

# Chapter 14

## Application of Evidence-Based Nursing Practice with Research

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### Chapter Objectives

*At the conclusion of this chapter, the learner will be able to*

1. Synthesize key components from evidence-based nursing practice and research utilization to drive the provision of quality nursing care
2. Demonstrate proficiency in evidence-based practice using the principles of the research process

### Key Terms

- Evidence-based practice
- Integrative reviews
- Meta-analysis
- Research use
- Systematic reviews

## Introduction

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In Chapter 1, *evidence-based practice* (EBP) was defined as a research-based, decision-making process that is used to guide the delivery of holistic care by nurses. The recent need for and acceptance of EBP is apparent in the literature. In a 2006 survey conducted by Sigma Theta Tau International (STTI 2006), results suggested that a majority of the nurses needed evidence on a weekly basis to guide practice. About 90% of the participants indicated a moderate to high level of confidence in EBP. The results of this survey again support the premise that EBP is a driving force for the use of scientific data in the decision-making process in the provision of nursing care.

Understanding the research process is the first step in using evidence in everyday nursing practice. Following initial historic background regarding research in nursing, the other chapters of this book have focused on the research process. Examples of evidence-based practice have been given to demonstrate how EBP is applied in specific components of the research process.

Difficulty analyzing the evidence has been identified as a major obstacle to research use. The preceding chapters have provided information to assist in the analysis of research findings in the application to nursing care. This chapter is designed to “pull the pieces together” with a practical approach for research utilization in evidence-based nursing practice.

## Process for Evidence-Based Practice

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Think Outside  
the Box



Frequently, a laboring patient receives an epidural for pain management. A potential side effect of this procedure and the laboring process is difficulty with urination. As a result, the patient habitually receives catheterization to address this problem. Depending on several factors, either a straight (in and out) catheter or a retention Foley catheter is used. Both methods for managing urinary retention include pros and cons.

- Based on the evidence, which way is best to manage this health challenge for the laboring client?
- List PICOT questions that could be generated from this scenario.
- What ethical considerations would need to be addressed prior to a research study?
- How would you incorporate patient preferences into the evidence-based practice?

According to Myers and Meccariello (2006), “outdated practices are barriers to decreased length of stay, favorable patient outcomes, and lowered costs” (p. 24). To move evidence-based nursing practice forward, a realistic approach for allowing bedside nurses to actively engage in the process must be determined and used. At each stage of providing holistic care, nurses have to be confident in asking the questions and seeking the best practices to advance the provision of effective nursing care. Omery and Williams (1999) set forth the initiative to ensure that careful and practical best evidence is used to propel health care decisions. Nurses must seek the best evidence to make sure that the care provided represents the optimal health care available for the treatment plan. By determining a functional method for documenting an EBP search, nurses can then gain confidence in conducting and implementing EBP.

The process for EBP determination is different from the process for research utilization. Research utilization is depicted in Chapter 13, which reflects how to complete an assessment of a single research report. The process for research utilization carefully examines a distinct study to determine the strengths and limitations assumed within that one study. Research utilization becomes a key aspect within the overall process of EBP, but it is only one piece. For a nurse to be able to effectively utilize EBP, he or she does have to be able to conduct research critiques. Jolley (2002) supported this idea by emphasizing the need for all nurses to be able to use research, but not everyone has to necessarily be able to conduct research. Bedside nurses need to understand how to recognize the aspects within a research process that either strengthen or limit the use of the results. By having this understanding about the applicability of the results to practice, a nurse can then determine which studies can be used to sustain best practices in EBP. As a result, nurses do need to appreciate the intricacies of the research process. Bedside nurses should be able to identify the justifications that a researcher provides for selecting a specific method of sampling, data collection, research design, and data analysis. If a researcher has a valid explanation for the choices employed within a study, the results can be valued and incorporated into practice. Having begun the work with research critiques discussed in Chapter 13, the nurse can then move to the next step of development to use those skills within the EBP process.

Melnyk and Fineout-Overholt (2005) delineated the process of EBP as involving five critical steps. These five steps are

- Raising the urgent clinical question using a format that provides the key aspects of the issue
- Assembling the most appropriate evidence that addresses the issue identified
- Evaluating the evidence critically to determine the validity, relevance, and applicability

- Assimilating the evidence into clinical practice
- Assessing the changes resulting from the use of the best evidence

Each of these steps must be carefully completed to come to a determination of best practices for a nursing setting. If an EBP process does not include all of the five steps, the result does not take into consideration all of the available evidence related to the clinical question.

Think Outside  
the Box



Over recent years, more and more parents are seeking alternative birthing options. Some individuals elect to deliver at home due to health care costs. Some make this decision from a desire to have a more natural birthing process. When complications occur during the birthing process, the baby may have to be admitted to an acute care setting. For newborn infants, the standard initial treatment process includes erythromycin eye ointment, triple dye to the cord, and a vitamin K injection. If the parents voice concerns about these procedures, what steps would a nurse need to take to provide evidence-based information concerning these procedures?

- List PICOT questions that could be generated from this scenario.
- What ethical considerations would need to be addressed prior to a research study?
- What key words would be used for a literature search to locate evidence related to this EBP question?
- What type of research project could be developed to further study this concern?
- How would you incorporate patient preferences into the evidence-based practice?

Although many models for EBP are currently being evaluated and modified, **Table 14-1** is provided as a quick and easy organizational design. Within this format, the initial step is to refine the question confronting the nurse. Careful time and attention should be given to clarifying the five aspects driving the EBP question. As discussed previously, the question should consider the following five aspects (PICOT):

- P—Population of interest
- I—Intervention of interest
- C—Condition of interest
- O—Outcome of interest
- T—Time

**Table 14-1**

**Format for Documenting Evidence-Based Practice Aspects**

**Question to be considered within the evidence-based practice process:**

- P (Population of Interest): \_\_\_\_\_
- I (Intervention of Interest): \_\_\_\_\_
- C (Comparison of Interest): \_\_\_\_\_
- O (Outcome of Interest): \_\_\_\_\_
- T (Time): \_\_\_\_\_

Articles	Who Involved	What Occurred	Where Completed	When	Why	How	Consistencies	Gaps

**Summary of findings:**

**Application of findings to evidence-based practice that validates/changes policies and procedures:**

Each of these characteristics for the clinical questions was discussed in Chapters 1 and 4. The development of a clear and concise clinical question is of paramount importance, because the question directs the entire process.

Once the question is determined, the nurse needs to work with the librarian to determine key words and/or expressions to use in conducting the literature review. Having appropriate terms to use within the various search engines helps to ensure that the resulting articles provide the structure for the analysis of the best practices. Melynk (2003) stated, “evidence-based practice is a problem-solving approach to clinical decision making that incorporates a search for the best and latest evidence, clinical expertise, and assessment, and patient preference and values within a context of caring” (p. 6 of 7).

Malloch and Porter-O’Grady (2006) classified these investigations of best practices as meta-analyses, systematic reviews, or integrative reviews. The combining of these different study types identified within the literature review and search engine inquiry provide the foundation for determining whether there is a need to change practice patterns. *Meta-analysis* incorporates a statistical technique to determine the rigorousness of the findings from multiple studies on a focused question. A *systematic review* is the summarization of all evidence found correlated to an identifiable research or clinical issue employing a rigorous format to ensure completeness of the assessment. An *integrative review* also summarizes prior research studies on a selected topic but, in addition, draws conclusions from the summary concerning the studies examined.

Think Outside  
the Box



Evidence-based practice should cause the nursing profession to question most of our normal activities. A simple skill such as catheterizing an individual can result in an EBP question such as: How much urine should a nurse drain off the bladder at one time following a catheterization of a client?

- List PICOT questions that could be generated from this scenario.
- What ethical considerations would need to be addressed prior to a research study?
- What key words would be used for a literature search to locate evidence related to this EBP question?
- What type of research project could be developed to further study this concern?
- How would you incorporate patient preferences into the evidence-based practice?

The format provided in Table 14-1 allows for either a systematic review or an integrative review. Once the PICOT question has been determined and the literature review has been completed, each of the identified articles/studies is carefully assessed. For each article, the *who* involved (sample), *what* occurred (research design), *where* completed, *when*, *why*, and *how* (statistical/data analysis) are determined and documented. As these aspects of a research critique are completed on the different studies, consistencies and/or gaps within the different studies begin to surface. The identification of consistencies within the different studies provides support for potential changes in practice or confirmation of best practices currently being used. The detection of gaps within the studies presents the need for further and/or more in-depth research endeavors on the topic under consideration. The idea of identifying consistencies and gaps within the different articles/research reports is related to the concept of similarities and the omissions that may be present. Associations established from the results of the various studies need to be collected to add strength to the rationale for making any changes in policies and procedures related to the selected clinical question. If several studies all reflect the equivalent results, then nursing practice should embrace the behavior as supported by evidence. On the other hand, if multiple studies all reflect a gap in knowledge related to the selected clinical question, then further research should be directed toward the identified segment of nursing practice. According to Pravikoff, Tanner, and Pierce (2005), “the finding that a *lack of value for research in practice* was the most frequently selected barrier to the use of research in practice is of greatest concern” (p. 13 of 17). When practicing nurses cannot or do not use research results to strengthen and sustain holistic nursing practice, the implementation of EBP at the bedside becomes incomplete.

After completing the grid portion of Table 14-1, time must be given to summarizing the findings. The nurse should pay careful attention to and critically consider the meaning ensuing from the consistencies and gaps identified. This painstaking contemplation of the discovered omissions and similarities focuses the next steps within the process. By taking the time and energy to summarize and synthesize the information collected, the nurse becomes well versed in the current state of the clinical problem. Obtaining this clearer viewpoint related to the clinical problem allows the nurse to make an informed decision as to what is needed next in this challenge.

The final section of this table relates to the application aspect. After completing each of these prior steps, the nurse has a base on which to make recommendations for maintaining or changing a policy or procedure. The time taken to complete this exercise allows for any recommendations to be based on sound, factual data. The suggestions can then be effectively supported by a wealth of tested research endeavors.

Think Outside  
the Box



Frequently, an insulin drip protocol will seek to maintain a serum blood sugar result between 70 to 110 mg/dl. At one health care agency, a pilot research project revealed a mean blood sugar for patients dismissed from a cardiac intensive care unit after three months was 148. The nurses questioned the protocol ranges as a result of this pilot study result.

- List PICOT questions that could be generated from this scenario.
- What ethical considerations would need to be addressed prior to a research study?
- What key words would be used for a literature search to locate evidence related to this EBP question?
- What type of research project could be developed to further study this concern?
- How would you incorporate patient preferences into the evidence-based practice?

## Conclusion

Yoder (2005) stated, “both EBP and QI initiatives require ongoing evaluation of the practice environment, the appropriate use of data collection and evaluation, and the dissemination of the information learned through excellent communication process both from the top down and the bottom up” (p. 3 of 3). Resources are available to aid the nurse to strengthen EBP foundations and activities (see **Table 14-2**). The cur-

**Table 14-2**

Suggested Resources to Support the Retrieval and Appraisal of Evidence

- Oncology Nursing Society (ONS) EBP Online Resource Center “Evidence Search” section: [http://onsopcontent.ons.org/toolkits/ebp/process\\_model/evidence\\_search.htm](http://onsopcontent.ons.org/toolkits/ebp/process_model/evidence_search.htm)
- National Library of Medicine Web site, which allows free searches of MEDLINE through PubMed: [www.ncbi.nlm.nih.gov/entrez/query.fcgi](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi)
- National Guidelines Clearinghouse: [www.guideline.gov](http://www.guideline.gov)
- National Comprehensive Cancer Network: [www.nccn.org](http://www.nccn.org)
- Agency for Healthcare Research and Quality: [www.ahrq.gov](http://www.ahrq.gov)
- Cochrane Database of Systematic Reviews: [www.updates-software.com/conchrane/abstract.htm](http://www.updates-software.com/conchrane/abstract.htm)
- University of Alberta – EB Medicine Tool Kit: [www.ualberta.ca/ebm/ebm.htm](http://www.ualberta.ca/ebm/ebm.htm)
- RNAO Best Practice Guidelines: [www.mao.org](http://www.mao.org)
- Centre for Evidence-Based Nursing (York, UK): [www.york.ac.uk/healthsciences/centres/evidence/cebn.htm](http://www.york.ac.uk/healthsciences/centres/evidence/cebn.htm)
- Joanna Briggs Institute: [www.joannabriggs.edu.au](http://www.joannabriggs.edu.au)
- SchARR Netting the Evidence: [www.shef.ac.uk/scharr/ir/netting](http://www.shef.ac.uk/scharr/ir/netting)



rent health care community requires nurses and other health care providers to be diligent in the determination and provision of holistic health care. The different treatments and plans of care put forth for clients must be based on factual, tested data. Each nurse must take responsibility for ensuring that the care provided is based on firm, accurate research data. This research data is then used to provide individualized health care to clients based on factual data, patient preferences, and nursing expertise.

Think Outside  
the Box



Gather at least three of your peers and form a journal club. Select a topic of your choice and identify a PICOT question. Conduct an integrative review for the selected topic. What conclusion can you draw from the review? How will this change your practice?

## Summary Points

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1. Evidence-based practice (EBP) was defined as a research-based, decision-making process used to guide the delivery of holistic care by nurses.
2. Understanding the research process is the first step in using evidence in everyday nursing practice.
3. To move evidence-based nursing practice forward, a realistic approach for allowing bedside nurses to actively engage in the process must be determined and used.
4. The process for research use carefully examines a distinct study to determine the strengths and limitations assumed within that one study.
5. By having an understanding of the applicability of the results to practice, a nurse can then determine which studies can be used to sustain best practices in EBP.
6. The development of a clear and concise clinical question is of paramount importance, because the question directs the entire process.
7. Meta-analysis incorporates a statistical technique to determine the rigorosity of the findings from multiple studies on a focused question.
8. A systematic review is the summarization of all evidence found correlated to an identifiable research or clinical issue employing a rigorous format to ensure completeness of the assessment.
9. An integrative review also summarizes prior research studies on a selected topic but, in addition, draws conclusions from the summary concerning the studies examined.
10. For each article, the *who involved* (sample), *what occurred* (research design), *where completed*, *when*, *why*, and *how* (statistical/data analysis) are determined and documented.
11. The identification of consistencies within the different studies provides support for potential changes in practice or confirmation of best practices currently being used.
12. The detection of gaps within the studies presents the need for further and/or more in-depth research endeavors on the topic under consideration.
13. Obtaining this clearer viewpoint related to the clinical problem allows the nurse to make an informed decision as to what is needed next in this challenge.



## RED FLAGS

- Research utilization and evidence-based practice are not one and the same.
- The recommendation for changing nursing practice must be based on sound evidence not a single study.

## Case Scenario

A Hispanic woman presents to the Emergency Room complaining of epigastric pain in atypical form, nausea, diaphoretic, and complaining of neck pain. The initial assessment reveals a 60-year-old, Hispanic female with a history of diabetes and hypertension. She has a granddaughter attending nursing school at the local community college. The client reports being a smoker with a family history of cardiac problems. She is 5 feet 3 inches tall and weighs 185 pounds. She is a homemaker with no outside employment. For the most part, she reports a sedentary life style and denies alcohol consumption. The ER physician orders an EKG and cardiac panel to rule out an acute myocardial infarction. Other tests ordered include a chest X-ray, urinalysis, and standard chemistry (CBC, troponins, creatinine protein). The tests revealed elevated troponin and EKG changes with an elevation in the ST segment. The client is diagnosed with a full-blown myocardial infarction. The ER physician mobilizes the cath lab team and orders a cardiology consultation. The client is transported to the cath lab for an angiogram, which reveals two blocked cardiac vessels. After a double angioplasty is performed, the client is transferred to the Cardiac Care Unit. After she arrives in the unit, the nursing staff assessed the client and determines that the angioplasty versus manual compression was completed with Perclose. The use of this closure for angioplasty has been a source of discussion in the CCU. As a result of this case and others, the nursing staff elects to engage in an evidence-based practice activity to determine if the policies and procedures currently used on the unit reflect the best practices for this type of client and medical treatment plan. The following PICOT question was identified (see **Table 14-3**). The EBP process was initiated.

As can be seen from the case study analysis, there are gaps in the literature in the lack of actual research projects on the use of Perclose versus manual pressure. All of the literature reviewed were case studies with reference to recommendations from the manufacturer. If the nurses wished to continue further exploring Perclose, they could use the Gap Table (Table 5.4) in Chapter 5. However, the case study illustrates how EBP and research can lead to specific actions to improve nursing care. Thus, patient outcomes can be improved.

**Table 14-3**

Format for Documenting Evidence-based Practice Aspects

**Question to consider within the evidence-based practice process:**

- P (Population of Interest): \_\_\_ Hispanic adult 50 years or older
- I (Intervention of Interest): \_\_\_ Perclose usage
- C (Comparison of Interest): \_\_\_ Manual pressure
- O (Outcome of Interest): \_\_\_ decreased length of stay, decreased hematoma, decreased discomfort, decreased infection rate
- T (Time): \_\_\_ within 2 weeks from discharge

Articles	Who Involved	What Occurred	Where Completed	When	Why	How	Consistencies	Gaps
Geary, Landers, Fiore, & Riggs. (2002). Management of infected femoral closure devices, <i>Cardiovascular Surgery</i> , 10(2), 161–163.	4 males, 1 female age range 63–73	Infection	NY, Acute care unit, outpatient general hospital	2002	Examined Perclose, no indication of prophylactic antibiotic use, staphylococcal infections	Case studies	All had infections, suture placement, antibiotics	Little research, recommendations came from manufacturer, no indication of ethnic origin
Heck, Muldowney, & McPherson. (2002). Infectious complications of Perclose for closure of femoral artery punctures, <i>JVIR</i> , 427–431.	2 females, 1 male, age range 40–76	Infection	Three different institutions	2002	Report of cases, 3 days post op.	Case studies	2 had staphylococcal, one from bacterial, concerns about suture placement	Refers to published trials
Johanning, Franlin, Elmore, & Han. (2001). Femoral artery infections associated with percutaneous arterial closure devices, <i>Journal of Vascular Surgery</i> , 34(6), 983–985.	2 males, age range 50–56	Infections	Eastern State	2001	Add to data, staphylococcal arterial infection, MRSA, blood serum at site served as bacterial growth medium	Case studies	Suture placement, pre-procedure antibiotics	Refers to MAUDE, no time designation on these cases as to how long before identification of infection

*continues*

**Table 14-3 continued**

Format for Documenting Evidence-based Practice Aspects

Articles	Who Involved	What Occurred	Where Completed	When	Why	How	Consistencies	Gaps
Tiesenhansen, Tomka, Allmayer, Baumann, Hessinger, Portugaller, & Mahler (2004). Femoral artery infection associated with a percutaneous arterial suture device, <i>VASA</i> , 33, 83–85.	77-year-old male	Infection resulting in septic death	Austria	2004	Add to data, infection identified 4 weeks post hospitalization, seen in ER prior to final admission to hospital with sepsis, Perclose carries risk of femoral artery infections	Case studies	Sterile field must be maintained, suture placement	Refers to research, not of Hispanic origin

**Summary of findings:**

Perclose can reduce length of stay; To improve outcomes – proper use of Perclose and consideration of prophylactic antibiotic therapy should be utilized in conjunction with the use of Perclose; All of the reviewed articles were case studies; No quantitative research was found; No nurse-directed research was located; Length of time before infections identified ranged from 3 days to 4 weeks; Sterile technique during procedure is paramount.

**Application of findings to evidence-based practice that validates/changes policies and procedures:**

- All articles suggest prophylactic antibiotic use and strict adherence to manufacturer's recommendations for insuring a sterile surgical site.
- ER department should review its policies concerning the assessment of post-angioplasty clients who present with vague symptoms since the infection may be masked until it develops into a sepsis type of infection even as late as 4 weeks postprocedure.
- Patient education should be addressed within policies to ensure that clients are taught to maintain a clean site at the incision area, to complete all antibiotic treatment ordered, and to report vague symptoms reflective of infections even up to 4 weeks postprocedure.

## Suggested Readings

Coopey, M., & Clancy, C. M. (2006, July/September). Translating research into evidence-based nursing practice and evaluating effectiveness. *Journal of Nursing Care Quality*, 21(3), 195–202.

Marchiondo, K. (2006, January/February). Planning and implementing an evidence-based project. *Nurse Educator*, 31(1), 4–6.

Newhouse, R. P. (2006, July/August). Examining the support for evidence-based nursing practice. *Journal of Nursing Administration*, 36(7-8), 337–340.

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## Critical Thinking Exercise

Multiple ideas related to potential clinical questions are provided for your consideration. Select a situation to use in working through the process reflected in Table 14-1. The situations are presented in a brief manner. Take the idea and develop the PICOT question to best meet the needs at a selected health care agency of your choice. These ideas are provided to stimulate thought and ideas.

- A possible clinical question relates to whether a relationship between adequate pain control and length of stay in a community hospital setting could be determined.
- Another clinical situation for investigation involves the determination of any relationship between glucose control during the operative period and length of stay in an acute care setting.
- An alternative clinical circumstance relates to the effect of a one-on-one diabetic education course on the patient's HbA1C.
- In the occurrence of a medication error, the value of full disclosure to patients and/or family to build trust and restore confidence as opposed to nondisclosure, with a look at the impact on perceived quality of care, could be investigated.
- An additional idea involves determining whether the length of time and frequency of visits to patient's rooms by nursing staff affects the number of calls and the perception of quality of care by the patient and/or family members.
- Maternal/child nurses understand that certain treatments (prophylaxis eye treatments, vitamin K injections, PKU tests) are provided for all newborn children. What happens to children born outside of an acute care setting (e.g., home births)? What rationales do we have to support these treatments?
- Childhood immunization is a state-directed process for all school-age children. Certain immunizations (MMR, polio, DPT) are designated at key times prior to and during the school age years. So what is happening with the growing number of home-schooled children? Are they getting the immunizations? What happens when these children come into acute care settings without having received the expected childhood immunization series?

