EVIDENCE-BASED EMERGENCY NURSING PRACTICE: STATE OF THE SCIENCE AND RECOMMENDATIONS FOR THE PROFESSION

A DISSERTATION

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To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Faye A. Blair entitled "Evidence-Based Emergency Nursing Practice: State of the Science and Recommendations for the Profession." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Nursing.

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ABSTRACT

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EVIDENCE-BASED EMERGENCY NURSING PRACTICE:
STATE OF THE SCIENCE AND RECOMMENDATIONS
FOR THE PROFESSION

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Over the past two decades, there has been a shift in healthcare towards practice that embraces evidence over tradition. This shift has started a discourse in nursing for the need to develop initiatives to create and sustain nursing practice that is based on high quality evidence. Information about how U.S. emergency nurses find and use evidence to inform practice has not been reported. The purpose of this study was to identify sources of knowledge, skills, barriers, and facilitators to the implementation of evidence-based practice in the emergency care setting.

Rogers Diffusion of Innovation theory guided this descriptive correlation study. The diffusion of evidence-based practice involves both individual and organizational factors. Factors influencing adoption of evidence-based practice include (a) characteristics of the adopter (nurse), (b) characteristics of the organization, (c) communication channels, and (d) the innovation (evidence-based practice).

The Developing Evidence-Based Practice questionnaire was used to survey randomly selected registered nurse members of the Emergency Nurses Association. The questionnaire explored sources of knowledge used to infuse practice, barriers and

facilitators to finding and using evidence to change practice, and self-reported skills in finding, reviewing, and using evidence. A total of 280 questionnaires, 28% of the total mailed, were returned within the study timeframe.

Findings suggest that emergency nurses use experiential sources of knowledge more frequently than literature sources. Information from policies, procedures, and guidelines were easier to find and use than research reports. Barriers to developing evidence-based practice include time constraints, lack of resources, lack of authority to change practice, and difficulty in understanding identifying implications of research. Skill in finding and using organizational information was greater than finding and using research information. Interpreting statistics and conclusions in research articles were problematic for many. Nurses with higher education levels have greater self-reported skills in finding, reviewing, and using evidence.

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CHAPTER I

INTRODUCTION

The term evidence-based practice (EBP) emerged in the 1980s and marked a new paradigm to base clinical decisions more on evidence and less on observation or tradition. In contrast with the concept of research utilization, which heretofore was the basis for evidence in practice, EBP encompasses not only research utilization, but the expertise of the clinician as well as patient preferences and values (Rutledge, 2000). Nursing scholars have largely embraced this paradigm and EBP has entered the discourse on how to define nursing education, knowledge, and practice.

EBP is one of the five competencies outlined in the Institute of Medicine (2003) report on quality of health care. It is no longer acceptable for the nursing profession to continue to base nursing care on the way it has always been done, but rather to seek the best approach that is both outcomes based and cost effective.

Problem of the Study

Over the past two decades, there has been a shift in healthcare towards practice that embraces evidence over tradition. This shift has started a discourse in nursing education, practice, and administration for the need to develop initiatives to create and sustain nursing practice that is based on high quality evidence. The information explosion of the 21st century has served to create a plethora of research, opinion articles, and

textbooks for the best evidence for nursing care along with a need to translate all of this into clinical practice. However, the gap between evidence and practice has not diminished (Levin & Feldman, 2006; Melnyk et al., 2004). There is a need to know how emergency nurses integrate EBP into their practice and what barriers exist to making EBP the standard of care. The purpose of this study is to identify sources of knowledge, skills, usage of, and barriers to EBP for emergency nurses and to determine factors required by emergency nurses to implement EBP.

Rationale for the Study

Barriers and facilitators of research utilization have been widely studied for general nursing populations and some subspecialty nursing groups. Hutchinson and Johnston (2006) identified 35 published studies that examined barriers to research use. Three of these studies explored barriers to research utilization by U.S. nursing specialties (Barta, 1995; Lewis, Prowant, Cooper, & Bonner, 1998; McCleary & Brown, 2003). No studies were found to describe if or how U.S. emergency nurses integrate EBP into their clinical arena.

As research utilization is a subset of EBP, there is a need to measure other factors that comprise the totality of EBP. Studies examining barriers to implementing EBP are less prolific than those looking at research utilization alone (Gerrish et al., 2007; Melnyk et al., 2004; Pravikoff, Tanner, & Pierce, 2005; Sigma Theta Tau International, 2006). These studies have provided views of the nursing population as a whole. As nurses practice in varied settings, with varied knowledge bases and research agendas, it is

possible that specialty-practice nurses may identify different needs for implementation of EBP.

Emergency departments provide resuscitation, diagnosis, and interventions for critical and urgent conditions. Patients arrive unscheduled and often undiagnosed. Emergency nurses practice in a fast paced, mostly episodic environment where treatment and nursing care decisions must be swift and accurate. In this hectic environment, emergency nurses must make quick triage decisions and identify immediate care needs. There is limited time to consult a protocol or procedure manual before care is initiated, so emergency nurses must have internalized knowledge to perform at their best. This environment may create special challenges to the use and implementation of EBP.

Studies have supported improved outcomes when health care is based on findings from well designed studies (Melnyk, Fineout-Overholt, Stone, & Ackerman, 2000). However, a recent study of U.S. nurses found that nurses are not prepared to implement EBP due in part to lack of time, lack of value for research, and lack of skills to search for and evaluate bibliography databases (Pravikoff et al., 2005). In order to overcome deficits to implementation of EBP, Melnyk (2002) suggests the first step is to assess and identify the obstacles to evidence-based care. Assessment findings can then be translated into action plans that build a foundation for implementing evidence based practice.

Sources of emergency nurses' knowledge, barriers to and skills needed for finding and reviewing best evidence, and barriers and facilitation to support changing practice must be identified if emergency nurses are to develop a blueprint for incorporating more evidence to guide practice. The challenge for nursing is to find ways to generate,

disseminate, and use knowledge that informs and is informed by the practice of nursing (McCormack, 2004). Finding the factors to assist the emergency nurse in the endeavor of EBP is timely and important.

Theoretical Framework

Research and expert opinions are the cornerstones of EBP. In order to realize the benefits, these works must make it from the page to the clinical arena. Understanding how knowledge is obtained and synthesized by the individual and adopted for practice is essential for moving forward with EBP. Rogers (1995) Diffusion of Innovation theory guides this study. This theory describes the process in which a new idea, practice, or technology migrates from creation to use.

Rogers (1995) defines the diffusion process as that "which is the spread of a new idea from its source of invention or creation to its ultimate users (group) or adopters" (individuals). Antecedents to the diffusion process include absorptive capacity for new knowledge, preexisting knowledge/skills base, and ability to find, interpret, and integrate new knowledge (Greenhalgh, Robert, McFarlane, Bate, & Kyriakidou, 2004).

The diffusion of EBP involves both individual and organizational factors. Factors influencing adoption of the innovation include (a) characteristics of the adopter, (b) characteristics of the organization, (c) communication channels, and (d) the innovation itself (Rogers, 1995). These factors are the focus of this study (see Figure 1).

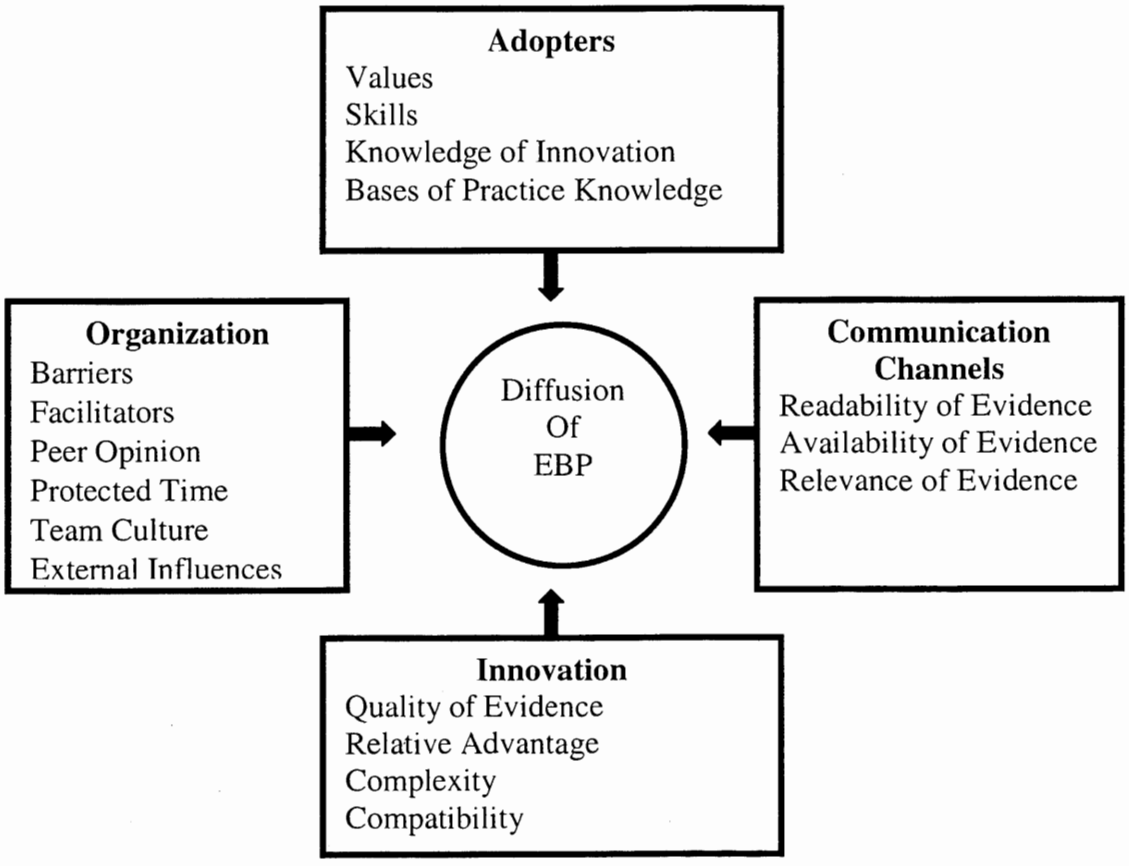

Figure 1. Factors influencing the development of evidence-based practice.

Characteristics of the Adopter

Individual nurses who have the potential to use EBP are labeled adopters. Characteristics of the adopter include nurses' values, skills, and awareness of EBP, including benefits to the nurse and her practice, confidence to change practice based on evidence, and capacity, knowledge, and understanding to use evidence upon which to base practice (Funk, Champagne, Weise, & Tornquist, 1991). The innovation (EBP) is seen as relevant if the adopter (nurse) identifies benefits to their own circumstances (Rogers, 1995).

The adoption process by nurses begins with sufficient knowledge of EBP's purpose and how to use it. Successful adoption is enhanced when there is a clear advantage for the uses (Rogers, 1995). Nurses who reported a belief that EBP was important and benefited their practice were more likely to use EBP (Melnyk et al., 2004). However, a lack of value for research was found to be the prevailing barrier for nurses to use EBP (Pravikoff et al., 2005). Further, a majority of nurses are not familiar with EBP (Sigma Theta Tau International, 2006).

Knowledge of where and how nurses obtain practice knowledge is important to discover how best to reach the individual nurse with the information necessary to implement EBP. Adoption of innovations by individuals is enhanced if the organizations (or units of the organization) have similar educational and professional background. Those individuals within the organization who have influence on the beliefs of their colleagues can help or hinder diffusion (Greenhalgh et al., 2004). Persons with positional authority, such as managers or administrators also have influence over diffusion success (Funk, Champagne, Tornquist, & Wiese, 1995).

Characteristics of the Organization

Organizations which are large, with departments divided into specialized units with defined professional knowledge will assimilate new innovations more readily (Greenhalgh et al., 2004). Emergency departments are an example of specialized units with a defined knowledge base. The degree of similarity of the peer group that is involved with the innovation has a direct bearing on the ease and speed of the diffusion. Groups with a common mission and language, such as emergency nurses, may have

different needs for innovation than other health care providers. A team culture that encourages innovation further enhances diffusion (Rogers, 1995).

Barrier and facilitator characteristics to diffusion of EBP have been previously studied. No access to protected time for evaluation and trial of innovations has been identified as the most frequent barrier to EBP diffusion (Pravikoff et al., 2005, Melnyk et al., 2004). Facilitative factors that have improved chances of successful diffusion include administrative support, encouragement and commitment of resources (Funk et al., 1995).

External influences such as a desire for the organization to achieve or maintain Magnet designation is an important influence on diffusion. Organizations that link together through shared values and goals can help spread innovations among the members (Greenhalgh et al., 2004).

Characteristics of the Communication Channels

Communication of the innovation is another key to successful diffusion. Communication channel characteristics deal with the readability of evidence based literature, ease of searching for relevant literature, and relevance of available evidence. Availability of evidence for clinical practice is antecedent for diffusion. In order to be useful, the evidence should be articulated in a readable and relevant fashion. Lack of clear practice implications and sources of evidence compiled in multiple locations are among the top barriers to EBP diffusion (Pravikoff et al., 2005).

Characteristics of the Innovation

Key attributes of the innovation that facilitate adoption include quality of the evidence, relative advantage, complexity, and compatibility (Greenhalgh et al., 2004).

Compatibility with existing values, the perception of the innovation being better than what it replaces, the difficulty in understanding its use, the degree to which it can be experimented with, and the visibility of the results all contribute to successful diffusion.

Quality of the evidence is paramount to use by the clinician. The evidence must be interpreted as reaching conclusions that result in adaptability to the clinical setting. Innovations that have a clear advantage of effectiveness have a greater chance of being implemented and sustained. Potential adopters who see no advantage will generally dismiss the innovation (Greenhalgh et al., 2004).

Relative advantage describes innovations that are clear, unambiguous, and effective. If potential users see no advantage in the innovation, its adoption is thwarted. EBP is uniquely situated for adoption because the clinical questions to be studied come from the practitioner (Greenhalgh et al., 2004).

Innovations that are complex in nature take more time and resources for implementation. If the innovation is perceived by key players to be easy to understand, use, and explain to others, it becomes easier to adopt. Interventions that reduce barriers will contribute to the success of the adoption (Greenhalgh et al., 2004).

Innovations that are seen to have compatibility with the user's norms, values, and needs and are also simplistic in design are adopted more readily. Organizational goals that align with the innovation are an added incentive for adoption (Greenhalgh et al., 2004).

For the purpose of this study, sources of knowledge of the innovation, and factors influencing the adoption of the innovation (EBP) will be explored in the context of emergency nursing.

Assumptions

The following assumptions are projected for this study:

1. Self-reported responses to questions will accurately reflect the experiences of the respondents.
2. Sample will be representative of the population.
3. EBP is accepted by government entities and nursing professional organizations as a means to improve quality of patient care.

Research Questions

The following research questions are formulated for the study:

1. What are the sources of practice knowledge for emergency nurses?
2. What do emergency nurses identify as barriers to finding and reviewing evidence?
3. What are the barriers to changing emergency nurses' practice on the basis of evidence?
4. What facilitators currently exist to support changing emergency nurses' practice?
5. What skills do emergency nurses currently possess in finding, reviewing, and using different sources of evidence?
6. Is there a relationship between emergency nurses' self- reported skill level and
   a) Highest educational preparation
   b) Type of facility

c) Size of facility

d) Years as a registered nurse

e) Number of years of emergency nursing practice

f) Current Certified Emergency Nurse

g) Magnet vs. non Magnet work setting.

7. Is there a relationship between Magnet designation and

a) Colleague support

b) Nurse Manager support

Definition of Terms

The following terms are defined for this study:

1. Adopter – an individual who has the potential to implement evidence- based practice.
2. Barriers – those elements that have the potential to limit the finding, interpreting, or usage of evidence to verify or change clinical practice. For the purpose of this study, barriers are operationalized as scored responses on the Developing Evidence-Based Practice (DEBP) questionnaire.
3. Certified Emergency Nurse (CEN) – Registered nurses who have successfully passed the certification examination in emergency nursing and whose certification is current. For the purpose of this study, CEN is operationalized by a positive response to the question "Are you currently a certified emergency nurse?".
4. Diffusion – the process by which an innovation is communicated (Rogers, 1995).

5. Emergency Nurse – a registered nurse member of the Emergency Nurses Association who currently practices in an emergency care clinical, educator, manager, or academic role.
6. Evidence – Knowledge from a variety of sources that has been subjected to testing and has been found to be credible. This includes research, patient experiences and preferences, and practical knowledge.
7. Evidence based practice – The integration of best research evidence with clinical expertise and patient values.
8. Facilitators – those elements that increase the likelihood of finding, interpreting, or using evidence to verify or change clinical practice. For the purpose of this study, facilitators are operationalized as a scored response on the DEBP questionnaire.
9. Innovation – The idea that is new to the potential adopter (Rogers, 1995).
10. Magnet Work Setting – A hospital that has been designated by the American Nurses. Credentialing Center as a Magnet facility. Designation is based on several factors that comprise professional nursing, including fostering and sustaining a practice environment where nursing research and EBP are an integral part of the culture of nursing delivery (Turkel, Reidinger, Ferket, & Reno, 2005). For the purpose of this study, Magnet work setting is operationalized by a positive response to the question "Is your facility Magnet accredited?".

11. Skill – the ability of the emergency nurse to find, interpret, or use available evidence. For the purpose of this study, skill is operationalized by scored responses on the DEBP questionnaire.
12. Sources of evidence – Written information found in journals, texts, policies, procedures, protocols, intranet, media, verbal information from peers and other health care providers and experience of the clinician. For the purpose of this study, sources of evidence are operationalized as scored responses on the DEBP.
13. Sources of practice knowledge – places from which the nurse draws data with which to solve problems and make clinical decisions (Estabrooks, 1998). For the purposes of this study, sources of practice knowledge are operationalized as scored responses on the DEBP.

Limitations

The theoretical and methodological limits of this study are

1. The sample to be used in this study is a subset of members of the Emergency Nurses Association. Emergency nurses who join a professional organization may be more familiar with research and evidence based practice terms and issues than those emergency nurses who do not belong to a professional organization.
2. The participants of this research will be filling out a survey. There is no way to test if the responses given accurately reflect their knowledge and feelings about evidence based practice. Mailed surveys historically have a low rate of return. Those who do return the survey may have an increased interest or experience with evidence based practice.

Summary

The proliferation of nursing scientific and expert clinical opinion literature is creating an urgent need to identify ways to integrate this knowledge into clinical practice. EBP is emerging as the gold standard for informing practice in nursing. Emergency nurses practice in an environment where patients arrived unscheduled, and often have acute, undiagnosed conditions, presenting unique challenges. Identification of how and where clinical emergency nurses seek practice knowledge and self identification of skills and barriers to develop EBP is a necessary step in the process of implementation of EBP in the emergency care setting.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter presents a review of the literature related to evidence-based practice (EBP), barriers and facilitators of EBP, and sources of practice knowledge that provide readiness for evidence based practice. The Magnet Recognition program, which was developed by the American Credentialing Center (ANCC) to recognize health care organizations that provide nursing excellence and emphasizes nursing research utilization and EBP, will also be included in this literature review.

Defining Evidence-Based Practice (EBP)

The global shift to EBP principles denotes a departure from historically tradition-based practice to one that is guided by the best evidence available. The origin of EBP has been traced to the work of Dr. Archie Cochrane who, in 1972, criticized the medical profession for its lack of rigorous evaluation of research findings to guide policy makers and health care organizations in decisions about health care (Melnyk & Fineout-Overholt, 2005). From this work, The Cochrane Collaboration was formed to provide systematic review of randomized controlled trials in health care to assist practitioners in making well informed decisions about health care.

Sachkett, Rosenberg, Gray, Haynes, and Richardson (1996) defined evidence based medicine as the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. Integration of clinical expertise

with the best available external clinical evidence from systematic research forms the basis for evidence based medicine. Individual patient's predicaments, rights, and preferences are an integral part of this process. Other health care professions have accepted this approach and the more generic term of evidence based practice has been coined to encompass other health care disciplines.

Governmental agencies have adopted EBP. The Institute of Medicine (2003) (IOM) report recommends integration of evidence based practice into the education of health professionals, with EBP defined as the integration of best research with clinical expertise and patient values. This body further identifies best research evidence as qualitative as well as evidence from experts in practice. Expertise in practice is derived from knowledge and experience over time and includes patient values. Included in the elements necessary to EBP is knowing where and how to find the best evidence. The Agency for Healthcare Research and Quality (AHRQ) is a federal agency within the Department of Health and Human Resources. The AHRQ is charged with improving the health care outcomes of Americans by encouraging the use of evidence to make informed health care decisions. This agency has created EBP centers to facilitate the translation of evidence-based research findings (Agency for Healthcare Research and Quality, 2007).

The concept of research utilization in nursing practice is not new. Hunt (1981) identified several reasons for lack of implementation of nursing research findings:

1. Nurses do not know about the research findings.
2. Nurses do not understand the research findings.
3. Nurses do not believe the research findings.

4. Nurses do not know how to use them.
5. Nurses are not allowed to use the research findings.

In 1996, Hunt again addressed the lack of progress of utilization of nursing research findings. Finding that the identifying factors stated above still exist, she goes further to identify researchers and organizations as part of the problem, citing that nurses

1. Do not produce their findings in usable form.
2. Do not study the problems of practitioners.
3. Do not manage to persuade and convince others of their value.
4. Do not develop the necessary programs for the acceptance and introduction of innovation.
5. Do not have the necessary authority or access (Hunt, 1996).

There has been a major focus to make research results more obtainable to clinicians. The Cochrane Library publishes systemic reviews on randomized controlled trials of which some have a nursing focus. There has also been a proliferation of evidence-summary publications, such as Evidence-Based Medicine and Evidenced-Based Nursing journals. Even with this resources, a recent survey examining nurses' perceptions of their skills in obtaining evidence and their access to tools with which to do so found many of the same problems including lack of understanding of electronic databases, difficulty accessing research material, and difficulty understanding research articles (Pravikoff et al., 2005). The key to diffusing research into clinical practice is the recognition of the need for change by individual practitioners. Making research results available to clinicians is not sufficient (Hunt, 1996).

As the conceptualization of EBP makes its way into the rhetoric of nursing, it becomes important to differentiate EBP from the older concept of research utilization. A major difference between the two is the EBP focus on the practitioner's own experience combined with the practice content, suggesting that the practitioner's own knowledge and experience plays an important part in determining the relevant research (French, 1999). Therefore, elements needed to develop EBP include

1. Defining the situation from the practitioner's point of view
2. The experience and knowledge of the practitioner.
3. The findings from previous research.
4. The findings from research undertaken by the practitioner
5. Recommendations for change based on the practitioners own context and applicability to specific patient groups. (French, 1999).

Nursing scholars have embraced the EBP movement and define its use for the discipline of nursing as a systematic approach to determine the most current and relevant evidence upon which to base decisions about patient care (Melnyk & Fineout-Overholt, 2005). Sigma Theta Tau International (2002) defines evidence based nursing as an integration of the best evidence available, nursing expertise, and the values and preferences of the individuals, families, and communities who are served.

The Institute of Medicine (2003) outlined tasks that are essential to EBP. These include knowing where and how to find best evidence, formulating clinical questions, searching for answers (evidence), determining validity of the evidence, and finding ways to integrate findings into clinical practice. In step with these elements, Melnyk and

Fineout-Overholt (2005) cite the following elements for nursing EBP: (a) asking a clinical question; (b) searching for the best evidence; (c) critically appraising the evidence; (d) integrating the evidence with one's own clinical expertise, the patient's condition, and patient preferences and values; and (e) evaluating the results.

There is debate in the literature regarding what is or should constitute the concept of "evidence" in EBP. Scott-Findlay and Pollock (2004) call for specificity when using the term "evidence." These authors postulate that the term evidence should be reserved for research results, while also acknowledging that other ways of knowing (e.g., clinical experience, patient preferences) are to be valued and embedded in clinical decision making. Evidence is information that has been subjected to testing and found to be credible. Knowledge, on the other hand, is the product of knowing and resides only in the human factor. Knowledge is obtained when the individual who takes in information integrates it into their own experiences (Scott-Findlay & Pollock).

Other authors argue for a more inclusive definition of evidence in nursing practice to describe clinical knowledge. Raycroft-Malone et al. (2004) postulates there are two types of evidence that are used to form the basis of professional knowledge: propositional and non-propositional. Propositional knowledge is defined as formal and explicit, derived from research and scholarship that is concerned with generalisability. Non-propositional knowledge is informal, implicit, and derived from practice, personal knowledge, and life experience. This type is not concerned with transferability beyond a particular case or setting. These authors further suggest that non-propositional knowledge has the ability to become propositional knowledge once it has been

articulated, debated, and verified by others. Together, these two professional pathways to knowledge constitute evidence based practice.

As evidence to support clinical practice incorporates findings from scientific and non-scientific sources, it is important to consider what the best evidence available is. Meta-analyses and individual randomized controlled trials are generally considered the highest level of evidence. However, many clinical questions are best answered by qualitative or other types of studies (Melnyk & Fineout-Overholt, 2005). A hierarchy that encompasses a broad range of evidence types is necessary to guide clinicians' evaluation of the best available evidence. The *Journal of Worldviews on Evidence-Based Nursing* publishes evidence-based studies and opinion articles which identify levels of evidence based on the following hierarchy:

Level I: Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCT), or evidence-based practice guidelines based on systematic reviews of RCT's

Level II: Evidence obtained from at least one well-designed RCT

Level III: Evidence obtained from well-designed controlled trials without randomization

Level IV: Evidence from well-designed case-control and cohort studies

Level V: Evidence from systematic reviews of descriptive and qualitative studies

Level VI: Evidence from a single descriptive or qualitative study

Level VII: Evidence from the opinion of authorities and/or reports of expert committees (Melnyk & Fineout-Overholt, 2005)

French (1999) operationalized the EBP propositional and nonpropositional knowledge approach in his account of an evidence based practice project. His analysis of the concept of EBP led to the following definition which defined his study:

> The definition of evidence–based practice is the systematic interconnecting of scientifically generated evidence with the tacit knowledge of the expert practitioner to achieve a change in a particular practice for the benefit of a well defined client/patient group. (p.74)

His project brought together clinical nurses who completed practice-based research projects which were born out of their own professional practice. This is the inherent difference between research utilization and EBP. The EBP concept is practice driven, with an active integration of tacit and propositional knowledge that is linked to quality outcomes and is immediately applicable to the daily clinical environment of the clinician (French, 1999).

Milton (2007) argues for the nursing profession to resist using exclusionary methods for evidence in nursing. From the premise of nursing being both an art and a science, Milton postulates that the lived experience of what is important in health and quality of life from the patient's perspective should be honored as evidence of values. Documenting and articulating the non-research evidence presents nursing with the most difficulty (Estabrooks, 1998).

Barriers and Facilitators to Evidence-Based Practice

Studies of nurses' readiness to implement EBP have largely concentrated on gaps and barriers to research utilization. Success in establishing a research based practice requires understanding the views of all key players (administrators, researchers, and clinicians) in the implementation process (Funk et al., 1995). Funk et al. (1991) developed and validated the Barriers to Research Utilization Scale to explore nurses' perceptions of elements impeding the use of research in clinical practice. Factor analysis of this tool identified four groupings that parallel the four major characteristics in Roger's diffusion of innovation theory: (a) nursing research values, skills and awareness (adopter), (b) organizational characteristics (organization), (c) communication of the research (communication), and (d) quality of the research (innovation).

The BARRIERS scale has been used extensively in nursing research utilization studies. Hutchinson and Johnston (2006) reviewed studies published between 1991 and April 2005 utilizing the BARRIERS scale. Thirty five journal publications describing use and results of this scale were identified. Although studies varied in size and response rates, authors found a large degree of consistency between studies on the rank importance of barriers to research utilization. Lack of time to read and implement research was the most common barrier found (77%), followed by lack of understanding of statistics (52%), lack of authority to change practice based on research findings (31%) and being unaware of research (26%).

Two major studies have been conducted to determine specialty nurses attitudes and perceived barriers to using research in practice. In a descriptive study of 498

nephrology nurses, Lewis et al. (1998) examined this group's perception of barriers and facilitators to using research in practice. The Barriers scale, along with a non-psychometric tested Facilitators scale and demographic questionnaire were mailed to participants, resulting in a 34% response rate. Respondents were clinical staff nurses (52%), management (30%), advanced practice nurses (12%) and educators (6%). While over 90% of these nurses indicated that they have a favorable attitude towards research to improve clinical practice, more than 50% found it difficult to apply research to practice. The barriers to research utilization identified in this study closely follow other studies of the general nursing population. Insufficient time to implement research ideas (75%), insufficient time to read research (70%), the nurse is unaware of the research (64%), and statistical analyses are not understandable (63%), and no authority to change procedures (62%) were the most frequently cited barriers. The most effective facilitators to nurses' use of research were increased administrative support, increased time for reviewing and implementing research findings, and improving the understanding of research reports.

McCleary and Brown, (2003) studied pediatric nurses' perceptions of barriers to research utilization and to what extent involvement, education and knowledge of research influence barriers to research utilization. The study questionnaire included demographic information and two scales, the Barriers Scale and the Edmonton Research Orientation Survey. One hundred and seventy-six pediatric nurses returned a survey questionnaire for a response rate of 33.3%. The top five barriers include time to read research (80%, n = 141), relevant literature is not complied in one place (65.5%, n = 115), statistical analyses are not understandable (64.5%, n = 113), insufficient authority to change client

care procedures (57.2%, n = 101), and insufficient time on the job to implement new ideas (54.6%, n = 96). Barriers to research utilization were not associated with age, years of experience in nursing, or educational preparation.

To study the influences on nurses' utilization of research, Hutchinson and Johnston (2004) surveyed 761 nurses working at a teaching hospital in Australia. With a response rate of 45%, (N =317) these authors found the top five barriers to research utilization were time to read research, implement new ideas on the job, being unaware of the research, not enough authority to change practice, and statistical analysis was not understandable. Most frequently reported facilitators for research utilization were increasing availability of time to review and implement research findings, conducting clinically focused research, and colleague support.

Recently, there has been a shift in the literature on research utilization to include the more comprehensive concept of EBP. Although some authors use these terms interchangeably, they are not the same. Research utilization denotes a process that uses critique of scientific knowledge, synthesis of findings, and application of findings as a basis for practice, where as EBP encompasses research utilization and other types of knowledge such as clinical opinion, guidelines, and patient preferences (Omery & Williams, 1999). Lack of understanding regarding the difference between research utilization and EBP has contributed to the slow integration of EBP in nursing (Melnyk et al., 2000).

Melnyk et al. (2004) sought to identify variables that correlate to the engagement of the nurse to use EBP. Using a convenience sample of nurses who were attending an

EBP conference, a 52 item survey developed by two nurse experts, reviewed for validity and clarity by EBP experts, and pilot tested by 10 practice nurses for face validity and clarity was administered to 160 nurse attendees. Survey results found a positive correlation with reported use of EBP when nurses held beliefs of importance of ($r = .32$, $p < .001$) and benefits from EBP ($r = .40$, $p = .001$) in improving patient outcomes. Nurses who reported a good knowledge of EBP also reported a higher extent of evidence-based care in their practice ($r = .42$, $p < .0001$). Barriers to EBP were sited by 42.3% of the 78 nurses surveyed. The most frequently identified barriers were (a) lack of time, (b) lack of access to resources, (c) lack of financial support, (d) closed minds, and (e) lack of knowledge. The major facilitator to EBP was found to be having a mentor (44%). Findings from this study emphasize the importance of a belief that EBP improves patient outcomes and is important to advancing this practice. A major limitation to this study was the sample, both in numbers and motivation of the participants. All participants were at a conference to learn about EBP, so interest in this subject was already determined and generalisability cannot be used.

Factors influencing the implementation of EBP were the focus of a descriptive study of 330 nurses at a large teaching hospital in England by Gerrish and Clayton (2004). This study investigated barriers to finding, reviewing, and changing practice based on both research reports and organization information (e.g., policies, procedures, guidelines). Barriers related to time to find and review evidence and implement changes based on evidence were most frequently cited in this study. Insufficient resources were also a significant barrier. Nurses were confident in their ability to change practice based

on evidence, however, they reported a lack of authority to change practice in a culture that was not receptive to change. When asked about colleague support, managers were found as least supportive of changing practice.

In a landmark study, Pravikoff et al. (2005) used a descriptive, exploratory method to examine U.S. nurses readiness for EBP. A mailed survey to 3,000 U.S. nurses yielded a response of 760 nurses (25%) who worked as clinical nurses. Responses from those nurses who identified working in administration or education were excluded from this particular review. A 93 item questionnaire developed by the authors was utilized. Only 46% of respondents said they were familiar with the term evidence-based practice. Computer skills of the sample to search the Internet or World Wide Web were encouraging (83% replied they were somewhat successful at this skill), however, adequate searching skills using CINAHL or MEDLINE were identified as only 19% and 36% respectively. Three fourths of respondents reported never searching CINAHL and more than half had never searched MEDLINE. Although 36% of respondents reported that their clinical facilities had access to electronic databases, 46% characterized online resources as less than adequate.

Respondents were asked to rank a list of 10 barriers to using EBP that interfere with their research use. This list excluded the barrier of lack of time, as the authors acknowledged that this barrier has been established in most research as being a most frequent barrier. A lack of value for research in practice was found to be the most prevalent barrier, followed by lack of understanding of organization or structure of electronic databases, difficulty accessing research materials, lack of computer skills, and

difficulty understanding research articles. These results were recorded in rank order without identification of percentages or number of respondents (Pravikoff et al.). Nurses in this study reported that their most frequent source of information to guide practice was provided by a peer or colleague (67%). Seventy-seven percent of the respondents had never been trained in how to conduct a bibliographical data base search and 58% reported not using research reports at all to support their practice (Pravikoff et al., 2005). The authors concluded that nurses in the U. S. are not ready for EBP. Gaps in computer skills, limited access to informational resources, and most importantly, the lack of appreciation of research to inform practice must be addressed before EBP can become a reality for U.S. nurses (Pravikoff et al.).

Sigma Theta Tau International (2006) commissioned an electronic survey of registered U.S. nurses to ascertain their experience and usage of EBP. Five hundred sixty eight nurses responded to the survey, providing a 95% confidence level (+ /- 4%) that the sample is representative of the population. Although 90% of respondents perceive a need for information or research to support their practice, results indicate that 69% of registered nurses have a low to moderate familiarity with EBP. Nurses who have five or less years of nursing tenure were found to be more likely to consider availability and accessibility of EBP information at least adequate. Consistent with other studies, nurses in this survey identified lack of time (66%) and difficulty with appraisal and analysis of information (45%) as barriers to EBP usage.

It is interesting to note that some of the same reasons for the lack of nursing research findings in clinical practice raised by Hunt (1981) still exist today. If EBP is to

become a reality, nurses must continue to explore barriers and facilitators to infusing evidence into practice.

Sources of Practice Knowledge

Where and how nurses obtain the knowledge for their practice is an antecedent to implementation of EBP. Sources of knowledge are those places from which the nurse draws data with which to solve clinical problems and make clinical decisions (Estabrooks, 1997).

Carper (1978) proposed that nursing knowledge could be classified into empirics (science), aesthetics (art), ethics (moral), and personal knowledge. Tacit knowledge, which encompasses personal knowledge and the art of a discipline, is part of the learned, transmitted, and unarticulated knowledge of practice which is acquired through experience (Scott-Findlay & Pollock, 2004). Because of its subjectivity, tacit knowledge lends itself less to empirical testing, and therefore is difficult to communicate effectively.

Within the context of EBP, Raycroft-Malone et al., (2004) describe four constructs for knowledge in nursing practice: (a) knowledge from research evidence; (b) knowledge from clinical experience; (c) knowledge from patients, clients, and caregivers; and (d) knowledge from local context (audits, patient narratives, organizational culture, and local policies). These constructs combine to form the basis for clinical practice.

Estabrooks (1998), in a study of research utilization, examined sources of practice knowledge. Using a randomly selected sample, she mailed a self-developed questionnaire to 1,500 staff nurses, resulting in a final sample of 600 nurses (40% return). Nurses in this study had a mean age of 41 and had graduated from basic nursing

education an average of 18 years prior to the study. Scores for knowledge source questions were ranked one to five with five being the most frequently used knowledge source. The most frequently used knowledge source was information learned from the patient (4.286), personal experience of nursing over time (4.109), information learned in nursing school (3.827), information from attending in-services/conferences (3.774), information from policy and procedure manuals (3.661), and information shared by fellow nurses (3.637). Sources of knowledge least used were identified as articles published in nursing journals (3.251), articles published in nursing research journals (2.550) and information from the media, internet, television, and popular magazines (2.410). These results are instructive, as the most frequent sources of knowledge appear to be experiential. As scientific, peer reviewed journals are the primary source of research dissemination, these results indicate that this is significantly less important as a knowledge source and print journals may not be the right vehicle for empirical knowledge transfer (Estabrooks).

Gerrish and Clayton (2004) asked 330 nurses in a large teaching hospital to identify sources of knowledge used to inform practice and skills. Experiential sources of knowledge were used more frequently than either colleague advice or literature sources. Internet sources were the least used source of knowledge. Self-reported skills in finding, reviewing and using different sources of evidence to change practice were also assessed in this study. Nurses reported being more skilled at finding and using organizational information than finding and using research information. Using research to change practice was the most problematic skill for nurses in this study.

Individual Adopter Determinants of EBP Utilization

The goal of EBP is to use the best available evidence to influence practice, which in turn creates positive outcomes for patients. In order to design interventions to increase utilization, it is necessary to understand individual factors that influence use of EBP.

Rodgers (2000) conducted a study of 680 Scottish nurses to identify individual factors influencing levels of research utilization. Correlations of nurse characteristics with mean research utilization scores were conducted. Results showed that time from degree ($r = 0.03$, $N = 677$) and age ($r = 0.002$, $N = 678$), were found to be non-significant. However, highest degree held was found to be significantly correlated to research utilization (rho = 0.12, p = < 0.01, $N = 646$).

Champion and Leach (1989) surveyed 59 community hospital nurses to determine individual variables to nurses' use of research utilization. Age, highest degree obtained, and years of nursing experience were found to be not significantly correlated with research utilization. No correlations statistics were reported for these variables.

A sample of 382 nurses in China was surveyed to determine factors influencing research utilization (Tsai, 2000). Results indicate that the higher the educational level, the higher research utilization. Nurses with graduate degrees ($n = 15$) had a mean research participation score of 18/33, as compared to baccalaureate graduates ($n = 115$) with a mean score of 6/33, and diploma graduates ($n = 235$) with a mean score of 2/33. Statistically significant relationships were also found between research utilization and years of work experience. Subjects with greater than 10 years of experience ($n = 160$) had a median research utilization score of 5/33, with those who had 0-5 years of

experience (n = 134) and those with > 5 to 10 years of experience (n = 88) having medium scores of 1/33 and 2/33 respectively.

Estabrooks, Floyd, Scott-Findlay, O'Leary, and Gushta (2003) conducted a systemic review of studies that examined the influence of individual factors on the research utilization behaviors of nurses. These authors found 20 studies that met the criteria of measuring one or more individual determinants of research utilization with a dependant variable of research utilization. Measurement of the same variable was unusual across studies, but where comparisons could be made, results for educational level, years of experience, years in current role, and professional membership activities were equivocal with significant, or non significant being evenly split. Age of the nurse was found to be non-significant in all studies in this review.

Certification in specialty practice denotes a standard of knowledge. CEN (Certification in Emergency Nursing) denotes a specified body of knowledge in emergency nursing, a measure of knowledge and critical thinking skills for emergency practice (Emergency Nurses Association, nd.). Certification testing compels the nurse to stay current with the unique information and skills required to provide quality care and ensure consistency of knowledge (Grief, 2006). Staying current implies practicing within the current best evidence within the profession. No studies were found that evaluate certification in emergency nursing with EBP.

Uncertainty remains whether individual characteristics are determinants of research utilization. There is a paucity of literature on individual characteristics of specialty nurses that may influence EBP utilization. Emergency nurses, as a specialty

group, would benefit from knowledge of which, if any, characteristics enhance the development of EBP.

Magnet Facilities

The Magnet Recognition Program is offered by the American Nursing Credentialing Center as a means to recognize hospital nursing department's achievement of nursing excellence in professional practice. The Magnet criterion emphasizes use of evidence base practice and research utilization to facilitate positive patient outcomes. Evidence base practice is listed as one of the top research priorities in Magnet hospitals (Lundmark & Hickey, 2007). Criteria to achieve Magnet status includes fostering and sustaining a practice environment where research and EBP is integrated into the fabric of nursing care and nursing decision making (Turkel et al., 2005). In a survey of 241 nurses at a large Magnet designated facility, Wilson et al. (2004) found that the most frequent research activities of the surveyed nurses were subscribing to a nursing journal (35%), reviewing literature of new products or new aspects of nursing care (29%), and collecting data for a manager or leader (29%). These authors further found that nurses were interested in learning how to put nursing research into practice (38%) and measuring patient outcomes (39%). It is noted that changing the culture of an organization to embrace the implementation of EBP is challenging. However, exposure to the principles of EBP as well as working to overcoming barriers to EBP during the Magnet designation preparations should result in a better understanding and ability to practice within the principles of EBP.

Summary

There is a striking similarity between study results of barriers to research utilization of the past twenty years and the more recent readiness for EBP research. Lack of time to read research, lack of skills to evaluate research, and lack of administrative support for the process continue to be significant barriers to implementing sustained evidence-based clinical environment. Methods to access evidence have certainly changed over this period. Computer data bases have usurped card catalogs and on-line journals have eclipsed trips to the library. The EBP studies have addressed the electronic age barriers to evidence gathering. Despite the electronic revolution, as evidenced by the long history of studying barriers to research utilization and more recently EBP, there is still a wide gap between evidence findings and clinical practice. Identification of those elements that inhibit the attitudes, knowledge, and access to the multitude of evidence to inform practice is the key to creating interventions that are effective.

Emergency nurses practice in an episodic environment that may have distinct attributes that affect the use of EBP principles. Evaluating this unique group of nurses' readiness for EBP will be beneficial in building the implementation strategies to link evidence to improved patient outcomes.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This study, which explored factors influencing the implementation of evidence-based practice (EBP), was conducted using a descriptive correlation design. The data was collected using a validated questionnaire that was mailed to a randomly selected subset of Emergency Nurses Association (ENA) members.

Setting

The questionnaire was mailed to the home address of the ENA member. The ENA members were from all states within the United States, and in both rural and urban settings.

Population and Sample

The population for this study was United States members of the Emergency Nurses Association (ENA). The ENA is the nation's only professional association dedicated solely to the advancement of emergency nursing. Members were registered nurses, licensed vocational nurses, and students who practice in varied roles, such as clinical nurses, educators, administrators, clinical nurse specialists, and faculty. ENA provides standards of emergency nursing, educational courses, and core curriculum for emergency nursing. Membership as of October, 2007 was 24,117. A copy of the survey, research proposal, cover letters, IRB approval letter, and consent forms was provided to ENA prior to approval to purchase a mailing list. A list of randomly selected members of

ENA was purchased from InFocus, a company that contracts with the ENA to provide mailing lists. The mailing list consisted of 1001 randomly selected names and addresses of current U.S. ENA members. Members were from all 50 states. Of these, four names were eliminated because they were identified on the list as a nursing assistant (1), retired (1), paramedic (1), and LPN (1). A total of 997 questionnaires were mailed. Five questionnaires were returned due to invalid addresses. Three weeks after the initial mailing, a reminder letter was sent to all persons who received the initial mailing. Questionnaires received five weeks after the initial mailing were included in the analysis. A total of 280 questionnaires, 28% of the total mailed, were returned within the five week timeframe. There was no identifying information on the questionnaire, therefore, responses were anonymous.

Protection of Human Subjects

Permission to conduct the study was obtained from the Houston Campus Texas Woman's University Institutional Review Board and The Emergency Nurses Association. (see Appendix A). There was no identifying information on the questionnaire, therefore the survey was anonymous. A statement at the top of the questionnaire indicated that returning the completed survey served as consent to participate in the study. Return envelopes were destroyed by the investigator.

Instrument

The instrument used in this study is the Developing Evidence-Based Practice (DEBP) questionnaire developed by Gerrish et al. (2007). Permission to use this instrument may be found in Appendix B. The instrument consisted of five sections:

(a) bases of practice knowledge, (b) barriers to finding and reviewing evidence, (c) barriers to changing practice on the basis of evidence, (d) facilitation and support in changing practice, and (e) skills in finding and reviewing evidence. Of the 22 items in the bases of practice knowledge section, 16 were items from the Estabrooks scale (Estabrooks, 1998). The instrument consisted of 48 items, with a five point likert scale. Sections 1 and 4 were scored with the lowest score (1) being never and the highest score (5) being always with 3 scores in between. Sections 2 and 3 were scored with the lowest score (1) being agree strongly and the highest score (5) being disagree strongly with 3 scores in between. Section 5 is scored with the lowest score (1) being complete beginner and the highest score (5) being expert with 3 scores in between.

A pilot study of the DEBP was conducted by Gerrish et al. (2007) with 20 hospital nurses and resulted in minor modifications. The authors then conducted two studies using the tool. Study 1 surveyed two contrasting hospital sites. The questionnaire was sent via mail to 728 teaching hospital clinicians and 683 general hospital clinicians with a return rate of 45% and 40% respectively. The usable sample was 598, after exclusion of incomplete questionnaires.

Prior to study 2, the content validity was considered by four experts in community health nursing. Four additional sources of knowledge, two additional barriers and two further skills were added. The tool was again piloted with five community health nurses but no changes were required.

A random sample of 1600 community health nurses was used for Study 2. The questionnaire included the additional items from the content experts. The response rate was 47% and the usable sample was 689, after exclusion of incomplete questionnaires.

Study 1 and study 2 results were combined to validate the instrument, resulting in a sample size of 1287. The questionnaire was tested using Cronbach's Alpha as an indicator of reliability. An overall α of 0.874 was found, with a low of 0.730 and a high of 0.913 for the five sections. Therefore, the five individual sections of the questionnaire were found to be reliable.

Study 1 results in the section examining the bases for practice knowledge were compared to the corresponding questionnaire results reported by Estabrooks (1998). The correlation between the rank-orders of the means in the two studies yielded a value of Spearman's $\rho = 0.897$ ($p< 0.01$). Tests of the difference between means in the two studies showed none to be significant at the 0.01 level. These results gave evidence of construct validity.

A factor analysis of the DEBP was conducted, based on 10 principal components with initial eigenvalues greater than one. Due to the fact that there were some questions added between Study 1 and Study 2, those added questions were not included in the factor loading, but instead reported as correlations between the item scores and factor scores. The ten factors were found to relate neatly to the five sections of the instrument, demonstrating construct validity. Therefore, the psychometric properties of the DEBP suggest that it is a reliable instrument. Although found to be a valid instrument, the DEBP as a whole did not constitute a scale, as the component sections were too diverse

in meaning for this distinction (Gerrish et al., 2007). For this study, the component section of skills in finding and reviewing evidence was treated as a scale.

This instrument addressed the broader concept of EBP, which includes accessing and using organizational tools such as guidelines and protocols as well as research utilization. The DEBP instrument used the personal "I" rather than questions that use the general phrase "the nurse," making the respondent think about their own practice, rather than nursing as a whole (Gerrish et al., 2007).

This instrument connects well to Rogers (1995) Diffusion of Innovation (DOI) theory. Practice knowledge, a necessary antecedent to EBP diffusion, and Roger's characteristics of the adaptor, the organization, the communication, and the innovation are represented in this instrument. Table I represents the five sections of the DEBP instrument and the relationship to the characteristics of DOI. The DEBP instrument may be found in Appendix C.

Two open-ended questions about barriers to providing EBP and facilitators of EBP were included in the questionnaire. Biographical and work environment information was also included (Appendix C).

Table 1

Relationship of the Developing Evidence-Based Practice Questionnaire (DEBP) with Diffusion of Innovation (DOI) Characteristics

Section Of DEBP	Question # On DEBP	DOI Characteristics
Bases of Practice Knowledge	1-22	Adopter
Barriers to finding and reviewing evidence	23,24,30 25,26 27,28 29, 31,32	Adopter Organization Communication Innovation
Barriers to changing practice on the basis of evidence	33 34-37	Adopter Organization
Facilitation and support in changing practice	38-41	Organization
Self-Assessment of Skills	42-48	Adopter

Data Collection

An explanatory cover letter (Appendix D) and the questionnaire were mailed to a randomly selected sample of 997 registered nurses whose names and addresses were generated from the membership of ENA. A prepaid, self addressed envelope was provided for respondents to return the questionnaire. Three weeks after the initial mailing, a reminder letter (Appendix E) was sent to all persons who received the initial mailing. Once returned, the envelope containing the questionnaire was separated from the questionnaire and destroyed. Questionnaires received by the investigator within five weeks of the initial mailing were included in the study.

Treatment of Data

Descriptive statistics were used to identify the characteristics of the study population. Sources of practice knowledge (research question #1), the barriers to finding and reviewing evidence (research question # 2), barriers to changing practice based on the evidence (research question #3), facilitators for changing practice (research question #4), and self assessment of skills (research question #5) were analyzed by calculating percentages, frequencies, means, and standard deviations.

A total score of self-assessment of skills was computed by adding skill scores of each of the participants. Total scores were used to analyze correlations. Spearman's correlation was used to determine if a relationship exists between self assessment of skills and (a) highest educational preparation, (b) type of facility, (c) size of facility, (d) number of years as a registered nurse, (e) number of years of emergency nursing practice, (f) current CEN status, and (g) Magnet or non-Magnet work setting (research question # 6). Using the Bonferroni approach to control for Type1 error across the seven correlations, a p value of .01 was required for significance. Spearman's correlation was also utilized to analyze the relationship between Magnet status and colleague support and Magnet status and nurse manager support. A p value of .01 was required for significance.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this descriptive, correlation study was to identify sources of knowledge, skills, barriers to, and facilitators of evidence-based practice (EBP) for emergency nurses to determine factors needed to implement EBP. The Developing Evidence-Based Practice (DEBP) was used to collect data. The questionnaire consisted of 22 (35%) questions related to sources of knowledge used in practice, 10 (16%) questions relating to barriers to finding and reviewing research reports and organizational information, 5 (8%) questions relating to barriers to changing practice based on "best evidence," 4 (6%) questions relating to the extent colleagues support changing practice, and 7 (11%) questions relating to self assessment of current skills in finding, reviewing, and using different sources of evidence. Two open ended questions (3%) were asked to identify any additional barriers to providing EBP, and any factors which would facilitate EBP. In addition, 13 biographical and work environment questions (21%) were collected.

Data were imputed into SPSS Version 11.5. Data for research questions one through five were analyzed using descriptive statistics. Data for research questions six and seven were analyzed using descriptive and correlative statistics. This chapter reports findings on sample characteristics and each of the seven research questions.

Description of the Sample

A mailing list of randomly selected members of the Emergency Nurses Association (ENA) was obtained from InFocus, a company that contracts with the ENA. The mailing list consisted of 1001 randomly selected names and addresses of current U.S. ENA members. Members were from all 50 states. Of these, four names were eliminated because they were identified on the list as a nursing assistant (1), retired (1), paramedic (1), and LPN (1). A total of 997 questionnaires were mailed. Five questionnaires were returned due to invalid addresses. Three weeks after the initial mailing, a reminder letter was sent to all persons who received the initial mailing. Questionnaires received five weeks after the initial mailing were included in the analysis. A total of 280 questionnaires, 28% of the total mailed, were returned within the five week timeframe. There was no identifying information on the questionnaire, therefore, responses were anonymous.

Table 2 shows the frequencies and percentages of gender, ethnicity, and age of the 280 respondents. The sample consisted of 241 women and 39 men. Mean age of the respondents was 45 with a range from 23 to 69 years of age. Most (88.6 %) participants were Caucasian.

Table 2

Frequencies and Percentages of Gender, Ethnicity, and Age of 280 Emergency Nurses Participating in the Study

	N	%
Gender		
Female	241	86.0
Male	39	14.0
Ethnicity		
Caucasian	248	88.6
African American	6	2.1
Hispanic	4	1.5
Other	11	3.9
No Response	10	3.6
Age (years)		
20 -29	24	8.6
30 -39	51	18.2
40 -49	94	33.6
50 -59	90	32.1
60 -69	19	6.8
No Response	2	.7

Highest educational level, current position, and current place of employment are shown in Table 3. A Bachelor of Science degree was the most frequent education level (50%), with Associate degree nurses being the next highest (26.1%). Most respondents (67.1 %) were clinical staff nurses.

Table 3

Highest Educational Level, Current Position, and Current Place of Employment of 280 Emergency Nurses Participating in the Study

	N	%
Highest Educational Level		
Associate Degree	73	26.1
Diploma	19	6.8
BSN/BS	140	50.0
MSN/MS	48	17.1
Current Position		
Clinical/Staff Nurse	188	67.1
Clinical Educator	13	4.6
Clinical Specialist	11	3.9
Manager/Director	58	20.7
Faculty/Academic	1	0.4
Other	9	3.2
Current Place of Employment		
Teaching Hospital (500 beds or less)	57	20.4
Teaching Hospital (greater than 500 beds)	50	17.9
Community Hospital (500 beds or less)	147	52.5
Community Hospital (greater than 500 beds)	16	5.7
Other	10	3.6

Hospitals with less than 500 beds were the most frequently reported place of employment, with 52.1% working in community hospitals and 20.4% in teaching hospitals. The majority of respondents have been a registered nurse for more than 20 years (45.4%) with 26.1% reporting practicing emergency nursing for more than 20 years. Most respondents reported having internet access at work (254/280, 90%) and access to an electronic library at work (193/279, 69%). Current CEN certification was reported by almost half of the respondents (137/280, 49%). Most respondents (230/280, 82.1%) did not work in a Magnet designated facilities

Findings

Research Question 1

Research question 1 was what are the sources of knowledge for emergency nurses? Respondents were asked to rate the knowledge used in their practice on a five point scale ranging from never (1), seldom (2), sometimes (3), frequently (4), to always (5). Responses were received from 280 participants. Mean scores and standard deviation of each source of knowledge were calculated. The scores were rank-ordered from most to least frequent. Results are presented in Table 4.

Experience was an important source of knowledge. Respondents reported they frequently or always use experience in caring for patients over time (n = 254, 91%) and information learned from patients (n =225, 89%) as the greatest source of practice knowledge. Other experiential sources of knowledge used frequently or always were intuition about what seems to be "right" for patients (n =176, 63%) and what has worked for years (n =158, 56.2%).

Table 4

Means and Standard Deviations for 280 Emergency Nurses' Responses to Knowledge Source Questions, Rank Ordered (Range: 1= Never to 5= Always)

Rank	Source of Knowledge	M	SD
1	My personal experience of caring for patients over time	4.23	.616
2	Information I learn about each patient as an individual	4.09	.732
3	Information I get from attending in-service training/conferences	3.91	.616
4	What doctors discuss with me	3.90	.654
5	Information I learned in my training	3.88	.715
6	Information I get from hospital policy and protocols	3.76	.822
7	Information my fellow practitioners share	3.73	.616
8	My intuition about what seems to be "right" for my patient	3.69	.747
9	New treatments and medications that I learn about when doctors prescribe them for patients	3.66	.768
10	Information senior clinical nurses share, (e.g. clinical nurse specialists, nurse practitioners)	3.64	.880
11	What has worked for me for years	3.55	.775
12	Information I get from national policy initiatives/guidelines	3.55	.858
13	Articles published in the Journal of Emergency Nursing	3.53	.761
14	Articles published in nursing journals	3.46	.732
15	Articles published in medical journals	3.39	.836
16	Information in textbooks	3.34	.857

Table 4 (Continued)

Means and Standard Deviations for 280 Emergency Nurses' Responses to Knowledge Source Questions, Rank Ordered (Range: 1= Never to 5= Always)

Rank	Source of Knowledge	M	SD
17	Information I get from product literature	3.14	.790
18	Articles published in research journals	3.10	.908
19	The ways that I have always done it	2.98	.749
20	Information I get from the internet (other than internet medical journals or libraries)	2.95	.905
21	Medication and treatments I gain from pharmaceutical or equipment company representatives	2.88	.896
22	Information I get from the media (e.g. magazines, TV)	2.12	.738

Formal and informal communication was used by respondents as sources of knowledge. Formal communication described as in-services/conferences was used frequently or always by the majority of respondents (n =224, 80 %). Information learned in basic training was used frequently or always 73% of the time (n = 204). Informal communication sources of knowledge used frequently or always included physicians (n = 219, 78%), fellow practitioners (n =189, 67%), senior clinical nurses (n =179, 64%), and discussions about new treatments learned about when ordered by the physician (n =170, 60%).

Respondents used documents and other sources of written material to inform practice. Information from hospital policies and procedures was used frequently or always by the majority of respondents (n =190, 68%). Information from national policies and guidelines was used frequently or always by 59% of the respondents (n =165). Journal sources used frequently or always by respondents include the Journal of Emergency Nursing (n =152, 54%), other nursing journals (n =143, 51%) and medical journals (n =139, 50%). Research journals were used frequently or always only 35% of the time (n =97).

Research Question 2

Research question 2 was what do emergency nurses identify as barriers to finding and reviewing evidence?" Respondents were asked to rate the extent that each of 10 items reflected a barrier on a five point scale consisting of agree strongly (1), agree (2), neither agree nor disagree (3), disagree (4), or disagree strongly (5). Responses were received from 280 respondents. Table 5 shows means and standard deviations of barriers to finding and reviewing research reports and organizational information in rank order from most to least frequent barrier.

'Time constraints were found to be a major barrier for respondents. Fifty one percent (n = 143) of respondents agreed or strongly agreed that there was insufficient time to find research reports or to find organizational information (n = 87, 31%). Thirty four percent (n =96) agreed or strongly agreed that lack of confidence in judging the quality of research reports was a barrier. Ease of finding research reports was less of a barrier, with only 27% (n=76) of respondents agreeing or strongly agreeing. Respondents

disagreed or strongly disagreed that finding organizational information (n =254, 91%) and finding appropriate research reports (n = 210, 75%) were substantial barriers.

Table 5

Mean and Standard Deviation of Barriers to Finding and Reviewing Research Reports and Organizational Information, Rank Ordered (Range: 1 = strongly agree to 5 = strongly disagree), N = 280

Rank	Barrier	M	SD
1	No time to find research reports	2.71	1.07
2	No confidence in understanding research reports	3.09	1.04
3	Research reports are not easy to find	3.19	1.04
4	No time to find organizational information	3.22	1.05
5	Difficult to understand research reports	3.24	1.04
6	Difficult to identify implications of research findings	3.43	.826
7	Organizational information is hard to find	3.72	.914
8	Difficult to identify implications of organizational information	3.80	.732
9	Do not know how to find appropriate research reports	3.88	.984
10	Do not know how to find organizational information	4.27	.721

Research Question 3

Research question 3 was what are the barriers to changing emergency nurses' practice on the basis of evidence? The respondents were asked to rate the extent each item reflected a barrier on a five point scale consisting of agree strongly (1), agree (2), neither agree nor disagree (3), disagree (4), or disagree strongly (5). Responses were received from 280 participants. Means and standard deviation for barriers to changing practice in rank order from the greatest to the least barrier are found in Table 6.

Forty three percent of respondents (n = 120) agreed or strongly agreed that insufficient resources were a significant barrier. Time at work to implement changes in practice was another area that respondents agreed or strongly agreed was a barrier (n =97, 35%).

Table 6

Mean and Standard Deviation for Barriers to Changing Practice on the Basis of "Best" Evidence, Rank Ordered (Range: 1 = strongly agree to 5 = strongly disagree), N = 280

Rank	Barrier	M	SD
1	There are insufficient resources (e.g. equipment) to change practice	2.93	1.06
2	There is insufficient time at work to implement changes in practice	3.06	1.05
3	The culture of my team is not receptive to changing practice	3.09	1.18
4	I lack the authority in the workplace to change practice	3.10	1.21
5	I do not feel confident about beginning to change my practice	3.96	.732

Other barriers that respondents agreed or strongly agreed with were the culture of their team was not receptive to changing practice (n = 105, 37%) and lack of authority to change practice (n = 105, 37%). Respondents disagreed or disagreed strongly 80% of the time (n =226) that they did not feel confident in beginning to change practice.

Research Question 4

Research question four was what facilitators currently exist to support changing emergency nurses' practice? Respondents were asked to rate how supportive their colleagues, managers, administrators, and doctor's with whom they work are on a scale consisting of never (1), seldom (2), sometimes (3), frequently (4), and always (5). Not all respondents answered all questions, resulting in different totals for some questions. Table 7 shows frequencies, means and standard deviation of responses in rank order from most to least supportive.

Table 7

Frequencies, Means and Standard Deviation of Support for Changing Practice, Rank Ordered (Range: 5 = always to 1 = never)

Rank	Facilitator	N	M (SD)
1	Doctor with whom I work are supportive of my changing practice	278	3.21 (.815)
2	Nurse managers are supportive of my changing practice	278	3.19 (.902)
3	Nursing colleagues are supportive of my changing practice	279	3.13 (.743)
4	Nursing administration is supportive of my changing practice	276	3.08 (.973)

Research Question 5

Research question 5 was what skills do emergency nurses currently possess in finding, reviewing, and using different sources of evidence? The questionnaire consisted of seven self-assessment questions with choices ranging from complete beginner (1), novice (2), competent (3), proficient (4), and expert (5). Responses were received from 279 participants. Table 8 shows means and standard deviations, presented in rank order, for skills in finding, reviewing, and using different sources of evidence.

Table 8

Means and Standard Deviation of Skills in Finding, Reviewing, and Using Different Sources of Evidence, Rank Ordered (Range: 5 = expert to 1 = complete beginner), N = 279

Rank	Skill	M	SD
1	Finding organizational information (protocols, guidelines, etc.)	3.67	.844
2	Using the library to locate information	3.45	.919
3	Using organizational information to change practice (protocols, guidelines, etc.)	3.15	.943
4	Finding relevant research "evidence"	3.04	.942
5	Searching for "evidence" using electronic databases, such as CINALH or Medline	3.04	1.15
6	Using research evidence to change practice	2.76	.954
7	Interpreting statistics and conclusions in research articles	2.75	.938

Respondents reported beginner or novice level skills for ability to interpret statistics and conclusions in research articles (n =113, 41%), using research evidence to change practice (n = 110, 39%), and using electronic data bases (n = 93, 33%). Only 26% of respondents (n = 74) reported beginner or novice skills with finding relevant evidence. Respondents reported being competent or higher in their ability to find organizational information (n = 261, 93%), using the library to find information (n = 242, 88%), and using organizational information to change practice (n = 220, 78%).

Research Question 6

Research question 6 was is there a relationship between emergency nurses' self-reported skill level and (a) highest educational preparation, (b) type and size of facility where nurses practice, (c) years as a registered nurse, (d) years as an emergency nurse, (e) current certification in emergency nursing (CEN), and (f) Magnet status of hospital in which the nurses practice? Skill ratings were summed for each participant to determine a total skill score. Scores ranged from 7 to 35, with a mean of 21. Totaled skill scores were then recoded into three categories: beginner/novice (25^{th} percentile of summed score and below), competent (26-74^{th} percentile of summed score), and proficient/expert (75^{th} percentile and above of summed score). When categorized, 24% of emergency nurses rated their skills as beginner or novice (n = 67), 46% as competent (n = 127), and 30% as proficient or expert (n = 84). Spearman (r_s) was calculated for each of the seven variables. Using the Bonferroni approach to control for Type 1 error across the seven correlations, a p value of .01 was required for significance. Table 9 shows the frequencies and correlations of self-reported skills and selected demographics.

Table 9

Correlation of Self-Reported Skills and Selected Demographics

Skill Level and:	N	r_s	Sig.
Highest Education Level	279	.279*	0.00
Type of Facility	269	-.087	.157
Size of Facility	269	-.050	.415
Years as a registered nurse	279	.481	.042
Years as an emergency nurse	279	.060	.321
Current Certification in Emergency Nursing	279	-.146	.015
Magnet Facility	279	.013	.831

Note: * denotes a significant finding

Research Question 7

Research question 7 was is there a relationship between Magnet designation and (a) colleague support for changing practice and (b) nurse manager support for changing practice? The sample had 50 respondents who identified working in Magnet designated facilities. Spearman (r_s) was calculated to identify if a relationship existed. Correlation results are reported in Table 10.

Table 10

Correlation of 50 Participants Who Identified Working in Magnet Facilities and Selected Facilitators of EBP

Magnet Status and:	N	r_s	Sig.
Colleague Support	279	-.031	.603
Manager Support	277	-.062	.306

Results indicate that neither colleague support nor nurse manager support are related to Magnet designation in this sample.

Open-Ended Questions

Participants were asked, in an open-ended response, to identify any additional barriers to providing evidence-based care. Unit culture issues were the prevailing response. A respondent wrote "Many nurses believe in the theory of we have always done it that way and do not want to look at the overall picture and allow themselves to reanalyze a new approach." Staffing and overcrowding in emergency departments was also identified as a significant barrier. A respondent wrote "lack of staff, lack of equipment, overwhelmed nurse to patient ratio" contribute to barriers. In addition, there were comments citing lack of research availability and readability. Another respondent wrote "It is too hard for non-researchers to interpret research, but I use information when other journals translate it into clinical language."

Participants were also asked to identify factors that would facilitate providing EBP. Management support was the most frequent response to this open-ended question. A respondent wrote "We need administration that supports nurse autonomy", while another respondent wrote "A cooperation unified perspective of both health care management and healthcare workers in the interest of patient outcomes." Access to research articles in an understandable form was also a common response. A respondent wrote a facilitator would be "Easy access to research and research written to understand how it applies to emergency nursing practice. So many times research only talks about numbers and statistics and not practicality as how to apply it."

Summary of the Findings

The sample of 280 emergency nurses was comprised of predominantly Caucasian females, with an average age of 45. The majority of the sample was BSN prepared nurses working in a community hospital setting with less than 500 beds. The source of knowledge most frequently reported was personal experience of caring for patients over time, with information learned about each patient was rated second. Nursing and medical journals were cited less frequently as a source of knowledge. The most frequent barriers to EBP were lack of time and confidence in understanding research reports. Overall, physician support was found to be the most frequent facilitator and administration was the least supportive of respondent's efforts to change practice. When facilitator support was compared in Magnet and non-Magnet facilities, nurse managers in Magnet facilities were found most supportive. Ability to find organizational information was the most frequent skill in finding, reviewing, and using evidence. Using research information to

change practice and interpreting statistics and conclusions in research articles were identified by the respondents as the skills most frequently at the novice or beginner level.

A significant positive relationship was found between highest level of education and combined skill scores. Magnet designation did not show a significant correlation with either colleague support or nurse manager support.

CHAPTER V

SUMMARY OF THE STUDY

Evidence-based practice has emerged as the standard method to infuse clinical practice with scientific inquiry, experiential knowledge, and patient preferences. Previous studies have concentrated on infusion of research utilization in clinical practice. Results of these studies, as well as more recent studies of EBP utilization, show a continuing gap in using evidence to inform clinical practice. Lack of time to read research, lack of skills to evaluate research, and lack of organizational support are recurrent themes.

Emergency nurses practice in an episodic environment with demanding patient loads that may effect diffusion of EBP. Factors influencing the adoption of EBP include characteristics of the individual adopter, the organization, the communication channels, and the innovation (EBP). To determine factors that support emergency nurses' implementation of EBP, this study investigated sources of emergency nursing practice knowledge, barriers, facilitators, and skills needed to implement EBP. This chapter includes a summary of the study, discussion of the findings, conclusions and implications for the emergency nursing profession and recommendations for future study.

Summary

A descriptive, correlation study design was employed to examine the factors necessary to diffuse EBP in emergency nurses' clinical practice. Following approval by the Emergency Nurses Association (ENA) and the institutional review board for human subjects, a randomly selected list of 1001 ENA members was obtained. Four persons were removed because they were not registered nurses, resulting in 997 ENA members asked to participate in this study. A 63-item questionnaire was mailed to the participants, along with a cover letter explaining the study and a self-addressed stamped envelope for returning the questionnaire. There was no identifying information on the questionnaire; therefore, the responses were anonymous. Three weeks after the initial mailing, a reminder letter was sent to all participants. Questionnaires returned within five weeks of the initial mailing were included in this study.

The Developing Evidence Based Practice questionnaire used in this study consisted of 22 questions to ascertain sources of knowledge used by emergency nurses, 10 questions about barriers to finding and reviewing research reports and organizational information, 5 questions relating to barriers to changing practice based on "best" evidence, 4 questions relating to the extent colleagues support changing practice, and 7 questions relating to self assessment of current skills in finding, reviewing, and using different sources of evidence. A five-point likert scale was used for responses. Two open-ended questions about barriers and facilitators of EBP were asked. Thirteen biographical and work environment questions were also included.

A total of 280 questionnaires were returned within the time frame for this study, resulting in a 28% return rate. The responses were inputted into SPSS 11.5 for analysis. Seven research questions were examined using descriptive and correlation statistics:

1. What are the sources of practice knowledge for emergency nurses?
2. What do emergency nurses identify as barriers to finding and reviewing evidence?
3. What are the barriers to changing emergency nurses' practice on the basis of evidence?
4. What facilitators currently exist to support changing emergency nurses' practice?
5. What skills do emergency nurses currently possess in finding, reviewing, and using different sources of evidence?
6. Is there a relationship between emergency nurses' self- reported skill level and (a) highest educational preparation, (b) type and size of facility, (c) years as a registered nurse, (d) number of years of emergency nursing practice, (e) current Certified Emergency Nurse, (f) Magnet vs. non-Magnet work setting?
7. Is there a relationship between Magnet designation and (a) colleague support, (b) Nurse Manager support?

Findings suggest that emergency nurses use experiential knowledge more frequently than formal knowledge. Major barriers to EPB found in this study were related to time to find and use evidence. Self reported skills in finding and using organizational information were greater than finding and using research information. Nurses with higher educational levels reported greater skills in finding and using different sources of evidence.

Discussion of the Findings

Response Rate

Of the 997 questionnaire mailed to participants, 280 were returned within the timeframe of this study, resulting in a response rate of 28%. Similar studies have shown response rates of 33 – 45% (Gerrish & Clayton, 2004, McCleary & Brown, 2003). Efforts were made to maximize response rates, including reminder letters to all participants and providing self-addressed stamped envelopes for returning surveys. Possible reasons for this low response include the length of the questionnaire, lack of time to complete the questionnaire, high emergency department workload, or lack of interest in evidence- based practice. Due to this small return rate, results may not be generalizable to all Emergency Nurses Association members.

Sources of Knowledge

Sources of knowledge are those places in which nurses draw from to inform their clinical practice (Estabrooks, 1997). Respondents in this study used information derived from caring for patients over time and information learned from each patient as their most frequent sources of knowledge. Intuition about what seems right for patients was also a prominent source of knowledge. These forms of experiential knowledge are gained through repeated clinical encounters (Estabrooks et al., 2005). Experiential knowledge is especially germane to emergency nurses' practice because most emergency patients are unknown to the nurse and undiagnosed upon presentation in an environment where rapid care decisions must be made. Nurses spend the majority of their time observing and caring for patients, therefore, it is not surprising that nurses have a high regard for

experiential knowledge. The respondents recorded clinical care practices that have worked for years to be a less important knowledge source, perhaps indicating that emergency nurses learn from experience over time. There was no determination of whether experiential knowledge used by respondents was evidence-based.

Formal communication from teaching environments such as in-services and conferences were recorded often by the respondents as sources of knowledge. In-services are routinely based within the clinical unit or hospital. As time away from the clinical unit may be a limiting factor for seeking information, the convenience of this learning environment may be a factor in knowledge acquisition. Basic nursing training was recorded by respondents as an important source of knowledge. Since the majority of nurses in this study have been out of their basic training for more than 20 years, the findings suggest principles learned in basic nursing preparation that do not change (e.g., sterile procedure, anatomy) may continue to infuse practice knowledge. Potentially, a significant portion of what was known and taught in the respondent's basic training may not be relevant in current practice (Estabrooks, 1998). However, since experiential learning was ranked high as a source of knowledge, this finding of the importance of basic nursing preparation is congruent with experiential learning. These findings are consistent with other studies (Estabrooks, 1998; Gerrish & Clayton, 2004) where experience was the most frequent source of knowledge, with basic nursing education and information from in-services/conferences also identified as frequent sources of knowledge.

Communication with members of the health care team was recorded by respondents as a frequent knowledge source. In this study, physicians were identified more frequently as sources of knowledge than either nursing colleagues or senior nurse clinicians. Findings were different in other studies (Estabrooks, 1998; Gerrish & Clayton, 2004), where nursing colleagues were identified as sources of knowledge more frequently than physicians. This finding may be due to the nature of emergency practice, where the physician is a constant presence in the clinical area and therefore accessible as a source of knowledge.

Information from hospital policies, procedures, and national guidelines ranked higher than literature sources (e.g., journals, textbooks) by the respondents in this study. Often, hospital policies, procedures, and guidelines are available for review and reference on the clinical unit and therefore can be readily assessed. The convenience of the location may be an important factor related to their informational use. Use of information from hospital policies and procedures was also found to be an important source of knowledge in both the Gerrish and Clayton (2004) and Estabrooks (1998) studies. Pravikoff et al. (2005) reported that 58% of respondents seldom used journal articles and research reports as sources of information. As policies and procedures are used frequently to inform practice, it would be beneficial if these sources were evidence-based.

Information gained from literature sources was a less frequent source of knowledge used by respondents in this study. The *Journal of Emergency Nursing* was the literature source most frequently identified as a source of knowledge by respondent.

As members of Emergency Nurses Association, all respondents in this study receive the *Journal of Emergency Nursing*. This journal has specialty-specific articles and research, which may be of more interest to the respondent's specialty than other nursing journals. Other nursing journals and medical journals were used less frequently to inform practice. Textbooks, product literature, and lastly, research journals were the least used literature sources. These findings are consistent with other studies (Estabrooks, 1998; Gerrish & Clayton, 2004; Pravikoff et al., 2005) where journal articles and research reports were found to be seldom used as sources of knowledge. These findings suggest that access to literature may be a factor in use of knowledge sources.

Information obtained from the internet other than internet medical journals or internet libraries and information obtained from the media were among the least frequently used sources of knowledge by the respondents in this study. Media and internet sources of knowledge were also found to be used infrequently in other studies (Estabrooks, 1998, Gerrish & Clayton, 2004, Pravikoff et al., 2005). Problems with using the internet as a source of practice knowledge include time required for searches and uncertain reliability of the information retrieval (Pravikoff et al.). These findings suggest that some internet sources may not contain clinical information that is trustworthy or reliable.

Together, sources of knowledge derived from clinical practice, personal communications with colleagues and patients, and published literature constitute sources of knowledge used to provide evidence-based practice. This study did not determine the extent to which any source of knowledge was evidence-based. To be considered credible

evidence, non-empirical sources of knowledge should be explicated, analyzed, and critiqued (Rycroft-Malone et al., 2004). Identification of sources of knowledge used by respondents provides information for future studies of clinical practice knowledge as evidence sources.

Barriers and Facilitators to Evidence-Based Practice

Previous studies of barriers and facilitators to research utilization have used Rodgers (1995) Diffusion of Innovation theory to organize their findings into factors of the organization, the adopter, the innovation, and communication channels (Funk et al., 1991; Hutchinson & Johnston, 2004; McCleary & Brown, 2003). These factors will be used to disuses barriers and facilitators to evidence-based practice found in this study.

Organizational factors. Organizational factors include workplace matters, such as time, resources, team culture and facilitation, and authority to change practice (Wallin, Ewald, Wikblad, Scott-Findlay, & Arnetz, 2006) that may effect the implementation of evidence-based practice. Time constraints and insufficient resources were found to be the greatest barriers to EBP in this study. Respondents reported having insufficient time to find research reports and insufficient time at work to implement changes in practice. Time to find organizational information such as guidelines and protocols was found to be much less of a barrier. These findings may reflect the complexity in finding research reports as opposed to finding organizational information, which is usually located within the clinical unit in the form of written policy and procedure manuals or guidelines. Other studies reinforce that time factors are major barriers to research utilization and implementing evidence-based practice (Gerrish & Clayton, 2004; Hutchinson &

Johnston, 2004; McCleary & Brown, 2003). Insufficient resources (e.g., equipment) were identified as significant barriers in this study and also in the Gerrish and Clayton study. Allocations of resources that are adequate and continuing are important to successful implementation of innovations (Greenhalgh et al., 2004). These findings suggest that equipment resources needed to implement evidence-based practice may not be available to the respondents.

Team culture and lack of authority to change practice were also barriers identified by the respondents. The adoption of innovations is more likely when the team culture is positive, and individuals have the authority to try out and use the innovation (EBP) to change practice (Greenhalgh et al., 2004), raising concerns of how conducive the respondent's practice environments are to implementing EBP. In this study, physicians were identified as being more facilitative when respondents were trying to change practice than managers or other nurses. Administrators were identified as being least facilitative. These findings again may be the result of the clinical environment in which the respondents practice, where the physicians may always present and communication between nurses and physicians may occur frequently. Administrative support is essential to providing necessary infrastructure to enable evidence-based practice (Newhouse, 2006). The finding that nurse manager and administrator support was a barrier suggests that evidence-based practice may not be seen as a priority in the respondent's clinical setting. These findings are different than findings by Gerrish & Clayton (2004) where managers were seen as the least supportive. In a review of 35 barrier studies, lack of support from team members (including doctors, managers, and colleagues) were cited in

the top 3 barriers in 7 studies and lack of authority to change practice was a significant barrier in 11 studies (Hutchinson & Johnston, 2006).

Innovation factors. The innovation in this study was evidence-based practice. Key attributes of the innovation that affect diffusion include the qualities and complexity of the evidence (Greenhalgh et al., 2004). In this study, difficulty in understanding research and difficulty with identifying implications of research findings were reported to be barriers. This may be due to the lack of systemic reviews and well-substantiated evidence available to assist nurses with solving clinical problems (Melnyk, Fineout-Overholt, Stetler, & Allen, 2005; Newhouse, 2006). Studies reported in the literature often do not make clear implications for clinical practice due to design issues such as generalisability (Polit & Hungler, 1999) possibly contributing to the findings in this study that identifying clinical implications of research is problematic.

Communication channel factors. Communication channel factors include those characteristics that deal with the readability, access to, and relevance of available evidence (Funk et al., 1991).The ease in which research could be found was reported by the respondents to be a more significant barrier than the ease in finding organizational information, such as policies and procedures. These findings are congruent with other studies where respondents indicated that research material was difficult to access (Carroll et al., 1997; Pravikoff et al., 2005) As 90% of the respondents in this study reported having on-line access to electronic libraries at work, the major issue with finding research reports may be linked to a lack of electronic database searching skills and time constraints. Forty five percent of respondents in this study have been out of their basic

nursing training for 20 years or more. The proliferation of nursing research, and therefore emphasis on accessing research, came about after their initial training raising the possibility that the respondents in this study have not had any formal training in electronic searching. This finding may also reflect the often time consuming process of searching multiple databases to find appropriate evidence.

Difficulty understanding and identifying implications of research findings were identified as barriers in this study, as well as other studies (Gerrish & Clayton, 2004; Pravikoff et al., 2004). This finding suggests that respondents may not be adequately prepared, through education or experience, to adequately evaluate research to find its usefulness for clinical decisions (Pravikoff et al).

Adopter factors. Characteristics of the adopter include skills and knowledge necessary to use evidence upon which to base practice and the confidence to change practice based on evidence (Funk et al, 1991). Knowing where to find research and organizational information were barriers for few of the respondents. These findings suggest that although respondents know where to find research information, other factors, such as time constraints and skills to access research reports may impact their ability to find and utilize evidence.

Confidence in changing practice was found to be very high, with 80% of the respondents reporting they were confident in beginning to change practice. This finding was similar to the Gerrish and Clayton (2004) findings, where confidence to begin changing practice was also high. However, the finding that respondents perceive lack of authority to change practice was a significant barrier may mitigate this confidence.

Innovations that are perceived to have few barriers that must be overcome will be assimilated more easily (Greenhalgh et al., 2004). Interventions to reduce the number and extent of barriers improve chances of successful adoption (Greenhalgh et al.). Identifying barriers to evidence-based practice in the clinical setting assists the nursing profession in finding ways to mitigate these circumstances, paving the way to implementation of evidence-based practice.

Skills in Finding, Reviewing, and Using Different Sources of Evidence to Change Practice

Respondents were asked to identify how skilled they were in finding, reviewing, and using different sources of evidence to change practice. Respondents reported being competent or greater in skills of finding organizational information such as protocols and guidelines (94%) and using organization information to change practice (79%) in contrast to finding research information (73%) or using research to change practice (61%). Using clinical guidelines to synthesize available evidence for specific clinical conditions is helpful in mastering the sometimes massive amount of literature (Slutsky, 2005). These findings suggest that organizational information in the form of protocols and guidelines may be easier than finding and synthesizing research evidence to change practice.

Although 87% of respondents reported skills in library use were competent or greater, skills in searching for evidence using electronic databases such as CINHAL and Medline was at the beginning or novice stage for 33% of the respondents. This finding suggests respondents may not have been instructed in the use of electronic literature search strategies. Lack of search skills using electronic databases was also found to be

problematic for nurses in Pravikoff et al.'s (2004) study, with 87% of nurses reported never searching CNIHAL and 69% never searching Medline. Frequent review of bibliographic and full-text databases that provide up-to-date information is the best choice for finding relevant evidence (Fineout-Overholt, Nollan, Stephenson, & Sollenberger, 2005), suggesting that respondents in the current study may not have the skills necessary to conduct electronic database searches which may impede the respondents ability to find relevant evidence to infuse practice.

Skills in interpreting statistics and conclusions in research articles were reported as at the beginner or novice stage by 41% of respondents. This is congruent with the finding of difficulty in identifying implications of research by the respondents in this study. Understanding statistics was found to be problematic in other studies. Hutchinson and Johnston reported that 64.1% of respondents in their study found statistics were not understandable, and Carroll et al. (1997) reported 63.5% of respondents found statistical analysis difficult to understand. Many clinical nurses are overwhelmed by the jargon and statistical symbols in research reports to fully understand their meaning (Polit & Hungler, 1999); perhaps indicating that respondents in this study would benefit from educational activities directed to understanding research reports.

When skill scores were summed for all respondents (N =279), 24% of respondents rated skills for finding, reviewing, and using sources of evidence to change practice as beginner or novice, 46% as competent and 30% as proficient or expert. Respondents with higher educational levels had a significant correlation (p = .01) with greater skill rating needed for EBP. Other studies (Rodgers, 2000; Tsai, 2000) found

higher educational level was correlated with research utilization. However, in a systematic review of 20 studies that examined the influence of individual factors on the research utilization, the authors found educational level was equivocal (Estabrooks et al., 2003). The findings in this study suggest that those nurses with more advanced education may have been exposed to more research courses. Variables of facility type and size, years of nursing practice, certification in emergency nursing and magnet work setting were not found to correlate with self-reported skill level.

Results in this study indicate that neither colleague support nor nurse manager support are related to Magnet designation. With only 50 respondents indicating that they practice in Magnet facilities, the sample size may have been too small to identify a relationship. Criteria to achieve Magnet status includes fostering and sustaining a practice environment where evidence-based practice is incorporated into clinical practice (Turkel et al., 2005). Magnet facilities have been found to have nurses that value and benefit from research (Karkos & Peters, 2006), however, a relationship between colleague and management support in Magnet facilities could not be demonstrated in this study.

Conclusions and Implications

Exploring the bases of practice knowledge, barriers to and skills necessary to implement EBP is antecedent to developing effective strategies to diffuse evidence into clinical practice. The respondents in this study were registered nurses members of the Emergency Nurses Association. Based on the findings, the following conclusions were derived:

1. Experiential knowledge is used more frequently than formal knowledge to guide emergency nurses' practice.
2. Organizational factors including time constraints, insufficient resources and lack of authority to change practice are the most frequently perceived barriers to evidence-based practice.
3. Administrators were identified as the least supportive when nurses try to change practice.
4. Self-reported skill in finding and using organizational information was greater than self-reported skill in finding and using research information.
5. Nurses with higher education levels have greater self-reported skills in finding, reviewing, and using different sources of evidence.

From the conclusions of this study, the following implications for emergency nursing practice were derived:

1. Emergency nurses use knowledge gained through experience as their greatest source of knowledge. Strategies to share clinical experiences such as clinical rounds, consultation at the bedside, and on- site clinically focused educational programs would facilitate knowledge development.
2. Time constraints and insufficient resources were identified barriers to evidence-based practice. Strategies to provide evidence to infuse practice should be readily available to the practicing nurse. Evidenced-based clinical guidelines, policies, procedures, and workplace access to on-line journals that are germane to the

clinical specialty and offer information with clear, succinct, clinical implications would facilitate use of evidence in practice.

3. Administrative support is essential to providing necessary infrastructure to enable evidence-based practice. Administrators can support development of evidence-based practice by providing access and protected time to learn and use skills such as searching electronic databases, and sanctioning authority for clinical nurses to change practice based on evidence.
4. Nurses self-report skills are greater in finding and using organizational information such as policies, procedures, and guidelines than in finding and using research information. To facilitate evidence-based practice, education to improve skills in finding and interpreting research is needed.
5. Nurses with higher educational levels self-report greater skills in using different sources of evidence. Sharing their knowledge with colleagues would facilitate evidence-based practice.

Recommendations for Future Study

Based on the conclusions and implications from this study, the following recommendations for future study are:

1. Replication of this study at the individual institutional level should be done as a prerequisite to implementing an evidence-based practice program.
2. Research should be completed to identify how experiential learning is used in evidence-based practice.

3. Inter-institutional intervention studies are needed to ascertain effective models for implementation of evidence-based practice.

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APPENDIX A

Agency Approvals

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

Office of Research
6700 Fannin Street
Houston, TX 77030-2343
713-794-2480 Fax 713-794-2488

January 3, 2008

Ms. Faye Blair
College of Nursing - J. McFarlane Faculty Advisor
6700 Fannin St.
Houston, TX 77030

Dear Ms Blair:

Re: *"Evidence-Based Emergency Nursing Practice: State of the Science and Recommendations for the Profession"*

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was determined to be exempt from further review.

Any changes in the study must receive review and approval prior to implementation unless the change is necessary for the safety of subjects. In addition, you must inform the IRB of adverse events encountered during the study or of any new and significant information that may impact a research participant's safety or willingness to continue in your study.

Sincerely

Dr. Gayle Beitsch, Co-Chair
Institutional Review Board - Houston

EMERGENCY NURSES ASSOCIATION

915 Lee Street
Des Plaines, IL 60016-6569
Telephone 847/460-4000
Fax 847/460-4004
Website www.ena.org

January 22, 2008

Faye A. Blair, MSN
9408 Bassoon Drive
Houston, TX 77025

Dear Faye,

This letter is to comfirm that you have permission to use the Emergency Nurses Association's mailing list for your research, *"Evidence-based Emergency Nursing Practice: State of the Science and Recommendations for the Profession."* You have requested a randomly selected list of 1,000 names. Your use of this mailing list will consist of the initial mailing and a reminder postcard. As a ENA member, you are entitled to a 15% discount on the usage fee.

While it is not required, we do hope that you will consider publishing your findings in the Journal of Emergency Nursing. Thank you for selecting the Emergency Nurses Association for your needs.

Sincerely,

Altair M. Juarez

Altair M. Juarez, MPH
Senior Research Associate
T: 847/460.4107
F: 847/460.4004

APPENDIX B

Approval To Use Instrument

Subject: RE: Request to use the Developing Evidence-Based Practice questionnaire

Date: Mon, 15 Oct 2007 09:23:01 +0100

From: "Gerrish, Kate" View Contact Details Add Mobile Alert

To: "Faye Blair"

Thank you for your interest in using the questionnaire I have developed. I would be very happy for you to do so (and to modify it as necessary for a local contact) provided that you acknowledge the original source.

I have attached a copy of the questionnaire that was used in study 2 of the JAN paper - i.e. with community health care nurses as it included a small number of additional items that the one used in the hospital study. It may be that not all items are relevant to your proposed sample.

Good luck with your study - I would be interested in learning about your findings in due course.

Kind regards

Kate Gerrish

Professor Kate Gerrish
Centre for Health and Social Care Research
Sheffield Hallam University

From: Faye Blair **Sent:** 13 October 2007 01:43
To: k.gerrish
Subject: Request to use the Developing Evidence-Based Practice questionnaire

Kate Gerrish, BN, MSc, PhD, RN
Professor of Nursing
Centre for Health and Social Care Research
Sheffield Hallam University, Sheffield
Teaching Hospitals NHS Trust, Sheffield, UK

Dear Dr. Gerrish,

I am a doctoral candidate at the Texas Woman's University in Houston, Texas. I am researching emergency nurses' readiness to implement evidence-based practice for my dissertation and would like permission to use your instrument "Developing Evidence-Based Practice."

The population for this study will be a randomly selected subset of the U.S. members of the Emergency Nurses Association.

Please let me know if you need additional information. I sincerely appreciate your consideration of this request.

Regards,

Faye Blair, RN, MSN

APPENDIX C

Questionnaire

Thank you for agreeing to participate in this study.

COMPLETION OF THIS QUESTIONNAIRE WILL BE CONSTRUED AS INFORMED CONSENT.

Please circle the number that best describes your experience.

	The knowledge that I use in my practice is based on:	**Never**	**Seldom**	**Sometimes**	**Frequently**	**Always**
1	**Information I learn about each patient as an individual**	1	2	3	4	5
2	**My intuition about what seems to be "right" for my patient**	1	2	3	4	5
3	**My personal experience of caring for patients over time**	1	2	3	4	5
4	**What has worked for me for years**	1	2	3	4	5
5	**The ways that I have always done it**	1	2	3	4	5
6	**Information my fellow practitioners share**	1	2	3	4	5
7	**Information senior clinical nurses share, e.g. clinical nurse specialists, nurse practitioners**	1	2	3	4	5
8	**What doctors discuss with me**	1	2	3	4	5
9	**New treatments and medications that I learn about when doctors prescribe them for patients**	1	2	3	4	5

Please circle the number that best describes your experience.

	The knowledge that I use in my practice is based on:	Never	Seldom	Sometimes	Frequently	Always
10	Medication and treatments I gain from pharmaceutical or equipment company representatives	1	2	3	4	5
11	Information I get from product literature	1	2	3	4	5
12	Information I learned in my training	1	2	3	4	5
13	Information I get from attending in-service training/conferences	1	2	3	4	5
14	Information I get from hospital policy and protocols	1	2	3	4	5
15	Information I get from national policy initiatives/guidelines	1	2	3	4	5
16	Articles published in medical journals	1	2	3	4	5
17	Articles published in nursing journals	1	2	3	4	5
18	Articles published in research journals	1	2	3	4	5
19	Articles published in the Journal of Emergency Nursing	1	2	3	4	5
20	Information in textbooks	1	2	3	4	5

		Never	Seldom	Sometimes	Frequently	Always
21	Information I get from the internet (other than internet medical journals or libraries)	1	2	3	4	5
22	Information I get from the media (e.g. magazines, TV)	1	2	3	4	5

From the previous section you can see that there are different sources of knowledge or "evidence" that can be used to support practice. These include:

- Professional judgment or expert opinion – your own and others
- The patient's perspective
- Professional development and education
- Organizational information such as policies, procedures, audit reports, etc.
- Published research reports

The following questions explore your views on how confident you feel about overcoming barriers to achieving evidence-based practice. The first set of barriers refers to finding and reviewing research reports and organizational (hospital) information such as policies, guidelines, and clinical protocols.

Please circle the number that best indicates the extent to which you agree with the following statements as they apply to your current role.

	Barriers to finding and reviewing research reports and organizational information	Agree strongly	Agree	Neither agree nor disagree	Disagree	Disagree strongly
23	I do not know how to find appropriate research reports	1	2	3	4	5
24	I do not know how to find organizational information (guidelines, protocols, etc.)	1	2	3	4	5
25	I do not have sufficient time to find research reports	1	2	3	4	5

		Agree strongly	Agree	Neither agree nor disagree	Disagree	Disagree strongly
26	I do not have sufficient time to find organizational information (guidelines, protocols, etc.)	1	2	3	4	5
27	Research reports are not easy to find	1	2	3	4	5
28	Organizational information (protocols, guidelines, etc.) are not easy to find	1	2	3	4	5
29	I find it difficult to understand research reports	1	2	3	4	5
30	I do not feel confident in judging the quality of research reports	1	2	3	4	5
31	I find it difficult to identify the implications of research findings for my own practice	1	2	3	4	5
32	I find it difficult to identify the implications of organizational information (protocols, guidelines, etc.)	1	2	3	4	5

The second group of barriers refers to changing practice on the basis of evidence.

Please circle the appropriate number to indicate the extent to which the following statements apply to you now.

	Barriers to changing practice on the basis of "best" evidence	Agree strongly	Agree	Neither agree nor disagree	Disagree	Disagree strongly
33	I do not feel confident about beginning to change my practice	1	2	3	4	5
34	The culture of my team is not receptive to changing practice	1	2	3	4	5
35	I lack the authority in the workplace to change practice	1	2	3	4	5
36	There is insufficient time at work to implement changes in practice	1	2	3	4	5
37	There are insufficient resources (e.g. equipment) to change practice	1	2	3	4	5

The following questions explore the extent to which your colleagues may support you to change practice.

Please circle the number that best describes your current experience.

	Facilitators to changing practice on the basis of "best" evidence	Never	Seldom	Sometimes	Frequently	Always
38	Nursing colleagues are supportive of my changing practice	1	2	3	4	5
39	Nurse managers are supportive of my changing practice	1	2	3	4	5

		Never	Seldom	Sometimes	Frequently	Always
40	Nursing administration (Director, Chief Nursing Officer) is supportive of my changing practice	1	2	3	4	5
41	Doctors with whom I work are supportive of my changing practice	1	2	3	4	5

42. Please identify any additional barriers to you providing evidence-based care.

_____

_____

_____

43. Please identify any factors which you think would facilitate your providing evidence-based practice.

_____

_____

_____

In this next section, please rate your skills in finding, reviewing, and using different sources of evidence.

Please circle the appropriate number that best indicates how you rate your current skills.

	Skills rating	Complete Beginner	Novice	Quite skilled	Competent	Expert
44	Finding relevant research "evidence"	1	2	3	4	5
45	Finding organizational information (protocols, guidelines)	1	2	3	4	5
46	Using the library to locate information	1	2	3	4	5
47	Searching for "evidence" using electronic databases, such as CINALH or Medline	1	2	3	4	5

		Complete Beginner	Novice	Quite skilled	Competent	Expert
48	Interpreting statistics and conclusions in research articles	1	2	3	4	5
49	Using research evidence to change practice	1	2	3	4	5
50	Using organizational information to change practice (protocols, guidelines, etc.)	1	2	3	4	5

Finally, please provide some information about yourself.

51. Please indicate if you are ___Female __Male

52. Your age? _____

53. Your ethnicity? _____

54. How many years have you been a Registered Nurse?

__Two or less years
__Three to Five years
__Six to Ten years
__Eleven to Fifteen years
__ More than Fifteen years

55. How many years have you been an Emergency Nurse?

__Two or less years
__Three to Five years
__Six to Ten years
__Eleven to Fifteen years
__ More than Fifteen years

56. What is your highest level of education?

___ADN
___Diploma
___BSN
___Other _____
___MSN
___PhD
___DNSc

57. Which best describes your current position?

___Clinical/Staff Nurse **___Clinical Educator**

___Clinical Specialist **___Faculty/Academic**

___Manager **___Other _____**

58. What best describes your current place of employment?

___Teaching Hospital (less than 500 beds)

___Teaching Hospital (greater than 500 beds)

___Community Hospital (greater than 500 beds)

___Community Hospital (less than 500 beds)

___Other _____

59. Is your facility Magnet Accredited? ____Yes ____No

60. In what state do you practice? _____

61. Are you currently a Certified Emergency Nurse? ___Yes ____No

62. Do you have access to the internet at work? ___Yes ____No

63. Do you have access to an electronic library at work? ___Yes ____No

Thank you so much for your time and thoughtful answers to this survey.

A pre-stamped envelope has been provided for you to return the completed survey. Please mail it at your earliest convenience.

APPENDIX D

Explanatory Cover Letter

Title: Evidence-Based Emergency Nursing Practice: State of the Science and Recommendations for the Profession

Investigator: Faye Blair, RN, MSN
Advisor: Judith McFarlane, DrPH

Dear Fellow Emergency Nurse,

You have been randomly selected to participate in a study of emergency nurses' sources of knowledge and readiness to implement evidence-based practice (EBP). Results from this study will be used to identify ways to help nurses access the information needed to provide high quality patient care. Your input is very important.

I am a registered nurse and have been an emergency nurse for 27 years. I am attending the doctoral program at Texas Woman's University in Houston, Texas. The purpose of my dissertation is to determine emergency nurses' sources of knowledge and readiness to implement evidence-based practice. I would appreciate your time in answering the questions on the enclosed questionnaire. There is a self-addressed, stamped envelope for return of the questionnaire. The questionnaire should take about 15 minutes to complete.

Your responses are anonymous. There is no identifying information on the questionnaire. The questionnaire will be separated from the envelope by the investigator when returned. Envelopes will then be destroyed by the investigator. Responses cannot be linked to any individual or institution. By completing and returning the questionnaire, you grant permission to use your responses in this study. Your participation is voluntary. There is no penalty for not participating in this study.

Although your name was randomly chosen from the ENA membership list, the study is being conducted as a dissertation through Texas Woman's University. ENA is not sponsoring this study.

If you have any questions, you may contact the Principal Investigator or the Dissertation Chairperson. Phone numbers and e-mail addresses are at the top of this page.

Thank you in advance for your time and participation in this study.

Faye A Blair, RN, MSN

APPENDIX E

Reminder Letter

Dear Emergency Nurse Colleague,

A few weeks ago, I mailed you a study questionnaire about Emergency Nurses' Sources of Knowledge and Readiness for Evidence Based Practice but I have not yet heard from you. I realize you may be very busy. I hope you can find 15 minutes to participate in this study. Your name was randomly selected from all the members of ENA. Your input is important in making the study representative of all emergency nurses.

If you have already completed and mailed the questionnaire, then I thank you. If you need another copy of the questionnaire, please e-mail me and I would be happy to resend the questionnaire.

Thank you so much for participating in this study.

Faye Blair, RN. MSN