems and share them with nurse researchers. Participate in ongoing unit-based studies. Subscribe to journals that provide uncomplicated explanations of research studies.
Resistance to change	Listen to people's concerns about change. When considering an EBP project, select one that interests the staff, has a high priority, is likely to be successful, and has baseline data. Mobilize talented individuals to act as change agents. Create a means to reward individuals who provide leadership during change.
Lack of organizational support for EBP	Link organizational priorities with EBP to reduce cost and increase efficiency. Recruit administrators who value EBP. Form coalitions with other healthcare providers to increase the base of support for EBP. Use EBP to meet accreditation standards or gain recognition (i.e., Magnet Recognition).

To overcome barriers to using research findings in practice, it can be helpful to use a model to assist in understanding how new ideas come to be accepted practice. The ***model of diffusion of innovations*** (Rogers, 2003) has been used in the nursing literature for this purpose (Barta, 1995; Carroll et al., 1997; Schmidt & Brown, 2007; Van Patter Gale & Schaffer, 2009). You are already familiar with the concept of diffusion. From studying chemistry you know that diffusion involves the movement of molecules from areas of higher concentration to areas of lower concentration. In the same way, innovative nursing practices frequently begin in a small

KEY TERM

model of diffusion of innovations: Model to assist in understanding how new ideas come to be accepted practice

early adopters:
Individuals who are
the first to embrace an
innovation

laggards: Individuals
who are slow or fail to
adopt an innovation

number of institutions and eventually spread or diffuse, becoming standard practice everywhere. The model includes four major concepts: innovation, communication, time, and social system. Rogers (2003) defines diffusion as "the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system" (p. 11). An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. Before adopting an innovation, individuals seek information about its advantages and disadvantages.

Initially, only a minimal number of individuals, known as *early adopters*, embrace the innovation. With time, early adopters who are opinion leaders, through their interpersonal networks, become instrumental as the diffusion progresses through the social system. Those individuals who are slow or who fail to adopt the innovation are known as *laggards*. In the scurvy example, it took about 200 years for the innovation to diffuse throughout the British Navy. You may also be surprised to see how long it has taken other things we take for granted to diffuse throughout American households (**Table 1-3**).

TABLE 1-3 Spread of Products to a Quarter of the Population

Product	Year Invented	Years to Spread
Electricity	1873	48
Telephone	1876	35
Automobile	1896	55
Airplane	1903	64
Radio	1906	22
Television	1926	26
VCR	1952	34
Microwave oven	1953	30
PC	1975	16
Cellular phone	1983	13
Internet	1991	7

Source: Data from Leading Edge Forum (2011).

CRITICAL THINKING EXERCISE 1-3

In the scurvy example, identify communication channels and social system barriers to the adoption of citrus fruits as a treatment for scurvy. Now, consider how the model of diffusion of innovations could have been applied to this situation. How could the physicians have overcome the barriers you identified and convinced others to become early adopters so that citrus became accepted practice for the treatment of scurvy?

TEST YOUR KNOWLEDGE 1-1

1. Which of the following is not a component of the definition of EBP?
   a. Clinical expertise
   b. Nursing research
   c. Organizational culture
   d. Patient preferences
2. To promote EBP, which of the following strategies must be addressed? (Select all that apply.)
   a. Lack of commitment to EBP
   b. Lack of computer skills
   c. Lack of time
   d. Lack of value placed on research in practice

How did you do? 1. c; 2. a, b, c, d

1.2 What Is Nursing Research?

At the end of this section, you will be able to:

‹ Define research
‹ Discuss the contribution of research to EBP
‹ Categorize types of research
‹ Distinguish between quantitative and qualitative research approaches
‹ Describe the sections found in research articles

Research is a planned and systematic activity that leads to new knowledge and/or the discovery of solutions to problems or questions (Polit & Beck, 2011). Simply stated, research means to search again. But the search must be deliberate and organized as relevant questions are examined. It is essential that established steps be followed.

Following a systematic approach (**Table 1-4**) is more likely to yield results that can be used with confidence. Through research, scientists aim to describe, explain, and predict phenomena. But isn't science supposed to prove that things are true? Sometimes you may hear or read the phrase "research proves"; however, the use of the word *prove* is inaccurate. Research findings *support* a particular approach or view because the possibility of error exists in every research study. This underscores why a planned, systematic approach is necessary and why *replication studies* are important.

Nurses use research to generate new knowledge or to validate and refine existing knowledge that directly or indirectly influences nursing practice. In nursing research, the phenomena of interest are persons, health, nursing, and environment. Nurses study patient outcomes, attitudes of nurses, effectiveness of administrative policy, and teaching strategies in nursing education. Nursing research contributes to the development and refinement of theory. But most important, as a baccalaureate-prepared nurse, you will use research as a foundation for EBP. Without research, nursing practice would be based on tradition, authority, trial and error, personal experiences, intuition, and borrowed evidence. This is why you must have the skills to read, evaluate, and apply nursing research so that as an early adopter you can be instrumental in moving an innovation to the point of care.

FYI

Research can be categorized as descriptive, explanatory, or predictive; basic or applied; and quantitative or qualitative. Nursing research concerns persons, health, nursing practice, and environment and can be used to generate new knowledge or to validate and refine existing knowledge that directly or indirectly influences nursing practice.

TABLE 1-4 Steps of the Research Process
1. Identify the research question.
2. Conduct a review of the literature.
3. Identify a theoretical framework.
4. Select a research design.
5. Implement the study.
6. Analyze data.
7. Draw conclusions.
8. Disseminate findings.

Types of Research

A variety of terms is used to describe the research conducted by scientists. Research can be categorized as *descriptive*, *explanatory*, or *predictive*; *basic* or *applied*; and *quantitative* or *qualitative*. These categories are not necessarily mutually exclusive. For example, a study may be descriptive, applied, and qualitative. Although this sounds complicated, when you understand the definitions, it will become clear.

One way to classify research is by its aims. Descriptive research answers "What is it?" This category of research is concerned with providing accurate descriptions and can involve observation of a phenomenon in its natural setting. The goal of the explanatory category is to identify the relationships a phenomenon has with individuals, groups, situations, or events. Explanatory studies address why or how phenomena are related. Predictive research aims to forecast precise relationships between dimensions of phenomena or differences between groups. This category of research addresses when the phenomena will occur. Table 1-5 provides an example of how these different types helped nurses to better understand the phenomenon of pain during chest tube removal.

Another way to classify research is to consider whether findings can be used to solve real-world problems. Basic research, sometimes known as bench research, seeks to gain knowledge for the sake of gaining that knowledge. This knowledge may or may not become applicable to practical issues or situations. It may be years before a discovery becomes useful when it is combined with other discoveries. For example, vitamin K was studied for the sake of learning more about its properties. Years later, the knowledge gained about its mechanism of action during coagulation formed the foundation for vitamin K becoming an accepted treatment for bleeding disorders. In contrast, the aim of applied research is to discover knowledge that will solve a clinical problem. The findings typically have immediate application to bring about changes in practice, education, or administration.

Quantitative and *qualitative* are terms that are also used to distinguish among types of research. Philosophical approach, research questions, designs, and data all provide clues to assist you in differentiating between these two methods of classification. Quantitative research views the world as objective. This implies that researchers can separate themselves from phenomena being studied. The focus is on collecting *empirical evidence*, in other words, evidence gathered through the five senses. Researchers quantify observations by using numbers to obtain precise measurements that can later be statistically analyzed. Many quantitative studies test hypotheses. In contrast, the premise of qualitative research is that the world is not objective. There can be multiple realities because the context of the situation is different for each person and can change with time. The emphasis is on verbal descriptions that explain

KEY TERMS

descriptive research: A category of research that is concerned with providing accurate descriptions of phenomena

explanatory research: Research concerned with identifying relationships among phenomena

predictive research: Research that forecasts precise relationships between dimensions of phenomena or differences between groups

basic research: Research to gain knowledge for the sake of gaining knowledge; bench research

applied research: Research to discover knowledge that will solve a clinical problem

quantitative research: Research that uses numbers to obtain precise measurements

qualitative research: Research that uses words to describe human behaviors

empirical evidence: Evidence that is verifiable by experience through the five senses or experiment

TABLE 1-5 An Example of Building Knowledge in Nursing Science: Pain and Chest Tube Removal (CTR)

Study	Aim of Research	Findings
Gift, Bolgiano, & Cunningham (1991)	Describe	Individuals reported burning pain and pulling with CTR. Women reported pain more frequently than men did.
Puntillo (1994)	Describe	Compared CTR pain with endotracheal suctioning. Patients reported less pain with suctioning than with CTR. "Sharp" was the most frequent adjective for CTR pain.
Carson, Barton, Morrison, & Tribble (1994)	Explain	Patients were assigned to one of four groups for treatment with pain medications: IV morphine, IV morphine and subfascial lidocaine, IV morphine and subfascial normal saline solution, and subfascial lidocaine. There were no significant differences in pain alleviation.
Puntillo (1996)	Predict	Patients were assigned to either placebo normal saline interpleural injection or bupivacaine interpleural injection. There was no significant difference in pain reports.
Houston & Jesurum (1999)	Explain	Examined effect of Quick Release Technique (QRT), a form of relaxation using a breathing technique, during CTR. Patients were randomly assigned to either an analgesic-only group or an analgesic with QRT. Combination of QRT with analgesic was not more effective than was analgesic alone in reducing pain.
Puntillo & Ley (2004)	Predict	Patients were randomly assigned to one of four combinations of pharmacological and nonpharmacological interventions to reduce pain: 4 mg IV morphine with procedural information, 30 mg IV ketorolac and procedural information, 4 mg IV morphine with procedural and sensory information, and 30 mg IV ketorolac with procedural and sensory information. There were no significant differences among the groups regarding pain intensity, pain distress, or sedation levels.
Friesner, Curry, & Moddeman (2006)	Predict	A group of adults who had undergone coronary artery bypass used a slow deep-breathing relaxation exercise with opioid analgesia. Their pain ratings were compared to a group using opioids only. There was a significant reduction in pain ratings for the patients who used the breathing exercise combined with opioids.

Study	Aim of Research	Findings
Demir & Khorsbid (2010)	Predict	Cardiac patients were randomly assigned to a group that received ice and analgesia, a group that received warmth and analgesia, or a group that received only analgesia. Patients who received the application of ice reported significantly less pain than did patients from the other two groups.
Ertuğ & Űlker (2011)	Predict	Patients were randomly assigned to either an experimental group that received cold prior to CTR or a control group that had no intervention for pain management. Patients receiving cold reported significantly less pain than did those in the control group.

Note: CTR = chest tube removal.

human behaviors. In this type of research, the focus is on providing a detailed description of the meanings people give to their experiences. **Table 1-6** provides a comparison of these two approaches.

Another important point about quantitative and qualitative approaches is that there are two styles of reasoning associated with them. *Deductive reasoning*, primarily linked with quantitative research, is reasoning that moves from the general to the particular. For example, researchers use a theory to help them reason out a hunch. If the researcher believes that the position of the body affects circulation, then the researcher could deduce that blood pressure readings taken while lying down will be different from those measured while standing. In contrast, *inductive reasoning* involves reasoning that moves from the particular to the general and is associated with qualitative approaches. By using inductive reasoning, researchers can take particular ideas and express an overall general summary about the phenomenon (**Figure 1-1**).

What Makes Up a Research Article?

The development of EBP requires careful attention to research already published. Therefore, it is essential for nurses to identify research studies from among the many other types of articles included in the literature. The trick is knowing what sections are contained in a research article.

Typically, an *abstract* is the first section of a research article and is usually limited to 100–150 words. The purpose of the abstract is to provide an

KEY TERMS

deductive reasoning: Thinking that moves from the general to the particular

inductive reasoning: Thinking that moves from the particular to the general

abstract: The first section of a research article that provides an overview of the study

TABLE 1-6 Comparisons of Quantitative and Qualitative Approaches

Attribute	Quantitative	Qualitative
Philosophical perspective	One reality that can be objectively viewed by the researcher	Multiple realities that are subjective, occurring within the context of the situation
Type of reasoning	Primarily deductive	Primarily inductive
Role of researcher	Controlled and structured	Participative and ongoing
Strategies	Control and manipulation of situations Analysis of numbers with statistical tests Larger number of subjects	Naturalistic; allows situations to unfold without interference Analysis of words to identify themes Smaller numbers of participants
Possible designs	Nonexperimental Correlational Quasi-experimental Experimental	Phenomenological Ethnographic Grounded Theory Historical

KEY TERMS

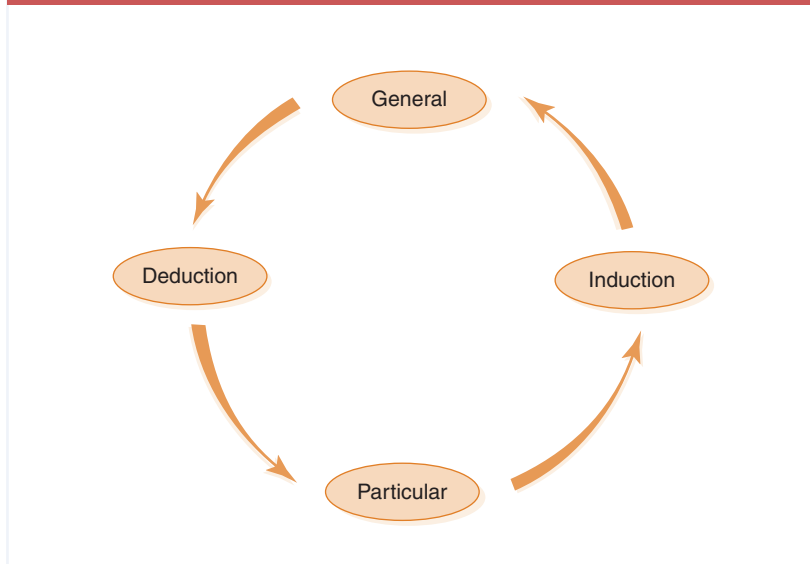**introduction:** Part of a research article that states the problem and purpose

review of literature: An unbiased, comprehensive, synthesized description of relevant previously published studies

overview of the study, but the presence of an abstract does not necessarily mean that an article is a research study. Because abstracts can frequently be found online, it is usually helpful to read them before printing or requesting a copy of the article. Careful attention to abstracts can avoid wasted time and effort retrieving articles that are not applicable to the clinical question.

The *introduction*, which follows the abstract, contains a statement of the problem and a purpose statement. The problem statement identifies the problem in a broad and general way. For example, a problem statement may read, "falls in hospitalized patients can increase length of stay." Authors usually provide background information and statistics about the problem to convince readers that the problem is significant. The background information provided should set the stage for the purpose statement, which describes what was examined in the study. For example, a purpose statement may read, "the purpose of this study was to examine the relationship between time of evening medication administration and time of falls." A good introduction convinces readers that the study was worthy of being conducted.

The third section is the *review of literature*. An unbiased, comprehensive, synthesized description of relevant, previously published studies should be

FIGURE 1-1 **Ways of Reasoning**

presented. For each study included in the review, the purpose, sample, design, and significant findings are discussed. The review should focus on the most recent work in the field but may include older citations if they are considered to be landmark studies. A complete citation is provided for each article so that readers can retrieve the articles if desired. A well-written literature review concludes with a summary of what is known about the problem and identifies gaps in the knowledge base to show readers how the study adds to existing knowledge.

The research article should include a discussion of the *theoretical framework*, which may be in a separate section or combined with the review of literature. A theoretical framework often describes the relationships among general concepts and provides linkages to what is being measured in the study. Authors frequently use a model or diagram to explain their theoretical framework.

A major portion of a research article is the *methods section*, which includes a discussion about study design, sample, and data collection. In most cases, authors explicitly describe the type of design they selected to answer the research question. In this section, it is important for the authors to describe the target population and explain how the sample was obtained. Procedures for collecting data, including the types of measures used, should also be outlined. Throughout this section, authors provide rationale for decisions made regarding how the study was implemented.

KEY TERMS

results section:
Component of a research article that reports the methods used to analyze data and characteristics of the sample

discussion section:
Portion of a research article where interpretation of the results and how the findings extend the body of knowledge are discussed

list of references:
Publication information for each article cited in a research report

....

Readers frequently consider the ***results section*** to be the most difficult to understand. Here, authors describe the methods they used to analyze their data, and the characteristics of the sample are reported. In quantitative studies, data tables are frequently included for interpretation, and authors indicate which findings were significant and which were not. In qualitative studies, authors present themes that are supported by quotes from participants. After reading the results section, the reader should be confident that the researchers selected the appropriate analysis for the data collected.

The body of a research article concludes with a ***discussion section***. Authors provide an interpretation of the results and discuss how the findings extend the body of knowledge. Results should be linked to the review of the literature and theoretical framework. The authors discuss the limitations of the study design and sometimes suggest possible solutions to address them in future studies. Implications for practice, research, and education are proposed. Often it is helpful to read this section after reading the abstract and introduction because it provides clarity by giving readers an idea of what is to come.

The article concludes with the ***list of references*** that are cited in the article. While styles vary, many journals adhere to the guidelines provided in the *Publication Manual of the American Psychological Association*. Because it is often helpful to refer to the original works listed in the reference section, it is wise for readers to obtain a copy of the entire article, including the reference list.

TEST YOUR KNOWLEDGE 1-2

True/False

1. When reading a quantitative research article, you would expect to see words being analyzed as data.

2. The purpose of research is to prove something is true.

3. It is possible for a descriptive, qualitative study to be applied to practice.

How did you do? 1. F; 2. F; 3. T

1.3 How Has Nursing Evolved as a Science?

At the end of this section, you will be able to:

‹ Describe the cycle of scientific development
‹ Identify historical occurrences that shaped the development of nursing as a science

Nursing has been described as both an art and a science. Historically, the emphasis was more on the art than the science. But as nursing has developed, the emphasis has shifted. We propose that nursing is the artful use of science to promote the health and well-being of individuals, families, and communities. Thus, nursing is based on scientific evidence that provides the framework for practice. The art of nursing is the blending of science with caring to create a therapeutic relationship in which holistic care is delivered. The profession of nursing is entering a new era in which the emphasis is on EBP, therefore reaffirming the importance of science in nursing.

Cycle of Scientific Development

To fully appreciate nursing as a science, an understanding of the history of research in nursing is necessary. Although a grasp of history is important, it can be confusing when one focuses on a list of events and dates to memorize. Instead, by focusing on the what and why of historical occurrences instead of the when, the evolution of nursing as a science will be more clear.

Nursing has developed in a similar fashion to other sciences. **Figure 1-2** depicts the *cycle of scientific development*. Scientists begin by developing grand theories to explain phenomena. A grand theory is a broad generalization that describes, explains, and predicts occurrences that take place around us. Research is then conducted to test these theories and to discover new knowledge. Conferences and publications result from the need to disseminate research findings. Findings are applied to patient care, resulting in changes in practice, and are used to refine established theories and propose new ones. This cycle repeats, building the science as new discoveries are made. Political and social factors are central to the cycle in that they channel research priorities, funding, and opportunities for dissemination of findings.

> **KEY TERM**
>
> **cycle of scientific development:** A model of the scientific process

FIGURE 1-2 Cycle of Scientific Development
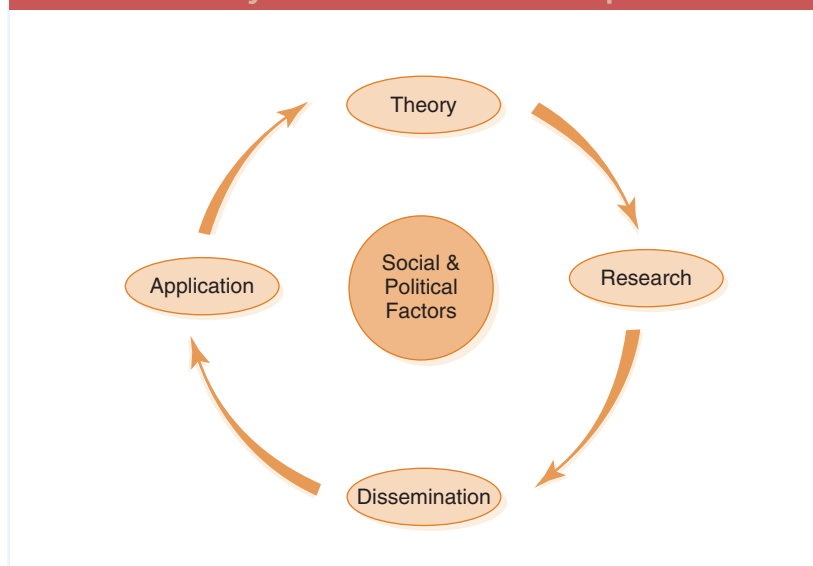
A Glimpse of the Past

Before 1900

Florence Nightingale is considered by most to be the first nurse researcher. One could say that, as an innovator, she was the first nurse to create an EBP. Through the systematic collection and analysis of data, she identified factors that contributed to the high morbidity and mortality rates of British soldiers during the Crimean War (1853–1856). Health reforms based on her evidence significantly reduced these rates. Her observations during the war led her to theorize that environmental factors were critical influences on the health of individuals. In 1859, she disseminated her ideas in *Notes on Nursing: What It Is, and What It Is Not* (1859/1946), which continues to be in print today. Even though Nightingale was an innovator in nursing research, 40 years passed before nursing research reemerged as relevant to nursing practice.

1900–1929

During the first quarter of the 20th century, the focus of nursing research was closely aligned with the social and political climate. Women were empowered by the suffragette movement; thus their interest in higher education increased. Nursing education became the focus of nursing research. The work of nursing leaders such as Lavinia Dock, Mary Adelaide Nutting, Isabel Hampton Robb, and Lillian Wald was instrumental in reforming nursing education. Similarly,

the Goldmark Report (1923) identified many inadequacies in nursing educa-tion and recommended that advanced educational preparation for nurses was essential. As a result, Yale University School of Nursing became the first uni-versity-based nursing program in the United States. Also during this time, the first nursing doctoral program in education was started at Teachers College at Columbia University (1924). These events are important because aligning programs of nursing with universities provided the environment for the gen-eration and dissemination of nursing research.

During this era, nursing was prominent in community health, addressing clinical problems such as pneumonia, infant mortality, and blindness. Because nursing research was still in its infancy, descriptive studies focusing on mor-bidity and mortality rates of these problems were typically conducted. The first nursing journal, *American Journal of Nursing*, was published (1900) and the American Nurses Association was established (1912). As a result, nursing was organized and promoted as a profession.

<div style="float:right; border:1px solid #ccc;">

FYI

In the early 1900s, nursing research was primarily focused on education preparation.

</div>

1930–1949

The time from 1930 to 1949 was influenced by the Great Depression, which was followed by World War II. During the Depression, families did not have money to provide a university education for their children. Consequently, university-based nursing education did not flourish, and nursing research did not advance. As a result of the war, the demand for nurses was so great that nursing education continued to take place primarily in hospital-based diploma programs because this was the quickest way to prepare individuals for the workforce. Nurses continued to focus their research on educational issues, and their studies began to be published in the *American Journal of Nursing*. At the close of this era, the Brown Report (1948) was published. Like the Goldmark Report published 25 years earlier, the Brown Report recommended that nurses be educated in university settings. These events illustrate how the social system can impede the diffusion of an innovation as accepted practice.

1950–1969

In the 1950s, significant events occurred that advanced the science of nursing. The innovation of moving nursing education into universities began to become accepted. Through the work of the Western Interstate Commission for Higher Education (1957), nursing research began to be incorporated into graduate curricula, which provided a structure for the advancement of nursing science. Several nursing research centers, includ-ing the Institute of Research and Service in Nursing Education at Teachers College (1953), the American Nurses Foundation (1955), the Walter Reed Institute of Research (1957), and the National League for Nursing Research

for Studies Service (1959), were established. The availability of funds from government and private foundations increased awards for nursing research grants and predoctoral fellowships.

Also during the 1950s, the focus of nursing research shifted from nursing education to issues such as the role of the nurse in the healthcare setting and characteristics of the ideal nurse. Early nursing theories described the nurse–patient relationship (Peplau, 1952) and categorized nursing activity according to human needs (Henderson, 1966). To accommodate the growth of nursing science, journals were needed to disseminate findings. In response, *Nursing Research* (1952) and *Nursing Outlook* (1953) were published, and the *Cumulative Index to Nursing Literature* (CINL) became more prominent.

The scholarly work done by nurses during the 1960s propelled nursing science to a new level. Nursing's major organizations began to call for a shift to research that focused on clinical problems and clinical outcomes. Nurse researchers began to develop grand nursing theories in an attempt to explain the relationships among nursing, health, persons, and environment (King, 1964, 1968; Levine, 1967; Orem, 1971; Rogers, 1963; Roy, 1971). As in the evolution of any science, nursing began to conduct research to test these theories. Because of the volume of nursing scholarship, new avenues for dissemination of information became necessary. Conferences for the sole purpose of exposing nurses to theory and research were organized. For example, in 1965 the American Nurses Association began to sponsor nursing research conferences. Worldwide dissemination became possible with the addition of international journals, such as the *International Journal of Nursing Research* (1963), thus increasing the interest in nursing research.

1970–1989

The hallmark of the 1970s and 1980s was the increased focus on the application of nursing research. The Lysaught Report (1970) confirmed that research focusing on clinical problems was essential but that research on nursing education was still indicated. It was recommended that findings from studies on nursing education be used to improve nursing curricula. During this era, the number of nurses with earned doctorates significantly increased as did the availability of funding for research fellowships. The scholarship generated by these doctoral-prepared nurses increased the demand for additional journals. Journals, such as *Advances in Nursing Science* (1978), *Research in Nursing and Health* (1978), and *Western Journal of Nursing Research* (1979), contained nursing research reports and articles about theoretical and practice issues of nursing. In 1977, CINL expanded its scope to include allied health journals, thus changing its name to the *Cumulative Index to Nursing and Allied Health Literature* (CINAHL), which allowed individuals in other disciplines to be exposed to nursing research.

On the national scene, the ethical implications of research involving human subjects were given much attention. In 1973, the first regulations to protect human subjects were proposed by the Department of Health, Education, and Welfare. The formation of institutional review boards to approve all studies was an important result of this regulation. Work regarding ethics in research continued throughout the decade with publication of the Belmont Report (1979). This report identified ethical principles that are foundational for the ethical treatment of individuals participating in studies funded by the federal government. Because the focus of nursing research on clinical problems involving patients was growing, nursing research was held to the same standards as other clinical research. Thus, the protection of human subjects became an important issue for nurse researchers.

Despite the abundance of research produced during the 1960s and 1970s, little change occurred in practice. Because nurses recognized a gap between research and practice, the emphasis in the 1980s was on closing this gap. The term *research utilization* was coined to describe the application of nursing research to practice. Activities to move nursing science forward included the Conduct and Utilization of Research in Nursing Project. Through this project, current research findings were disseminated to practicing nurses, organizational changes were facilitated, and collaborative clinical research was supported.

The social and political climate of the 1980s included a major change in the financing of health care with the introduction of diagnosis-related groups (DRGs). As a result, significant changes in the way health care was reimbursed occurred. Nurse researchers began to respond to the social and political demand for cost containment by conducting studies on the cost-effectiveness of nursing care. Another important social and political influence on nursing research was the establishment of the National Center for Nursing Research (NCNR) at the National Institutes of Health (NIH) in 1986. This was significant because nursing was awarded a place among other sciences, such as medicine, for guaranteed federal funding.

Activities that took place in the 1980s are consistent with the maturing of nursing as a science. As the body of knowledge grew, specialty organizations popped up enabling individuals to share their expertise in various clinical areas. In addition, the demand for journals in which to publish research continued, and *Applied Nursing Research* (1988), *Scholarly Inquiry for Nursing Practice* (1987), *Nursing Science Quarterly* (1988), and *Annual Review of Nursing Research* (1983) were started. In 1984, the CINAHL database became electronic. As nursing researchers became more sophisticated in the use of research methods, they embraced approaches new to nursing, such as qualitative methods. New theories (Benner, 1984; Leininger, 1985; Watson, 1979) that used caring as an important concept were especially amenable to emerging research methods.

1990–1999

In the 1990s, organizations began setting research agendas compatible with the social and political climate. For example, public concerns about the inequities of healthcare delivery were at the forefront. Priorities for nursing research included access to health care, issues of diversity, patient outcomes, and the goals of Healthy People 2000. Because nursing research was gaining respect for its contributions to patient care, opportunities for interdisciplinary research became available. In 1993, the NCNR was promoted to full institute status within NIH and was renamed the National Institute of Nursing Research. This was significant because the change in status afforded a larger budget that enabled more nurses to conduct federally funded research. Furthermore, with increased funding, nurse researchers designed more complex studies and began to build programs of research by engaging in a series of studies on a single topic.

The knowledge explosion created by technological advances vastly influenced nursing research. Electronic databases provided rapid access for retrieval of nursing literature, and in 1995, CINAHL became accessible to individuals over the Internet. Through email, nursing researchers were able to communicate quickly with colleagues. Software programs to organize and analyze data became readily available, allowing researchers to run more sophisticated analyses. Practice guidelines, from organizations such as the Centers for Disease Control and Prevention, were easily obtained on the Internet. The *Online Journal of Knowledge Synthesis for Nursing* (1993) was the first journal to take advantage of this technology by offering its content in an electronic format.

In previous eras, the focus was on the application of findings from a single study to nursing practice. In the early to mid-1990s, the emphasis was on research utilization. The Iowa model of nursing utilization (Titler et al., 1994) and the Stetler model for research utilization (Stetler, 1994) were introduced to facilitate the movement of findings from one research study into nursing practice. In the late 1990s, it became apparent that multiple sources of evidence were desirable for making practice changes. Thus, EBP gained popularity over research utilization, and these models were adapted to fit with the EBP movement (Stetler, 2003; Titler et al., 2001).

2000–2009

In the new millennium, nursing research continued to be influenced by social and political factors. Healthcare reform in the United States, although considered a political priority, remained elusive throughout the decade. Although the

H.R. 3962—Affordable Health Care for America Act—was passed, significant changes had yet to be implemented.

Globalization became an important influential factor during this decade. With the ease of retrieving information came the ability to share research findings internationally. Nurses were able to access articles about research conducted in a variety of other countries. Nurses in other countries became more equipped to conduct research as well. Sigma Theta Tau International significantly broadened its membership to include more chapters in other countries. Globalization also raised new concerns that provided nurses with opportunities for research.

During this decade, a renewed focus centered on patient safety and outcomes. The American Nurses Association was instrumental in creating the National Database of Nursing Quality Indicators (NDNQI). The purpose of this database is to collect and evaluate unit-specific nurse-sensitive data from hospitals in the United States. Participating facilities receive unit-level comparative data reports to use for quality improvement purposes. Refer to **Table 1-7** for a listing of the current NDNQI measures. Many of these measures are used by hospitals that have received Magnet Recognition for nursing excellence.

Another significant accomplishment during this time was the mapping of human genes. Conducted by the Human Genome Project (HGP), an international research effort to sequence and map all of the genes—together known as the genome—was completed in 2003. As a result, knowledge about genetics was integrated into nursing education. Genetic-related research became a high priority for nursing and other health professions.

Another challenge faced in the new millennium was a nursing shortage. Topics such as nurse–patient ratios and interventions to decrease length of stay became priorities for research. Other changes occurred in nursing education. The use of technology for distance learning became more prominent as a way to educate nurses. Additionally, the Doctor of Nursing Practice (DNP) degree was recommended as the minimal educational requirement for those entering advanced practice nursing. Nursing programs across the country began to offer DNP degrees. Nurses who are prepared at the doctoral level and practice in clinical settings can serve as leaders in EBP.

2010 to the Present

Since 2010, changes related to the Affordable Health Care for America Act have begun to be implemented. Thus, nurses will be able to glean potential research questions as changes in health care come about.

TABLE 1-7 2013 NDNQI Measures
Nursing Staff Skill Mix
Nursing Hours per Patient Day
Assault/Injury Rates
Catheter-Associated Urinary Tract Infection Rate
Central Line–Associated Bloodstream Infection Rate
Fall/Injury Rates
Hospital/Unit Acquired Pressure Ulcer Rates
Nurse Turnover Rate
Pain Assessment/Intervention/Reassessment Cycles Completed
Peripheral IV Infiltration Rate
Physical Restraint Prevalence
RN Education/Certification
RN Survey
Practice Environment Scale
Job Satisfaction
Ventilator-Associated Pneumonia Rate
Source: Adapted from ANA (2013).

For example, nurses can study the impact of even shorter hospital stays on readmission rates. As care moves away from hospitals to alternative settings, research will be needed to determine the effects of these changes on patient outcomes.

Globalization continues to be an important social factor in health care. For example, globalization contributes to an increasing threat of pandemic. Nurses are in an excellent position to study ways to effectively prevent the spread of diseases and to contribute to the implementation of strategies to care for infected populations.

The electronic medical record (EMR) is fast becoming standard in health care. Concerns about the protection of personal information are paramount. Additionally, linking EBP to EMRs will evolve. For example, when patient data are entered into the EMR, a message may appear suggesting practice guidelines based on the best evidence.

CRITICAL THINKING EXERCISE 1-4

Ten years from now nursing students will study how historical occurrences have shaped the evolution of nursing as a science. Discuss four current events that will be considered to have influenced the development of nursing science.

TEST YOUR KNOWLEDGE 1-3

True/False

1. Nursing research popular in the 1950s involved the study of nursing students.

2. Grand nursing theories were first introduced in the 1980s.

3. In the 1980s, DRGs were a driving force because they focused nursing research on cost-effectiveness.

4. Technological advances created a knowledge explosion that has vastly influenced nursing research.

5. Each historical era contributed to the development of nursing science.

How did you do? 1. T; 2. F; 3. T; 4. T; 5. T

1.4 What Lies Ahead?

At the end of this section, you will be able to:

‹ Identify factors that will continue to move nursing forward as a science
‹ Discuss what future trends may influence how nurses use evidence to improve the quality of patient care

Factors similar to those that have propelled nursing research forward through history will continue to be influential into the future. In the 21st century, nursing research will grow in importance as EBP becomes more widely established and patient outcomes come under increased scrutiny. Nursing research agendas will continue to be driven by social and political influences.

The cycle of scientific development must continue in order to expand the body of nursing knowledge and to recognize nurses for their contributions to health care. Middle range and practice theories that are more useful in clinical settings need to be developed. Nursing research must include studies that replicate previous studies with different populations to confirm prior findings. Studies that demonstrate nursing's contribution to positive health outcomes will be especially important. A commitment to the continued preparation of nurses as scientists is vital to achieve excellence in nursing research. It will be increasingly important for nurses to advocate for monies and to draw on new funding sources. Interdisciplinary and international research will continue to be important as complex health problems are addressed. Technology will continue to offer new ways to communicate research findings to a broader audience, thereby improving diffusion of innovations. Research topics that are most likely to be priorities are listed in Table 1-8.

Nursing will continue to be challenged to bridge the gap between research and practice. EBP offers the greatest hope of moving research findings to the point of care. Nursing education must prepare nurses to appreciate the importance

TABLE 1-8 Nursing Research Priorities
Bioterrorism
Chronic illness
Cultural and ethnic considerations
End-of-life/palliative care
Genetics
Gerontology
Healthcare delivery systems
Health disparities
Health promotion
HIV/AIDS
Management of pandemics/natural disasters
Mental health
Nursing informatics
Patient outcomes/quality of care
Safe administration of medications
Symptom management

of basing patient care on evidence. Educators need to create innovative strategies that teach students to identify clinical problems, use technology to retrieve evidence, read and analyze research, weigh evidence, and implement change (Schmidt & Brown, 2007). Nurses must accept responsibility for creating their own EBP and collaborating with others to improve patient care.

Nurses who work in clinical settings and who are prepared at the doctoral level are especially well positioned to move EBP forward. Healthcare facilities are expected to embrace EBP to achieve Magnet Recognition. International collaborations, such as the Joanna Briggs Institute, are essential so that when best practices are identified they can easily be shared.

The Challenge

Make a commitment to be an innovator when it comes to EBP! You are already well on your way to having the knowledge and skills needed to overcome barriers that laggards often cite as reasons for not adopting EBP. As you study this text, don't go through the pages just to pass an exam. Learn the

> ### FYI
>
> The Doctor of Nursing Practice degree is the recommended educational requirement for those entering advanced practice nursing. Nurses who are prepared at the doctoral level and who practice in clinical settings can serve as leaders in EBP.

CRITICAL THINKING EXERCISE 1-5

Recall a question you encountered during your last clinical experience. How might you have answered that question using an EBP approach?

TEST YOUR KNOWLEDGE 1-4

1. How can nurses who use EBP best be described?

    a. As change agents

    b. As early adopters

    c. As innovators

    d. As laggards

True/False

2. As the cycle of science continues, more middle range and practice theories will emerge that will be useful in clinical settings.

How did you do? 1. b; 2. T

material so you can carry it with you throughout your career. To fulfill your commitment, with your next clinical assignment, adopt one or two of the strategies suggested in **Table 1-1**. Over the course of your career, your actions will convince laggards that EBP really does create excellence in patient care.

1.5 Keeping It Ethical

At the end of this section, you will be able to:

‹ Identify five unethical studies involving the violation of the rights of human subjects

Scientific research has made significant contributions to the good of society and the health of individuals, but these contributions have not come without cost. In the past, studies have been conducted without regard for the rights of human subjects. It is surprising to learn that even after national and international guidelines were established, unethical scientific research continued. Four major studies involved the violation of the rights of human subjects: (1) the Nazi experiments, (2) the Tuskegee study, (3) the Jewish Chronic Disease Hospital study, and (4) the Willowbrook studies. In addition, falsification and fabrication of data by the "Red Wine Researcher" provide another example of misconduct.

During World War II, physicians conducted medical studies on prisoners in Nazi concentration camps (NIH Office of Extramural Research, 2011). Most of the *Nazi experiments* were aimed at determining the limits of human endurance and learning ways to treat medical problems faced by the German armed forces. For example, physicians exposed prisoners of war to mustard gas, made them drink seawater, and exposed them to high-altitude experiments. People were frozen or nearly frozen to death so that physicians could study the body's response to hypothermia. The researchers infected prisoners with diseases so that they could follow the natural course of disease processes. Physicians also continued Hitler's genocide program by sterilizing Jewish, Polish, and Russian prisoners through X-ray and castration. The War Crimes Tribunal at Nuremberg indicted 23 physicians, many of whom were leading members of the German medical community. They were found guilty for their willing participation in conducting "crimes against humanity." Seven physicians were sentenced to death, and the remaining 16 were imprisoned. As a result, the *Nuremberg Code*, a section in the written verdict, outlined what constitutes acceptable medical research and forms the basis of international codes of ethical conduct. The experiments conducted were so horrific that debate continues about whether the findings from these Nazi studies, or other

KEY TERMS

Nazi experiments: An example of unethical research using human subjects during World War II

Nuremberg Code: Ethical code of conduct for research that uses human subjects

unethical studies, should be published or even used (Luna, 1997; McDonald, 1985; Miller & Rosenstein, 2002), and professional organizations, such as the American Medical Association (AMA), have published position papers about this dilemma (AMA, 1998).

In the 1930s, the *Tuskegee study* was initiated to examine the natural course of untreated syphilis (NIH Office of Extramural Research, 2011). In this study conducted by the U.S. Public Health Service, black men from Tuskegee, Alabama, were recruited to participate. Informed consent was not obtained, and many of the volunteers were led to believe that procedures, such as spinal taps, were free special medical care. Three hundred ninety-nine men with syphilis were compared to 201 men who did not have syphilis. Within 6 years, it was apparent that many more of the infected men had complications compared with the uninfected men, and by 10 years, the death rate was twice as high in the infected men as compared with the uninfected men. Even when penicillin was found to be effective for the treatment of syphilis in the 1940s, the study continued until 1972, and subjects were neither informed about nor offered treatment with penicillin.

In 1963, the *Jewish Chronic Disease Hospital study* began and involved the injection of foreign, live cancer cells into hospitalized patients with chronic diseases (NIH Office of Extramural Research, 2011). The purpose of the study was to examine whether the body's inability to reject cancer cells was due to cancer or the presence of a debilitating chronic illness. Because earlier studies indicated that injected cancer cells were rejected, researchers hypothesized that debilitated patients would reject the cancer cells at a substantially slower rate than healthy participants did. When discussing the study with potential subjects, researchers failed to inform them about the injection of cancer cells because researchers did not want to frighten them. Although researchers obtained oral consent, they did not document the consent, claiming the documentation was unnecessary because it was a standard of care to perform much more dangerous procedures without consent forms. Researchers also failed to inform physicians caring for the patients about the study. At a review conducted by the Board of Regents of the State University of New York, researchers were found guilty of scientific misconduct, including fraud and deceit.

KEY TERMS

Tuskegee study: An unethical study about syphilis in which subjects were denied treatment so that the effects of the disease could be studied

Jewish Chronic Disease Hospital study: Unethical study involving injection of cancer cells into subjects without their consent

CRITICAL THINKING EXERCISE 1-6

Do you think that the findings from unethical studies should be published? Why or why not?

Also in the 1960s, a series of studies was conducted to observe the natural course of infectious hepatitis by deliberately infecting children admitted to the Willowbrook State School, an institution for children with mental disabilities (NIH Office of Extramural Research, 2011). During the ***Willowbrook studies***, administrators claimed overcrowded conditions and stopped admitting patients; however, children could be admitted to the facility if they participated in the hepatitis program. Because at that time facilities to care for children with mental disabilities were few, many parents found they were unable to obtain care for their children and fell victim to being coerced to allow their children to participate in the study.

Unfortunately, ethical violations are not a thing of the past. In 2008, a 3-year investigation was launched into claims of scientific misconduct at the University of Connecticut (Callaway, 2012). Dr. Das studied the beneficial health effects of red wine and other foods on cardiac health and longevity. He was found guilty of falsifying data on more than two dozen papers and grant applications. This type of behavior creates public distrust of research findings and can also inhibit researchers' ability to recruit subjects.

TEST YOUR KNOWLEDGE 1-5

Match the following.

1. Nazi medical experiments
2. Tuskegee study
3. Jewish Chronic Disease Hospital study
4. Willowbrook studies
5. "Red Wine Researcher"

a. Infected subjects with cancer cells
b. Coerced parents to allow children into study
c. Exposed subjects to cold
d. Falsified and fabricated data
e. Failed to treat subjects with penicillin

How did you do? 1. c; 2. e; 3. a; 4. b; 5. d

RAPID REVIEW

» EBP involves: (1) practice grounded in research evidence integrated with theory, (2) clinician expertise, and (3) patient preferences.

» Tradition, authority, trial and error, personal experiences, intuition, borrowed evidence, and scientific research are sources of evidence.

» Individual and organizational barriers can prevent adoption of EBP.

» Innovations are adopted by the diffusion of the innovation over time through communication channels among the members of a social system.

» Research is a planned and systematic activity that leads to new knowledge and/or the discovery of solutions to problems or questions.

» Scientific research offers the best evidence for nursing practice.

» Nurses use the pyramid of evidence to rank evidence from strongest to weakest.

» Research can be categorized as descriptive, explanatory, or predictive; basic or applied; and quantitative or qualitative.

» By analyzing words, qualitative research focuses on the meanings individuals give to their experiences. Quantitative research views the world as objective and focuses on obtaining precise measurements that are later analyzed.

» Most research articles include an abstract, introduction, review of literature, theoretical framework, and methods, results, and discussion sections, and they conclude with a list of references.

» The cycle of scientific development involves theory, research, dissemination, and application. Social and political factors are central to the cycle.

» The cycle of scientific development can be seen operating in each historical era.

» Social and political factors will continue to influence nursing research.

» For nurses to use EBP to improve patient care, they must be committed to being early adopters of innovations.

» NDNQI is a national database that involves measurement and reporting of nursing-sensitive outcomes.

» Four studies are recognized for their gross violation of human rights: Nazi medical experiments, the Tuskegee study, the Jewish Chronic Disease Hospital study, and the Willowbrook studies. A fifth study, known as the "red wine researcher," involved falsification of fabrication of data.

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APPLY WHAT YOU HAVE LEARNED

Sign into a database for nursing literature (i.e., CINAHL, ProQuest, PubMed). For this chapter, you will need to obtain the following two articles:

Pipe, T. B., Kelly, A., LeBrun, G., Schmidt, D., Atherton, P., & Robinson, C. (2008). A prospective descriptive study exploring hope, spiritual well-being, and quality of life in hospitalized patients. *MEDSURG Nursing*, *17*, 247–257.

Flanagan, J. M., Carroll, D. L., & Hamilton, G. A. (2010). The long-term lived experience of patients with implantable cardioverter defibrillators. *MEDSURG Nursing*, *19*, 113–119.

One of these articles used qualitative methods, and the other used quantitative methods. Identify which is which. After you have done that, for each article identify the various sections that make up a research article. You may want to share these articles with nurses during your next clinical experience and consider ways the recommendations can be incorporated into practice.

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American Medical Association. (1998). *Information from unethical experiments* (CEJA Report 5–A-98). Retrieved from http://www.ama-assn.org/resources/doc/code-medical-ethics/230a.pdf

American Nurses Association. (2010). National Database of Nursing Quality Indicators: Guidelines for data collection on the American Nurses Association's National Quality forum endorsed measures: Nursing Care Hours per Patient Day, Skill Mix, Falls, Falls with Injury. Retrieved from http://www.odh.ohio.gov/~/media/ODH/ASSETS/Files/dspc/health%20care%20service/nursestaffing7-13-10materials.ashx

Barnsteiner, J., & Prevost, S. (2002). How to implement evidence-based practice. Some tried and true pointers. *Reflections on Nursing Leadership*, *28*(2), 18–21.

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