CHAPTER TWO

Research Evidence

In Chapter 1, reference was made to research evidence, but it was not explained in full. That needs to be done. As a student new to the science of nursing, when mention is made of research evidence, you will naturally think of the findings of a scientific study. However, as you proceed through this course, you will come to see that research evidence can take several forms, namely:

- Findings from a single, original study
- Conclusions from a summary of several (or many) original studies
- Research-based recommendations of a clinical practice guideline

Types of Research Evidence

Building Knowledge

A finding of a single original study is the most basic form of research evidence. Most studies produce several findings, but each finding should be considered as a separate piece of evidence because one finding may be well supported by the study whereas another finding may be on shaky ground. Although a finding from an original study is the basic building block of scientific knowledge, knowledge is really more like a structure made up of many different kinds of blocks (see **Figure 2-1**).

Findings from many soundly conducted studies are necessary to build a reliable body of clinical knowledge regarding an issue. Insistence on confirmation of a finding from more than one study ensures that a knowledge

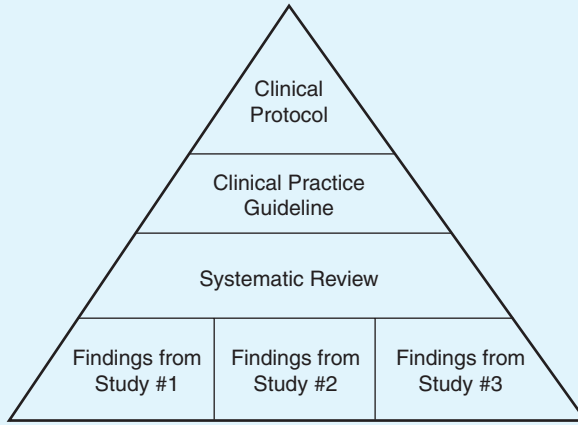

Figure 2-1 Building Knowledge for Clinical Practice

claim (or assertion) is not just a fluke unique to the patients, setting, or research methods of one study. If a finding is confirmed in several different studies, clinicians have confidence in that knowledge because it held up across diverse settings, research methods, patient participants, and clinician participants.

There are several recognized ways of combining findings from two or more studies; as a group these methods are called systematic reviews. Conclusions from systematic reviews may then be translated into evidence-based recommendations by expert panels. A group of e-b recommendations is called an evidence-based clinical practice guideline. Although evidence-based recommendations are not technically research evidence, if they were directly derived from research findings and summaries, they are considered so for practical purposes. In this chapter, each of these forms of research evidence is introduced briefly in turn. Later in the book, each is considered in depth.

Findings from an Original Study

Most people think of a research study as involving (1) a large number of subjects who are (2) randomly assigned to be in one of several intervention groups; (3) research environments that are tightly controlled; and (4) data that are meticulously obtained and then analyzed using statistics to produce

results. In fact, research using these methods is common and valuable; however, it is only one type of scientific study—there are many other kinds. The most common way of thinking about research methods is to categorize them as qualitative and quantitative.

Qualitative Research

Qualitative research methods collect data in the form of what people say, observations of events, and written material. The data are not quantified by scales or number values; rather verbal descriptions that convey the meanings in the data are constructed. The goal of qualitative research is understanding—not counting, averaging, or quantifying in any way.

Qualitative research is used to study what it is like to have a certain health problem or healthcare experience such as being a physically disabled parent or recovery after a major head injury. Qualitative research methods are also used to study social settings, social interaction, and social processes. The following are examples of situations a nurse researcher might study using qualitative methods:

1. The interpersonal support dynamics at a social center for persons with chronic mental illness (a subculture setting)
2. How intensive care unit (ICU) staff members interact with family members of unconscious patients (social interaction)
3. How a family who has entered a family weight loss program makes changes in eating and physical activity over time (social process)

These kinds of social situations are typically tangles of issues, forces, perceptions, values, expectations, and aims. They can be understood and sorted out best by a researcher embedding herself in the situation and using methods of inquiry that will get at participants' perceptions, feelings, daily thoughts, beliefs, expectations, and behavior patterns. Data collection methods such as in-depth conversations, diary keeping, extensive interviewing, extended observation, and focus groups are used to acquire insights regarding these subjective realities. The data are analyzed in ways that preserve the life meanings of the stories and comments the participants offer. Qualitative research is described in more depth in Chapter 4.

Quantitative Research

Quantitative research methods are also used to examine how the world works. However, numerical measurement is used to explore and confirm

the level at which the phenomena are present and the nature of **relationships** among them. I realize I introduced a new word in that last sentence, so a bit of a diversion is needed because the word is used in research articles. The word *phenomena* (the plural word) is used throughout the research world as a catchall phrase to describe the realities that exist in a field of study. The phenomena of interest in nursing can be grouped into five categories (adapted from Kim, 2000). The categories and examples of phenomena within each are:

1. The client as a person (motivation, anxiety, hope, exercise level, and adherence to treatments)
2. The client's environment (social support, financial resources, and peer group values)
3. Nursing practice (risk assessment for skin breakdown, patient teaching, and wound care)
4. The nurse–patient relationship and communication (person-centered talk, participative decision making)
5. The healthcare system (access to health care, quality of care, cost)

In brief, nursing phenomena are personal, social, physical, and system realities that exist or occur within the realm with which nursing is concerned. When phenomena are examined in a quantitative research study, they are called the research **variables**.

Getting back to types of research, exploring the nature of phenomena can be done using qualitative research methods. However, the workings of many phenomena can be explored more extensively when the phenomenon is measured quantitatively. For instance, body temperature could be described using the qualitative words *cool, warm*, and *hot*, but using the quantitative standard of thermometer degrees is a more precise way of conveying and tracking body temperature.

Moreover, quantifying phenomena allows exploration of how a change in one relates to a change in another, as when the relationship between body temperature and white blood count is analyzed using a correlation statistic. Quantitative methods are also used to test how well a nursing intervention works compared to another intervention. In intervention studies, the outcomes expected to be produced by the intervention are carefully measured in each patient participant and a determination is made regarding how many participants in each intervention group attained the outcomes of interest.

Study Purpose and Study Method

The researcher's decision to use either a qualitative method or a quantitative method is determined by the nature of the question. As just described, qualitative methods yield better understanding for some types of research questions, whereas quantitative methods provide better answers to other questions. Together, qualitative and quantitative methods serve a range of purposes:

- Understand a health, illness, or healthcare experience (e.g., How do 18–20-year-old, black women view mammography?)
- Develop a theory about responses to an illness condition (e.g., a theory about determinants of exercise in urban-dwelling adolescents)
- Describe a health-related situation (e.g., mother–infant interaction)
- Measure the strength of relationships between several health-related phenomena (e.g., hours worked outside the home and mother fatigue)
- Test a hypothesis about the effectiveness of an intervention (e.g., A smoking cessation program delivered to small groups of sixth graders by a school nurse will result in a lower level of smokers in 3 years than will an interactive computer program delivered and evaluated in the same time frame.)

Generally, each of these purposes requires a different research strategy and approach, although researchers sometimes use qualitative and quantitative methods in combination with one another. Using mixed methods may produce a more complete portrayal of an issue than can one method alone. For instance, researchers used mixed methods to identify health concerns in an African American community; they conducted focus groups and analyzed the results of a community health survey. They concluded that "Although quantitative approaches yield concrete evidence of community needs, qualitative approaches provide a context for how these issues can be addressed" (Weathers et al., 2011, p. 2087).

Qualitative research methods are generally inductive, meaning researchers produce findings by working from particular observations to groupings of observations, to general statements. Qualitative researchers have strategies and plans before they enter the settings in which they will make observations and inquiries, but they are also flexible to revise their investigative approach and to follow leads that arise.

In contrast, quantitative researchers tend to have specific research questions and choose a research design that will produce answers to those questions. A **research design** is a framework or general guide regarding

how to structure studies conducted to answer a certain type of research question. The four quantitative research designs used most often in nursing research are:

1. Descriptive designs
2. Correlation designs
3. Experimental designs
4. **Quasi-experimental** designs (Burns & Grove, 2009)

You will be learning about each of these.

Researchers choose the design that will provide the best approach to their research question or purpose and that is feasible given the resources available. Using the design features as a template, they develop a detailed study plan that spells out specifically how their study will be conducted. A **study plan** includes the following:

- The theoretical framework that will be used (if any)
- Sites and settings that will be involved
- How the sample will be obtained
- Ethical protections that will be put in place
- Information that will be provided to participants
- Design of the interventions (if any)
- Measuring instruments that will be used
- The sequence of study activities
- Data collection procedures
- How unwanted influences will be controlled
- How data analysis will be performed

In summary, the two major categories of research methods used in clinical nursing studies are qualitative and quantitative. Both methodological approaches are needed to develop the full range of knowledge needed by clinical nurses.

Conclusions of a Systematic Review

Systematic reviews are an important and useful form of research evidence. A systematic review is a research summary that produces conclusions by bringing together and integrating the findings from all available original studies. The integration of findings from several or many studies can be done using tables and logical reasoning and/or with statistics. The

cumulative findings are formulated as new knowledge claims, which are unifications of the separate findings of the original studies. The methods for accomplishing the unification are widely agreed upon and serve to reduce bias resulting from the process used to summarize the findings.

Systematic reviews, when well done, bring to light trends and nuances regarding the clinical issue that are not evident in the findings of individual studies. I suggest that now you take a look at an abstract of a systematic review. I suggest this because reading and using the conclusions of systematic reviews is one of the destinations on your learning path, and looking at one will give you a sense of this important learning destination.

1. Go to the CINAHL database in your library's website or go online to PubMed (http://www.ncbi.nlm.nih.gov/pubmed). PubMed is a free, online database of healthcare articles.
2. Type the following text in the search box: "facilitated tucking Obeidat, 2009" and click on the *Search* button. (Facilitated tucking involves holding or swaddling an infant so his arms and legs are slightly flexed and close to his body.)
3. That should bring up the citation and abstract for a systematic review of five studies about facilitated tucking of preterm infants during invasive procedure to modulate their responses to pain; the review was conducted by Obeidat, Kahalaf, Callister, & Froelicher and published in 2009.
4. Note that the abstract provides information about how many articles were included in the review, the outcomes that were examined, and the main conclusion of the review. Remember: You are reading a very short synopsis of the review, not the entire report.

From this quick look at the abstract of a systematic review, you should get a sense of the groundwork that has been done by the persons who did this review. In the process of doing the review, they did the following:

- Searched for articles
- Sifted through them for relevant studies
- Extracted information from each study report
- Brought the findings together in a coherent way

Clearly, this saves clinical nurses a great deal of time when they are looking for the research evidence about an issue in care. You will delve more deeply into systematic reviews in later chapters.

Recommendations of an Evidence-Based Clinical Practice Guideline

The third form of research evidence is the recommendations of an evidence-based clinical practice guideline. A clinical practice guideline consists of a set of recommendations, and when the recommendations are based on research evidence, the whole guideline is referred to as an evidence-based clinical practice guideline. These guidelines are most often developed by organizations with the resources (money, expertise, time) required to produce them. Again, I suggest taking a look at one, as follows:

1. Go to the website of the Registered Nurses' Association of Ontario (RNAO; http://www.rnao.org).
2. Click the *Best Practice Guidelines* tab; enter "dyspnea" into the search box and click *Search*. The search result will include the guideline *Nursing Care of Dyspnea: The 6th Vital Sign in Individuals With Chronic Obstructive Pulmonary Disease*.
3. Double click to open the page for the guideline
4. Under Downloadable Files you will see *COPD Summary*. Open that by double clicking and you will see a list of recommendations.

The developers of this guideline looked at the research evidence regarding nursing assessment and management of stable, unstable, and acute dyspnea associated with COPD. Based on the evidence, they derived the recommendations listed. (I suggest that you look at the Practice Recommendations [1–5] and ignore the Education and Organization and Policy Recommendations that follow.)

The strength of the evidence supporting each recommendation is indicated in the right column and definitions of those levels are provided at the end of the table; do not get caught up in that right now, although you should know that level Ia is very strong research evidence whereas level IV evidence was obtained from expert opinion evidence (i.e., no research exists, so consensus of an expert panel was the best available evidence). The evidence levels that support the recommendations are mostly either Ia or IV, indicating that considerable research evidence is available for some issues but none for others.

Remember that you are looking at part of a much larger report. The other document, the complete 166-page guideline (viewable by clicking on *Free Download*), presents more specific guidance and detailed review of

the evidence that led to each recommendation. It also informs the reader how the search for evidence was conducted and how the 2010 update of the original 2005 guideline was done.

RESEARCH EVIDENCE

- Findings from original studies
- Conclusions of systematic reviews
- Recommendations of evidence-based clinical practice guidelines

As you can see, evidence-based clinical practice guidelines are much more ready to go for clinical application than systematic reviews and definitely more ready to go than tracking down the original research articles and working forward from there. For time-pressed protocol development teams, evidence-based clinical practice guidelines and systematic reviews are the short roads to evidence-based protocols (see **Figure 2-2**).

If starting the development of a care protocol by retrieving individual research articles is like baking a cake from scratch, and systematic reviews

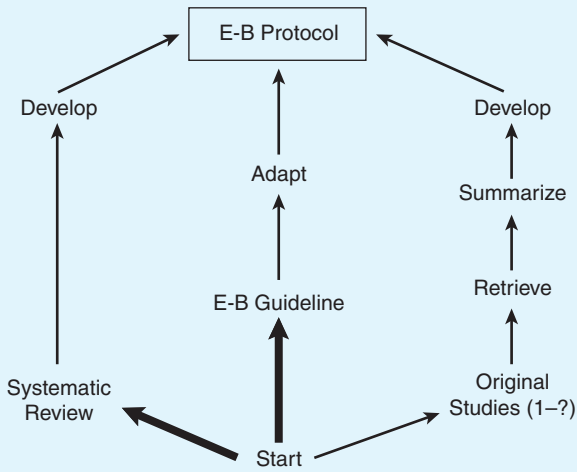

Figure 2-2 Roads to E-B Protocols

are like using a cake mix, then starting with an evidence-based clinical practice guideline is like buying a cake at the bakery and adding a personalized topping or presentation.

Going Forward

In the next chapter, you will begin to learn how to read research reports of individual studies. Then in Chapters 4 through 8, you will be guided through reading of exemplary articles reporting five different types of research (one qualitative study and four types of quantitative studies). After that, you will read a systematic review and learn how one type of systematic review is conducted, and then you will read an evidence-based clinical practice guideline and learn how they are produced.

Note that this order is the reverse of the order in which care design project teams **search** for research evidence—they first look for evidence-based guidelines and systematic reviews. If they exist and are well done, the team can build on them rather than reinventing the wheel. The order of presentation in this book is reversed because proceeding from original studies to systematic reviews to evidence-based clinical practice guidelines is a more natural learning order.

For a full suite learning activities and resources, visit the book's website: http://go.jblearning.com/brown3e.

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