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UNIVERSITY OF SAN DIEGO

Hahn School of Nursing and Health Sciences

DOCTOR OF PHILOSOPHY IN NURSING

AN EDUCATIONAL INITIATIVE TO PROMOTE EVIDENCE-BASED PRACTICE

By

Laurel Ann Ecoff, MS, RN, NEA-BC

A dissertation present to the

FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE

UNIVERSITY OF SAN DIEGO

In partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY IN NURSING

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Dissertation Committee

Cynthia D. Connelly, PhD, RN, FAAN, Chairperson

Jane M. Georges, PhD, RN

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## ABSTRACT

Evidence-based practice (EBP), recognized as essential in providing quality patient care and achieving optimal outcomes, is the integration of the best research evidence, patient preference, and clinician expertise. Healthcare providers must attain expertise in integrating EBP into the clinical setting. Fellowships are one strategy reported in the literature to assist nurses in acquiring needed knowledge and skills for evidence-based care. The purpose of the study was to evaluate the effectiveness of an educational intervention, the Evidence-Based Practice Institute (EBPI), to teach nurses the process of EBP for project implementation to improve nursing and patient outcomes.

This descriptive study used a mixed-method design and previously collected data. Two surveys were administered to participants of the EBPI at the beginning (pre-test) and conclusion (post-test) of this educational intervention to assess barriers to utilizing research, knowledge, skills, and attitudes of EBP. Additionally, participants, nurse mentors, and fellows participated in focus groups on the last day of the EBPI. A sample of 17 subjects, eight mentors and nine fellows, completed the surveys and nine mentors and 11 fellows participated in the focus groups.

The study used several theories to guide the interpretation of the data; Diffusion of Innovations to inform the findings, Critical Feminist Theory to assess for power relations, and the Quality Outcomes framework of structure, process, and outcome to summarize the results.

The one statistically significant finding occurred post-test ( $p < .05$ ) in the fellow group for one subscale on the EBP survey. Three themes emerged from the focus groups:

organizational culture and support, EBPI structure and process, and professional growth and development. Barriers and facilitators within each theme were reported.

Hospitals are under increased pressure to provide quality care using the best evidence. A priority for every hospital is the integration of the best evidence into practice in a systematic fashion to ensure safe quality patient outcomes. Educational programs that teach the value of evidence-based practice and the steps to integrate evidence into practice are an effective modality to promote evidence-based clinical decision-making about patient care.

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## DEDICATION

I dedicate this dissertation to my parents, William Ecoff and Kathryn Ecoff, RN. My father would have been so proud that I obtained a PhD. My mother was my inspiration to become a registered nurse from the first time I played dress-up with her nursing cape and cap. She was proud that I became a nurse and continued my education and in 2005, she nominated me for a scholarship from nursing school alumni association. Just prior to her death that year, I was notified that I had received the scholarship from the Swedish Hospital Alumni Association and the news brought my mom great joy. Upon hearing of my Mom's death, the scholarship committee chairperson sent me the nomination letter that my Mom had written. It truly was a gift to receive this letter and read my mother's description of my accomplishments and the pride in me that she conveyed through her written words. I miss my parents both very much.

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Dr Cynthia Connelly, PhD, RN, FAAN, my committee chair, who I met in the early 1980s when we both attended the University of San Diego (USD), has been an enormous support during my academic journey. When I started the doctoral program in September 2004, we reconnected at the School of Nursing (SON) Back to School Picnic. Dr. Connelly became my committee chair and advocate at USD and an influence in my opportunity to teach in the Master's in Clinical Nursing program. Dr. Connelly not only guided me through the dissertation process but also was patient as I tried to nail down my topic.

I give thanks to my committee members – Jane Georges, PhD, RN taught the first course I took at USD in the fall of 2004, Logics of Inquiry. Dr. Georges introduced me to critical feminist theory and power relations – a lens I now use to examine relationships. In that first class, I felt we had met before and the next summer, while taking another course taught by Dr. Georges, she shared our connection in the early 1980s. I appreciate her gracious support and facilitation of my application for Institutional Review Board approval. I first met my third committee member, Linda Urden, DNSc, RN, NE-BC, FAAN, when I assumed my current role at Sharp Memorial Hospital. I looked to Dr. Urden as a mentor for how she operationalized her role in research and education. Dr. Urden provided constructive feedback about the study design and content of the dissertation.

I want to recognize Dr. Caroline Brown, my mentor, for creative curriculum design and the vision for the Consortium for Nursing Excellence San Diego. In January 2006, nurse leaders from San Diego, including Dr. Brown and me, attended an evidence-

based conference in Los Angeles. It was Dr. Brown's suggestion that we collaborate and develop a community-wide, evidence-based practice fellowship for nurses. I also want to acknowledge the other members of the CNESD for their ongoing work in the development and refinement of the EBPI. We are doing something in San Diego that is an exemplar for community-wide collaboration to promote evidence-based practice. My dissertation is an evaluation of the first year cohort from one healthcare system.

My dear friends who have supported me throughout the program are very important to me. Janine Joseph listened and helped me de-stress on our Sunday morning walks and supported me through a computer crash while on vacation at Lake Powell. Cara Rauschl kept me focused on what is important – the connection of friends and family. Debbie Holly, a friend since the beginning of our nursing careers, has given immeasurable support to me and kept me going through our priorities for travel – shopping, eating, and site seeing!

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My professional colleagues have been cheerleaders for me – through their interest in my progress and celebration when I defended the dissertation. My boss, Jennifer Jacoby, Chief Nursing Officer at Sharp Memorial, has been a support through my journey by allowing me to be away from work on Thursdays to attend class. She may not



remember, but she suggested that I return to school to obtain a PhD several years before I realized that dream.

I will dearly miss the interaction on the USD campus with faculty and school colleagues. I looked forward to attending class on Thursdays, as the time was not only an investment in me but also an opportunity to see my friends at school. The interactions inside and outside the classroom, with faculty and friends, were both intellectually stimulating and supportive in nature. A faculty member I met while taking statistics, Dr. Donna Agan, graciously agreed to read and format the final version of this dissertation and I appreciate her willingness to take on the project!

Finally, I give thanks to my family for their support through my educational journey – not only my doctoral degree but also my bachelor's and master's degrees. When I moved to San Diego from Minnesota, I immediately started working towards my Bachelor's in Nursing (BSN) Degree at USD and the educational journey has continued throughout my nursing career. I remember my younger son, Bryan, admonishing a friend to be quiet because his mommy was upstairs getting a master's degree. Mark (my husband), my older son, Greg, and Bryan have lived through my busy school periods, lack of availability, and the occasional competition for computer time.

My Minnesota sisters have listened by phone to the ups and downs of my school life and have always welcomed my visits when I could coordinate them with my school and work schedule. I miss my sisters all the time. I left my sister, Susie, waiting for me in my car this past year with just a borrowed doctoral dissertation to read – it gave her a good perspective about the journey one takes through a PhD program, the new terminology, and way of thinking that one learns.

## Table of Contents

Dedication.....	iii
Acknowledgements .....	iv
List of Tables.....	xi
List of Figures.....	xii
Chapter 1 Introduction.....	1
Background.....	1
What is Evidence-Based Practice (EBP)? .....	1
Why is EBP Important.....	2
Nurses' Knowledge of EBP.....	3
Significance of the Study.....	4
Theoretical Framework.....	4
Purpose of the Study.....	5
Chapter 2 Review of the Literature .....	6
Evidence-Based Practice .....	6
External Influences .....	6
Barriers to EBP .....	8
Strategies to Promote EBP .....	10
Evaluation of Education Strategies to Promote EBP.....	11
Fellowships and Internships .....	11
Synthesis .....	20
Diffusion of Innovations Theory .....	25
Time.....	28

The BARRIERS Scale .....	29
Donabedian’s Model of Quality Outcomes .....	30
Summary .....	30
Chapter 3 Methodology .....	32
Research Design .....	32
Sample and Sampling .....	32
Educational Innovation: Evidence-Based Practice Institute (EBPI) .....	33
Operational Definitions .....	40
Measures .....	41
Demographic Information .....	41
BARRIERS: The Barriers to Research Utilization Scale .....	41
Evidence-based Practice Questionnaire (EBPQ).....	43
Focus Group Questions .....	44
Human Subjects Protection .....	44
EBPI Feasibility Study .....	45
Repeated Measures Surveys .....	45
Focus Groups .....	46
University of San Diego IRB Approval .....	47
Chapter 4 Results.....	48
Participant Profile .....	48
Descriptive Findings.....	54
BARRIERS to Research Utilization Scale .....	54
Open-ended Questions.....	58

Time.....	58
Knowledge.....	58
Support.....	58
Culture .....	58
EBPQ.....	59
Measure Realities .....	60
Organizational Culture and Support.....	63
EBPI Structure and Process.....	66
Professional Growth and Development.....	67
Gaps in Development .....	69
Follow-up Survey .....	70
Project Completion and Dissemination.....	70
Use of EBP in Practice .....	70
Professional Growth .....	71
Summary of Results.....	72
Chapter 5 Discussion of Findings.....	73
Reliability of the Instruments .....	75
Power Relations.....	79
Quality of Focus Group Data.....	80
Credibility.....	80
Transferability .....	80
Dependability.....	81
Implications for Nursing.....	80

Nursing Practice .....	81
Evaluation of EBP Fellowships .....	82
Access to Evidence .....	83
Nursing Research.....	84
Research Strengths and Limitations .....	85
Conclusions .....	86
References .....	90
Appendix A: USD IRB Application.....	99
Appendix B: Evidence Based Practice Institute Focus Group Interview Guide .....	101
Appendix C: Evidence Based Practice Institute, Institute Follow-up Survey .....	104

## LIST OF TABLES

Table 1	Synthesis of Literature Review of Fellowships for Staff Nurses .....	24
Table 2	EBPI Projected Costs per Fellow .....	30
Table 3	Andragogy: Characteristics and Learning Environment .....	36
Table 4	Overview of EBPI Curriculum .....	37
Table 5	Fellow EBP Projects.....	39
Table 6	Reasons for Participant Attrition.....	49
Table 7	Mentor and Fellow Personal Characteristics .....	50
Table 8	Mentor and Fellow Academic Preparation.....	51
Table 9	Mentor and Fellow Nursing Experience and Tenure.....	53
Table 10	Comparison of Mentors and Fellows BARRIERS Scale at Pre- and Post- Test .....	55
Table 11	Mentor and Fellow Top Three Barriers Pre- and Post-Test .....	57
Table 12	Comparison of Mentors' and Fellows' EBPQ Scale at Pre- and Post-Test.....	60
Table 13	Measure Reliabilities .....	61
Table 14	EBP Structure, Process, and Outcomes .....	88

## LIST OF FIGURES

Figure 1	Model of Five Stages in the Innovation-Decision Process.....	27
Figure 2	Diffusion of Innovation Curve .....	29

## CHAPTER 1

### Introduction

The American Nurses Credentialing Center (ANCC; date), The Joint Commission (TJC; 2003), and the Institute of Medicine (IOM; 2003) have cited evidence-based practice (EBP) as a critical step in improving healthcare quality. According to the IOM, all health professionals should be educated to deliver patient-centered care emphasizing EBP. Although the application of the best evidence by nurses is essential to achieve the optimal patient outcomes, educational pathways and curricula for licensure as a registered nurse (RN) vary and, as a result, so does nurse's knowledge and attitudes related to research and EBP. Hospitals that strive for evidence-based nursing practice are challenged with offering programs to develop the EBP skills of their staff nurses.

#### *Background*

##### *What is Evidence-Based Practice (EBP)?*

EBP in nursing is part of a larger movement that began in the early 1990s with evidence-based medicine (EBM). The most commonly cited definition of EBM is by Sackett (1996), "the conscientious, explicit, and judicious use of current best evidence in



making decisions about the care of the individual patient . . . [It] means integrating individual expertise with the best available external clinical evidence from systematic research” (p. 71)

Evidence-based nursing practice is a problem-solving approach that involves the conscientious use of current best evidence in making decisions about patient care. The definition of EBP for nursing incorporates patient values and preferences and is defined as a systematic search for and critical appraisal of the most current evidence to answer a clinical question along with one’s own clinical experience, patient values, and preferences (Melnyk & Fineout-Overholt, 2005). The process of EBP minimizes the translation time needed for implementation of research findings into practice and clarifies the differences between ritualistic practice, habitual approaches, personal preferences, anecdotal experiences, empirical data, and statistical significance to support nursing practice (Alspach, 2006).

#### *Why is EBP Important?*

The ANCC (2008), TJC (2003), and the IOM (2003a) cited EBP as a critical step in improving healthcare quality. The ANCC’s Magnet Recognition Program (MRP) lists improved recruitment and retention of RNs as one of the primary benefits of achieving Magnet Recognition, as well as enhanced public confidence in the facility (American Nurses Credentialing Center, n.d.). The use of EBP methods in nursing care delivery to achieve quality outcomes is a key component of the Magnet program. The Joint Commission has consistently supported the implementation of EBP in medicine and nursing as a means of improving care in healthcare systems. The Shared Visions-New Pathways approach adopted by TJC in 2004 placed new emphasis on quality and the use

of evidence in healthcare. The IOM report concluded that all health professionals should be educated about patient-centered care emphasizing EBP.

### *Nurses' Knowledge of EBP*

The IOM (2004) reported an uneven application of EBPs in nurses' work environments. IOM Recommendation 4-3 stated that organizations must employ structures and processes that establish the organization as a *learning organization*. The IOM further argued that learning organizations must support nursing staff in ongoing acquisition of knowledge and skills to support clinical decision-making. A learning organization, as defined by Senge (1990), is one where people continually increase their ability to create desired outcomes, where new patterns of thinking are developed, where collective goals are supported, and where people are continually learning to see the whole together. A learning organization provides structures, systems, and tools to achieve goals and desired outcomes.

Notably, research has shown that nursing care is not consistently based on evidence. Common drivers have included ritual and tradition (e.g., the way it has always been done), personal opinion, and a lack of concern for patient values. Pravikoff, Tanner, and Pierce (2005) studied 760 RNs in the United States and found that 67% obtained information for practice from other nurses; 58% did not use research reports to support their practice; 82% never used a hospital library; 54% were not familiar with the term, EBP; 67% had never searched a nursing database; and 72% had not evaluated research reports. These findings support the need for educational programs to increase nurse's knowledge and application of EBP.

### *Significance of the Study*

The integration of EBP into the environment of an organization is an essential component of the Magnet Recognition process. An important step is the establishment of educational interventions that develop the expertise of advanced practice nurses (APNs) and foster the skills of bedside nurses in the practice of EBP (Turkel, Reidinger, Ferket, & Reno, 2005). Scholar or fellowship programs are an example of educational interventions designed to develop the EBP skills of bedside nurses.

Fellowship programs are described in the literature (Gawlinski, 2004, 2008; Hinds, Gattuso, & Morrell, 2000) and can be found through a Google search (key phrase *ebp fellowship programs for nurses*) on hospital Internet sites (e.g., University of California, San Francisco [UCSF]; University of California, Los Angeles [UCLA]; the American Society of Registered Nurses; Children's Hospital of Orange County; Stanford Hospital; Hartford Hospital; University of Iowa Hospitals and Clinics; the Oncology Nursing Society). There are not, however; reports of programs designed for APNs and bedside nurse to participate in educational interventions as a fellow-mentor dyad, where both individuals attend classes together. There is limited research examining the effectiveness of fellowship programs using standardized measures and no studies that evaluate the effect of the educational intervention on both the fellow and mentor. This study addressed this gap and gave direction for the design of future educational interventions (i.e., fellow-only with mentorship, fellow and mentor dyad programs).

### *Theoretical Framework*

Rogers' (2003) Diffusion of Innovations theory provided a foundation to understand the relationship between the educational intervention and repeated measures

results. Themes from focus groups were compared with Rogers' perceived characteristics of an innovation. Donabedian's (1980, 1988) model for evaluating the quality of care provided the contextual framework to summarize the structure and processes of the intervention under study and highlighted the outcomes.

#### *Purpose of the Study*

The overall purpose of this descriptive study, using a mixed method design conducted in a naturalistic setting, was to evaluate the effectiveness of an educational intervention to teach nurses the process of EBP for the implementation of projects that improved nursing and patient outcomes. Results from this study should contribute to decisions regarding curriculum modification and continuation of the program. The specific aims of the study were to:

- Examine nurses' levels of knowledge, practice, and attitudes toward EBP and barriers to research utilization before and after participation in a structured Evidence-Based Practice Institute (EBPI) educational program.
- Examine the relationship of selected demographic variables to nurses' levels of knowledge, practice, and attitudes toward EBP and barriers to research utilization before and after participation in a structured EBPI educational program.
- Identify qualitative themes described by nurse participants regarding the perceived benefits and barriers of participation in a structured EBPI educational program.

## CHAPTER 2

### Review of Relevant Literature

#### *Search Methods*

A literature search was conducted using the following search engines: Pub Med, CINHALL, Ovid, and ProQuest. The search terms were EBP, evidence-based nursing practice, evidence-based practice barriers, evidence-based practice fellowships, Magnet Recognition Program, and Rogers' Diffusion of Innovation Theory. Examining reference lists found in books and articles brought about additional sources. Citations were selected based on their content, relevancy, and currency. Data based articles from peer-reviewed journals were primarily selected. Subsequently, citations and references lists of the journal articles accessed from the literature search identified other articles and books. This exhaustive review is presented using four broad headings: EBP, strategies to promote EBP, fellowships and internships, and diffusion of innovation theory.

#### *EBP*

##### *External Influences*

The current climate in healthcare requires that hospitals examine how care is being provided. Hospitals are expected to provide high quality, evidence-based care to

patients. Hospital performance outcomes are becoming increasingly transparent to consumers with the advent of publicly reported quality data, often front-page news headlines or on the Internet. Pay for performance (e.g., no pay for poor performance) is affecting hospital reimbursement. Effective October 1, 2008, the Centers for Medicare and Medicaid Services (CMS; 2007) no longer pays for hospital-acquired conditions that are high volume and/or high cost that could have been prevented through the application of evidence-based guidelines. These conditions include serious preventable events (e.g., objects left in during surgery, wrong blood transfusions, catheter-associated urinary track infections, hospital-acquired pressure ulcers, vascular catheter-associated infections, surgical site infections, falls with injury).

The prevention of many of these conditions, infections, falls, and pressure ulcers are within the independent scope of practice of a RN in the state of California. Subsection (b) (1) of Business and Professional Code Section 2725 of the California Nursing Practice Act authorizes RNs to provide services that insure the safety, comfort, personal hygiene, and protection for patients and the performance of disease prevention and restorative measures (Board of Registered Nursing, n.d.). Nurses have the responsibility to protect the safety and comfort of patients including the provision of care using the best evidence available in the prevention of falls, infections, and pressure ulcers.

Other influences are programs that recognize hospitals for quality patient care and outcomes (e.g., Malcolm Baldrige National Quality Award, Magnet Recognition Program). The criteria for the Malcolm Baldrige Award, America's highest honor for performance excellence and organizational results or outcomes, is based on seven key areas of achievement (National Institute of Standards & Technology, 2007). Currently six

hospitals or healthcare systems in the United States earned Malcolm Baldrige awards, including the health system involved in this study. The Magnet Recognition Program is the highest nursing award that a hospital can achieve. Conferred by the ANCC (2007), the award recognizes organizations for quality patient care, nursing excellence, and innovations in professional practice.

An expectation of a Magnet environment is the integration of research and EBP into clinical and operational processes (ANCC, 2007). Criterion 6.27 required that applicant organizations provide evidence of education and mentoring activities effectively engaging staff nurses in research and/or EBP activities. The organization in which this research was conducted comprised four acute-care and three specialty hospitals. As of January 2008, two of the acute care hospitals were Magnet designated and embraced the Magnet criteria as guiding principles for excellence in nursing practice and patient outcomes. Achievement of Magnet designation and re-designation provide a major force in the promotion of EBP by hospitals.

#### *Barriers to EBP*

While the importance of providing research-driven practice has been clearly identified in the literature, many barriers exist that prevent nurses from so doing. Primary barriers reported in the literature included (a) the nurse not having time to read research, (b) the nurse not feeling she/he had the authority to change patient care, (c) insufficient time on the job to implement new ideas, (d) the nurse being unaware of research, (e) physicians not cooperating with implementation, (f) relevant research not being compiled into one place, (g) statistical analyses not understandable, (h) an overwhelming amount of research information, (i) feelings that the results were not generalizable to the nurse's

own setting, and (j) the nurse not feeling capable of evaluating the quality of the research (Dunn, Crichton, Roe, Seers, & Williams, 1997; Fink, Thompson, & Bonnes, 2005; Hutchinson & Johnston, 2004; Karkow, & Peters, 2006). Four domains describe these barriers: setting, presentation, nurse, and research; the four factors of the BARRIERS scale, a widely used instrument developed by Funk, Champagne, Wiese, & Tornquist (1991) to assess barriers to research utilization in an organization.

Pravikoff et al. (2005) studied the concepts of time, access to the tools or resources necessary to search for research (e.g., computer, medical librarian), and the skill or ability to use these resources. In a sample of 760 nurses across the United States, the researchers found individual and institutional barriers. The top individual barriers in this study were the lack of value for research in practice; lack of understanding electronic databases; difficulty in accessing research materials; lack of computer skills; difficulty finding research articles; and lack of a computer, library, search skills, knowledge about research, and the skills to critique or synthesize the literature or both. The primary institutional barriers included the presence of goals with a higher priority, difficulty in recruitment and retention of staff, lack of budgets for the acquisition of resources or training in resource use, perceptions about the ability of the nursing staff to incorporate or pursue EBP, and perceptions that EBP or research not being achievable in the practice setting.

According to Pravikoff et al. (2005), strategies to increase EBP necessitate addressing commonly reported barriers in the design of the intervention. Organizations must provide the time, resources, and training required for EBP. Individual nurses should commit to using the best available evidence in patient care and seek opportunities to



increase the knowledge and skills essential in obtaining and integrating evidence into practice. Pravikoff et al concluded that achieving EBP required a multifaceted approach.

### *Strategies to Promote EBP*

Multiple strategies reported in the literature provided means to increase EBP in hospital settings. Newhouse, Dearholt, Poe, Pugh, and White (2007) offered a strategic plan with multiple approaches to infuse an EBP model into their organization. Salmond (2007) suggested multiple methods to address the barriers identified in empirical research, supporting the assertion by Pravikoff et al. (2005) that a multifaceted approach was required to overcome barriers to EBP.

The following strategies represented a partial list of numerous examples found in the literature. The strategies included evidence-based policy and procedures (Oman, Duran, & Fink, 2008), clinical coaching (Ervin, 2005), identification and analysis of *sacred cows* (i.e., traditional practice not supported by evidence; Brown, 1993; Muller-Smith, 1999; Tellis-Nayak, 2006), journal clubs (Goodfellow, 2004; Kearley, 2007; Luby, Riley, & Towne, 2006; Oman et al., 2008; Phillips & Glasziou, 2004; Schwartz, Dowell, Aperi, & Kalet, 2007), mock trials (Phillips et al., 2006), research rounds (Thew, 2008), grand rounds (Oman et al.), EBP council, (Oman et al.; Salmond, 2007), and job descriptions with EBP outcomes and web-based resources (Newhouse et al., 2007). In addition, educational initiatives (e.g., EBP fellowship programs for nurses; Cullen & Titler, 2004; Gattuso, et al., 2007; Gawlinski, 2004), research internships or fellowships (Hinds et al., 2000; Wells, Free, & Adams, 2007), and workshops, programs or projects (Cheng, 2003; Clifford & Murray, 2001; McCluskey & Lovarini, 2005; Newhouse et al.;

Sherriff, Wallis, & Chaboyer, 2007) identified methods to develop knowledge and build skills that advanced EBP.

#### *Evaluation of Educational Strategies to Promote EBP*

Evaluation of educational interventions to increase EBP was essential to determine whether learners developed the necessary knowledge and skills. Fineout-Overholt and Johnston (2007) recommended formal research evaluation of programs to determine if the education produced the desired outcomes; specifically, clinicians committed to delivering high quality care and improving healthcare outcomes. Key concepts identified by the authors included data-driven healthcare decision-making, outcome evaluation as part of curricula, and evaluation of learner's integration of EBP. Mott, et al. (2005) also supported formal evaluation of educational strategies to increase knowledge and use of EBP in clinical settings. In addition, Larrabee, Sions, Fanning, Withrow, and Ferretti (2007) suggested that evaluation of education programs provided evidence for program improvement.

#### *Fellowships and Internships*

Fellowships and internships were identified as one strategy to increase nurse skills and knowledge to ensure that practice was evidence-based. A fellowship in this context was a structured experience that included education, mentorship, and a completion of a project. According to Cullen and Titler (2004), staff nurses were in the best position to question nursing practice but needed structured support to successfully navigate the EBP process. Fellowships provided the education and structure to support staff nurses in the completion of an EBP project. For the purpose of this study, the term, fellowship, will be

used to refer to both fellowships and internships unless specifically described as such by the author(s) of individual studies.

Gawlinski (2004), adjunct faculty at UCLA and the Director of Evidence-Based Practice at UCLA Medical Center offered an Advanced Practice Institute that was designed to assist nursing educators and administrators in developing EBP fellowships in their own facilities. In 2002, Gawlinski implemented a fellowship program at UCLA Medical Center. The 6-month program, designed for direct care providers with clinical nurse specialists as mentors, teaches nurses the steps of the EBP process in a series of 8-hour classes. These steps include:

1. Finding the latest evidence and research by searching the literature to help solve their practice issue.
2. Critiquing and synthesizing the evidence.
3. Developing an EBP document that describes the practice change
4. Implementing the new EBP; and
5. Evaluating outcomes of the practice change. (p. 12)

Dissemination of the project internally to peers and committees and externally at conferences was an expectation of fellows in the program. According to Gawlinski (2006), the staff-nurse fellowship program had been an important strategy to facilitate the provision of evidence-based care on the part of staff nurses. Key to the success of the fellowship was administrative support for staff-nurse release time to attend classes and work on projects. The benefits of the fellowship were significant as Magnet designation criteria were met through staff-nurse participation in research utilization and patients ultimately benefit the most as the recipients of evidence-based quality care.

Gawlinski (2008) conducted a more comprehensive evaluation of the EBP fellowship program as part of an overarching infrastructure for advancing research and EBP. The fellowship was one of five structures at UCLA along with a research institute, advanced practice committee, clinical practice committee, and nursing practice research council. Gawlinski emphasized the need for leaders to commit to making EBP a priority and support structures and processes necessary for the use of EBP. Outcomes in the evaluation of the five structures described within the context of Donabedian's (1980, 1988) quality assessment model included professional growth and development, retention and recruitment of nurses, the development of an individual professional nursing legacy, the ability to influence care for patients and their families, and improvement of patients' lives. Gawlinski also reported outcomes from five EBP projects and suggested that nurses engaged in EBP created healing environments for patients and a healthy workplace for colleagues.

Hinds et al. (2000) reported on the creation of a hospital-based nursing research fellowship program for staff nurses. The purpose of the program was to support staff nurse participation in the research mission of the hospital, Saint Jude Children's Research Hospital, and to integrate them into research activities. The curriculum components of the 12-month program addressed research infrastructure, research topics, methods, skill development, brainstorming, and brain teasing or critiquing.

The fellows completed an evaluation of the program that included rating the objectives, content and learning strategies on a five-point Likert-type scale from 1 (poor) to 5 (excellent). Mean ratings for all items ranged from 3.8 to 4.9 (overall  $M = 4.49$ ). The fellows generated scholarly products that visually represented their work (e.g., abstracts,

posters, research papers, nursing care guidelines). Leadership evaluation of the fellowship was favorable and focused on positive reactions of the staff towards the program and the fact that the program did not result in staffing difficulties or cost overruns in their areas (Hinds et al., 2000).

Subsequent to the report by Hinds and Associates (2000), Gattuso, et al. (2007) described how the research fellowship transformed into an EBP fellowship. During the existence of the research fellowship, three cohorts of 5-to-10 staff members each completed the 12-month program. A careful evaluation of the research fellowship was conducted. Fellows and nursing leadership satisfaction rates were high; however, monitored outcomes did not meet nursing faculty expectations. Nurse fellows were not routinely involved in opportunities to apply research skills to clinical situations and fellows did not transfer their skills to the clinical setting after the conclusion of the program. Based on these findings and other logistical challenges, the decision was made to transition the research fellowship into an EBP fellowship.

The revised fellowship, still 12 months in length, addresses a variety of topics including the history of EBP, project selection, skill development, critiquing, project implementation, evaluation and the important role of change agent (Gattuso, et al., 2007). The focus was EBP, not the generation of new knowledge through research and an EBP textbook was used as part of the curriculum. Fellows were assigned to individual projects by their unit directors instead of working on one joint project as they did in the research fellowship. To ensure accountability and progression of the projects, fellows met formally with their clinical directors during the program and directors assumed oversight

for the fellow's EBP projects after the completion of the 12-month program. The fellows met monthly to learn the process of EBP and talk about their projects.

Program evaluation consisted of monitoring project completion and evaluation of program effectiveness. As with the research evaluation, a 5-point Likert-type scale was used and determined the program to be moderately effective to very effective. Fellows reported integration of EBP knowledge and skills in daily practice. The faculty monitored project completion on an ongoing basis. Clinicians from other disciplines were being encouraged to participate in the fellowship. This could be considered an important step because Fineout-Overholt and Johnston (2007) supported an interdisciplinary approach to patient care and outcome evaluation.

An internship for staff nurses to promote EBP, described by Cullen and Titler (2004), incorporated coursework, team meetings, and facilitated project work time. Objectives of the internship were to (a) promote innovative thinking by staff nurses, (b) facilitate development and integration of a clinically relevant EBP project, (c) increase understanding and use of the Iowa Model of EBP, and (d) encourage professional growth and development of staff nurses. Staff nurses that meet eligibility criteria and were accepted into the program had 12 meeting days over the first 12 months of the internship. Thereafter, the interns participated in quarterly meetings until project completion, typically 18-24 months from topic selection. Six staff nurses were accepted into each internship cycle.

Evaluation of the staff nurse projects consists of three components: (a) assessment of nursing knowledge, (b) process evaluation, and (c) patient/family outcomes (Cullen & Titler, 2004). Program evaluation of the internship consisted of quantitative and

qualitative data from interns, their managers, and advanced practice nurse mentors. The interns completed questionnaires at the close of classroom days and on the last program workday. The evaluation questionnaires consisted of Likert-type questions on a scale of 1 to 5 with a mean scores ranging from 4.2 to 4.8. The questions addressed the class content and application of the content in practice. The researchers conducted focus groups with the interns, managers, and mentors at the end of the program and addressed questions (e.g., the usefulness of the internship, opportunities for improvements, changes to the program). Several themes emerged from the focus groups and touched on the need for coordination of schedules and release time to address the time consuming nature of projects and the importance of the intern-APN partnering for support and project success. Managers suggested that the application process, topic selection, and post-implementation dissemination were also important to success. While participants suggested some program enhancements, the feedback overwhelmingly supported an EBP internship as an effective method to improve patient outcomes.

To promote evidence-based care, Milne, Krishnasamy, Johnston and Aranda (2007) developed a multidisciplinary critical appraisal and research utilization-training program in Melbourne, Australia. The aims of the Clinical Research Fellowship (CRF) program were to (a) develop participant research utilization skills, (b) develop transferable written and verbal skills, and (c) address key barriers to research utilization. Research utilization was one aspect of EBP and was the use of research knowledge in clinical practice (Melnik & Fineout-Overholt, 2005). The 12-week program offered to nurses, allied health and radiation therapists included educational content, practice exercises, and application of course content in practice. Following facilitator-led classes,

CRF participants worked independently on individual projects relevant to their work environment.

Program evaluation conducted upon completion of two program cycles focused on the affects for participants and their clinical practice (Milne et al., 2007). The evaluation examined the outcomes of the projects and the professional and personal influence of the program. Participants were surveyed on various topics (e.g., number of times the project had been presented, writing for publication, use of critical appraisal skills in practice). Surveys included open-ended questions about personal and professional outcomes of the program. Sixteen projects were evaluated and 10 were found to have sufficient evidence to support practice change. In the remaining six projects, while there was either no evidence or insufficient evidence found in the literature, several research questions were identified and addressed as primary research projects. Milne, et al. identified several keys to program success: (a) availability of funding to provide participants time to attend classes and work on their projects, (b) executive endorsement or the support of nursing leadership for the program and projects, and (c) availability of evidence implementation expertise, faculty, and facilitators to address barriers and support participants.

Using a quantitative, pretest-posttest design, Larrabee et al. (2007) evaluated a program at West Virginia University Hospitals to achieve systematic EBP change. The primary goal of the program was to improve care quality, patient outcomes, and patient's perceptions of quality by using the best evidence to change practice. A secondary goal was to offer professional development opportunities. Elements of the program were formal and informal education, individual, and group mentoring, chartering of project



teams, and creation of Nursing Research Council. The program used the Rosswurm and Larrabee six-step model for EBP change. In 1999, nurse leaders received education about Research Utilization (RU) EBP followed by the implementation project teams, and staff nurse mentorship by the principle investigator. A formal 2-day workshop based on the six-step model was subsequently implemented in 2002.

The research study addressed two questions:

1. Were there differences in mean attitude scores between Time 1 (1999) and Time 2 (2002)? and
2. Were attitudes associated with knowledge about availability of support services and participation in utilization of evidence or research conduct (Larrabee et al, 2007)?

The evaluation also included nurse attendance at the 2-day workshop, practice change projects, and scholarly dissemination of projects outside of the organization. The Alcock, Carroll, and Goodman. (1990) Staff Nurse and Research Activities Scale was used to measure attitudes about research use and research participation. Study results demonstrated that more than 275 RNs attended the workshop, teams completed over 30 RU projects, and significant project dissemination had taken place. In addition, the hospital where the program was implemented became Magnet designated in 2005. Knowledge about support services increased between Time 1 and Time 2 and was associated with higher attitude scores about research and RU and nurses that participated in research-related activities had more positive scores than nurses that did not participate.

Larrabee et al. (2007) also suggested future evaluation of program implementation should use experimental designs or at the least, time-series or controlled

before-after design. Minimally, the study could be strengthened using a time-series study to obtain data from 1-year pre- and 1 year post-intervention. This would detect variation across time and identify trends in improvement and sustainability of program elements.

A nursing research internship, reported in the literature by Wells et al. (2007), was designed to enhance EBP among staff nurses. The internship, which began in 1999 at Vanderbilt University Hospitals and Clinics, was a 2-year program that consisted of monthly workshops. The program curricula were designed to address the barriers to EBP widely reported in the literature. Evaluation of the program occurred from October 2004 to January 2005 and included the interns that completed the program. Interviews focused on questions to determine (a) the continued use of EBP, (b) the professional development of the interns, and (c) other unanticipated effects of the program. All 10 of the interns participating in the interviews conducted a literature search in the previous 6 months that demonstrated continued use of EBP skills. Most advanced in the organization's career development system, participated in a hospital committee, and four enrolled in a Master's in Nursing program. Participants also felt valued and had increased opportunities for networking with colleagues in many areas of the organization. Wells et al. (2007) concluded that, while the internship was time intensive for the interns and research staff, the supportive program was an important factor in the use of research to answer clinical questions.

Turkel, Ferket, Reidinger, and Beatty (2008) reported on a 12-month Nursing Research Fellowship that incorporated research and EBP projects into the program. Direct care RNs were chosen to be fellows in the program consisting of structured educational sessions and mentoring from a doctorally-prepared consultant. Selection

criteria included a minimum of a bachelor's degree, successful completion of research and statistical courses, and basic computer competency. Based on initial interest in the fellowship, the authors decided to modify the program to include research fellows and research partners. Fellows were allowed 16 hours of release time per month and were expected to design, implement, and disseminate a research study. Partners conducted a review of the literature, initiation of an evidence-based project, and dissemination of findings.

Evaluation of the program involved a quantitative, 10-item questionnaire, the Assessment of Nursing Research Knowledge, and qualitative interviews using appreciative inquiry methodology. Both the qualitative and quantitative results indicated an increase in nursing knowledge. This study also included the financial requirements of the program.

### *Synthesis*

Fellowships have been widely reported in the literature as an effective strategy to advance EBP by nurses and promote quality patient outcomes. Key themes related to fellowships included (a) factors that contribute to success, (b) curriculum elements, (c) evaluation, and (d) outcomes. Successful fellowships depend on many factors (e.g., organizational support, release time to attend classes and work on projects, mentorship of staff nurses by research faculty and APNs). All authors reported organizational support for the establishment of a fellowship (Cullen & Titler, 2004; Gattuso, et al., 2007; Gawlinksi, 2004; Hinds et al., 2000; Larrabee et al., 2007; Milne et al., 2007; Turkel et al., 2008; Wells et al., 2007). Release time from direct patient care hours was another key factor in the success of the nurses in fellowship programs. It was important that nurses

had the time to attend classes and work on projects (Cullen & Titler; Gawlinski; Milne et al.; Turkel et al.; Wells et al.). Nurse selection criteria (e.g., years of nursing experience, minimum of part-time employment, at least 1 year in the current clinical area, leadership skills, interest in research or EBP) contributed to the success of nurses accepted into a fellowship (Cullen & Titler; Gawlinski, Turkel et al.). Finally, mentorship throughout the fellowship by either faculty or clinical nurse specialists was a key theme reported by all authors.

Fellowships typically involved a series of classes over time (Cullen & Titler, 2004; Gattuso, et al., 2007; Gawlinski, 2004; Hinds et al., 2000; Larrabee et al., 2007; Milne et al., 2007; Turkel et al., 2008; Wells et al., 2007). The length of the classroom portion of the fellowship varied from 12 weeks (Milne et al.) to 12 months (Gattuso et al.; Hinds et al.; Turkel et al.) with one outlier at 2 days (Larrabee et al.). EBP models varied in the fellowships; Gattuso, et al. and Larrabee et al. used the model by Rosswurm, Larrabee, Cullen & Titler used the Iowa Model of EBP, and others used the generic steps of EBP to guide curriculum (Gawlinski; Milne et al.; Wells et al.). The implementation of a project was a key strategy in all fellowship programs to develop skills beyond the classroom setting. Common skills involved developing an answerable question; conducting literature searches; critically appraising the literature; designing, implementing, and evaluating an intervention; gaining approval from the institutional review board; writing an abstract; developing and presenting a paper or poster (Gattuso et al.; Hinds et al.; Larrabee et al.; Milne et al.; Turkel et al., Wells et al.). The overall length of the fellowships from initiation of classes to project completion varied between 1 and 2 years.

Evaluation of fellowships involved both quantitative (questionnaires and standardized measures) and qualitative (focus groups and interviews) and focused on fellows, mentors, and leadership. Components in evaluations included assessment of knowledge, continued use of EBP, process evaluation, and patient/family (project) outcomes. Various forms of questionnaires were used to assess satisfaction with fellowships. Milne et al. (2007) asked participants to give input about the strengths and weaknesses of the program and to list involvement in presentations, writing for publication, participation in research projects, teaching critical appraisal skills and the use of critical appraisal skills in daily work. Larrabee et al. (2007), to evaluate staff nurses that participated in various activities and workshops, used one standardized measure, the Adcock Staff Nurses and Research Activities instrument. Turkel et al. (2008) used an instrument entitled the Assessment of Nursing Research Knowledge. In addition to questionnaires completed by nurse-interns, Cullen and Titler (2004) conducted focus groups with the interns, nurse managers, and APNs at the conclusion of the program to elicit information about the efficacy of the fellowship.

Outcomes of fellowships included the development of EBP knowledge, integration of EBP skills into practice, professional development of fellow, and support of Magnet Recognition criteria. Completion of projects was a key outcome of the fellowships. Projects that benefited patients and improve care outcomes included admission urine cultures, blood pressure monitoring, and caring behaviors for adolescents (Gattuso, et al., 2007); standardization of intravenous drip concentrations, end of life comfort care tool kit, and guidelines for the care of postoperative children with congenital heart disease (Gawlinski, 2004); optimal pain control for radiation induced

mucositis and psycho-social intervention for women with early stage breast cancer (Milne et al., 2007); and revision of skin care protocols for breast radiation patients, revision of a pain scale for impaired adults, and music therapy of a post-anesthesia care unit (Turler et al., 2008). Cullen and Titler (2004) summarized other implications for developing EBP programs and suggested the use of a *bottom-up* approach or staff-nurse driven projects promoted adoption of EBPs.

Table 1

*Synthesis of Literature Review of Fellowships for Staff Nurses*

Study	Educational Program	Evaluation	Key Outcomes/Recommendations
(Gawlinski, 2004, 2008)	Evidence-Based Practice Nurse Fellowship; 6-month program	Donabedian's (1980, 1988) quality assessment model of structure, process, and outcome provided the context for the evaluation. Fellow's EBP projects outcomes were described in detail.	Outcomes included professional growth and development, retention and recruitment of nurses, development of individual professional nursing legacy, influence over care for patients and families, improvement of patient's lives.
(Hinds, Gattuso, & Morrell, 2000)	Research Fellowship; 12-month program	Objectives, content and learning strategies were rated on a five-point Likert Scale 1 (poor) to 5 (excellent)	Mean ratings ranged from 3.8 to 4.9 with overall mean at 4.49. Program transitioned to EBP Fellowships as fellows were unable to transfer research skills to clinical setting.
(Gattuso, et al., 2007)	Evidence-Based Practice Fellowship; 12-month program	Project outcomes and program effectiveness (5-point Likert scale)	Program determined to be moderately effective to very effective.
(Cullen & Titler, 2004)	Evidence-Based Practice Internship; 12-month formal internship, project completion within 18-24 months	Assessment of nursing knowledge; process evaluation; patient/family outcomes using quantitative (evaluation tool using Likert scale) and qualitative (focus groups)	Evaluation questionnaires had mean score of 4.2 to 4.8. Focus groups indicated need for coordination of schedules and release time for nurse-interns, and importance of intern-APN partnering for successful completion of projects.
(Milne et al., 2007)	Clinical Research Fellowship (research utilization)	Program evaluation focused on outcomes of projects and the professional and personal impact of the program	Survey data indicated out of 16 projects, 10 had sufficient evidence to support practice change. Key success factors: funding for participant time, executive support, and availability of faculty and facilitators to address barriers and support participants.
(Larrabee et al., 2007)	Evidence-Based Practice Program; two-day workshop	Quantitative pretest-posttest design using the Adcock et al. Staff Nurse and Research Activities Scale	Study results demonstrated knowledge about support increase between time 1 and 2 and was associated with higher attitude scores about research and research utilization
(Wells, Free & Adams, 2007) (Turler et al., 2008)	Nursing Research Internship; two-year program Nursing Research Fellowship; 12 month program	Interviews conducted with interns that completed the program Quantitative, 10 item questionnaire, Assessment of Nursing Research Knowledge and qualitative interview using appreciative inquiry methodology	Interns that participated in the interviews demonstrated continued use of EBP skills developed in during program Projects included both research and EBP. Quantitative data and qualitative responses indicated increase in nursing research knowledge. Financial requirements of program identified

A review of the ANCC Magnet Recognition website revealed that five of the seven hospitals discussed in this review earned Magnet status between 2004 and 2006 (i.e., UCLA Medical Center, West Virginia University Hospitals, University of Iowa Hospitals and Clinics, Northwest Community Hospital, Vanderbilt University Hospitals and Clinics). There was no information available for one of the hospitals, Saint Jude Children's Research Hospital; however, the hospital could be in the Magnet application process. The remaining hospital was in Australia and no information about Magnet status could be found although, according to the ANCC website, there was one Magnet-designated hospital in Australia. Not surprisingly, the majority of hospitals in this review implemented structured programs to meet Magnet criteria for EBP. Karkow and Peters (2006) suggested that the preparation required to achieve Magnet designation transformed the work environment or setting and reduced barriers to EBP.

#### *Diffusions of Innovations Theory*

Rogers (2003) Diffusion of Innovation Theory described how innovations were spread through society. Rogers defined diffusion "as the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 11). Rogers further described the four main elements in the diffusion process: (a) the innovation, the idea, practice or object; (b) the communication channel, the means by which the innovation was shared between individuals; (c) time, the interval it took an individual to move from first knowledge of an innovation to its adoption or rejection; and (d) the social system, a set of interrelated units engaged in joint decision making to accomplish a common goal.



Diffusion of Innovations Theory (Rogers, 2003) provided a model for planning the integration of evidence into practice over time. Innovations, once implemented, either were continued because of favorable outcomes or discontinued when a better idea or technology became available or dissatisfaction with the process or outcomes occurred (Yoder-Wise, 2007). The diffusion of an innovation might be influenced by internal and external factors: financial constraints, changes in products or technology, publication of compelling evidence or the development of widely disseminated standards may influence the diffusion of an innovation.

#### *Adoption Decision Process*

Diffusion or adoption of innovations occurred sequentially through a decision process that included knowledge, persuasion, decision, implementation, and confirmation (see Figure 1; Rogers, 2003). The first stage, knowledge, was exposure to an innovation and how it functioned. Stage 2, persuasion, was the development of attitudes about an innovation through psychological involvement and selective perception. These activities could be used to create interest in moving from a favorable attitude to behavior changes. The third stage, decision, was the commitment to adopt the innovation. At this stage, the innovation might be adopted, adopted and discontinued, rejected, or not considered by an individual or the organization.

Stage 4, implementation, involved putting the innovation into practice. Behaviors change as the innovation was adopted and key features of an innovation were identified in order to evaluate its effectiveness. Issues with the implementation of the innovation were addressed and changed or reinvention occurred to facilitate the sustainability of the innovation. In Stage 5, confirmation, evaluation of the innovation, occurred. A decision

was made about continuing or discontinuing the innovation and if integration into an individual's or organization's practices would occur (Rogers, 2003).

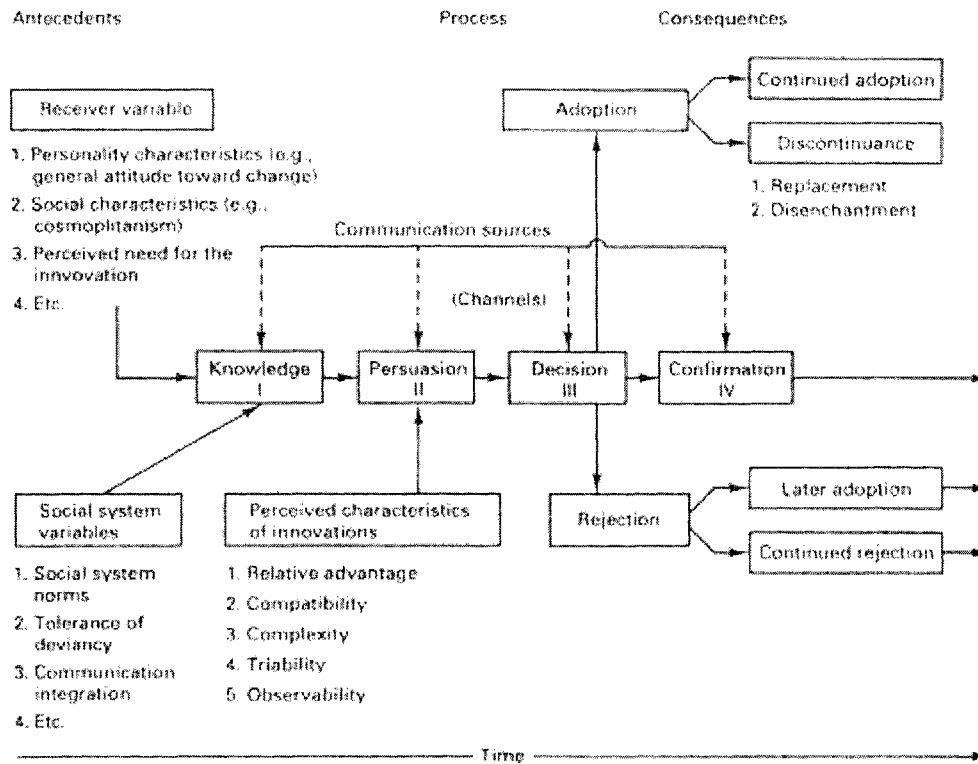


Figure 1. Model of five stages in the innovation-decision process

### Characteristics of an Innovation

Characteristics of an innovation influence the rate of adoption. How members of a social system perceive these characteristics can determine if innovations diffuse slowly or rapidly. The characteristics of an innovation are its relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Innovations perceived by adopters to have greater relative advantage, compatibility, trialability, observability, and less complexity are adopted more rapidly than other innovations. *Relative advantage* refers to the degree an innovation is perceived to be better than previous ideas, processes,

or objects. *Compatibility* is the degree to which the innovation is viewed as consistent with existing values, past experiences, and needs of the potential adopters. *Complexity* refers to the degree that an innovation is perceived as difficult to understand and use. *Trialability* is how an innovation can be tried on an experimental basis. This is important, as a trialable idea is less uncertain to an adopter who is considering it and observability is the degree that the results of an innovation are visible. Adopters who can see the results of an innovation are more likely to adopt the idea.

### *Time*

The concept of time related to diffusion of innovation refers to three elements. The first element of time describes the process an individual or other decision-making unit or group goes through (a) first knowledge of the innovation, (b) the formation of an opinion about the innovation, (c) a decision to adopt or reject the idea, (d) implementation of the innovation, and (e) confirmation of the decision to adopt the innovation. The second element of time describes five adopter categories: innovators, early adopters, the early majority at the far left of the adoption curve, the late majority, and laggards at the right of the curve (see Figure 2). Each type of adopter has distinct characteristics. Innovators, venturesome risk-takers actively seeking new information, have a why-not attitude about the innovation and are gatekeepers for the flow of new ideas into a system. Early adopters are opinion leaders and have the highest degree of respect. They serve as role models, decrease uncertainty about an idea by adopting it, and help trigger the critical mass when they adopt an innovation. The early majority is deliberate in their decision to adopt new ideas and, while not leaders in the adoption curve, make up one-third of the curve and are willing to make safe choices. The late

majority are skeptical and must have all concerns resolved before prior to adoption. The late majority also comprises one-third of the adopters in a system. Finally, laggards are suspicious and traditional; their point of reference is in the past. Laggards must be certain that an idea will not fail or adoption will not occur.

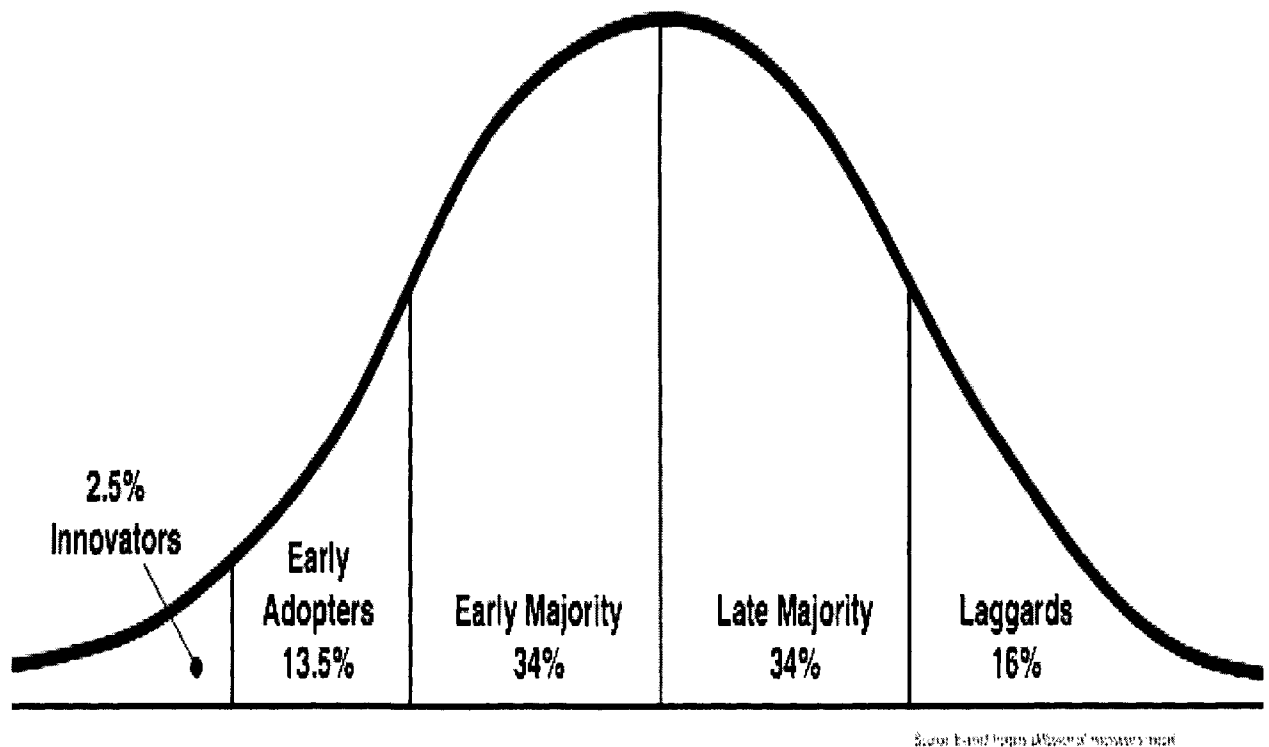


Figure 2. Diffusion of innovation curve.

The final time element involved in diffusion is the rate of adoption, measured as the number of members of a social system that adopt the innovation during a given time (Rogers, 2003).

#### *The BARRIERS Scale*

The BARRIERS scale, one of the instruments used to collect data in this study, had four factors (Funk et al., 1991). The purpose of introducing the scale in this chapter was the linkage of the scale to the theoretical framework. The questions on the scale were categorized into the factors and addressed barriers to research utilization. Factor 1

described the characteristics of the adopter or the nurse's research values, skills, and awareness. Factor 2 addressed the characteristics of the organization, setting barriers, and limitations. Factor 3 described the characteristics of the innovation, the qualities of the research. Factor 4 addressed the characteristics of the communication or the presentation and accessibility of the research. The BARRIERS scale was based on Rogers' Diffusion of Innovations model (Rogers, 2003) and the Conduct and Utilization of Research in Nursing questionnaire (Funk et al.). The psychometrics of the scale appear in the methodology chapter.

#### *Donabedian's Model of Quality Outcomes*

Donabedian's (1980, 1988) model for evaluating the quality of care provided a contextual framework to summarize the influence of the EBPI on the outcome variable, the increased use of EBP. It was a linear framework of structure, process, and outcome designed for use with quality assessment and improvement processes. The structure in this study was the EBPI and varying support structures at the individual entities. Processes to support the EBPI occurred when appropriate structure(s) were in place. Outcomes were measured throughout and at the conclusion of the EBPI.

#### *Summary*

This study was the evaluation of an innovation or idea; EBP. The communication channel was the EBPI. The social system included the EBPI fellows and mentors, faculty, the participant organizations, and on-site contacts. The time for this study started with the first EBPI class and concluded with the third data collection point. The focus of the EPBI was to foster networks for mutual sharing, innovative thinking, and creative problem

solving to move EBP initiatives into clinical realities. Ultimately, patients benefit through improved nursing knowledge about EBP and decreased barriers to conducting EBP.

## CHAPTER 3

### Methodology

The purpose of this study is to evaluate the effectiveness of an educational intervention to teach nurses the process of EBP for the implementation of projects that improve nursing and patient outcomes. This chapter provides a description of the research design, sample, and sampling, the educational initiative, instrumentation, data collection procedures, and human subject protection.

#### *Research Design*

The research design using secondary data analysis is a repeated measures design, incorporating both qualitative and quantitative methods. Previously collected data from participants working within an integrated healthcare system were analyzed. Descriptive and inferential statistical analyses were used to analyze the quantitative data and thematic analysis of qualitative was conducted for the focus group data. In the analysis of the educational intervention, the qualitative data informed the quantitative data through a further elaboration of the effect the program had on participant practice.

#### *Sample and Sampling*

The sample included participants employed by a large Southern California healthcare system located in a metropolitan area and included RNs in direct care and

clinical leadership roles within the organization. Data were collected from participants in January 2007 (baseline), May 2007 (focus group), July 2007 (post-test) with follow-up conducted in June 2008. The healthcare system's Institutional Review Board provided approval for each data collection point.

*Educational Innovation: Evidence-Based Practice Institute (EBPI)*

The EBPI was a fellowship program for bedside nurses and their mentors who were, in most cases, clinical nurse specialists. The Institute, developed by the Consortium for Nursing Excellence, San Diego (CNE, SD) consisted of a series of classes that culminated in the completion of an evidence-based practice change project. Designed by consortium members, who comprised leaders in education and research from educational institutions and healthcare organizations, the EPBI supported the vision of the CNE, SD. The vision, to inspire clinical excellence through the promotion of evidence-based practice, was operationalized through the objectives of the EBPI. The Institute included six classes over 6-months with structured non-clinical time in the work setting to complete class assignments and the project. The overall time to complete a project varied between 6 and 9 months and the EBPI culminated in a graduation ceremony for fellows and mentors.

Prior to fellow recruitment, EBPI faculty developed a worksheet that could be used to outline program expenses to entity-based Chief Nursing Officers (see Table 2). The goal was to obtain approval for work-release time. RNs in direct patient care were usually non-exempt employees and therefore needed to be replaced in staffing. The worksheet included salary and non-salary costs for both classroom time and practicum to work on EBP projects. Most mentors, however, were exempt or salaried and a



replacement factor did not need to be calculated. Because the hours the fellows would be involved in the EBPI were approximately 5% of total hours worked in a calendar year, non-productive time (e.g. vacation, sick time) were not included in the calculation.

Table 2

*EBPI Projected Costs per Fellow*

Type of Costs	Itemized Costs
Non-Salary Costs	Books: \$ _____/participant  Printing and duplication _____  Food (lunch): _____ (institution to take turns with breakfast and snacks)  <b>Total non salary = \$ _____</b>
Salary Costs	Classroom = 6 days (48 hours) Practicum days = 6 days (48 hours) Follow-up day (8 hours) Graduation and poster sharing day (8 hours)  Total hours = 112 x _____ (average hourly rate) = _____ (per fellow)  <b>Total salary = \$ _____</b>

Chief Nursing Officers and faculty used the worksheet to calculate expenses based on entity-specific average hourly rates and determined the number of fellows that could be supported monetarily to attend the EBPI. Individual entities approved between one and five fellow-mentor dyads. Additional costs that were identified but not factored in to the approval worksheet included statistician time for analysis, dissemination costs, (e.g., poster production), graduation conference costs, librarian and administrative support, mentor, and faculty time.

Potential fellows were selected for the program through an application process that included demographic information and identification of a proposed clinical question. The applicant obtained a recommendation and approval from their manager to attend the program and also selected a potential mentor. The applications were submitted to the EBPI program coordinator, who convened a panel to select fellows and mentors as there were limited spaces allocated to each hospital. The panel uses a scoring rubric to select dyads with well-defined clinical questions that aligned with nursing unit or hospital strategic priorities. In most cases, the mentor was the Clinical Nurse Specialist or Educator assigned to the nursing unit in which the fellow was employed. The mentors were not assessed for evidence-based practice or research expertise; however, there was no concern about lack of knowledge on the part of the mentor because both dyad members attended the classes together. Confirmation of acceptance to the EPBI was done electronically and pertinent details (e.g., class times, location, parking) were provided.

Principles of andragogy (Table 3; Knowles, 1970), methods used to teach adults, were incorporated in the structure of the day and learning environment. Classes took place at a local university with adequate classroom and computer lab space. Fellows and mentors were seated together but co-mingled with dyads from other hospitals thereby serving two purposes, dyads were able to meet colleagues from the 11 participating hospitals, and there was sharing of information about similar projects or questions. The class structure was interactive and began with an icebreaker relevant to the course content. For example, when Rogers' Diffusion of Innovation was discussed, the exercise explored the EBPI participant adoption rate of Apple's iPod. The icebreakers encouraged

a relaxed and informal environment and the seating of the dyads encouraged collaboration and sharing of experiences among the EBPI participants.

Table 3

*Andragogy: Characteristics and Learning Environment*

<b>Andragogy</b>	<b>Characteristics</b>	<b>Learning Environment</b>
Method or techniques used to teach adults (Knowles, 1970)	<ul style="list-style-type: none"> <li>▪ Learner is self-directed</li> <li>▪ Learner is internally motivated</li> <li>▪ Learner's experiences are valued and varied</li> <li>▪ Task or problem-centered</li> </ul>	<ul style="list-style-type: none"> <li>▪ The climate is relaxed and informal</li> <li>▪ Collaboration is encouraged</li> <li>▪ Teacher and class set goals</li> <li>▪ Decisions are made by teacher and students</li> <li>▪ Students process activities and inquire about projects</li> <li>▪ Teacher, self, and peers evaluate</li> </ul>

The dyad selection process took into consideration self-report and manager validation for the fellow and mentor self-direction and motivation. The course objectives and teaching methods and activities also incorporated the principles of andragogy (see Table 4). EBPI faculty, available to participants throughout each class, facilitated discussions and answered questions about course content during small group work in dyads.

Table 4

*Overview of EBPI Curriculum*

Class	Objectives	Teaching Methods and Activities
1.	<ol style="list-style-type: none"> <li>1. Identify and discuss critical concepts related to evidence-based practice.</li> <li>2. Identify a clinical practice question arising from concerns in nursing care at the bedside.</li> <li>3. Utilize innovative thinking to solve clinical problems encountered in bedside nursing.</li> <li>4. Conduct a literature search and critical synthesis of the existing evidence within an identified clinical domain.</li> </ol>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Discussion</li> <li>• Small group work in dyads</li> <li>• Computer Lab</li> <li>• Administer pre-test</li> </ul>
2.	<ol style="list-style-type: none"> <li>1. Identify and discuss critical concepts related to evidence-based practice</li> <li>2. Utilize innovative thinking to solve clinical problems encountered in bedside nursing.</li> <li>3. Understand the skills needed for critical analysis of quantitative research literature.</li> <li>4. Understand the skills needed for critical analysis of qualitative research literature.</li> </ol>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Discussion</li> <li>• Small group work in dyads</li> </ul>
3.	<ol style="list-style-type: none"> <li>1. Utilize innovative thinking to solve clinical problems encountered in bedside nursing care.</li> <li>2. Apply skills needed for critical analysis of quantitative and/or qualitative research literature to your literature bases.</li> <li>3. Make a decision about moving forward with your project or refining your project with a modified PICO question</li> <li>4. Begin to identify measurable outcomes for your project and develop a strategy to manage the data that you will collect.</li> </ol>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Discussion</li> <li>• Small group work in dyads</li> <li>• Computer Lab</li> </ul>
4.	<ol style="list-style-type: none"> <li>1. Describe key components of design, methods, procedure and data analysis when refining a clinical protocol.</li> <li>2. Describe essential elements required to ensure a successful change process.</li> <li>3. Perform an opportunity and threat analysis in preparation for developing a strategic plan.</li> <li>4. Describe two creative approaches to move stakeholders toward increased project support.</li> <li>5. Describe potential sources of resistance and strategies to assure successful implementation of this EBP project.</li> </ol>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Discussion</li> <li>• Case Study</li> <li>• Small group work in dyads</li> <li>• AV - movie</li> </ul>

Class	Objectives	Teaching Methods and Activities
	6. Design a simple <i>elevator speech</i> that summarizes your project and vision.	
	7. Understand the role of the IRB in protecting subject's rights.	
	8. Describe the steps necessary to complete the IRB process at your facility.	
5.	1. Describe the importance of excitement and identification of early successes in a change project.	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Discussion</li> <li>• Small group work in dyads</li> <li>• Computer Lab</li> </ul>
	2. Identify if resources and commitment are adequate for a successful outcome in your change project.	
	3. Complete a Force Field Analysis to determine helping and hindering factors for sustained change.	
	4. Analyze specific clinical outcomes using the Excel spreadsheet program.	
	5. Compute a t-test on demonstration data using the Excel spreadsheet program.	
	6. Compute a Chi-square test on demonstration data using the Excel spreadsheet program.	
	7. Construct graphs and charts of data computed using the Excel spreadsheet program.	
6.	1. Recognize the strategies for effective communication of your project.	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Discussion</li> <li>• Small group work in dyads</li> <li>• Computer Lab</li> <li>• Focus Groups: Fellow and Mentor</li> </ul>
	2. Understand the basics of Power Point and poster presentation.	
	3. Understand the basics of writing an abstract and publication of your findings.	
	4. Develop a plan to disseminate the project within the agency of origin.	

Table 5 lists the evidence-based projects proposed by the fellows written using the problem or population, intervention, comparison, and outcome (PICO) question format. Questions drafted at the beginning of Class 1 continued to be refined through the literature search phase of the curriculum. Most questions were finalized by the third class.

Table 5

*Fellow EBP Projects*

PICO Questions
1. In emergent and elective surgery patients, what is the impact of a multidisciplinary process improvement project on patient satisfaction rates and discharge timeliness?
2. In patients holding in the ED, does implementing a standard guideline for use of Medication Administration Records, as compared to no standard guideline, improve the standard of care?
3. Does providing information related to mechanical prophylaxis of deep venous thrombosis (DVT) increase compliance?
4. Does the use of SBAR (Situation-Background-Assessment-Recommendation) as a standardized approach to communication promote better interaction between RNs and physicians?
5. Does providing structured written and oral information on the patient satisfaction discharge survey improve patient satisfaction scores on the Progressive Care Telemetry Unit?
6. Does implementation of intra-abdominal pressure (IAP) monitoring education increase staff knowledge and improve patient outcomes?
7. Does an educational intervention regarding evidence-based practices in the treatment of dually diagnosed patients improve the knowledge level of the nursing staff?
8. Does implementing a Perinatal Safety Plan (Obstetric [OB] Team Stat) reduce the response time to an obstetrical emergency and help expedite delivery of a compromised fetus?
9. In post cardiac surgery patients, does promotion of skin integrity with dressing changes and protocols that identify potential risks, reduce, and prevent epidermal stripping?
10. Does implementing EBP guidelines for kinetic and proning therapy in patients with acute lung injury and acute respiratory distress syndrome (ALI/ARDS) at Sharp Memorial's Surgical Intensive Care Unit improve pulmonary function?
11. Does using <i>read-back</i> at change of shift handoff in the MICU decrease the amount of missed or delayed labs and radiology procedures for patients?
12. In the neonate population, is normal saline or heparin more effective in maintaining intravenous line patency?

Evaluation of the EBPI was conducted at several points: pre-test of participants on the first day, check-in with fellows and mentors on Day 3 about what was working and opportunities for improvement, focus group interviews on Day 6, and post-test evaluation 2 months after the last class. The ultimate outcome of the program was a completed project and either a podium or poster presentation at graduation. All fellows were required to submit an abstract and four fellows were selected for a podium presentation. The remaining fellows prepared a poster presentation. A nationally-known expert and author on evidence-based practice provided a keynote presentation for graduation. Fellows and mentors participated in a graduation ceremony and received a pin that recognized them as *EBP Champions*.

#### *Operational Definitions*

Measured study variables included nurse's knowledge, practice, and attitudes toward EBP and barriers to EBP. Operational definitions for each of these variables is presented below:

*Nurse's Knowledge of EBP.* Nurse's knowledge of EBP was measured using the Evidence-based Practice Questionnaire (EBPQ). Knowledge EBP included research, information technology skills, and the ability to interpret the literature and apply it to individual patients or populations (Upton & Upton, 2006).

*Nurse's Practice of EBP.* The practice of EBP addressed the frequency with which the nurse applied the steps of EBP to individual patient care. In the development of EBPQ, Upton and Upton (2006) used the steps of EBP outlined by Sackett, Richardson, Rosenberg, and Haynes (2000). These steps included formulating answerable questions,

acquiring literature, critically appraising the literature, integrating the evidence, evaluating the outcome, and sharing the literature with colleagues.

*Nurses' Attitudes towards EBP.* Nurse's attitudes towards EBP was measured using EBQ. Attitude included perceived barriers (e.g., workload) along with personal judgments as to the value of EBP (Upton & Upton, 2006).

*Barriers to EBP.* The BARRIERS to Research Utilization Scale (Funk et al., 1991) measured barriers to EBP. The scale addressed barriers to research utilization within the context of four domains: nurse, setting, research, and presentation.

### *Measures*

#### *Demographic Information*

The following items were collected as part of demographic information: gender, age, ethnicity, first degree in nursing, year first degree in nursing earned, country granting degree, highest degree earned, year highest degree earned, years of experience as a RN, present nursing position, current practice area, and years in current position.

#### *BARRIERS: The Barriers to Research Utilization Scale*

The BARRIERS Scale, developed by Funk et al. (1991) and cited in more than 30 published studies (Hutchinson & Johnston, 2006), was a 35-item instrument; 29 fixed-response questions, five respondent-derived and rated barriers, and one open-ended question. The four factors on the scale included characteristics of the potential adopter, characteristics of the organization in which the research would be used, characteristics of the innovation of the research, and characteristics of the research communication.

The BARRIERS scale was adapted from the Conduct and Utilization of Research in Nursing (CURN) questionnaire developed by Crane, Pelz, and Horsley (1977). Internal



reliability was established with Cronbach's alphas ranging from 0.86 to 0.91 (Fink et al., 2005; Funk et al., 1991). The construct of the BARRIERS scale was based on Rogers' Diffusion of Innovations and followed important factors in the model (Karkow & Peters, 2006).

Closs and Bryar (2001) conducted a study in Great Britain using the BARRIERS scale. These researchers used exploratory factor analysis and identified four factors: (a) the benefits of research, (b) quality of the research, (c) accessibility of the research, and (d) resources for implementation. These factors were similar but not identical to the original study by Funk et al. (1991) with only 22 of the 28 items retained. The alpha coefficients for the four factors were 0.79 for research, 0.66 for accessibility, 0.75 for quality, and 0.69 for resources. Closs and Bryar concluded that some items contained in the scale did not fit the situation in Great Britain adequately. Furthermore, in their analysis of studies using the BARRIERS scale, Hutchinson and Johnson (2006) cautioned that the extent to which some nurses identified certain items as barriers was context specific. While barriers were ranked with a large degree of consistency, some differences occurred in rank ordering and should be considered when interpreting the results and planning strategies to overcome perceived barriers.

In a descriptive quantitative study by Karkow and Peters (2006), the questions on the scale were categorized into four domains based on factor analysis; nurse, setting, research, and presentation. Each of the four factors was tested for validity and internal consistency, while reliability was calculated using Cronbach's alpha, although these statistical values were not reported. The researchers found that the setting domain was the greatest barrier for nurses, with four of the top five barriers related to the setting.

The researchers for the EPBI program evaluation selected this scale based on its extensive use in the literature and the linkage of the factors to Rogers' Diffusion of Innovation theory. The instrument was found to be reliable and valid (citations); however, poor response rates have been a limitation in most published studies (Hutchinson & Johnson, 2006) and the primary investigator in this study received e-mails from respondents regarding confusing sentence construction and terminology. Analysis of missing data reflected that some respondents began questionnaires and stopped before completion. In addition, results might be contextual and work area should be a consideration when developing strategies to reduce barriers.

#### *Evidence-based Practice Questionnaire (EBPQ)*

The EBPQ, developed by Upton and Lewis (1998), was a 25 item, self-reported measure of knowledge, practice, and attitudes toward EBP. The questionnaire comprised three distinct scales: (a) practice of EBP, (b) attitudes towards EBP, and (c) knowledge of EBP (Upton & Upton, 2006). A literature search of key factors influencing EBP resulted in an extensive item pool. Experienced healthcare professionals who established face validity refined the item pool. All items were scored on a Likert-type scale from 1 – 7: Part I, *never to frequently*; and Part II on a range tied to two opposing statements; and Part III, *poor to best*.

Principal component factor analysis was used to determine the underlying dimensions of the scale. Internal consistency of the scale was assessed by Cronbach's alpha at 0.87 for the entire questionnaire, 0.85 for the practice of EBP subscale, 0.79 for the attitudes subscale, and 0.91 for the knowledge/skills subscale. Validity was assessed

via construct and discriminate validity with correlation coefficients ranging from 0.3 – 0.4 ( $p < 0.001$ ).

Hyman (2006) and Lehman (2007) reported using the EBPQ in studies reported in unpublished conference proceedings. The psychometrics properties of the EBPQ were not reported in these studies other than to state that the EBPQ had established reliability and validity. Limited publication of studies existed utilizing the EBPQ prior to the publication of conference proceedings and Koehn and Lehman (2008), Upton and Lewis (1998), and Upton and Upton (2006) were the only authors to publish EBPQ study findings. In the study by Koehn and Lehman, the Cronbach's alpha was 0.94 (entire questionnaire), 0.87 (practice), 0.72 (attitude), and 0.95 (knowledge/skills).

#### *Focus Group Questions*

An interview guide, approved by the Sharp HealthCare Institutional Review Board (SHC IRB), contained information about the purpose of the focus group and the procedures during the session. The PI read this information prior to the start of each focus group. The guide contained two sets of questions in order to elucidate the unique experience of the fellows and mentors.

#### *Human Subjects Protection*

Approval was obtained from the SHC IRB on three occasions to conduct a descriptive survey of hospitals within SHC, the EBPI repeated measures surveys, and the focus group sessions with fellows and mentors. The repeated measures and focus group sessions were submitted to the IRB as addendums to the descriptive survey conducted in November 2006 as a baseline assessment of all nurses within SHC. Participation in the surveys and focus groups was strictly voluntary and all data collected were confidential.

Participants' names and any other information that identified participants did not appear on the surveys with the exception of the first data point of the SHC EBPI cohort. Once the surveys were matched to the second data point, all identifying information was eliminated from the first set of surveys. Information collected during the descriptive study was electronically stored with no identifying information. Information collected as part of the analysis of the educational intervention was stored in a protected, private, locked area accessible only to the primary investigator. All collected data will be retained for 5 years after the completion of this study, then destroyed.

Study subjects were not paid to participate in the descriptive study, the first EBPI survey data point or the focus groups; however, subjects were offered a \$5.00 Starbucks gift card for the second EBPI survey packet if it was completed and returned. There were no physical or psychological risks to participant in either the descriptive EBP study or the EBPI feasibility study; however, fear of speaking in a group setting might have inhibited contributions of subjects in the focus group setting.

#### *EBPI Feasibility Study*

*Repeated measures surveys.* Fellows and mentors who completed the first data point prior to the launch of the EBPI were instructed to put their names on each of the surveys and submit them to faculty members. At that time, collection of the surveys was for the purpose of course evaluation and not an analysis of repeated measures over time for each participant. Survey data was stored in a locked drawer in a faculty members' office. Once the researcher decided to conduct a mixed method analysis of the EBPI, and after approval from the IRB was obtained, each member of the SHC cohort received a package by postal mail containing a letter explaining the purpose of the survey, a

demographic form, and the BARRIERS and EBPIQ surveys. All documents were coded to protect the identity of survey participants. The letter indicated that completion of the demographic form and surveys was implied consent. The letter explained the voluntary nature of the surveys and that their employment would not be affected by non-completion of the surveys. Participants returned the surveys by mail where they have been stored in a locked drawer accessible only by the principal investigator.

*Focus groups.* Upon approval by the SHC IRB, the SHC EBPI fellows and mentors participated in focus groups. Each group, invited to participate by the principal investigator, proceeded to the identified room at predetermined times. The fellows and mentors were separated for two reasons; the first to learn about the experience unique to the particular role, and second to minimize the effect of potential power relations, although the PI/interviewer remained cognizant of these effects throughout the focus groups.

The researcher read information to the participants about the purpose of the focus groups and the confidential nature of their responses emphasizing that participation was voluntary, could be terminated at any time, and non-participation would not affect their employment. Additionally, participants were informed that the discussion would be tape recorded. Once instructions were completed and a verbal consent to proceed obtained, the PI/interviewer asked participants the predetermined focus groups questions. Responses to questions were probed further when indicated to clarify responses or acquire expanded detail or information.

*University of San Diego Institutional Review Board Approval*

Prior to proceeding with secondary data analysis of the preexisting data from SHC, approval was obtained from the University of San Diego IRB. Procedures and documentation required by the IRB were followed (Appendix A).

## CHAPTER 4

### Results

The purpose of this study was to examine the effect of an educational initiative on nurses' knowledge, practice, attitudes, and barriers to evidence-based practice. Secondary data analysis was conducted on pre-existing data collected in three phases, from January 2007 through June 2008, and included (a) quantitative pre-test and post-test using two surveys, (b) focus groups interviews to ascertain qualitative information about the experience of the mentors and fellows in the education program, and (c) a follow-up survey to determine participant activities post completion of the EBPI. In this chapter, the specific findings for each aim are presented.

#### *Participant Profile*

The original cohort consisted of 17 mentor-fellow dyads. Because one mentor had two fellows, 33 participants registered on the first day of the EBPI. Over the next 6 months, eight participants were lost to attrition. Table 6 describes the participants who did not complete the EBPI. An additional two participants completed the classes but did not graduate, thus 23 mentors and fellows completed the program. Only the participants who completed the pre- and post-test of the surveys are included in the participant profile. These participants, ( $n = 17$ ), also attended the project

dissemination and graduation day held in October 2007. The return rate for the post-test surveys was 74%.

Table 6

*Reasons for Participant Attrition*

Participant	Total # of Classes	Reason for Attrition
Fellow-1	1	Did not wish to continue after Class 1
Mentor-1	1	Fellow left the program – see Fellow-1
Fellow-2	4	Mentor moved out of state – see Mentor-2
Mentor-2	4	Moved out of state
Fellow-3	1	Mentor backed out of EBPI – see Mentor-3
Mentor-3	1	Unable to fulfill commitment as mentor
Mentor-4	4	Moved out of the county
Fellow-4	1	Unknown
Fellow-5	6	Completed classes – moved out of state
Fellow-6	6	Completed classes – did not finish project

Participant profile information is presented in two groups, mentor and fellow, with a comparison of participant demographics. The majority of the participants in the mentor-fellow sample were female (94.1%). Age ranges for both the mentor and fellow groups were between 30 years and 59 years. The primary ethnic group for mentors (87.5%) and fellows (55.6%) was White non-Hispanic with missing data for one fellow participant (see Table 7).



Table 7

*Mentor and Fellow Personal Characteristics*

Characteristics	Mentors		Fellows	
	<i>n</i>	%	<i>n</i>	%
Gender	8		9	
Male		12.5		
Female		87.5		100.0
Age	8		8	
30-34		37.5		11.1
35-39				11.1
40-49		25.0		33.3
50-59		37.5		23.3
Ethnicity	8		8	
Black (not Hispanic)				11.1
White (not Hispanic)		87.5		55.6
Asian/Pacific Islander				11.1
Multi-Ethnic		12.5		11.1

A characteristic that differed between the mentors and fellows was the highest educational degree earned. Consistent with the definition of mentor, a trusted counselor or teacher, and the idea that a mentor has additional knowledge to offer, mentors had a larger percentage of advanced degrees (Master's 75.0%) as compared to the fellow group (Master's 22.2%; see Table 8).

Table 8

*Mentor and Fellow Academic Preparation*

Characteristics	Mentor		Fellow	
	<i>n</i>	%	<i>n</i>	%
First Nursing Degree	8		7	
Associate Degree		12.5		44.4
Diploma		12.5		
Baccalaureate (Nursing)		62.5		11.1
Baccalaureate (Other Field)				11.1
Master's Entry Program in Nursing		12.5		11.1
Year of Graduation First Degree	8		8	
1972 to 1979		37.5		11.1
1982 to 1988		12.5		11.1
1993 to 1997		12.5		44.4
2000 to 2001		37.5		22.2
First Degree Country of Origin	8		8	
United States		87.5		77.8
United Kingdom		12.5		11.1
Highest Degree Earned	8		9	
Associate Degree				44.4
Baccalaureate (Nursing)		25.0		22.2
Baccalaureate (Other Field)		11.1		11.1
Master's (Nursing)		75.0		11.1
Master's (Other Field)				11.1
Year of Graduation Highest Degree	8		9	
1979				11.1
1981 to 1982		12.5		11.1
1993 to 1997				44.4
2000 to 2007		87.5		33.3

Current position was an additional characteristic that differed between the mentor and fellow groups. The mentors were in positions that indicated advanced preparation or knowledge. Of these positions, advanced clinician and nurse manager also indicated some level of advanced skills or knowledge; however, the data demonstrated that fellows were matched with mentors in higher-level positions (see Table 9).

Table 9

*Mentor and Fellow Nursing Experience and Tenure*

Characteristics	Mentor		Fellow	
	<i>n</i>	%	<i>n</i>	%
Years of Experience as RN	8		9	
3 to 7 years		37.5		22.2
8 to 12 years		12.5		11.1
13 to 20 years		12.5		55.6
21 years or over		37.5		11.1
Present Nursing Position	8		9	
Full-time Clinical Nurse				22.2
Part-time Clinical Nurse				11.1
Full-time Advanced Clinician				55.5
Nurse Manager				11.1
Nurse Director		12.5		
Clinical Nurse Specialist		62.5		
Nurse Educator		25.0		
Current Practice Area	8		9	
Cardiac/Telemetry		25.0		22.2
Critical Care		25.0		22.2
Emergency Department		12.5		
Labor and Delivery				22.2
Medical-Surgical				11.1
Neonatal Intensive Care Unit				11.1
Regulatory				11.1
Quality Case Management		12.5		
Surgery		12.5		
Years of Experience in Current Position	8		9	
< 6 months		12.5		
6 to 11 months				11.1
1 to 2 years		50.0		11.1
3 to 7 years		37.5		33.3
8 to 12 years				11.1
3 to 20 years				22.2
21 years or over				22.2

### *Descriptive Findings*

*Aim #1. Examine nurses' levels of knowledge, practice, and attitudes toward evidence-based practice and barriers to research utilization before and after participation in a structured Evidence-Based Practice Institute educational program.*

#### *BARRIERS to Research Utilization Scale*

The Barriers Scale addressed four factors, each with a scale score and a total score. The four factors were characteristics of the adopter, characteristics of the organization, characteristics of the innovation, and characteristics of the communication.

Table 10

*Comparison of Mentors and Fellows BARRIERS Scale at Pre and Post-Test*

		Pretest	Posttest	Mean	<i>t</i> -test	<i>p</i> -value
		M (SEM)	M (SEM)	Differences <sup>a</sup>	(Paired)	
Characteristics of:						
Adopter	Mentors	2.79 (0.16) ( <i>n</i> =8)	2.80 (0.09) ( <i>n</i> =8)	-0.01	-0.54	0.959
	Fellows	2.32 (0.19) ( <i>n</i> =9)	2.22 (0.25) ( <i>n</i> =9)	0.10	0.771	0.463
Organization	Mentors	3.02 (0.20) ( <i>n</i> =8)	2.80 (0.16) ( <i>n</i> =8)	0.21	0.80	0.450
	Fellows	2.89 (0.15) ( <i>n</i> =9)	2.89 (.23) ( <i>n</i> =9)	0.00	0.16	0.988
Innovation	Mentors	2.33 (0.16) ( <i>n</i> =7)	2.38 (0.19) ( <i>n</i> =7)	-0.05	-0.281	0.788
	Fellows	2.16 (0.15) ( <i>n</i> =5)	2.20 (0.27) ( <i>n</i> =5)	-0.04	-0.220	0.837
Communication	Mentors	2.65 (0.16) ( <i>n</i> =8)	2.646 (0.15) ( <i>n</i> =8)	0.004	0.017	0.987
	Fellows	2.37 (0.19) ( <i>n</i> =9)	2.63 (0.10) ( <i>n</i> =9)	-0.26	-1.474	0.179

*Note.* <sup>a</sup>Post-test mean score – pretest mean score

The top three barriers pre- and post-test were calculated for each group. In the mentor group, there were four barriers in the pre and post-test groups as two barriers at each time had the same means. The common barriers for both data points were the

following statements: *the nurse does not have time to read research*, and *the nurse does not feel that he/she has enough authority to change patient care procedures*. In the fellow group, there were four barriers in the pre- and post-test groups as two barriers at each time had the same means. The common barrier for the fellows at both data points was the following statement: *there is insufficient time on the job to implement new ideas*. The common barriers for both mentors and fellows pre-test were *the nurse does not feel that she/he has enough authority to change patient care procedures* and *the amount of research information is overwhelming*. At post-test, the common barrier was *the nurse does not have time to read research*.

Table 11

*Mentor and Fellow Top Three Barriers Pre- and Post-test*

Barriers	Mean
<b>Mentors Top 3 Barriers (Pretest)</b>	
The nurse does not have time to read research	3.62
The relevant literature is not compiled in one place	3.50
The nurse does not feel she/he has enough authority to change patient care procedures	3.38
The amount of research information is overwhelming	
<b>Mentors Top 3 Barriers (Post-test)</b>	
The nurse is unaware of the research	3.50
The nurse does not have time to read research	
The nurse does not feel she/he has enough authority to change patient care procedures	3.25
Physicians will not cooperate with implementation	3.14
<b>Fellows Top 3 Barriers (Pretest)</b>	
There is insufficient time on the job to implement new ideas	3.56
Physicians will not cooperate with implementation	
The nurse does not feel she/he has enough authority to change patient care procedures	3.33
The amount of research information is overwhelming	3.11
<b>Fellows Top 3 Barriers (Post-test)</b>	
There is insufficient time on the job to implement new ideas	3.44
The nurse does not have time to read research	3.22
The relevant literature is not compiled in one place	
Research reports/articles are not readily available	3.11



### *BARRIERS Open-Ended Questions*

Following the fixed-response questions, the BARRIERS instrument asked respondents two open-ended questions: (a) *Are there other things you think are barriers to research utilization?* and provided space for four responses, and (b) *What are the things you think facilitate research utilization?*” Responses from mentors and fellows were reviewed and coded into the following themes: time, knowledge, support, and culture with each theme differentiated into a barrier or a facilitator.

*Time.* Mentors and fellows identified time as a barrier to EBP. Without time, respondents perceived that workload prevented staff nurse participation in EBP. Suggested facilitators to address this barrier at the start of the EBPI included time set aside to work on projects, paid classes, and funded non-productive time for staff nurse involvement. Upon completion of the EBPI, similar suggestions to address time as a barrier included paid time out or time given to complete projects.

*Knowledge.* Knowledge of research and EBP processes were identified as barriers at the start of the EBPI and suggested facilitators include study groups, discussions, and presentations of new research to keep staff current, education rolled out to all nurses, journal clubs, and higher education (e.g., college classes). At the conclusion of classes, multiple participants identified the EBPI as a facilitator of knowledge about EBP along with attendance at research council meetings, journal clubs, and nursing courses at the graduate level.

*Support.* The theme of support included resources and mentoring. Participants identified the following facilitators at the beginning of the program: readily available relevant research without leaving campus or going to the library, mentoring from

advanced practice nurses, and administration and physician support. At the conclusion of the institute, additional backing included leadership that supported EBP efforts with mentors, advanced practice nurses, resources to do the literature searches, and shared decision-making meetings within a collaborative governance model.

*Culture.* Culture in organizations included assumptions, norms, and values, and sets the tone and expectation for change. Participants, primarily mentors, identified multiple culture-related barriers (e.g. lack of professional nursing qualities in staff, finding staff to implement new practice, lack of interest or motivation to change practice, EBP not modeled in administrative practices, defensive nursing practice, and attitudes). Encouragement and empowerment, defined need for change, acceptance of change, creation of a culture open to new ideas and research, and a team approach to gathering evidence, analyzing, and creating excitement about changing practice were facilitators identified by participants at the start of the EBPI.

Additional barriers at the conclusion of classes focused on entrenched nursing practices and that nurses did not feel empowered to make changes. Suggestions for additional facilitators included frequent feedback to staff about results and outcomes, well-informed leadership, education as the rationale of why things needed to change (e.g., based on research), processes to regularly review gaps in practice, working in a progressive unit that embraced change and best practice, and having a governing body, shared decision making, or steering committee to act as an advocate for a change

### *EBPQ*

The EBPQ had three distinct scales: practice of EBP, attitudes towards EBP, and knowledge and skills associated with EBP. Table 12 contains the pre- and post-test

results from the mentors and fellows. The statistically significant finding post-test occurred for fellows in the scale identified as *knowledge and skills associated with EBP*.

Table 12

*Comparison of Mentors' and Fellows' EBPQ Scale at Pre- and Post-Test*

		Pretest	Posttest	Mean	<i>t</i> -test	<i>p</i> -value
		<i>M</i> (SEM)	<i>M</i> (SEM)	Differences <sup>a</sup>	(Paired)	
Practice of EBP	Mentors	5.63 (0.36)	5.63 (0.38)	0.00	0.00	1.00
		( <i>n</i> =8)	( <i>n</i> =8)			
	Fellows	4.76 (0.51)	5.49 (0.31)	-0.73	-1.917	0.091
		( <i>n</i> =9)	( <i>n</i> =9)			
Attitude Toward EBP	Mentors	6.06 (0.26)	5.88 (0.27)	0.19	0.462	0.658
		( <i>n</i> =8)	( <i>n</i> =8)			
	Fellows	5.47 (0.45)	5.72 (0.31)	-0.25	-0.647	0.536
		( <i>n</i> =9)	( <i>n</i> =9)			
Knowledge/Skills Associated with EBP	Mentors	5.41 (0.26)	5.63 (0.26)	-0.21	-0.53	0.518
		( <i>n</i> =8)	( <i>n</i> =8)			
	Fellows	4.36 (0.26)	4.99 (0.18)	-0.63	-2.499	0.037*
		( <i>n</i> =9)	( <i>n</i> =9)			

*Note.* <sup>a</sup>Post-test mean score – pretest mean score.

\**p* < .05.

*Measure Reliabilities*

The reliabilities for the BARRIERS and EBPQ are found in Table 13. The post-test reliability coefficient for two of the subscales, BARRIERS Characteristics of the

Communication and the EBPQ Attitude toward EBP, were lower than the pre-test and original reliability coefficients.

Table 13

*Measure Reliabilities*

Measure	Alpha		
	Pre	Post	Original
<b>Barriers</b>			
Characteristics of the Adopter	.81	.83	.80
Characteristics of the Organization	.70	.78	.80
Characteristics of the Innovation	.70	.79	.72
Characteristics of the Communication	.73	.31	.65
<b>EBPQ</b>			
Practice of EBP	.93	.87	.85
Attitude Towards EBP	.56	.37	.79
Knowledge/Skills Associated with EBP	.94	.91	.91

*Aim #2. Examine the relationship of selected demographic variables to nurses' levels of knowledge, practice, and attitudes toward evidence-based practice and barriers to research utilization before and after participation in a structured EBPI educational program.*

The relationship of knowledge, practice, and attitudes of EBP and barriers to research utilization to highest overall degree, position, years of experience as RN, and years of experience in current position was examined pre- and post participation in the

EBPI. Because the scales were continuous, the relationship was examined through analysis of variance (ANOVA) with post-hoc Scheffé. In some cases, the latter test could not be completed due to limited samples sizes in particular groups. The analyses did not yield any statistically significant relationships between the identified demographic variables and the BARRIERS scale dimensions or the EBPQ subscales.

*Aim #3. Identify qualitative themes described by nurse participants regarding the perceived benefits and barriers of participation in a structured EBPI educational program.*

Qualitative data were obtained through focus groups with the mentors and fellows during the last class of the EBPI. Mentors and fellows were invited to participate in the focus groups that were held in an adjacent classroom. The tables in the room were configured in a U-shaped and, as such, the interviewers could see all of the participants. Each focus group was approximately 1 hour. Field notes written at the time of the focus groups reflected nine participants in the mentor group and 11 in the fellow group. Of the 25 mentors and fellows that completed the classes, this yielded an 80% participation rate for the focus groups.

A field guide or list of questions (Appendix B) was used to conduct the focus groups. The questions in general addressed the application of the information learned in the EBPI, barriers to implementing EBP, beneficial aspects of the program, and recommendations for change. A medical transcriptionist transcribed the tapes. The transcripts were then reviewed for accuracy by the PI. Two researchers participated in the interviews and the initial analysis of interview data involved a review of the field notes

and key phrases mentioned during the interview. The two researchers independently conducted coding and thematic analysis of the transcripts and then reviewed, compared, and contrasted identified themes and agreed on final themes. The qualitative data was reported in three broad themes identified through the analysis: organizational culture and support, EBPI structure and process, and professional growth and development. Barriers and facilitators were discussed as appropriate within each theme.

### *Organizational Culture and Support*

Culture can be viewed as the attitudes, experiences, beliefs, and values of an organization. Although the focus group participants were from one healthcare system, they represented five hospital sites. The culture of each organization varied based on the support systems available to the mentors and fellows, the perceived value of the EBPI by colleagues and managers, and the method in which projects were selected. Mentors and fellows described time as a significant factor in the success or failure of a project seen to completion. One mentor commented, “when we committed and signed the contracts, I questioned if you needed all this time with your person, but actually getting it scheduled was much harder than I thought it would be.” As a new program, the acceptance of release time was a challenge reported by the majority of fellows. The release time for the classes was not as much an issue as scheduling the time to work on the projects, because the value of the EBPI and the project was not known. The most successful fellows described working with their managers to pre-schedule time to work on the project with their mentor. Although one fellow commented, “my manager signed my application but she really didn’t know what was involved. So after the first couple of classes I went back to her for more time. She said it was impossible so I spent a lot of my own time doing the

work.” Several fellows described the need to defend their hours out of patient care to their colleagues and also commented that co-workers were hesitant or reluctant to cooperate with the project.

Most mentors expressed concern for their ability to connect with fellows to help facilitate their projects. Fellows described what they thought it took to be a great mentor and added that the mentor needed to be a leader, be accessible, take initiative as well, and lead by example. One fellow commented that her mentor was sympathetic and went out of her way to schedule time to support her project. Another fellow commented, “I had the perfect mentor. I had her home phone, her cell phone, and her personal email, and she was always there for me.” Several fellows, however, talked about the lack of access to their mentors. One expressed frustration that her mentor missed the majority of the classes and was not available for assistance at the hospital. Another commented that her mentor worked part time, that she did not have a relationship with the mentor, and that her mentor “had no interest in my project at all.” She attributed this to the fact that her mentor was from a department other than her own. Overall, mentors and fellows reported that there needed to be a *fit* or connection between the dyad for the relationship to be effective and the project to be successful.

The selection process for the fellowship program involved the submission of an application and an idea for a project. In some cases, the projects were pre-selected for the fellows. Two mentors described working with fellows in which the projects were selected for the fellows based on organizational need instead of personal passion for the topic. One mentor commented, “I felt walking into it that it wasn’t her idea and sometime it was hard to get her to pay attention.” Another mentor went on to say, “you want to serve the

entity or system goal but at the same time have your fellow have a passion for the topic.” Additionally, one of the hospitals within the system had the Magnet designation and a second hospital was in the process of submitting the documents required for Magnet. One mentor commented that, in “the absence of a Magnet mandate, I don’t know if it was worth it” in reference to the organizational significance of the project. Knowing “what was feasible in an institution and what reality was” was another factor that influenced what one was capable of doing in the prescribed timeframe of the EBPI.

Additionally, there were identified barriers that restricted the ability for fellows to access the Internet due to an organizational policy to restrict access to unauthorized Internet sites. This impeded the fellows’ ability to conduct literature searches. Most clinical workstations also did not have word processing software. This was not an issue for mentors, as the majority of mentors had their own offices and access to a non-restricted computer.

The availability of hospital-based mentors for the dyads was another area identified as a challenge for some participants. Two of the hospitals had designated directors of research and education and one hospital had a nurse researcher. Mentors and fellows at these hospitals had direct access to these individuals in between classes for review of documents and to coach them through the IRB process. One fellow commented, “she (the director of research) has been very helpful and very supportive of us and helped us get IRB approval.” In the classroom setting, faculty made rounds to the dyads during experiential work on the projects; however, the lack of on-site hospital resources was a barrier to timely completion of project milestones.



Lastly, two of the EBPI classes contained content about planned change and facilitation strategies. Participants talked about challenges, especially the ability to engage all shifts. One fellow described focusing on communication to gain buy-in to the project and several participants talked about it “being harder to get the doctors on board.”

#### *EBPI Structure and Process*

Questions that addressed the EBPI structure and processes asked about the design of the curriculum, the course materials, and timing of the classes, including a break during the summer. Mentors and fellows had numerous comments about the structure and processes involved in the EBPI and offered suggestion for improvement for future cohorts. Participants relayed the need to start marketing the next fellowship program at least 3 to 4 months in advance to allow adequate time to identify a question, submit the application, and, if selected, schedule the classroom and release days. The EBPI was designed to be six classes over the same number of months, but the first three classes were held with only 2 weeks in between each class. While this gave participants needed content early on in the program, mentors noted that it was too much, too fast. Consensus from the mentor and fellow groups was to offer the classes once a month to ensure time to reach the expected project milestones.

The projects were bigger in scope than anticipated and there was a significant amount of up-front reading. Fellows described the textbook as complicated with unfamiliar language. Both mentors and fellows found the articles about specific steps in the EBP process just as valuable to their learning. Mentors and fellows described *pressure points* or challenges in the program, including the development of the PICO question, the literature search and review, and the process to obtain IRB approval. One

fellow noted he or she would have liked to develop the PICO question sooner and that would have helped with the literature search. A mentor experienced lost time though the IRB process. A fellow commented, “my mentor and I scheduled an 8-hour day to do our IRB application; you want to make sure you say the right things, and we are still working on it.” This fellow went on to say, “we felt we were behind but then you come to class and realize that half of the people are still working on it, too.”

Helpful aspects of the program included the EBPI notebook with all the materials and tools, “really good teachers with no dull lectures,” and the website with all of the course materials. The first class addressed literature reviews and participants noted it helpful to have the hospital librarians in the computer lab assisting with searches. Other positive comments included, “this is a great program, the faculty is awesome and highly educated, and that they lectured on what they were knowledgeable of or excited to talk about.” Another benefit was the diversity of nurses from 11 hospitals in San Diego and a fellow commented that she “enjoyed the variety of nurses from throughout the county and being able to hear that they were experiencing the same kind of things in their facility.” Both fellows and mentors discussed the benefits of interacting with nurses from other healthcare systems during EBPI participation.

### *Professional Growth and Development*

A consistent theme among mentors and fellows was the application of EBPI classroom learning to the work setting. Fellows reported being approached by their managers or co-workers to assist with literature searches, participate in unit-based or hospital practice councils, and unit evidence-based quality improvement. One fellow commented, “my manager knows what I’ve been doing. She actually came to me the

other day and asked me if I could research something for her now that she knows I have these tools.” Several fellows commented on seeing a bigger picture than before attending the EBPI and further elaborated that this entailed questioning practice and differentiating between practice based on evidence and habitual practice. “I’m definitely seeing patients and their disease processes in a different light.”

Two of the hospitals had shared governance councils and one fellow described the opportunity to attend the research council and present her project. This fellow depicted the presentation as a growth opportunity in a helpful setting. Tools to facilitate change introduced in the classes were reported to be beneficial and facilitate both the EBP project and the ability to perform one’s job. A fellow talked about how “I feel I was lacking in certain skills and tools but in these 6 months, I’ve learned so much and I have taken these tools back to quality committees.”

Several fellows described acting as a catalyst to generate enthusiasm in other staff members for their project. Comments included, “they are starting to show interest and are curious,” and “they are really excited and want to be part of it.” One fellow stated that involvement in the EBPI added credibility to her experience as a nurse and she added that, in her recent annual performance appraisal, “my goal for next year is to be more of a leader and I know it has to do with my project.”

Mentors who attended the classes along with the fellows described growth and development experiences similar to the fellows. One mentor described “picking up something new,” doing the exercises in class related to the change process and the identification of key stakeholders. Another commented how she learned to develop an elevator speech and coached her fellow by saying, “pretend I am a stranger you met in

the elevator. Tell me your speech because that is what you want to give in the practice council.” The mentor went on to comment about the excitement and enthusiasm that was generated by participation in the EBPI and noted that the unit practice council was excited for her fellow and interested in the project.

Several fellows talked about returning to school and one described an educational gap. “I got my master’s degree in 1989, so that was a long time ago and it’s been so good to be able to do work like this, you know, get a refresher.” This fellow talked about returning to school for additional postgraduate work. A second fellow talked about how the EBPI “takes you through every little baby step you need to do to get there.” The fellow added that now she was more interested in going back and getting a master’s degree, commenting “it [the EBPI] really opens your eyes and makes you think maybe it’s all possible.”

*Gaps in development.* An area that mentors wished the EBPI had addressed was coaching for the mentors about how to support their fellow through the project. Mentors agreed that the dyad approach to the program provided them with the same course content as the fellows and allowed them to work on the projects together during the experiential exercises. Mentors and fellows agreed that a requirement for acceptance into program should be advanced-beginner to competent skills with word processing, data management, and presentation software. The fellows described the learning curve as a barrier to completion of the key milestones within the project timeline. A mentor also commented, “if they [fellow] haven’t been on a system or entity committee, they don’t realize all of the forces that could interact or impinge on what they are trying to do or even who they need to go to help them expedite the project.”

### *Follow-up Survey*

A follow-up survey (Appendix C) was mailed in June 2008 to participants who had responded to the post-test surveys in July 2007. Of the 17 respondents that returned the post-test surveys, 13 returned the follow-up survey; a 76% return rate for this data point and an overall return rate of 56% of the mentors and fellows who completed the program in 2007. The survey consisted of eight questions designed to ascertain information about the project completion and dissemination, use of evidence in practice, and professional growth.

#### *Project Completion and Dissemination*

This section of the follow-up survey asked respondents about project completion and dissemination. Of the 10 people that responded to this portion of the survey, seven completed their project and four indicated they had implemented the project beyond their unit or department through various modalities (e.g., changes in patient care orders, policies, procedures). Project dissemination consisted of poster presentations by four respondents at conferences (e.g., the National Training Institute) sponsored by the American Association of Critical Care Nurses and the National Association of Women's Health, Obstetric, and Neonatal Nurses convention. One respondent submitted a manuscript of the project to a journal for publication and another had been asked to write a manuscript. Five respondents participated in additional projects post EBPI completion.

#### *Use of EBP in Practice*

Respondents were asked two questions about the continued use of EBP related to the use of EBP skills in daily work and the opportunity to teach EBP skills to colleagues. Specific EBP skills identified in the survey included:

1. Formulating a key clinical question
2. Finding best clinical evidence to answer the question
3. Searching electronic databases
4. Appraising research articles critically
5. Synthesizing research articles
6. Applying evidence to patient care
7. Integrating evidence into clinical decisions
8. Evaluating outcomes

Overall, 10 respondents indicated that they used EBP skills in their daily work with one exception; only seven responded that they synthesized the literature. Two respondents qualified their response to the use of daily skills and added “often, not daily” or “not daily, but I do apply them at Research Council.” The opportunity to teach EBP skills to colleagues were less consistent; the majority of respondents helped colleagues formulate a question, find the best clinical evidence, apply evidence to patient care, integrate evidence into clinical decisions, and evaluate outcomes. Only six respondents reported that they helped colleagues search electronic databases, appraised research articles critically, and synthesized research articles. One respondent replied *no* to all the items and noted “I feel like I still need more practice on using these skills myself before I could teach them.”

### *Professional Growth*

The last section on the follow-up survey related to professional growth, future education, and role changes. To the question, *Have you or do you plan to enroll in a higher degree*, five out of 11 respondents indicated they planned to pursue higher

education. Of these five, three indicated they would pursue either a doctorate in nursing or education, one would obtain a master's in nursing with a specialty focus of clinical nurse specialist, and one already enrolled in a master's in nursing program to become a nurse practitioner. Regarding role changes since completing the EBPI, five of 11 respondents transitioned to new positions. These role changes included clinical nurse to advanced clinician, clinical nurse specialist to nurse manager (two respondents), educator to diabetes inpatient nurse specialist, and clinical nurse to per diem clinical nurse. Of these changes, four were promotions and one was a voluntary reduction in hours related to the birth of a child.

### *Summary of Results*

The results presented in this chapter addressed analyses of mixed method data. Of the two surveys administered at the beginning and conclusion of the EBPI, only the EBPQ had statistically significant results post-test in the fellow group for the subscale, knowledge and skills associated with EBP. While no dimensions on the BARRIERS scale were statistically significant, analysis of the open-ended questions revealed four themes: time, knowledge, support, and culture. There were also no statistically significant results when the two surveys were examined for relationships with degree, position, years of experience as RN, and years of experience in current position. Analysis of focus group data from the mentors and fellows revealed themes similar to the BARRIERS open-ended questions: organizational culture and support, EPBI structure and process, and professional growth and development. Results from the follow-up survey identified areas of continued growth for both mentors and fellows. Further interpretation and discussion of results can be found in Chapter 5.

## CHAPTER 5

### Discussion of Findings

The purpose of this study was to examine the effect of an educational initiative on nurses' knowledge, practice, and attitudes, and barriers to evidence-based practice. Informed by Rogers' (2003) Diffusion of Innovation theory, this chapter presents the meaning and significance of the study findings; the implications of the study for practice; education, and research, recommendations for future research; and the strengths and limitations of the study. The results will be presented addressing each aim; the qualitative data, open-ended questions, and focus groups will be used to further elaborate the effect that the program had on participant practice.

This was a feasibility study of an educational initiative to promote evidence-based practice. The sample size was small and varied among the data points; 25 mentors and fellows completed the EBPI classes, 23 graduated from the program, 17 returned both the pre and post-test surveys, 20 participated in the focus groups, and 13 returned the follow-up survey. Although the sample size was small, the results are important and contribute to decisions about continuation and expansion of the program. Subsequent to a decision to continue or expand the program, results of this study will direct curriculum modification.



*Aim #1. Examine nurses' levels of knowledge, practice, and attitudes toward evidence-based practice and barriers to research utilization before and after participation in a structured Evidence-Based Practice Institute educational program.*

There were no statistically significant differences in the BARRIERS scale pre- and post-test and may have resulted from the limited sample. However, two other components of the scale, the identification of the top three barriers and the results of the open-ended questions, provided useful information and will be discussed. Two consistent barriers identified by the mentors both pre- and post-test were: (a) the nurse did not have time to read research and (b) the nurse did not feel she or he had enough authority to change patient care procedures. In the fellow group, one consistent barrier remained, there was insufficient time on the job to implement new ideas. The nurse not having time to read research was the common barrier for both groups. The ranking of two of these barriers were similar to other studies that used this scale. Six studies listed the barrier, insufficient time on the job to implement new ideas, in the top three (Brown, 1993; Bryar, et al., 2003; Funk et al., 1991; Hutchinson & Johnston, 2004; Parahoo, 2000; Thompson, Chau, & Lopez, 2006). The barrier, the nurse does not feel she/he has the authority to change patient care procedures, was in the top three in four of the studies (Brown; Funk, et al.; Parahoo; Thompson, et al.).

Overall, three of the four barriers were identified by the fellows post test: (a) the nurse does not have time to read research, (b) the relevant literature is not compiled in one place, and (c) research reports/articles are not readily available, seem to indicate that the fellows were challenged by the ability to obtain and read literature for their projects.

This was consistent with the report from the focus groups that the literature search and review was a pressure point in the EBP project.

The open-ended BARRIERS questions themed into four categories: time, knowledge, support, and culture, identified the EBPI as a facilitator for research utilization in practice. The three focus group themes, organizational culture and support, EBPI structure and process, and professional growth and development, contained content similar to the BARRIERS open-ended questions. Time to work on the project was a significant factor reported by mentors and fellows on the BARRIERS question and in the focus groups. The EBPI was recognized as a facilitator of knowledge and professional growth. Mentors or advanced practice nurses were seen as a key facilitator of progression through the project cycle and the lack of an engaged mentor was identified as a barrier. Culture and supports, especially entity or hospital-based councils, managers, and researchers, were important to project success.

There was one statistically significant result for the fellow population on the EBPQ. Fellows demonstrated an increase in skills and knowledge associated with EBP at the conclusion of the program. The results from the focus groups for the fellows support the finding of an increase in skills and knowledge on the EBPQ. Fellows reported being recognized by their managers and colleagues for their new skills.

#### *Reliability of the Instruments*

The EBPQ subscale, knowledge and skills associated with EBP, demonstrated statistically significant results and had high reliability coefficients (pretest = 0.94; post-test = 0.91; original = 0.91). This factor was comprised of 14 items on the EBPQ. The reliability coefficients for two of the subscales, Characteristics of the Communication on

the BARRIERS instrument (pre-test = 0.73; post-test = 0.31; original = 0.65) and Attitude towards EBP on the EBPQ (pre-test = 0.56; post-test = 0.37; original = 0.79) were lower at post-test than the pre-test and original coefficients. The dimension, Characteristics of the Communication, comprised six items on the BARRIERS instrument and the attitude factor had four items on the EBPQ. Had there been statistically significant results for these two subscales, interpretation of the findings would have proceeded with caution because of the low reliability coefficients. Nunnally and Bernstein (1994) noted that, when instruments or subscales with fewer items were used with small samples, the result would be lower reliability coefficients. Predictably, the subscales of the instruments used in this study yielded low reliability coefficients and the EBPQ subscale might be problematic, with even with larger samples, because it comprised less than five items.

*Aim #2. Examine the relationship of selected demographic variables to nurses' levels of knowledge, practice, and attitudes toward evidence-based practice and barriers to research utilization before and after participation in a structured EBPI educational program.*

Analysis of the relationship among degree, position, years of experience in nursing, and year in current position with EBP and barriers to research did not yield statistically significant results. In some cases, due to the small sample, this analysis could not be conducted among several demographic variables and scales. In a study by Koehn and Lehman (2008) using the EBPQ, an analysis determined the effect of four educational levels on the dependent variables or the three subscales: use of EBP, knowledge and skills of EBP, and attitudes towards EBP. This study had a sample size of

407 participants and statistically significant differences were found among two of the four educational levels. Of the four educational levels, diploma, associate degree, bachelor's of science in nursing, and master's degree, the BSN group ( $n = 195$ ) demonstrated significantly higher scores than did the associate degree group ( $n = 123$ ). The diploma ( $n = 61$ ) and master's ( $n = 28$ ) groups were smaller and did not demonstrate statistically significant results. The study by Koehn and Lehman demonstrated that demographic variables (e.g., education) might influence dependent EBP variables; however, the analysis might not yield statistically significant results when with a small sample, as demonstrated by the current study.

*Aim #3. Identify qualitative themes described by nurse participants regarding the perceived benefits and barriers of participation in a structured EBPI educational program.*

Three themes emerged from the focus groups conducted with mentors and fellows: (a) organizational culture and support, (b) EBPI structure and process, and (c) professional growth and development. Results from the focus groups were discussed in the context of Rogers' (2003) perceived attributes of an innovation; relative advantage, compatibility, complexity, trialability, and observability. These five elements influence whether adoption of an innovation or new activity would occur.

Relative advantage referred to the degree an innovation was perceived to be better than previous ideas or current practice (Rogers, 2003). In addition, positive rewards, outcomes, or an increase in perceived status influenced the rate of adoption. The selection of fellows for the EBPI was a competitive process and selection might have been perceived as a positive reward or increase in status within the organization. Several

participants identified the EBPI on the BARRIERS scale open-ended question as a facilitator of research utilization. Overall, mentors and fellows had positive remarks in the focus groups about the benefits and, therefore, advantages of participation in the EBPI.

Compatibility was the degree to which the innovation is viewed as being consistent with existing values, past experiences, and needs of the potential adopters (Rogers, 2003). The adopters in this study were the mentors and fellows who reported time to work on the project as a challenge related to organizational culture and support and EBPI structure and process. Participants also reported helpful aspects of the program, including the course materials, the quality of the faculty, and the variety of nurses in the EBPI from other hospitals. Overall, while the focus group results supported the compatibility of the EBPI with meeting participants' needs, several gaps existed (e.g., coaching for the mentors, better identification of the learning needs of the fellows).

Complexity referred to the degree that an innovation was perceived as difficult to understand and use. Mentors and fellows reported challenges, or pressure points, related to the development of PICO questions, the literature search and review, and the process to obtain IRB approval. While participants reported these challenges, 25 completed the program and 23 attended the graduation ceremony where they were required to do a podium or poster presentation. Although there was an element of complexity in EBPI, the majority of participants completed the program and transferred at least some skills to the work setting, as reported through the focus groups.

Trialability was how an innovation could be tried on an experimental basis. The EBPI provided participants with the opportunity to trial skills in the classroom setting.

This included writing PICO questions, searching databases, developing elevator speeches about projects, practicing change strategies, drafting IRB narratives and abstracts, and developing spreadsheets and posters in the computer lab. In the focus groups, mentors and fellows reported using a variety of the skills in the work setting, including change strategies, database search skills, and elevator speeches.

Observability was the degree that the results of an innovation were visible. Adopters that could see the results of an innovation were more likely to adopt the idea. The visibility of an innovation, in this study the EBPI and the EBP projects, occurred when participants presented information at entity councils, gave elevator speeches, and disseminated results. Mentors and fellows were able to observe the effect of their work and reaction by colleagues and thus provided reinforcement to adopt the skills and knowledge learned in the EBPI.

#### *Power Relations*

The focus groups were also examined for possible power relations, referring to imbalances in relationships as a result of gender, ethnicity, or class. The theme of power relations that emerged in the focus groups was potentially one of class or hierarchical differences between the mentors and fellows. Several fellows described the lack of availability or support from their mentors. The fellows did not feel comfortable addressing this issue due to the legitimate or positional power of their mentor. Another possible source of class related power relations was that one of the interviewers was a nursing director at a hospital within the healthcare system. While the mentors and fellows presenting in the room were not in a direct-reporting relationship to the nursing director, an individual could have been perceived the nursing director as someone in a position of

power. As a result, there could have been measured responses to questions from the participants; however, there were no overt indications of this during the focus groups or in the data analysis.

### *Quality of Focus Group Data*

Four criteria could be used to determine the trustworthiness or quality of the focus group data: credibility, transferability, dependability, and confirmability (Polit & Beck, 2003). Attention to criteria addresses the truthfulness of the qualitative data. The focus group methodology, including collection and analysis, will be examined using each of the criteria.

#### *Credibility*

Triangulation is a technique that increases the credibility of qualitative data. This study used two methods of triangulation, (a) investigator triangulation or the use of more than one individual to collect and analyze the focus group data, and (b) method triangulation or the use of multiple methods to address the research question (e.g., quantitative surveys, focus groups). Member-checking or reviewing results with respondents was not a component of the study.

#### *Transferability*

Transferability addresses the generalizability of the data beyond the context in the study. In this study, the focus groups were from multiple hospitals within one healthcare system. The experiences of the mentors and fellows during EPBI classes might be generalizable to participants in fellowship programs in other hospitals or healthcare settings. Experiences described in the work setting of hospitals might be unique to the healthcare system culture and therefore might not be transferable.

### *Dependability*

This criterion refers to the stability of data over time and over conditions (Polit & Beck, 2003). Replication of the data was one method to address dependability: this was done on a limited basis through the distribution of the follow-up survey. Questions about project completion and dissemination, use of evidence in practice, and professional growth addressed themes identified from the focus group data.

### *Confirmability*

Confirmability addresses the objectivity or the neutrality of the data (Polit & Beck, 2003). The establishment of an audit trail, including documents from the focus group data collection and analysis, would allow an independent researcher to arrive at similar conclusions about the data. In this study, field notes, transcripts, methodological notes, and coding drafts were generated. The second interviewer compared documents for congruence; however, an independent researcher did not perform an audit of the data.

### *Implications for Nursing*

#### *Nursing Practice*

The results of this study inferred multiple implications for nursing practice. Fellowships for nurses facilitated the development of EBP knowledge and skills. Participation in a fellowship with mentor-fellows dyads promoted growth and development of both roles and enhanced the success of EBP projects. Nurse leaders needed to incorporate evidence into their own practice and provide an environment to build and support a culture of EBP. Additionally, readily available evidence to support nurses' decision-making about patient care would address identified barriers, including lack of time to conduct literature searches and apply findings to practice. The evaluation



of EBP fellowship programs and ready access to evidence will be explored in more detail.

### *Evaluation of EBP Fellowships*

Of the EBP fellowships or internships discussed in Chapter 2, only one used a standardized measure reported in the literature, the Alcock et al. (1990) Staff Nurses and Research Activities Scale (Larrabee et al., 2007). The use of a valid measure would strengthen the outcome evaluation of educational interventions to promote evidence-based practice in nurses. As discussed in Chapter 2, evaluation of educational interventions was essential to determine if learners developed the necessary knowledge and outcomes. Fineout-Overholt and Johnston (2007) emphasized the need for formal research evaluation of programs to determine outcomes and Larrabee et al. suggested that formal evaluation provided evidence for program improvement.

Evaluation of educational interventions might also be considered in the context of Kirkpatrick's (1994) four-level model for assessing training effectiveness. The levels consisted of (a) reaction (to the education program), (b) learning (did it occur?), (c) transfer (behavior change), and (d) results (metrics). The first two levels measured outcomes or learning that took place within the confines of a classroom and consisted of a course evaluation and some method to evaluate learning by the participant. Level 2 evaluation methods included post-tests, observation, return demonstrations, case studies, and other modalities to determine if positive changes in knowledge, skills, and attitudes occurred. A Level 3 evaluation, transfer of learning to the work setting, would assess the integration of EBP skills and knowledge in daily practice. Level 4 assessments looked at outcomes, demonstration of organization outcomes, and return on investment. Healthcare

organizations that implemented EBP fellowships programs should conduct formal research evaluations, use a standardized measure as one of the modalities to evaluate the program, address data-driven decision-making, outcome evaluation of curricula, and evaluation of learner's integration of EBP. Kirkpatrick's model for training effectiveness could be used in the planning stages of an educational initiative to identify carefully how learning outcomes would be assessed.

### *Access to Evidence*

This study evaluated the promotion of evidence-based practice through participation in the EBPI and completion of a project. The evaluation methods included the BARRIERS open-end questions. Focus group results identified lack of time as a significant barrier. Strategies to put the best evidence at a nurse's fingertips were needed to address top barriers (e.g., relevant literature not centralized in one place, research reports and articles not readily available) and the nurse did not have time to read research. There were solutions available that, when used with electronic documentation systems, provided the latest evidence for nurses to use in making decisions about care. Proprietary system contain templates, flow sheets, care plans, and an education checklist linked directly to underlying evidence (ZynxCare, n.d.) in a collaborative project between a healthcare system and a university's school of nursing with generated evidence-based protocols (Vanden Plas, 2008) and a electronic consultation site providing evidence-based information (Mosby, n.d.). In addition to providing the latest evidence in an actionable form, the proprietary and healthcare-university system also include data repositories that collect information supporting continuous improvement of clinical

outcomes. These systems remove barriers and enable nurses to practice evidence-based nursing.

### *Nursing Research*

Nurses who participated in the EBPI complained about the confusing sentence construction and terminology on the BARRIERS scale. Although the open-ended questions on the BARRIERS scale identified useful barriers and facilitators to research utilization, it was not an appropriate measure to assess evidence-based practice. This study was about evidence-based practice rather than research utilization. Definitions of EBP by Sackett (1996) and Melnyk and Fineout-Overholt (2005) were broader than using the best evidence in practice. There were two other EBP components, the integration of clinical expertise and consideration of patient preference. While over 30 studies were reported in the literature to have used the scale to report barriers to RU, it was not the best tool to evaluate the practice of EBP.

The second instrument used in this study, the EBPQ, was reported twice in the literature. The first study described the development of the questionnaire by Upton and Upton (2006). In the second study by Koehn and Lehman (2008), the authors stated that the EBPQ was new and needed additional testing. This recommendation was further reinforced by the findings in this current study, with low reliability coefficients for the attitude subscale. Another instrument could examine evidence-based practice and was recently developed by Gerrish, et al. (2007). This instrument, the Developing Evidence-Based Practice Questionnaire, might be a more useful but has only been reported in two studies in the literature, the development of the questionnaire and one subsequent study by several of the original authors. What is needed is a reliable and a valid measure to

assess the practice of using the best evidence in practice considering patient preferences and using clinical expertise. The instruments by Upton and Upton and Gerrish et al. have not been widely used and, based on this study and recommendations in the literature, these tools need to be further tested and refined.

#### *Research Strengths and Limitations*

The strength of this study was the mixed methods approach to evaluation of an education initiative to promote evidence-based practice. The open-ended questions and the focus group data supported the one significant quantitative finding and provided additional information about the EBPI that could be used to modify curricula for future cohorts. Evaluation of the mentors in addition to the fellows was an additional strength, as previous studies in the literature did not report similar analyses with the mentor population.

The primary research limitation was the small sample size resulting in statistically insignificant quantitative results, with the exception of one subscale on the EBPQ. Both the EBPQ and BARRIERS surveys were self-report; a disadvantage of this type of survey could be the potential of respondents to describe themselves erroneously in a more positive light (Polit & Beck, 2003). Milner, Estabrooks, and Humphrey (2005) recommended the design and use of instruments that assess the actual ability of participants to use evidence rather than those that use self-reported methods.

A second limitation pertains to the focus group theme described as organizational culture and support. The sample represented five hospitals within one healthcare organization. Because variation in the level of support existed between hospitals, the results of this theme cannot be generalized across the entire organization.

An additional limitation was that a third data point was not collected using the BARRIERS and EBPQ to determine sustainability of the program. However, since these results did not demonstrate statistical significance, with the exception of one subscale on the EBPQ, it was questionable whether a third data point would have demonstrated appreciable decreases in barriers and increases in EBP knowledge, attitude, and skill. Another suggestion to strengthen the study would be the inclusion of project outcomes and the determination of any patient benefit due to project implementation including a cost-benefit analysis as well as nursing-related or patient care outcomes.

A third data point was collected in the form of a follow-up survey that inquired about project completion, use of EBP skills, and growth and development. According to Rogers (2003), there are five steps in the decision-making process about whether to adopt an innovation: acquiring knowledge about an innovation, recognizing the advantages, engaging in activities that lead to rejection or adoption, incorporating the activity in to practice, and seeking reinforcement of the innovation. On the follow-up survey, 10 of the 13 respondents indicated that they used EBP skills in their daily work, approximately one-half taught skills to their colleagues, five indicated that they planned to pursue additional education, and four received job promotions. These results reflect that at least the latter half were innovators or early adopters of EBP. The lack of differentiation between mentor and fellow on the follow-up survey was a limitation.

### *Conclusion*

This study examined the implementation of an educational initiative to promote evidence-based practice. When viewed as an innovation, the adoption of the EPBI by mentors and fellows could be examined using Rogers' (2003) Diffusion of Innovation

theory. This theory described how innovations were spread and included four elements in the diffusion process: (a) the innovation, (b) the communication channel, (c) time, and (d) the social system. The innovation in this study was the Evidence-Based Practice Institute. The communication channels included the classes, change strategies (e.g., elevator speeches), and dissemination methods that were implemented over time, both during and after the EBPI. The social system included the mentor-fellow dyad, the participants and faculty of the EPBI, and a nurse manager and colleagues in the hospital setting.

Donabedian's (1980, 1988) model for evaluating the quality of care provided a contextual framework to summarize the influence of the EBPI on the overall outcome variable, the increased use of EBP. It was a linear framework of structure, process, and outcome designed for quality assessment and improvement processes. The structure in this study was the EBPI with additional structural supports at individual hospitals (e.g., councils, directors of research). Processes to support the EBPI resulted when appropriate structures were in place, including experiential learning and the mentor-fellow relationship. These processes incorporated communication channels or the means by which the EBPI content was shared with participants.

Measurement of outcomes demonstrated one statistically significant quantitative finding; the development of EBP skills and knowledge in the fellow group. Qualitative responses to the BARRIERS post-test open-ended questions as well as focus group questions identified the EBPI as an effective modality to increase evidence-based practice. Dissemination of project outcomes occurred at the EBPI graduation and later at various conferences. Finally, while there were improvements in nursing and patient outcomes, this study did not specifically track those outcomes.

Table 14

*EBP Structure, Process, and Outcomes*

Structure	Process	Outcome
<ul style="list-style-type: none"> <li>Evidence-Based Practice Institute</li> </ul>	<ul style="list-style-type: none"> <li>Experiential Learning</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of professional growth and development</li> </ul>
<ul style="list-style-type: none"> <li>Entity Research and Evidence-Based Practice Councils</li> </ul>	<ul style="list-style-type: none"> <li>Supportive Faculty Mentor-Fellow Dyad Relationship</li> </ul>	<ul style="list-style-type: none"> <li>Completion of classes</li> </ul>
<ul style="list-style-type: none"> <li>Entity Support Positions</li> </ul>	<ul style="list-style-type: none"> <li>Entity Resources and Procedures</li> </ul>	<ul style="list-style-type: none"> <li>Graduation from EPBI</li> <li>Dissemination of projects</li> <li>Improvement of nursing and patient outcomes</li> </ul>

Healthcare organizations are under increased pressure to provide quality care in a manner that does not injure or harm patients. Hospital acquired conditions (e.g., falls with injury, pressure ulcers, surgical site infections, catheter associated urinary track infections), preventable with the use of evidence-based guidelines, will no longer be paid by CMS. Therefore, a priority for every hospital is the integration of the best evidence into practice in a systematic manner to ensure safe, quality patient outcomes. Educational programs, including the Evidence-Based Practice Institute in this study, teach the value of

EBP and the steps to integrate evidence into practice. Fellowships were an effective modality in promoting evidence-based clinical decision-making about patient care.



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## Appendix B

**EBPI Focus Group Interview Guide****Participants:**

Mentors and Fellows from SHC in the Evidence-Based Practice Institute

- Focus Group 1 - Fellows – application of EBPI
- Focus Group 2 -Mentors – experience of mentoring

*Introductions*

Participants know each other from the fellowship program

*Purpose of the Focus Group*

We are here today to talk about your experiences as fellows (or mentors) in the EBPI. The purpose is to get your perceptions of the Institute, how you have applied the information... There are no right or wrong or desirable answers. You can disagree with each other, and change your mind. Please feel comfortable saying what you really think and how you really feel. Your employment at Sharp HealthCare will not be affected by any information that you provide.

*Procedure(s) of the Focus Group*

Dr. \_\_\_\_\_ and I will be taking notes and tape recording the discussion so that we do not miss anything you have to say. As you know, everything is confidential. No one will know who said what and data will be reported in aggregate only with no names attached. I want this to be a group discussion, so feel free to respond to me and to other members in the group without waiting to be called on. However, I would appreciate if only one person did talk at a time. The discussion will last approximately one hour. There is a lot I want to discuss, so at times, I may move us along a bit.

*Rapport Building*

This has been done at each class – icebreaker exercise – so this procedure will be deferred.

*Fellow Interview Questions - attached*

- Fellow
- Mentor

*Closure*

Thank you for your participation... Your comments have provided us with guidance for program enhancements for future fellowship programs.

*Fellow Interview Questions*

1. How have you applied the information from the EBPI in your work setting?
2. How have you shared the information with other nurses at work?
3. Of the materials – templates, tools, change strategies, etc. introduced to you through the classes, which ones have you used?
4. Of these materials, which have you found most useful? Of the materials mentioned, why haven't you found \_\_\_\_\_ useful? How could it be more useful?
5. What obstacles or barriers have you encountered when trying to educate others about EBP and your project? What did you do to overcome these?
6. What obstacles or barriers have you encountered when completing class assignments? What suggestions do you have?
7. Describe the most beneficial aspect of the EBPI for you as a nurse.
8. What was the least beneficial aspect of the program?
9. Is there anything about your project that you wish you had done differently?
10. What tips would you give future mentors about being great mentors for the program?
11. What do you need to keep your project going through the summer and until the project is done?
12. If you were designing the next EBPI, how would you change or enhance the program?
13. Would you recommend the program to other staff nurses in your unit? Probe question – explore yes/no.
14. Is there any other information regarding your experience with the EBPI that you think would be useful for us to know?

*Mentor Interview Questions*

1. Has attending the Institute enhanced your ability to engage in EBP projects?
2. Of the materials – templates, tools, change strategies, etc. introduced to you through the classes, which ones have you used?
3. Of these materials, which have you found most useful? Of the materials mentioned, why haven't you found \_\_\_\_\_ useful? How could it be more useful?
4. As a mentor, what other materials would have been helpful for you?
5. What obstacles or barriers have you encountered when mentoring your fellow? What did you do to overcome these?
6. What obstacles or barriers have you encountered when assisting the fellow with the project?
7. What approaches worked well in the mentoring relationship?
8. Are there any things you would do differently in the relationship?
9. What tips would you give future mentors about being great mentors for the program?
10. What do you need to keep your fellows project going through the summer and until the project is done?
11. If you were designing the next EBPI, how would you change or enhance the program?
12. Would you recommend the program to other colleagues? Probe question – explore yes/no.
13. Is there any other information regarding your experience with the EBPI that you think would be useful for us to know?

## Appendix C

**Evidence-Based Practice Institute  
Institute Follow-Up Survey**

The following questions are designed to assess the long-term impact of the Evidence-Based Practice Institute. Your responses will remain anonymous, only the primary investigator will have access to the responses, and data will be reported in aggregate.

Question	Yes	No
1. Have you completed your EBP project?		
If yes, have you implemented the project beyond your unit or department? In what way?		
2. Have you presented your project at a conference?		
If yes, please identify conference and type of presentation: podium or poster.		
3. Have you, or are you writing up your project for publication?		
If yes, please identify the journal:		
4. Have you participated in other EBP projects since completing the Institute?		
If yes, please list project(s):		
5. Do you use the following skills in your daily work?		
a. Formulate a key clinical question		
b. Find best clinical evidence to answer the question		
c. Search electronic databases		
d. Appraise research articles critically		
e. Synthesize research articles		
f. Apply evidence to patient care		
g. Integrate evidence into clinical decisions		
h. Evaluate outcomes		

**Continued on Other Side  
Please Turn Page**

Question	Yes	No
6. Have you had the opportunity to teach the following skills to colleagues?		
a. Formulate a key clinical question		
b. Find best clinical evidence to answer the question		
c. Search electronic databases		
d. Appraise research articles critically		
e. Synthesize research articles		
f. Apply evidence to patient care		
g. Integrate evidence into clinical decisions		
h. Evaluate outcomes		
7. Have you, or do you plan to enroll in a higher degree?		
If yes, please identify type of degree:		
8. Have you changed roles since completing the Evidence-Based Practice Institute?		
If yes, please identify the new role:		

**Thank you for taking the time to complete and return the follow-up survey.**