Research for Advanced Practice Nurses
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Research for Advanced Practice Nurses

*From Evidence to Practice*

Third Edition

Marcia Pencak Murphy, DNP, ANP, FAHA, FPCNA
Beth A. Staffileno, PhD, FAHA
Marquis D. Foreman, PhD, RN, FAAN
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Preface

The increasing focus on evidence needed for practice decisions propels us to re-envision how we teach graduate students about research and evidence-based practice (EBP). This book serves as a resource for graduate students and practicing advanced practice registered nurses (APRNs) who contribute to the scholarly output in the discipline, particularly in the area of clinical practice. Similar to the previous editions, this book is unique because it is designed specifically for APRNs. Increasing numbers of APRNs are prepared with a doctorate in nursing practice (DNP) degree. DNP graduates are expert clinicians who have the knowledge and skills to address problems and improve outcomes in real-world health settings. APRNs prepared with a PhD degree are also engaged in practice scholarship. Collaborative teams, comprising APRNs prepared with master’s and doctoral degrees, can accelerate the translation of evidence into practice to improve health outcomes. Therefore, this book teaches APRNs prepared at the master’s and doctoral levels how to (a) find relevant and current evidence, (b) appraise the evidence, and (c) translate evidence into practice to improve patient care and outcomes. This edition expands on the previous edition by:

- Providing additional information concerning practice scholarship
- Providing practical steps and tools for seeking, appraising, and applying evidence into practice
- Integrating frameworks for implementation science and EBP

**Part I: Evidence-Based Practice.** The chapters in Part I focus on an overview of EBP: the definitions of EBP that have evolved over time, types of evidence, and models of EBP. Strategies for finding evidence are presented to guide the reader to respond to the mandate for EBP. This information on EBP is vital to graduate students who are developing skills that will prepare them to assume their advanced practice role in health care.

**Part II: Building Blocks for Evidence.** The section starts with appraising a single research article, a building block for evidence. Components of the research process are presented from a reviewer’s perspective of using the article as supporting evidence for practice in subsequent chapters. One of the documented barriers to EBP is that practitioners feel inadequate reading and interpreting research findings. Gaining knowledge about the research process is crucial for practitioners who must read, interpret, and determine the relevance of research findings (evidence) to practice.

**Part III: Using Available Evidence.** Meta-analyses, systematic reviews, and practice guidelines from various sources, such as professional organizations and government websites, are other types of evidence that may be used in establishing EBP. Appraising information from these sources is suggested in this section. Program evaluation provides an opportunity for use of evidence. Considerations when planning and implementing EBP activities
are also included in this section; that is, identifying the focus of EBP activities (unit or organizational) and developing an EBP protocol.

Part IV: Evaluating the Impact of Evidence-Based Practice and Communicating Results. Cost, outcomes, and ethical aspects are essential aspects of EBP. Communicating ideas through oral and written avenues is valuable in making EBP a reality. Techniques for acquiring oral and written methods for presenting ideas are included; such techniques are helpful in writing protocols and reporting outcomes of EBP activities.

Although graduate students are the primary audience for this book—a textbook for a graduate course in nursing research or an interdisciplinary health care course—nurses in clinical settings will also find the book helpful in fulfilling their research role toward achieving hospital Magnet® status. Our hope is that the information presented in this book will be used to provide optimal cost-efficient care to patients, which will increase their quality of life.

We acknowledge the work of Magdalena A. Mateo, PhD, RN, FAAN, for her contributions to previous editions of this book.

Marcia Pencak Murphy
Beth A. Staffileno
Marquis D. Foreman
Share

Research for Advanced Practice Nurses: From Evidence to Practice, Third Edition
PART I

Evidence-Based Practice
CHAPTER 1

Overview of Evidence-Based Practice

MARY D. BONDMASS

For nearly two decades, discussion and debate related to evidence-based practice (EBP) have ensued. Early data from the Institute of Medicine (IOM) suggested that health care in the United States is not as safe as it should and could be (IOM, 2000). In 2001, the IOM called for efforts to redesign health systems, including the mantra that decision making in health care be evidence based, opining that “Patients should receive care based on the best available scientific knowledge. Care should not vary illogically from clinician to clinician or from place to place” (IOM, 2001, p. 4). Core needs were identified and included in the IOM’s 2001 report, noting that health care should be safe, effective, patient-centered, timely, efficient, and equitable. A few years later (IOM, 2003), five core competencies were recommended for the health care education curriculum with a focus on EBP. During the past two decades, we have seen debate and discussion in the health care literature about multiple issues, including EBP nomenclature (“evidence-based medicine” vs. “evidence-based nursing” vs. “evidence-based practice”), educational preparation and requirements (who, what, where, when, how), and even some discussion of the very need for EBP (AACN, 1995, 2004, 2006, 2011, 2015; Burke et al., 2005; Estabrooks, 1998, 1999; IOM, 2001, 2003, 2008, 2010, 2016; Kleiber & Titler, 1998; Melnyk & Fineout-Overholt, 2015; Melnyk, Fineout-Overholt, Giggleman, & Cruz, 2010; Melnyk, Gallagher-Ford, Long, & Fineout-Overholt, 2014; National League for Nursing (NLN) Position Statement, 2005; O’Neil and the Pew Health Professions Commission, 1998; Stetler, 1994; Stetler et al., 1998; Stevens, 2002, 2004, 2009; Titler et al., 1994).

Today, as the latest edition of this text is prepared for publication, EBP and the need for an effective EBP curriculum in health care education are no longer optional or up for debate. Data are clear and compelling that health care education must change to meet the needs of EBP (IOM, 2010, 2016). In the advent of implementation of the 2010 legislation of the Health Care and Education Reconciliation Act and the Affordable Care Act (ACA), nursing is at the forefront of leading this change in both education and practice. The Future of Nursing: Leading Change, Advancing Health report from the IOM and Robert Wood Johnson Foundation (RWJF; 2010) and the Quality and Safety Education for Nurses (QSEN) initiative from the University of North Carolina and the American Association of Colleges of Nursing (AACN; 2012) are two examples of exciting initiatives available to advise and guide nursing on leading change in education and on EBP (IOM, 2010, 2016; QSEN Institute, 2012). EBP is considered by some to be key in not only providing high-quality, safe care, but also in saving health care dollars and reducing high turnover rates in certain health care professions (Melnyk, Fineout-Overholt, Giggleman, & Cruz, 2010).

While the Future of Nursing reports (2010, 2016) plot a course to position nurses for advanced practice, the QSEN competencies provide specific knowledge, skill, and attitude that are quite similar to, and no doubt developed from, the original five core competencies.
proposed by the IOM in 2003 to ensure quality in patient care. Of note, the Essentials of Master’s Education in Nursing (AACN, 2011) and the Essentials of Doctoral Education for Advanced Nursing Practice (AACN, 2006) were also developed using data and recommendations from the IOM (2003) report.

Comparisons of the core competencies proposed by the IOM in 2003 and the 2012 QSEN competency categories are displayed in Table 1.1. The graduate-level QSEN competencies for EBP are listed in Table 1.2.

### DEFINITION OF EBP

Multiple definitions of EBP have been proposed and have evolved over the past decades. One of the most common definitions of EBP in use today was derived from an initial proposal for evidence-based medicine by Sackett, Straus, Richardson, Rosenburg, and Haynes (2000). This definition was later refined in 2005 to be more inclusive (Straus, Richardson, Glasziou, & Haynes, 2005). Over time, many texts and publications agree on the definition of EBP to be “the integration of best research evidence with clinical expertise and patient values and circumstances” (Straus et al., 2005, p. 1). While many other excellent definitions are used in the literature, most would agree that this definition is inclusive enough for universal use.

### ORIGINS OF EBP

Many credit Archibald Leman Cochrane as one of the first proponents for EBP. In the 1970s, Cochrane began a series of studies on the health population studies, which pioneered the use of randomized controlled trials (RCTs). Through Cochrane’s experiences in the Spanish Civil War and later in World War II, he developed his beliefs that much of the medical community did not have sufficient evidence to justify its practice. In his landmark monograph *Effectiveness and Efficiency: Random Reflections on Health Services* (Cochrane, 1972), he advocated for RCTs as evidence for practice. Cochrane’s initial work is credited to the eventual development of the Cochrane Library database of systematic reviews, the establishment of the UK Cochrane Center in Oxford, and the international Cochrane Collaboration (2009).

In looking at the origins of EBP, it should be noted that Cochrane was not the only one advocating for the use of research findings in practice. Well in advance of Cochrane’s observations and publications, Nightingale (1858, 1859, 1863a, 1863b) wrote extensively...
### TABLE 1.2 Graduate-Level QSEN Competencies for Evidence-Based Practice

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate knowledge of health research methods and processes</td>
<td>Use health research methods and processes, alone or in partnership with scientists, to generate new knowledge for practice</td>
<td>Appreciate strengths and weaknesses of scientific bases for practice</td>
</tr>
<tr>
<td>Describe EBP to include the components of research evidence, clinical expertise, and patient/family/community values</td>
<td>Role model clinical decision making based on evidence, clinical expertise, and patient/family/community preferences</td>
<td>Value all components of EBP</td>
</tr>
<tr>
<td>Identify efficient and effective search strategies to locate reliable sources of evidence</td>
<td>Employ efficient and effective search strategies to answer focused clinical or health system practices</td>
<td>Value development of search skills for locating evidence for best practice</td>
</tr>
<tr>
<td>Identify principles that comprise the critical appraisal of research evidence</td>
<td>Critically appraise original research and evidence summaries related to area of practice</td>
<td>Value knowing the evidence base for one’s practice specialty area</td>
</tr>
<tr>
<td>Summarize current evidence regarding major diagnostic and treatment actions within the practice specialty and health care delivery system</td>
<td>Exhibit contemporary knowledge of best evidence related to practice and health care systems</td>
<td>Value cutting-edge knowledge of current practice</td>
</tr>
<tr>
<td>Determine evidence gaps within the practice specialty and health care delivery system</td>
<td>Promote a research agenda for evidence that is needed in practice specialty and health care system</td>
<td>Value working in an interactive manner with the institutional review board</td>
</tr>
<tr>
<td>Demonstrate knowledge of health research methods and processes</td>
<td>Use health research methods and processes, alone or in partnership with scientists, to generate new knowledge for practice</td>
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</tr>
</tbody>
</table>

(continued)
about the use of evidence for practice. More recently, the concept of research utilization reappeared in nursing literature in the 1970s. Some nurse leaders called it the translation of scientific evidence into practice and expressed the need for nurses to use scientific evidence from research studies to improve the quality of care in practice (Abdellah, 1970; Lindeman, 1975). By the mid-1970s, large research utilization projects developed several EBP models in the United States. In particular, three models for research utilization are considered the foundations for the initial understanding of EBP in nursing.

The Conduct and Utilization of Research in Nursing (CURN) project developed and tested a model for using research-based knowledge in clinical practice settings. The research utilization process is organizational with planned changes integrated throughout. Systems change is essential to establishing a research-based practice on a large scale (Haller, Reynolds, & Horsley, 1979; Horsley, Crane, & Bingle, 1978).

The Stetler Model of Research Utilization applied research findings at the individual practitioner level. The model has six phases and emphasizes critical thinking and decision making (Stetler, 1983, 1985, 1994; Stetler & Marram, 1976).

The Iowa Model of Research in Practice consists of research integrated into practice to improve the quality of care (Titler et al., 1994), and is an outgrowth of the Quality Assurance Model Using Research (QAMUR; Watson, Bulecheck, & McCloskey, 1987). Research utilization is an organizational process, with planned change principles integrating research and practice using a multidisciplinary team approach (Kleiber & Titler, 1998).

Both the Stetler and the Iowa models have continued to evolve over the past few decades and have become more consistent with EBP versus the more limited research utilization paradigm (Stetler, 2001a, 2010; Titler & Everett, 2001; Titler et al., 2001). Both models still provide guidance for evidence-based clinical decision making, including change requirements at both the organizational/systems and individual levels.

The Iowa Model of Research in Practice (Titler, 2010) was recently used as a curriculum framework for the Doctor of Nursing Practice (DNP) completion project at a large university’s School of Nursing in the Western United States (Lloyd, D’Errico, & Bristol, 2016). Also of interest, both the Stetler and Iowa models are considered among the determinant frameworks that have been found to influence implementation science (Nilsen, 2015). Implementation science, a close relative to research utilization and EBP, is defined

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### TABLE 1.2 Graduate-Level QSEN Competencies for Evidence-Based Practice (continued)

<table>
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</tr>
</tbody>
</table>

Data were retrieved from http://www.qsen.org.

EBP, evidence-based practice; QSEN, Quality and Safety Education for Nurses.

*Source: Cronenwett et al. (2009).*
as the study of methods to promote the systematic uptake of research findings and other EBPs into routine practice to improve the quality and effectiveness of health services and care (Eccles & Mittman, 2006).

An in-depth discussion of the pros and cons of all available models, while beyond the scope of this chapter, is encouraged before adopting an EBP model at any institution or within any practice.

■ TRANSITION FROM RESEARCH UTILIZATION TO EBP

Oftentimes in the literature and in practice conversation, the terms EBP and research utilization are used interchangeably; although they are similar, they are not synonymous (Estabrooks, 1999; Kirchhoff, 2009; Melnyk & Fineout-Overholt, 2015; Stevens, 2001, 2013). Kirchhoff (2009) made the case that the primary differences between EBP and research utilization are the processes (steps) used and the level of evidence being appraised for practice. Whereas summary evidence (systematic reviews) are considered the “heart” of EBP, the singular primary research article is the basic unit of analysis relied upon in research utilization (Stevens, 2001, 2013).

■ THE PRACTICE-FOCUSED NURSING DOCTORATE, ADVANCED NURSING PRACTICE, AND EBP

In 2004, the AACN recommended the DNP as the degree associated with practice-focused doctoral nursing education. Moreover, the practice doctorate was recommended to be the graduate degree for advanced nursing practice preparation, including but not limited to the four current advanced practice nurse (APN/APRN) roles of clinical nurse specialist, nurse anesthetist, nurse midwife, and nurse practitioner.

The Essentials of Doctoral Education for Advanced Nursing Practice (DNP Essentials), published in 2006 by the AACN, indicate, “Practice-focused doctoral programs are designed to prepare experts in specialized advanced nursing practice. They focus heavily on practice that is innovative and evidence-based, reflecting the application of credible research findings” (p. 3). If we then focus on the DNP as nursing’s accepted practice-focused doctorate, one might logically conclude that the DNP should lead initiatives to improve health outcomes and promote practice scholarship based on the essential underpinnings of the degree. As clinicians, most of us would recognize what improved health outcomes look like, but the same is not true for practice scholarship; therefore, the remainder of this chapter presents a brief discussion on that topic.

Essential III in the DNP Essentials (2006) refers to clinical scholarship and analytical methods for EBP and acknowledges that scholarship and research are the hallmarks of doctoral education. While many may think the discovery of new knowledge is only within the research domain, alternative paradigms of scholarship are evolving, and the scholarship of application (i.e., clinical application) can expand knowledge beyond just discovery (Boyer, 1990). “Nursing practice epitomizes the scholarship of application through its position where the sciences, human caring, and human needs meet and new understandings emerge” (AACN, 2006, p. 11).

To more fully describe what clinical scholarship looks like, one can examine the AACN’s expectations of Essential III and what DNP programs should prepare their graduate to do, including critical appraisal of existing literature and other evidence for best practice, design processes to evaluate outcomes of care or organizations and systems, design/direct/evaluate quality improvement initiatives, develop practice guidelines, utilize information
technology to improve outcomes, function as a practice specialist/consultant, and disseminate findings from EBP and research to improve outcomes (AACN, 2006). Relating to the last expectation, available data indicate that the number of publications, authored and coauthored by DNs, has paralleled growth in the number of DNP graduates between 2005 and 2012. Not surprisingly, most of the scholarly publications were related to clinical investigations and practice-focused studies (Broome, Riner, & Allam, 2013; Redman, Pressler, Furspan & Potempa, 2015). Even though formal research is not the focus of DNP education, Redman et al. (2015) opine that the current DNP publication data may indicate that DNP graduates are socialized into scholarly writing and critical analyses surrounding clinical issues. Although there remains some differing content and expectations among programs related to analytic focus and scholarship (Grey, 2013; Melnyk, 2013), Broome et al. (2013) stress the critical need for DNP graduates to publish their final projects, specifically related to the success of the DNP in leading needed health care change.

Moving forward since AACN’s 2004 and 2006 publications, and given the dramatic proliferation of DNP programs and the changing landscape in health care and higher education, the AACN recently convened the DNP Implementation Task Force, with a resulting white paper in August 2015. Among other issues, the charge of the task force was to clarify practice expectations as outlined in the DNP Essentials and to highlight practice scholarship. Specifically addressing the latter charge, the white paper’s recommendations included the following:

DNP practice-scholarship is demonstrated when the principles of nursing scholarship are combined with the eight DNP Essentials to produce a graduate prepared to improve health and care outcomes. The integration of these new or refined skills improves outcomes through organizational/systems leadership, quality improvement processes, and translation of evidence into practice, among other ways. (p. 2)

Moreover, this task force recommended that “practice-focused graduates are prepared to generate new knowledge through innovation and practice change, the translation of evidence, and the implementation of quality improvement processes in specific practice settings, systems, or with specific population to improve health or health outcomes” (AACN, 2015, p. 2). Clearly, considering the definitions of EBP and the IOM’s (2010, 2016) and AACN’s recommendations over the past decade, one can see the expectation for the DNP, educated in advanced nursing practice, should be to lead EBP initiatives. Not surprisingly and an appropriate closing to this section is a recent editorial in Worldviews on Evidence-Based Nursing titled The Doctor of Nursing Practice = Evidence-Based Practice Expert, which provides even further recognition and validation of the role of the DNP in EBP (Melnyk, 2016).

The reader is referred to the reference section of this chapter for Internet addresses for the various AACN position statements and white papers and the landmark IOM reports mentioned herein.

 SUMMARY

In the past few decades, EBP has emerged as a global movement. This movement includes more than research utilization, and many relevant EBP models have been developed to promote scientific and other evidence sources to improve the quality of care (Burrows & McLeish, 1995; Camiah, 1997; Davies, 2002; Estabrooks, 1999; Goode, Lovett, Hayes, & Butcher, 1987; International Council of Nurses [ICN], 1990; Kitson, Ahmed, Harvey, Seers, & Thompson, 1996; Kitson, Harvey, & McCormack, 1998; Olade, 1990, 2001; Redfern
& Christian, 2003; Rolfe, 1999; Rosswurm & Larrabee, 1999; Stetler, 2001a, 2001b, 2003; Stevens, 2004; Titler et al., 1994). In the new millennium, EBP is an umbrella term for many sources of evidence, including, but not limited to, meta-analysis, systematic reviews, consensus recommendations by experts, and clinical guidelines (Bondmass, 2009; IOM, 2003, 2010; Jennings & Loan, 2001; Kirchhoff, 2009; Melnyk & Fineout-Overholt, 2015; Melnyk, Gallagher-Ford, Long, & Fineout-Overholt, 2014; QSEN Institute, 2012; Roberts, 1998; Rolfe, 1999; Stetler et al., 1998; Stevens, 2001).

This chapter provided a brief overview of EBP related to advanced nursing practice and the APN. Origins, definitions, EBP models, and academic and clinical EBP competencies were presented as a snapshot of the challenges and expectations of APNs in an interprofessional EBP environment. Additionally, the expectations and responsibilities of the DNP, the APN/APRN, and advanced nursing practice were discussed in relation to leading initiatives to improve health outcomes and promote practice scholarship. In the various chapters of this book, in-depth and specific material will be presented with the intent to prepare APNs for their leadership role in health care related to research and EBP.

### SUGGESTED LEARNING ACTIVITIES

1. Search the literature or look within your own health care organization for an example of how a nurse, educated to the level of advanced nursing practice (preferably a DNP), implemented an evidence-based change initiative or quality improvement project that measurably improved health outcomes.
2. Gather a group of colleagues, either in your clinical or classroom setting, and conduct a self-assessment using the QSEN’s graduate-level EBP competencies related to your knowledge, skills, and attitudes; then compare your results.

### REFERENCES


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Stevens, K. R. (2009). *Essential competencies for evidence-based practice in nursing* (2nd ed.). Academic Center for Evidence-Based Practice: The University of Texas Health Science Center at San Antonio.


CHAPTER 5

Critical Appraisal of Evidence

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Whether one is reading a research article to translate findings into evidence-based practice (EBP) or as a building block for a proposed study, the process begins with appraising a single research article. Advanced practice nurses frequently read the research (data based and reviews) literature to answer questions related to diagnosis, therapeutic interventions, and prognosis of individual patients (Facchiano & Snyder, 2012). One of the barriers to translating research findings (and therefore providing evidence-based care or guideline-directed therapy) into practice is a lack of confidence in one’s ability to read and interpret research findings (Whifflin & Hasselder, 2013). The critical thinking skills nurses use in practice every day provide a foundation for developing the skill of reading and evaluating research.

Reading and evaluating data-based literature is a critical skill in translating research into clinical practice. Previous chapters have addressed how to locate and retrieve research literature; chapters that follow detail the various elements and designs of research studies and the reporting of results through research publications. The purpose of this chapter is to review the sections of a single research article and to provide an organized approach to reading and interpreting the strength and relevance of the information presented in the data-based article.

The critical appraisal of a data-based article determines the strengths, weaknesses, and usefulness of the research to practice and future research (Facchiano & Snyder, 2012). Clinicians must weigh the limitations of the study with the strengths to evaluate the study’s usefulness to practice. As a result, understanding the components of a data-based article and important questions to consider while reading each section is needed.

All research articles are written with an organized approach. Components of a data-based article include the title, abstract, background and significance of the study, methods, data analysis, findings and results, discussion, limitations, and implications for practice. Minor variations in the formatting may be required by a journal for publication, for example, limitations may be included in the discussion. Even so the logic of the researcher’s thinking should be clear enough so that the reader has few questions about how and why the study was conducted. By the end of the article, the reader should be able to determine how the research results fit into current knowledge and how (or whether) the findings translate to the practice environment for implementation or necessitate further testing and validation. As the reader progresses through the article, each section builds on the previous information. Exhibit 5.1 summarizes key elements to consider to appraise a data-based article and may serve as a general guide or checklist in reading the literature. This exhibit is one example of an appraisal tool; several other guides and tools are available including online software to assist in critically appraising the data-based literature.
EXHIBIT 5.1 Evaluating a Single Research Article—Questions to Consider

### Abstract
Does the article fit your research question or purpose? Practice setting or population?

### Background and Significance
- **Literature Review**
  - Is the literature current? Relevant?
  - Is the research literature summarized and evaluated?
  - Are gaps in the literature noted? How likely is it that the current study will close the gaps in current knowledge?
- **Problem Statement/Purpose (at the end of the background section)**
  - What was studied? What variables were measured (independent and dependent)?
  - Does the purpose (or research question) clearly address the problem?

### Method
- **Design**
  - What is the overall design of the study? Quantitative or qualitative?
  - Is the design a good match with the problem statement or purpose of the study?
- **Ethics**
  - How was the protection of human participants ensured?
- **Sample**
  - How was the sample identified? Do the participants have characteristics that can answer the research question? What are the inclusion and exclusion criteria?
- **Instruments**
  - Were the instruments that were used reliable? Validated in the study population?
- **Study Procedure**
  - Was the procedure realistic?
  - If an independent variable was manipulated, was it done consistently?
  - How were instruments/tools administered? In what environment? Was the environment consistent?
  - Over how much time were data collected?

### Data Analysis
- How were data analyzed?
- Were statistical tests used appropriately?
  - If the research is a qualitative study, how were themes and meaning elicited?

### Findings/Results
- What were the outcomes of the study? Are the results valid?
- Were all aspects of the problem statement/purpose addressed?
- How do the findings fit with previous research? Supported or not supported?

(continued)
The title describes and explains what the article is about. The title may include information about the focus or outcome of the research, the population studied, and the study design (Jack et al., 2010).

ABSTRACT
The first part of a research article is the abstract. The abstract is a brief, targeted summary of the full article that follows. The abstract provides the reader with a succinct overview of the study and can be used to evaluate whether the study is of interest or applies to the reader’s practice setting or population (Subramanyam, 2013). Most readers use the abstract as a screen to determine whether or not to read the entire research article.

BACKGROUND AND SIGNIFICANCE
The background or introduction of a data-based article provides an overview of the current status of a specific field and a context for the research. The first few paragraphs provide the reader with an understanding of the background of the study, why the study was conducted, and why the study was important (significance). The reader should be able to identify gaps in current knowledge and how the proposed study specifically fills the gaps. Near the end of the section (or set apart), the purpose (also referred to as the aim) or problem statement of the study is presented. The purpose or problem statement is closely related. Both or only one may be included in an article. The purpose or problem statement should be clearly stated and provides the variables (independent and dependent) examined. The author may also include research questions, hypotheses tested in the study, or both. In any case, the reader will know the population (who)
and the phenomenon (what) of interest. The reader uses this information to assess the remainder of the article.

LITERATURE REVIEW

In some cases, the background section includes a review of the literature. In other articles, the literature review is set apart as a separate section. The review of the literature should be appraised for both content and relevance. The literature presented should be relevant to the study, relate to the variables that were studied, and be current. The literature review often includes theoretical and data-based sources. The previous research studies included in the background section should at the minimum address the purpose, sample, design, and findings and a brief critique of the study’s strengths and weaknesses (Grove, Gray, & Burns, 2015). Another approach in reporting the research literature is to synthesize numerous studies and evaluate the body of knowledge. Whichever approach is used, the reader should have an understanding of the current knowledge and how the study may address gaps in knowledge or expand current knowledge. The existing research literature included in the review may be directly or indirectly related to the purpose of the study. Indirectly related studies should be linked for relevance.

The reader should check the publication dates of the literature cited and reference list and judge whether or not it is (at least reasonably) current. Although some studies are considered classics, much of the cited literature should be recent and reflect up-to-date thinking and understanding of the study’s focus. This is especially important in practice areas undergoing rapid change (e.g., genetics and genomics) and in areas that are time sensitive (e.g., attitudes and opinions). The reader’s personal knowledge and level of expertise in the content area are valuable in determining the currency and strength of the literature review included in the research article.

METHODS

A large section of the research article is the methods section, which describes how the study was conducted. The methods section includes design, sample, instruments, and specific procedures for data collection (Grove et al., 2015). The methods section is a critical part of a research article and deserves careful attention. While reading the methods section, the reader should be alert for any problems in the way the study protocol was implemented, such as sample bias, inconsistencies in data collection among participants, loss of participants or attrition, and weaknesses of the instruments or tools used to collect the data. The strength of the methods section helps the reader determine the overall usefulness and generalizability of the results that will follow.

Design

The study design is identified early in the methods section if it has not already been implied in the purpose or problem statement. The author should identify whether the study used a quantitative, qualitative, or mixed-methods design. Quantitative studies use designs that result in numerical data that can be used in statistical (mathematical) analysis and assess the size of relationships among variables (Melynk & Fineout-Overholt, 2015). Variables in quantitative designs may be measured using physiologic instruments (e.g., blood pressure and weight), questionnaires with fixed responses (e.g., scale of 1 to 5), or variables that can be assigned a number (e.g., gender). Quantitative research designs may be further identified as experimental, quasi-experimental, or nonexperimental (descriptive or correlational), depending...
on how participants were chosen, whether and how study variables were manipulated, and how the data to measure the variables were collected (Grove et al., 2015).

Qualitative studies use a nonnumerical study approach to collect data often to describe a phenomenon (Melynk & Fineout-Overholt, 2015). The most common qualitative designs are ethnographic, phenomenological, historical, and grounded theory approaches. Just as in quantitative designs, there are specific and distinguishing elements among the qualitative designs. The goal of studies that use qualitative designs is to explore or explain the phenomenon of interest from the perspective of individuals experiencing the phenomenon. As a result, qualitative designs yield descriptions that can then be analyzed and coded for themes, common elements, and shared meaning among participants (Jirwe, 2011). The end result of a qualitative design may be new knowledge or the beginning of a theory, whereas the end result of a quantitative study is often acceptance or rejection of current knowledge or theory.

In some instances, the study design may include both qualitative and quantitative elements to examine a specific research question or hypothesis, resulting in a mixed-methods design. How methods are mixed varies greatly but three major issues need to be addressed in this type of design, that of timing, weighting, and mixing (Kettles, Creswell, & Zhang, 2011). The analysis of a mixed-methods study design combines both numeric and narrative data (Ingham-Broomfield, 2016). Quantitative and qualitative design approaches can differ greatly, with quantitative designs requiring large sample sizes and random selection or assignment to treatment groups, whereas some qualitative designs have small samples recruited from a narrow group of individuals. Thus, a mixed-methods study may have a large or small sample depending upon which research design dominates. Ultimately, sampling decisions are based on the research questions (Ingham-Broomfield, 2016).

The design of the study should be sufficiently detailed so that the reader can determine how the study was actually conducted. The timeline and sequence of the study procedures should be clear and concise so that the study can be replicated. Regardless of the overall research design, the key question for the reader to consider is how well the design used is likely to fulfill the purpose of the study and answer the research question.

Sample

The number of participants who participated in the study (sample size) should be clearly stated and described in the article including the number of participants who do not complete the study. In addition, the authors should describe how the sample size was determined. In a quantitative study, sample size is determined by power analysis, a mathematical determination based on the researcher’s desired level of statistical significance, estimates of variability, and effect size. A power analysis is not included in a pilot study because a primary purpose of a pilot study is to collect information to justify and guide subsequent, larger studies (Moore, Carter, Nietert, & Stewart, 2011). In many qualitative studies, the researcher describes how the (often small) sample size was sufficient to answer the research question.

The article should also provide details regarding specific inclusion and exclusion criteria for participants to be enrolled as participants. Careful attention to potential participants excluded from the study will assist in determining whether findings may be translated to clinical practice. The reader should be especially alert for any apparent bias in selecting the sample and exclusions that can limit generalizability of the findings beyond the study’s individual sample and/or setting. A description of potential participants who were approached for inclusion but refused to participate should also be included to determine how closely the study population represents the population of interest as a whole.
The demographic and clinical characteristics of study participants (e.g., age, gender, comorbidities) are usually presented and help the reader evaluate to what degree the study sample is congruent with the reader’s population of interest. Sample characteristics are also important in determining whether or not the study findings might be applicable for translation into practice. The more closely the sample matches the reader’s population, the more likely the reader is to implement the findings into practice if all other criteria are met (no contradictory study results and other supporting studies with similar results). In addition, the number of participants and a brief description of participants who did not complete the study or study procedures should be included so that the reader can make a judgment whether individuals who completed the study were different from those who did not complete the study, which is a potential source of bias called attrition.

In quantitative studies, random selection of participants and random assignment of participants to treatment groups are ideal but often difficult to accomplish because of the constraints that accompany research on human participants in a clinical environment. As a result, a convenience sampling method is often used and is strengthened when the design incorporates random assignment to treatment groups. The reader needs to make a judgment regarding bias in the sample and the appropriateness of the sampling plan in answering the problem.

**Research Instruments and Data Collection Tools**

Each research tool or instrument used in the study should be described in detail. The instruments should measure the variables of interest. If an existing tool or instrument was used (e.g., depression scale), the number of items and a brief account of what the tool measures should be described. Measures of reliability, the consistency of the tool or instrument, and validity, whether the tool actually measures the phenomenon under study, are important considerations and should be reported in the article. The choice of the specific tool used should be explained in the context of the study variables, previous research that used the tool(s), and any subject characteristics considered in choosing the tool (e.g., reading level and short administration time in a population likely to experience fatigue with a long tool). An advantage of using research instruments that have already been used is that reliability and validity data may already be established (Mayo, 2015). If the researcher had developed a tool for the study, a full description of the instrument and a discussion of how reliability and validity were established should be included. Whether an existing research instrument was used or a tool was created for the study, a lack of information regarding reliability and validity leads to questions regarding whether or how well the variables in the study were actually measured.

**Ethics**

The methods section should also include a short description of how ethical considerations in conducting the study were addressed. Alternatively, the protection of human participants may be addressed as the first part of the description of the study procedure. In either case, a statement regarding review of the study by an institutional review or research ethics board prior to the beginning of the study is generally included. In addition, procedures for obtaining participants’ consent to participate in the study and how consent was obtained should be detailed. If the participants were minors or were incompetent to provide informed consent personally, the author should fully describe assent (for minors) or consent procedures, mention whether any difficulties were encountered, and if difficulties were encountered, how they were managed.
Study Procedures

The procedure section provides a detailed description of how the study was conducted, including exactly how and when data were collected and under what conditions. The information should be clearly presented so that the reader could replicate the study by following the description. The reader should see a logical flow in the data collection process and consider any extraneous variables in the setting that may affect the data.

DATA ANALYSIS

By the time, the reader comes to the data analysis section of the research article, the reader will know a great deal about the study. The reader has formed beginning opinions about the strength and potential usefulness of the study and is looking forward to reading the findings and results. The data analysis section begins with a description of how the data obtained from the research instruments were summarized and analyzed. The intent of this section is to tell the reader how the data were analyzed and is a straightforward presentation of information. In a quantitative report, the data are analyzed using statistical methods and tests. There are numerous statistical procedures and tests available. The key issue in evaluating the statistical analysis is to determine that the method used was appropriate for the research question and how the data were measured (Grove et al., 2015). In a qualitative study, the data analysis approach is described and coded, including how themes or patterns were elicited from the data. For the novice reader, the data analysis section may be the most intimidating part of the research article (Whifflin & Hasselder, 2013). This discomfort is often due to limited exposure to and understanding of the statistical tests used and uncertainty about whether the appropriate test has been applied to the data. Resources that will aid the reader as skills develop include a basic statistics book and colleagues with an understanding of data analysis techniques. As with any skill, the more the reader gains in understanding, the easier reading the analysis section becomes.

FINDINGS AND RESULTS

For many, the most enjoyable section of a research article to read is the findings of the study. Each previous section has been laying the foundation for this part of the article. The findings tell the reader what the researcher discovered as a result of the data that were collected and analyzed. As the findings of a study are presented, whether a qualitative or quantitative design was used, the reader learns whether the research question was answered and how completely the question or problem statement was addressed. All results and data that address the research question or problem statement are included in a discussion of the findings. If the study was analyzed using statistical methods, the statistical significance and confidence intervals of the results are noted. In the results section, the data and outcomes of statistical analysis are presented but not explained or discussed. The intent of the results section is to present the factual outcome of data analysis, rather than explain the meaning of the data. Although this section may seem dry or unimaginative, the advantage of this approach is to allow the reader to make beginning judgments regarding the study outcomes in the absence of the opinion or interpretation of meaning from others. In addition to a narrative summary of the results, most articles present findings using tables, graphs, or figures for easier review.

Qualitative study findings, depending on the specific qualitative design used in the study, are presented quite differently from quantitative results. In a qualitative study,
direct quotes or summaries of participant responses are often included in the results section or may be presented in a combined results/discussion section (Grove et al., 2015). The author may group the findings according to themes or patterns that became apparent during the data analysis. As a result, many qualitative studies provide data using a narrative approach and describe results in terms of richness and depth of the data.

Some readers prefer to read the results section immediately after reading the problem or purpose of the study. This may be due to curiosity about the outcome or to decide whether or not to read the entire article. The dedicated reader will then go back to the beginning of the article and read it entirely. There is nothing inherently wrong with reading the results out of sequence as long as the reader recalls that, in order to use the findings in practice or to build additional research studies, the previous sections of the article are critical in evaluating the strength of the findings. In addition, this approach may encourage a reader to fully read only those articles that report significance or that reinforce current ways of thinking. Studies that do not demonstrate statistical significance are often as revealing as those that do and encourage us to challenge existing perceptions. Finally, because the results section presents but does not discuss the findings, the reader may overlook studies with clinical (but not statistical) significance.

■ DISCUSSION

In the discussion section of an article, the author presents the conclusions he or she drew from the findings, acknowledges any limitations of the study, and suggests how findings may be generalized to individuals or groups beyond the study sample. In the discussion, the author describes how the results fit into the current body of general knowledge and specific previous research. The author should compare and contrast the study findings with those of the previous research that was cited in the review of the literature presented earlier in the article. A critical comparison by the author demonstrates to the reader that the researcher evaluated the findings with an open mind.

■ CONCLUSIONS

The author’s conclusions provide the researcher’s interpretation of the study findings. In contrast to the factual presentation of the study outcomes in the findings section, the conclusions present the meaning of the results from the author’s perspective. The conclusions drawn by the researcher should flow from the scope of the study and directly relate to the purpose of the study; they should be confined to the variables that were studied. The reader should evaluate the author’s perspective as well as his or her own to determine whether the findings answer questions in the reader’s clinical experience and/or provide information that explains phenomena previously unexplained.

■ LIMITATIONS

The author’s identification of the study’s limitations recognizes that, although no study is perfect, results can make a contribution and provide valuable information for future researchers (Facchiano & Snyder, 2012). At the same time, limitations cannot be used as an excuse for a poor design or flawed study procedures. Among the limitations often cited in research reports are problems with data collection (e.g., unexpected intervening variables that occurred during data collection), small sample size, problems with how the sample was obtained (e.g., convenience sample), and limitations inherent in the study’s
research design (e.g., nonrandom assignment of participants to groups). In most cases, the reader has already identified limitations and is not surprised by those noted by the author. The limitations will affect the reader’s confidence in translating the findings into clinical practice.

■ GENERALIZABILITY

The generalizability of study findings is an essential evaluation of a study’s outcome. Studies are conducted with participants who have specific characteristics and in settings with unique environments. In addition, manipulation of the independent variable and measurement of the dependent variable may be done in more than one way, and researchers may use comparable research instruments or tools or very different ones. As a result, the meaning of the findings and how the findings may be implemented with other populations and in other settings must be addressed in the article. An understanding of the limitations of the study also affects generalizability. A study with numerous or key limitations results in findings that have minimal or narrow generalizability beyond the population or setting in the study. This is especially likely when bias is present in the sample. Bias may be a design flaw or may be unintentional and discovered during data analysis.

■ IMPLICATIONS

The final major aspect of a research article is its implications for practice and research. An important goal of research is to provide evidence to further explain phenomena, validate current thinking and practice, or change current practice and approaches. Depending on the purpose of the study, the strength of the study’s design, and the statistical and clinical significance of findings, it is important for the author to suggest to the reader how the findings may actually be used. Implications may be noted for direct patient care practice, education, or the delivery of health care services. The implications should have direct links to the findings, be realistic, and be suggested within the limitations of the study as previously noted by the author. Again, the reader will critically evaluate the information presented, determine the extent to which the reader agrees or disagrees with the author’s perspective, and make a decision to implement the findings into practice.

Implications for future research are similarly important. Authors commonly cite a need for replication of the study, recognizing that changes in clinical practice are rarely made on the basis of a single study. In addition, the author should make suggestions for further studies that might expand understanding of the phenomenon or problem studied. In the case of an article based on a pilot study, the author should make specific recommendations for a larger study that may incorporate additional variables, change the study design, or revise or change the research tools (Moore et al., 2011).

■ SUMMARY

Reading a single research article is the first step in progressing down the path of translating evidence into practice, planning a research study, or both. Like most skills in nursing, comfort and proficiency in reading research studies increase with diligent practice. The critical thinking skills that nurses use in clinical practice are the building blocks for critically evaluating each section of a research article.
SUGGESTED LEARNING ACTIVITIES

Read two research articles—one quantitative and one qualitative—in your area of expertise or interest. Compare and contrast the two studies in the following areas:

1. Evaluate the methods section of the articles and note the following:
   a. What specific type of design did the research use?
   b. Does the design “match” the purpose of the study? Will the design provide the information to achieve the purpose or answer the problem stated?
   c. How was the sample obtained? Based on the specific quantitative/qualitative design of the study, was the sampling plan appropriate?
   d. In the quantitative study, were the reliability and the validity of the research instrument(s) described? In the qualitative study, how did the researcher record and organize the data?
   e. Were data obtained in the same manner from all participants?

2. Evaluate how the data were analyzed.
   a. In the quantitative study, were the statistical tests appropriate to the type of data collected?
   b. In the qualitative study, were the data analyzed in a way consistent with the type of qualitative design?

3. In both studies, are conclusions consistent with the data? Are limitations identified?

4. How could the study’s findings be used in practice and/or to plan further research?

ADDITIONAL RESOURCES

Critically Appraised Tool (CAT) maker and BestBETs. CATmaker is a software tool available through the Center for Evidence-Based Medicine. Retrieved from http://www.cebm.net

REFERENCES


