

## CHAPTER THREE

# READING RESEARCH ARTICLES

Although some kinds of reading are intended to be a passive experience, reading professional articles, especially research reports, should be anything but passive. One way to be an active reader is to annotate or mark your copy of the article: underline, circle phrases, highlight, jot comments in the margin, whatever helps you keep track of important information and connect the various parts of the study. Some people prefer to make notes in a file on their laptop—fine, whatever works for you.

I annotate right on my paper copy of articles. I write something like “sample” in the margin so I can quickly locate the **sample** size. I underline important definitions, outcomes, or findings. I circle abbreviations that will be used in the report and the parts of a table that are most important to me or unexpected. I put question marks where a statement doesn’t fit with what was said earlier or doesn’t make sense. Of course, it’s possible to overannotate and in so doing produce a clutter. However, if you annotate selectively, you’ll be able to find important information easily when you return to the article at a later time.

In this chapter, I make suggestions about how to read reports of individual studies. At this point in your learning, the goal in reading a research article about a study is to understand how the study was done and what was found. After you are comfortable reading research articles, you will add the goals of (1) determining if the findings are credible, or trustworthy, as a basis for practice; and (2) determining if the findings are relevant to the care of patients to whom your agency or unit provides care.

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### Goals in Reading a Research Report

1. Determine the purpose of the study
2. Understand how the study was done
3. Understand what was found
4. Appraise the credibility of the findings
5. Determine if the findings are relevant to the care of your patients

The emphasis in this chapter and in all of Part 1 of the book is on goals 1, 2, and 3, although goals 4 and 5 may pop into your thinking as you read. For instance, you will undoubtedly note if the patient groups that were studied are similar to a patient you have taken care of. You may make a mental note about this; however, serious consideration of the applicability of the study to a particular patient group is addressed in Part 2 of the book.

In reading this chapter, you may see a few terms that are unfamiliar to you. For now, just look them up in the glossary to get a sense of what they mean. Most of them are explained in full as you proceed through the first part of the book.

### Starting Point

Is this a report of an original research study? This seems like it should be an easy question to answer, but at times it is not. Some articles read like research articles, but they are in fact other kinds of reports. When you see tables with numbers and percentages, you may think you are reading a research study, but the article may just be providing numerical data to portray the frequency of a condition or describe a clinical program. Such data is anecdotal and naturally occurring with no **control** over its quality or the conditions under which it was collected. As you will learn, it takes more than numerical data to call an evaluation report “research.”

Most often, the author of a research article will refer to “the study” early in the report, but sometimes you have to read quite far into an article to determine that it has the essential elements of a study. The essential elements of a research study include the following:

- A specified research question, hypothesis, or purpose
- Specified, systematic methods of data collection and analysis

- Findings (interpreted **results**)
- Conclusions

If all these elements are present, then the likelihood that you are reading a research study report is very high. Remember, however, that there are many types of research methods and designs, and the essential elements of each type look quite different. Most quantitative studies address specific research questions or hypotheses, whereas qualitative studies may have a broad aim or purpose. Quantitative studies report results with tables, graphs, and statistics. Qualitative findings consist of extended quotes, narrative descriptions, or themes, whereas some studies have small sample sizes (e.g.,  $N = 6$ ); others use a very large number of participants (e.g.,  $N = 3,200$ ). In short, research articles are diverse but should include at a minimum a clear purpose statement, a description of methods used to collect and analyze data, results and/or findings, and conclusions.

## Format of Study Reports

Research reports of original studies are organized in a very logical way, and the formats used are similar from one journal to another. This standardization can help you as a reader because you will learn where to expect, and later locate, various kinds of information about the study. The following is a brief orientation to the format of research reports.

### *Title and Abstract*

The title tells you what the study examined and often the patient group of interest. These are your first clues as to whether the report is likely to be of interest to you. However, titles can be misleading because a phrase or term used in the title may be different from the one used in your practice setting.

Abstracts almost always precede the main body of the article. An abstract provides a brief summary of the study—typically 300 words or less. Note the section headings used in the abstract because they are useful in beginning to organize your thinking about the study. The abstract distills the main points of the study, and after reading it you should know if the study is of interest to you.

Let's assume that you've decided to read the whole study. Rather than read straight through the first time, you might want to read the introduction

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and then jump to the discussion section. The discussion summarizes the important findings and places them in the context of findings from earlier studies. Having read the introduction and the discussion, you should have a sense for the context of the study—and be ready to read the article from start to finish in its entirety.

### *Introduction*

In the introduction of a research report, the researcher presents her view of the current state of knowledge regarding the issue or problem being investigated; this includes what is known and what the gaps in knowledge are. In addition, the researcher may discuss theories or conceptual frameworks that are used to organize thinking about the issue. This background serves as a lead-in to the statement regarding the purpose of the study that is being reported. A study purpose may be stated as a purpose statement, aims, objectives, research questions, or as hypotheses that will be tested by the study.

**Study Purposes** Each discipline has a set of words it uses to describe the purposes of studies, and the words do not always mean the same thing to every researcher. Purpose words and phrases you will encounter in nursing study reports include:

- Acquire insight
- Understand
- Explore
- Examine
- Describe
- Compare
- Examine the relationship/association between
- Predict
- Test the hypothesis that

In the early stages of studying an issue, research is directed at acquiring understanding of the various aspects of the issue: the problems people with the condition are experiencing, forces at work, and what the condition or experience means to individuals. Generally, these early studies use qualitative research methods. The following are study purposes from early-stage studies:

- “The purposes of this study were to explore the lived experience of people with a chronic, nonhealing wound and to describe what it means for a person to live with a chronic wound” (Beitz & Goldberg, 2005).

- “The underlying purpose was to describe the process of how life situations and events of 32 drug-using women living in a large U.S. city influenced the onset of drug use and changes in drug-using behaviors” (Roberts, 1999).

Note how both purposes set forth issues they will examine but don't get highly specific about what they are looking for—they want persons, that is, the study participants, to highlight the important aspects of their situation and experiences.

After the condition or situation is well understood at the experiential or social process level, other researchers may determine the frequency with which it occurs in different populations or measure the degree to which aspects of the condition or situation are present. Later, when several studies have been done and the situation is fairly well mapped, researchers will propose and quantitatively test associations between aspects of the situation or effectiveness of interventions directed at it. The following examples illustrate several ways of stating quantitative research purposes:

- “The specific aims of this study were to (1) describe factors related to fatigue in older women after MI (myocardial infarction) and (2) examine the relationship of fatigue to physical activity after MI” (Crane, 2005).
- “The specific objectives of this pilot study were to (a) evaluate the effects of a culturally sensitive symptom-focused intervention on symptom distress, diabetes knowledge, perception of quality of life, glycosated hemoglobin levels, and self-care practices of older rural African-American women with type 2 diabetes” (Skelly, Carlson, Leeman, Holditch-Davis, & Soward, 2005).
- “We tested the hypothesis that children with acute lung injury treated with prone positioning would have more ventilator-free days than those treated with supine positioning” (Curley et al., 2005).

**Hypotheses** Hypotheses are quite specific; they name the aspects of the issue that will be studied and state the nature of the relationship between the aspects they expect to find in the study. For example, “An increase in  $x$  will be associated with an increase in  $y$ .” This hypothesis does not cast either  $x$  or  $y$  as causing the other. It says only that the two phenomena are related in some way. The hypothesis “Patients classified as high in PHE (positive health expectations) were expected to report higher QOL (quality of life) scores than patients with lower PHE scores” (Sears et al., 2004) is by itself an associative hypothesis. In context of the whole study, however, it is clear that the researchers believe that health expectations determine quality of life, not vice versa.

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Other hypotheses are explicitly directional, such as “Patients will find it more comfortable to be transferred on and off beds and stretchers using a mechanical lateral transfer device when compared to ‘manual’ lateral transfer methods” (Pellino, Owen, Knapp, & Noack, 2006). This statement is actually a causal hypothesis because it implies that one transfer method will cause less discomfort than the other.

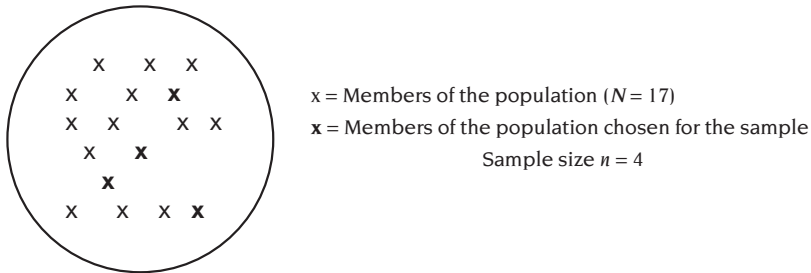
## Methods

In the Methods section, the author describes how the study was conducted, including information about the following:

- a. The overall arrangements and mechanics of the study
- b. The setting or settings in which the study was conducted
- c. The **institutional review board (IRB)** that gave ethical approval to the study
- d. How the sample was obtained
- e. The number of people in the sample
- f. How data was collected
- g. Any measurement **instruments** that were used (i.e., scales, questionnaires, physiologic measurements)
- h. How the data was analyzed

The information about the sample should be sufficient to inform you about the likelihood that the sample is a good representation of the **target population** and provide enough profile information about the sample to let you decide to what extent the sample resembles your patients. There are several ways of obtaining **random samples** that you will encounter as you read research articles. I won’t go into them here, but in future chapters I’ll point them out to you. The important issue is that the researcher should be very clear regarding who the target population is and how the sample was obtained (see Figure 3–1). This information enables users of the research to determine to whom the results from the sample can be generalized, that is, extended with confidence to others in the population even though they were not studied.

The information about how the data was obtained also includes a statement about the organization that gave ethical approval to the study, pro-



**Figure 3–1** Sampling.

cedures used to collect data, and descriptions of the measurement instruments used. For now, you should come away from reading the Methods section of the reports with an understanding of the characteristics of the people who were included in the study, the sequence of steps in the study, and the data that was collected.

## *Results/Findings*

In this section, the results of the data analysis are reported. Results are the outcomes of the analyses. In quantitative studies, results are tables, graphs, percentages, frequencies, and statistics. There should be results related to each of the research questions, hypotheses, or aims. To illustrate, consider the following hypothetical statement that might be found in the Results section of a quantitative study: “The *t*-test comparing the functional status scores of those in intervention group A and intervention group B indicated a significant difference (mean A = 8.4 ; mean B = 6.1;  $p = .038$ ).” This is a result statement; it reports the results of the statistical analysis.

The interpretation of a result is called a finding. A finding for the result statement just given would be stated something like, “The group who received nursing intervention A had a significantly higher functional level than did the group who received intervention B.” Note how the findings statement interprets the statistical result but does not claim anything more than the statistical result indicated. Findings statements are usually found in the Conclusions or Discussion section of quantitative study reports.

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To illustrate further, consider the results and findings of a hypothetical quantitative study comparing the effects of a new method for osteoporosis prevention education to standard education. A  $t$ -test was used to compare the scores of the two groups on an osteoporosis prevention questionnaire; the result of that test was  $t = 1.99, p = .025$ . This result indicates that the statistical calculation comparing the scores of the two groups resulted in a  $t$  value of 1.99, which is statistically significant at the  $p = .025$  level (I'll explain  $p$  values in a later chapter). The finding was this: The new educational method on average produced higher osteoporosis knowledge levels than standard education did, and there is a very low chance that this claim is wrong.

The results–findings distinction does not apply to qualitative research where data collection, analysis, generation of themes, and confirmation of themes are intermingled. Generally, qualitative study reports do not have a Results section, rather they have a Findings section in which themes, narrative descriptions, or theoretical statements are presented along with the data that led to them. Chapter 4 provides more explanation of the analytical processes used by qualitative researchers.

### *Discussion or Conclusions*

In the Discussion section, the researcher ties together several aspects of the study and offers possible applications of the findings. The researcher will usually open this section by stating the most important findings and placing them in the context of what other studies on the topic or question have found. In discussing the findings, many researchers describe what they think are the clinical implications of the findings. Here, they are allowed some latitude in saying what they think the findings mean. In the osteoporosis education for high school students example just given, the researcher might say, “The findings indicate that a short educational session is effective in increasing high school students’ knowledge regarding osteoporosis prevention.” This conclusion statement is close to the findings. On the other hand, if the researcher said, “Short educational sessions are an effective way of increasing osteoporosis prevention behaviors in high school students,” the findings statement would be out beyond the results. The study only measured the outcome of knowledge, not behaviors. The author is adding an assumption to the results, namely, that knowledge produces behavior change—and that is a big assumption.

Results → Findings → Conclusions

Authors are also expected to consider alternative explanations for their findings. This would include noting how research methods may have influenced the results, such as “The sample size may have been too small to detect a difference in the treatment groups” or “The fact that a high proportion of patients in the intervention group didn’t return for follow-up may have made the outcomes of the intervention group look better than they would have been if post data had been available from everyone in that group.” At the end of this section, the authors usually comment on what they view as the limitations of the study and the implications of the findings for future research.

## References

The reference list should include complete data for all citations made in the text. You might find it useful to circle in the text and in the reference list any articles that you want to obtain and read for greater understanding or because they studied a population of interest to you, for example, elderly persons living independently in rural areas. Perusal of the reference list also reveals how current other work on the issue is, who has done research on the issue, and which journals have published research articles about the issue.

## Reading Approach

Most readers find it necessary to read a research report at least twice. The first time you read your goal is to understand what was done and what was found. The second time you read it, you will naturally begin to notice issues that make you wonder, such as the following:

- Why did the researchers exclude persons with heart disease?
- Did they take into account patients’ balance when evaluating capacity for self-care?
- Did the fact that a study was going on put the nurse participants on best behavior?

After you get used to reading research articles, the first reading will be to understand how the study was done and what was found, and the second reading will be to critically appraise the **credibility** and applicability of the results. For now, however, you will probably require at least two readings just to understand how the study was done and what was done.

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### Wading In

Having considered how research reports are organized and noted some difference between the formats of qualitative and quantitative study reports, it is now time to delve into reading some of them. The research reports chosen for your learning throughout the book are considered exemplars in that they are typical or representative of a particular type of health care research. Most of the exemplar studies were also very well conducted, but they were not chosen because they are perfect models—all studies have warts. Rather, they were chosen because they used a research design that is widely used in health care research. Hopefully, you will actually “wade around” in these studies enough to acquire a thorough understanding of them.

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