

12-7-2015

Factors Affecting Implementation of Evidence-Based Practice Among Nurse Practitioners

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FACTORS AFFECTING IMPLEMENTATION OF EVIDENCE-BASED
PRACTICE AMONG NURSE PRACTITIONERS

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Philosophy

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Indiana University of Pennsylvania

December 2015

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Evidence-based practice (EBP) results in improved health care outcomes. Federal laws, national mandates, and national nursing education policies clearly delineate the importance of EBP in today's healthcare environment. Despite the seemingly endless sources of information regarding EBP, barriers to the implementation of EBP into clinical practice continue to hinder healthcare providers. Furthermore, scant research exists exploring factors that affect nurse practitioners' (NP) adoption of EBP.

This study explored how personal, practice, and professional variables influence NPs' adoption of EBP in clinical settings. A quantitative, correlational, cross-sectional approach with a survey-data collection methodology was utilized. A randomized sample selection from a national NP organization resulted in 480 clinically practicing participants. The Evidence-Based Education Questionnaire (EBEQ) was used to assess NPs' beliefs, knowledge, and self-perceived ability to implement EBP.

This study revealed how specific practice, personal, and professional variables correlated to EBEQ scores. Multiple key demographic variables are related to NPs' self-reported confidence in adopting and utilizing EBP. Overwhelmingly, NPs support and recognize the value of EBP; however, the study revealed discrepancies in implementation. Many NPs reported sources of clinical information that are clearly not evidence-based, such as use of intuition to make clinical practice decisions. Finally, the

data revealed NPs' self-reported facilitating factors and barriers to EBP. Results of this study indicated that the DNP education transforms NPs' self-reported adoption and utilization of EBP; whereas, other practice, personal, and professional variables have less influence in EBP. Encouragingly, NPs were overwhelmingly supportive of EBP; however, the study demonstrated NPs lack understanding of important EBP precepts.

The results of this study offers key stakeholders insight into the complexity of NPs' EBP, thus providing nurse educators, nurse researchers, and policy makers with foundational information. The implications of this study may be used to guide further research. Further EBP research should strive to move beyond descriptive research. Nursing researchers need to develop and conduct experimental research methods, which may elucidate which interventions positively affect NPs' EBP.

ACKNOWLEDGMENTS

Originally, I was not going to write any acknowledgements, then I thought about writing something cheeky, like “peace out” but at the end, I found myself compelled to recognize the people who mattered in this process. They say, “The dissertation is a solo project,” but that is not true (I refuse to reference this). Firstly, I dedicate this work to my father. Without knowing it, he taught me the value of hard work. Not an educated man, but truly a good man. He was so proud of me being a nurse. I did not realize how proud I was of him until near the end of his life. He would have liked the fact I have a PhD, but he was proudest of “Susie” the diploma graduate who worked as a bedside nurse.

Secondly, I thank another truly good and tolerant man, my husband, for always finding comforting and encouraging words. You were always a source of support and love. You are the icing on my cupcake. Thirdly, I thank my RMU colleagues who truly raised the bar on my own professional expectations and abilities. Fourthly, I wish to acknowledge my dissertation committee members, Dr. Lora Ott, Dr. Diana Rupert, and Dr. Tom White. Your thoughtful insight and expeditious review of my work was crucial. To my friend and fellow student, Donna McDermott, I am deeply grateful for your friendship and support. True friends are made during times of challenge and adversity. Lastly, to my survey participants who are my nurse practitioner colleagues, thank you for an overwhelming response to my survey. To my children, I hope my professional work serves as an example of what can be accomplished in life. Nothing worthwhile is ever easy. Now, make me a happy woman, finish your own formal education and give me grandchildren.

TABLE OF CONTENTS

Chapter		Page
ONE	INTRODUCTION	1
	Background	3
	Statement of the Problem	10
	Purpose	11
	Research Questions	12
	Conceptual Framework	12
	Definition of Terms	15
	Assumptions	17
	Delimitations	18
	Significance	18
	Summary	21
TWO	LITERATURE REVIEW	22
	Introduction	22
	Theory Support for the Study's Variables	22
	Transformational Learning Theory Literature Review	25
	Fostering Understanding and Implementing Teaching and Learning Strategies	26
	Relationships and Organizational Environment	33
	Use of Scales and Surveys	35
	Innovative Approaches	36
	Section Summary	37
	Evidence-Based Practice in Nursing Literature Review	38
	Nurse Generalists	39
	Nurse Generalists' Section Summary	57
	Advanced Practice Registered Nurses	58
	Promoting Evidence-Based Practice Among Nurse Generalists	58
	Nurse Practitioner Educators	64
	Utilization of Evidence-Based Practice Among Advanced Practice Registered Nurses	67
	Advanced Practice Registered Nurses Section Summary	76

Chapter		Page
	Measurements	78
	The Evidence-Based Education Questionnaire.....	78
	Summary	80
THREE	METHODOLOGY	81
	Study's Aims.....	81
	Design.....	82
	Setting/Sample	82
	Instrument	84
	Procedures.....	86
	Data Analysis	88
	Summary	90
FOUR	RESULTS	91
	Sample Characteristics.....	91
	Tool Reliability Data.....	96
	Relationships Between the Sample's Demographic Variables to Nurse Practitioners' Beliefs, Knowledge, and Self-Perceived Ability to Implement Evidence-Based Practice	96
	Facilitating Factors and Barriers to Evidence-Based Practice	111
	Reported Sources of Clinical Decision Information	113
	Chapter Summary	114
FIVE	DISCUSSIONS AND IMPLICATIONS	115
	Discussion	115
	Review of the Problem.....	115
	Key Findings	116
	Demographic Characteristics	117
	The Relationships Between Nurse Practitioners Demographics and the Evidence-Based Education Questionnaire	121
	Transformational Learning Theory Integration	130
	Nurse Practitioner Facilitators and Barriers to Utilizing Evidence-Based Practice	131

Chapter	Page
Sources of Information for Nurse Practitioners'	
Clinical Decisions	135
Limitations	139
Implications.....	140
Conclusions.....	144
REFERENCES.....	145
APPENDICES.....	156
Appendix A – Evidence-Based Education Questionnaire	156
Appendix B – Permission to Use, Modify, and Publish	160
Appendix C – Letter of Study Support	161
Appendix D – Invitation to Participate in Research Regarding Nurse Practitioners' Beliefs and Knowledge of Evidence-Based Practice.....	162

LIST OF TABLES

Table	Page
1	Participant “Other”93
2	Participant “Other”95
3	Cronbach’s Alpha for Five Factors.....96
4	Gender and Evidence-Based Education Questionnaire Factors Using T-Tests for Equality of Means.....99
5	Correlation of Evidence-Based Education Questionnaire with Age.....100
6	ANOVA Data Presenting the Overall Evidence-Based Education Questionnaire Score and its Five Factors with Highest Degree of Education102
7	Post Hoc Comparisons for Highest Degree (Doctor of Nursing Practice vs. Four Other Levels)103
8	Sample Descriptives Comparing Two Key Evidence-Based Education Questionnaire Questions for Master’s Educated Nurse Practitioners vs. Doctor of Nursing Practice Educated Nurse Practitioners Using T-Test for Equality of Means105
9	Correlation of Overall Evidence-Based Education Questionnaire Score and the Five Factors that Comprise the Evidence-Based Education Questionnaire with Number of Years Practicing as a Nurse Practitioner106
10	F-Test and Coefficients Results Displaying Estimated Change in Evidence-Based Education Questionnaire Scores for Hours Worked Weekly by Master’s vs. Doctor of Nursing Practice Educated Nurse Practitioners.....107
11	Descriptive Statistics with ANOVA for Overall Evidence-Based Education Questionnaire and its Five Factors and Education Delivery Method of Doctor of Nursing Practice Education110

Table		Page
12	Self-Reported Nurse Practitioners' Evidence-Based Practice.....	113
13	Respondent "Other" Cited Sources of Evidence for Clinical Decision Making.....	114

LIST OF FIGURES

Figure		Page
1	The Transformation Learning Theory	15
2	Histogram for evidence-based education questionnaire overall scores	97
3	Normal Q-Q plot for evidence-based education questionnaire overall scores	98
4	Scatterplot exploring the relationship between the overall evidence-based education questionnaire score and age	101
5	Means plot for the “judging evidence” factor	104
6	Scatterplot exploring the relationship between hours worked per week by the master’s NP and decreased overall evidence-based education questionnaire score	108

CHAPTER ONE

INTRODUCTION

In the Institute of Medicine (IOM) landmark reports *Crossing the Quality Chasm: A New Health System for the 21st Century* (2001) and *Health Professions Education: A Bridge to Quality* (Greiner & Knebel, 2003), evidence-based practice (EBP) was identified as a key recommendation to transform the current health care delivery system. The IOM reports serve as a clear call to initiate change, as the current health care system “harms too frequently and routinely fails to deliver its potential benefits” (Committee on Quality of Health Care in America, 2001, p. 1). Furthermore, the IOM reports call for stakeholders in health care education to demonstrate the relationship between the education of health care providers and the quality of care (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003).

Paralleling the IOM’s call for increased implementation of EBP in health care is the conversion from the master’s degree to the doctor of nursing practice (DNP) as the terminal clinical practice degree for nurse practitioner (NP). In 2006, the American Association of Colleges of Nursing (AACN) published the *Essentials of Doctoral Education for Advanced Practice Nursing*. The DNP *Essentials of Doctoral Education for Advanced Practice Nursing* (American Association of Colleges of Nursing, 2006) indicate that DNP prepared NPs should translate and disseminate EBP with the end-point resulting in improved health care outcomes. In the 13 years since the inception of the first DNP program in the United States, the number of DNP programs and graduates have surpassed the number of Doctor of Philosophy (PhD) in Nursing graduates and programs (Dreher, 2011). Both degrees require scholarship; however, there are differences

(American Association of Colleges of Nursing, 2006). The DNP is a practice doctorate; whereas, the PhD in Nursing is a research doctorate. Specifically, graduates with a PhD in Nursing develop new nursing knowledge by conducting and leading research. With less focus on theory and statistics than PhD nursing programs, DNP graduates translate evidence into practice to improve healthcare outcomes. Different from PhD nursing programs, DNP programs generally offer intense practice immersion. In common, both degrees use evidence to improve healthcare. As the DNP is a relatively new degree with exponential growth when compared to the older, well-established PhD in Nursing, nursing education researchers have an obligation to study the impact of the DNP in clinical practice empirically. DNP programs graduate an array of advanced practice registered nurses (APRN) and nurses in addition to NPs, such as nurse anesthetists (NA), nurse mid-wives (NMW), clinical nurse specialists (CNS), nurse educators and administrators; however, the proposed subjects of this research are NPs. In addition to the introduction of the DNP, relationships of other practice, professional, and personal variables affecting NPs EBP warrant empirical study. The wide range of additional variables make EBP implementation complex (Rice, 2013). Identifying relationships and predictors of NPs EBP that link research to actual practice becomes imperative if patient care outcomes are to be affected positively (Rice, 2013).

This national cross sectional, correlational study explored NPs' beliefs and knowledge regarding the adoption of EBP. Chapter One presents the background of EBP and the evolution of NP education, statement of the problem, and purpose of the research. A theoretical framework was used as the basis for the literature review and research questions. Additionally, Chapter One defines common terminology related to advanced

practice nursing and EBP and serves to elucidate readers' understanding of the research variables. This chapter includes the researcher's assumptions and delimitations regarding the study. Finally, the chapter concludes with the significance of this study's findings in regard to the state of the science of nursing education.

Background

Fueled by publication of IOM landmark reports *Crossing the Quality Chasm: A New Health System for the 21st Century* (2001) and *Health Professions Education: A Bridge to Quality* (Greiner & Knebel, 2003), there have been resounding calls to transform the United States health care system into a safer and higher quality system. The current system is mired by inadequate health care provider preparation needed to address the nation's shifts in demographics, interprofessional teamwork, informatics, and EBP utilization (Greiner & Knebel, 2003). Multiple national initiatives have called for sweeping health care reform as well as health care education restructuring (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003; Institute of Medicine, 2010).

With the election of President Barack Obama in 2008, federal laws supporting healthcare reform began to take shape. In March 2010, President Obama signed the Patient Protection and Affordable Care Act (ACA) into law. The ACA addressed the acute need for primary care providers to meet the growing demands on healthcare attributed to the expansion of health insurance coverage, increases in the general population, and an aging population (Patient Protection and Affordable Care Act, 2010). An estimated 52,000 additional primary care providers will be needed by 2025 (Pettersen, Liaw, Phillips, Rabin, Meyers, & Bazemore, 2012). Provisions in the ACA

(2010) appropriated funding aimed to increase the number of APRN capable of providing primary care services.

When considering the urgent need for primary care providers, all factors that affect their availability and education warrant consideration. The complexity of today's healthcare environment demands a high level of practice expertise and scientific acumen. In addition to changing health care needs in the United States shaped by changing demographics and federal laws, the IOM (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003; Institute of Medicine, 2010) called for innovative restructuring of the current education system to better prepare healthcare providers. In 2007, the Robert Wood Johnson Foundation funded the Quality and Safety Education for Nurses (QSEN) initiative to generate competencies for generalist nurses and prelicensure education to improve the safety and quality in health care. Also in 2007, QSEN leaders and the National Organization of Nurse Practitioner Faculties (NONPF) sought to identify similar competencies around knowledge, skills, and attitudes appropriate for APRN education (Cronenwett, Sherwood, Pohl, Barnsteiner, Moore, Sullivan, . . . Warren, 2009). Many of QSEN competencies are embedded in the AACN's *Essentials of Doctoral Education for Advanced Practice Nursing* (2006) which outline curricular elements that must be present in programs conferring DNPs.

In addition to increasing demands for primary care providers, United States DNP program growth is influenced further by the national nursing faculty shortage. The IOM's *The Future of Nursing: Leading Change, Advancing Health* (2010) recommended doubling the number of doctorally prepared nurses by 2020 in an effort to address the nursing faculty shortage. The nursing faculty shortage further fueled the development of

non-research clinical doctoral programs that produced expert clinicians to serve as educators (Advancing the Nation's Health Needs, 2005). Nurse educators need to evaluate the outcomes of the current educational offerings.

EBP is not a new concept. The earliest mention of EBP appears in the medical literature in the 1950s and 1960s. Archie Cochrane, a British epidemiologist, is widely recognized as the earliest proponent for increasing the quality of health care through conducting randomized controlled trials (Committee on Quality of Health Care in America, 2001). The medical literature gives the earliest definition of EBP, "conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Richardson, Rosenberg, & Haynes, 1996, p. 3). Nursing literature modified this definition to include clinician's expertise and patient's preferences. The Honor Society of Nursing, Sigma Theta Tau International (STTI) defined EBP as "an integration of the best evidence available, nursing expertise, and the values and preferences of the individuals, families and communities who are served" (Sigma Theta Tau International, 2003, "Evidence-Based Nursing," p. 4).

There is voluminous information in the literature regarding EBP across all areas of health care disciplines. Nursing is no exception. In the past decade, the growth of attention to EBP in the generalist nursing field, as well as the advanced nursing practice, has been phenomenal. The nursing literature is replete with information regarding teaching and implementing EBP. Information is readily available in textbooks (Melnik & Fineout-Overholt, 2014; Schmidt & Brown, 2015; Straus, Richardson, Glasziou, & Haynes, 2010). Entire journals, such as STTI's peer reviewed *Worldviews on Evidence Based-Nursing*, are published exclusively on EBP nursing issues. Professional

organizations, such as the American Society for Colposcopy and Cervical Pathology, and federally sponsored entities, such as the Centers for Disease Control and Prevention, publish evidence-based guidelines for practice, which serve as on-line resources for health care providers.

Despite this seemingly endless source of information, there appears to be a disconnect between the literature and clinical practice (Rice, 2013). The literature is replete with evidence that the healthcare system fails to provide care based on established guidelines (Balas & Boren, 2000; Cheng & Green, 2008; Lee, Berkowitz, & Saraiya, 2011; Perlen, Brown, & Yelland, 2013; Vincent, Johnson, Velasquez, & Rigney, 2010). Conversely, health care outcomes improve when providers incorporate evidence-based guidelines into care (Brooks, 2004; McGinty & Anderson, 2008; Newhouse, Stank-Hutt, & White, 2011).

Closely aligned with the EBP movement are changes in education and practice requirements for APRNs. The term APRN includes NPs, CNSs, NAs, and NMWs. Entry into practice as an APRN requires formal education beyond a bachelor of science in nursing degree (BSN). Traditionally, entry into practice for APRNs has been at the master's degree level or in the early history of the APRN profession, a certificate program. The master's degree remains the dominate educational preparation for advanced practice nursing (Auerbach, Martsof, Pearson, Taylor, Zaydman, Machow, . . . Dower, 2014); however, the educational landscape is changing. Currently, 30% of advanced practice nursing programs offer a BSN-DNP with an expected growth to 50% within the next several years (Auerbach et al., 2014). The DNP was originally

envisioned as a degree for APRNs; however, programs exist that confer a DNP to other nurses, such as educators and administrators.

Nurse practitioners represent the largest segment of the APRN population (Hamric, Spross, & Hanson, 2009). Currently, there are 189,000 NPs in the United States workforce (American Association of Nurse Practitioners, 2014). The American Association of Nurse Practitioners (AANP) (2013) defined NPs as “licensed independent practitioners who practice in ambulatory, acute, and long-term care as primary and/or specialty care providers. According to their practice population focus, NPs deliver nursing and medical services to individuals and families” (American Association of Nurse Practitioners, 2013, “Nurse Practitioner Curriculum,” p. 1).

There is currently no distinction made between master’s prepared NP and DNP prepared NPs in clinical practice. In fact, NONPF released the Nurse Practitioner Core Competencies (National Organization of Nurse Practitioner Faculties, 2012), which clearly requires that all NPs, regardless of their education preparation, meet the same practice expectations. The NONPF Nurse Practitioner Core Competencies specifically addresses the expectation of integration of evidence-based practice precepts in clinical practice. All NPs are expected to:

- critically analyze data and evidence for improving advanced practice nursing;
- integrate knowledge from the humanities and sciences within the context of nursing practice;
- translate research and other forms of knowledge to improve practice processes and outcomes;

- develop new practice approaches based on the integration of research, theory, and practice knowledge;
- use best available evidence to continuously improve quality of clinical practice;
- generate knowledge from clinical practice to improve practice and patient outcomes. (National Organization of Nurse Practitioner Faculties, 2012, p. 2)

The NONPF EBP competencies align with the QSEN competencies for APRNs (Cronenwett et al., 2009) as well as the AACN's *Essentials of Doctoral education for Advanced Nursing Practice* (2006).

In 2004, the member schools of AACN and NONPF endorsed the movement of the educational preparation of NPs from the master's degree to the doctoral level by 2015 (American Association of Colleges of Nursing, 2014; National Organization of Nurse Practitioner Faculties, 2012). Nationwide, nursing schools academic leaders support the value of the DNP in preparing nurses' for advanced practice nursing (Auerbach et al., 2014). Several motivating circumstances in APRN education led to the change. First, APRN master's degree curricula often exceeded the number of credits for most master's degrees due to added education time needed for preparation and training to provide medical care (Brar, Boschma, & McCuaig, 2010). Furthermore, by endorsing the clinical doctorate for the APRN, nursing moved to achieve parity with other health care professions, such as medicine, dentistry, pharmacy, psychology, and physical therapy, who award a doctorate as a terminal degree (American Association of Colleges of Nursing, 2014). Lastly, the additional educational content embedded in the DNP programs, such as EBP implementation precepts, addressed the IOM's call for a safer and

higher quality health care system (American Association of Colleges of Nursing, 2006; Committee on Quality of Health Care in America, 2001). These decisions resulted in the exponential growth of DNP programs nationwide: The number of nursing schools that offer a DNP degree has grown tenfold in the past seven years (Auerbach et al., 2014). Currently, 243 DNP programs exist nationwide, with another 59 programs in the planning stages (American Association of Colleges of Nursing, 2014).

Today's DNP traces its beginnings to the 1960s. Boston University developed the first clinical doctorate in which the graduate received a doctor of nursing science (DNSc). In the 1970s, the doctor of science in nursing (DSN) was developed, which aimed to increase the number of doctorally prepared nurses in faculty, administrative, and consultant roles. In the late 1970s, Case Western University began the nursing doctorate (ND), which focused on the clinical leader. In the fall of 2001, the University of Kentucky opened the first DNP program and graduated the first class of six students in 2005. Since then, many universities offering the DSN and DNSc degrees have converted to PhD programs and the ND degree programs have moved to DNP programs (Udlis & Mancuso, 2012).

DNP programs adhere to the AACN *Essentials of Doctoral Education for Advanced Nursing Practice* (American Association of Colleges of Nursing, 2006) and are accredited by the Commission on Collegiate Nursing Education (American Association of Colleges of Nursing, 2014); however, modalities of organization and delivery of content vary among schools (Udlis & Mancuso, 2012). The curricula in the DNP programs build upon *The Essentials of Master's Education for Advanced Practice Nursing* (American Association of Colleges of Nursing, 1996). Added content in DNP

programs include evidence-based practice, quality improvement, health care policy, and systems leadership. DNP programs are designed in one of two tracks: (a) the BSN to a DNP degree, which incorporates the National Task Force on Quality Nurse Practitioner Education's *Criteria for Evaluation of Nurse Practitioner Programs* (2012) in preparation for the NP certification examinations, (b) a completion track allows the practicing APRN with a master's degree to obtain a post master's DNP. Thirty percent of advanced practice programs have transitioned into offering a DNP; moreover, an additional 27% of these schools plan to close their APRN master's degree programs (Auerbach et al., 2014). Nurse practitioners who do not have a terminal degree by the 2015 target for DNP prepared NPs will be grandfathered and maintain full scope of practice. The decision to move to the DNP as the terminal degree for APRN practice was based on the increasingly complex demands of the current health care system, which includes EBP implementation in the clinical setting.

Statement of the Problem

The need to assimilate EBP into NPs clinical practice is clear. Nurse educators have been mandated to incorporate EBP into nursing education programs in order to affect positive change in patient care outcomes (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003; Institute of Medicine, 2010). Proponents of the DNP advocate the degree to bridge the gap between research and practice (Brar et al., 2010; Magyary, Whitney, & Brown, 2006; Vincent et al., 2010); however, this is conjecture based on anecdotal evidence and expert opinion. Little empirical research exists examining if the precepts of EBP taught in DNP programs have increased NPs utilization of EBP in dispensing health care. Similarly, beliefs influencing adoption of

EBP by the master's degree versus the DNP prepared NP have not been addressed by researchers fully. Finally, there is scant literature addressing NPs barriers and facilitators of EBP. Both the AACN and NONPF have endorsed the DNP as the terminal degree for NPs despite lack of sufficient empirical evidence. Nurse researchers have an obligation to study the effect of the DNP on the beliefs, knowledge, and implementation of NPs EBP.

Purpose

The overarching purpose of this study was to explore beliefs and knowledge that influence NPs adoption of EBP in clinical settings. The study had three specific aims. First, the study compared relationships between beliefs and knowledge that influence NPs integration of EBP and key demographic variables, such as educational preparation, DNP program delivery method, DNP program length, age, gender, practice setting, area of practice, years of practice experience, amount of direct patient care, and sources of evidence. Secondly, the study helped to identify barriers and facilitators of NPs EBP. Finally, the study sought NPs sources of information for clinical practice decisions. A quantitative, correlational, cross-sectional approach with a survey-data collection methodology was utilized to allow for a large randomized sample from a greater geographic area allowing generalizability of the findings.

Research Questions

This study sought to answer the following questions regarding factors that influenced the NPs beliefs, knowledge, and skills regarding EBP:

- What is the relationship between NPs personal, professional, and practice demographics and the five factors comprising the Evidence-Based Education Questionnaire (EBEQ): knowledge of EBP, finding EBP, integration of evidence-based practices, changing practice based on evidence, and judging evidence?
- What is the relationship between NPs personal, professional, and practice demographics with self-perceived ability to implement EBP?
- What demographic variables predict subjects' self-perceived ability to implement EBP?
- What are NPs barriers and facilitators to utilizing EBP?

The literature review, research questions, and methodology of this study were guided by the following adult educational theory.

Conceptual Framework

Theories and conceptual frameworks provide researchers with a plan to approach a phenomenon of interest. Understanding the theoretical underpinnings of a subject provides structured guidance for the research process: review of the literature; identify relevant variables; identify tentative relationships between variables; develop clear research questions; and decide methodological approaches. Framing the study within the context of a relevant theory enhanced the possibility of meaningful clinically relevant outcomes.

Researchers must incorporate sound theories in fostering the learning and utilization of EBP. Although multiple theories and conceptual frameworks have been linked to EBP, one is particularly applicable. The Transformational Learning Theory (TLT) lends significant insight into understanding the inconsistent adoption of EBP principles in clinical practice. Developed in the 1970s by John Mezirow and informed by the later work of Thomas Kuhn, Paulo Friere, and Jurgen Habermas, the TLT seeks to explain how adults learn with a subsequent change in beliefs and actions. Mezirow referred to this process as “transformational learning” (Kitchenham, 2008).

Mezirow’s TLT is a complex pedagogy that allows adult students to have a deep structural shift in premises of knowledge, beliefs, and skills. Transformational learning asserts individuals learn from subjective experiences and focuses on how knowledge is internalized into new beliefs and subsequent actions. Transformational learning acknowledges the significance of the subjective interpretation of experiences and focuses on *how* we know rather than the “traditional” learning, which focuses on *what* we know.

Transformational learning differs from traditional learning where the educator delivers the information to students. Mezirow postulated that with traditional learning students become a repository for the information and do not learn independent thought: Students become dependent on the educator. Student retention of information or change in behavior may not be sustained.

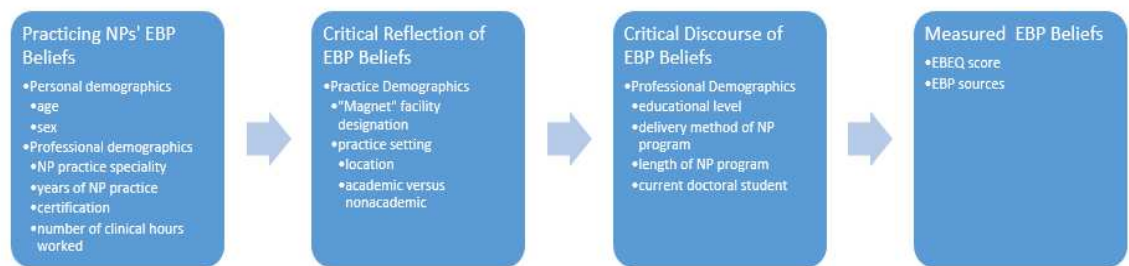
Mezirow’s transformational learning allows critical internal processes to develop by exploring and understanding one’s own beliefs and actions. Education strategies based on transformational learning lead students to consider new concepts, question prior beliefs and actions, and make a decision to embrace or reject information. Students

achieve a sense of empowerment. Transformational learning allows students to understand how learning experiences are perceived and how these perceptions lead to actions. Learning does not come from the experience alone, but rather the reflection on the experience. To learn, one must critically analyze the experience.

Transformative learning involves key processes. Students must undertake a critical reflection on their own beliefs and actions. Students must recognize a dilemma or problem with the current situation in order to acknowledge a need for change. By breaking down old beliefs, new perspectives may emerge to become long-lasting change manifesting in new behaviors. The educator facilitates these steps by engaging students in critical reflection and discourse.

The TLT and transformational learning strategies provided valuable insight into NPs EBP. John Mezirow's TLT describes how adult learners internalize new information to achieve changes in beliefs, knowledge, or skills by describing how sustained change is dependent on the process of reflection (Kitchenham, 2008). This study attempted to apply the theory components to NPs beliefs and knowledge of EBP (Figure 1). The end-purpose was to provide stakeholders in NPs education and practice a transformational learning framework of factors that affects utilization of EBP.

The Transformational Learning Theory Applied to NPs EBP Study Variables*



*Adapted from Taylor, E. W., & Cranton, P. (2012). *The handbook of transformative learning*. San Francisco, CA: Jossey-Bass.

Figure 1. The transformational learning theory.

Definition of Terms

Definition of terms is used to provide readers with a context to fully understand the study's key terms and unique variables and if appropriate, how they will be measured. The researcher uses the following key terms throughout the research proposal:

An advanced practice registered nurse is a licensed registered nurse (RN) who has completed graduate education as a NP, CNS, NMW, or NA. Minimally, APRNs hold a master's degree and are certified by a nationally recognized organization or meet an individual state's criteria for practice.

Beliefs in evidence-based practice are defined as the "endorsement of the premise that EBP improves clinical outcomes and confidence in one's EBP skills/knowledge" (Melnik, Fineout-Overholt, & Mays, 2008, p. 210). The subjects' beliefs in EBP will be measured by the EBEQ score (Al Hadid, Hasheesh, & Al Momani, 2011). A higher score equates to higher EBP beliefs (Appendix A).

The doctor of nursing practice is a clinical doctorate that is recognized as the terminal degree for NPs. The curricula in the DNP programs build upon *The Essentials of Master's Education for Advanced Practice Nursing* (American Association of Colleges of Nursing, 1996). Essential components of DNPs' programs include education in evidence-based practice, quality improvement, systems leadership, and health care policies.

Doctor of nursing practice program delivery methods are defined as: Face-to-face: Students on are site for the program's entirety. On-line: Students participate in the program exclusively off site in an electronic format. Hybrid: A combination of on-site and on-line student program participation.

Doctor of nursing practice program length: The length of the DNP program will be measured by the number of semesters required for degree completion.

Evidence-based practice is a process of "integration of the best evidence available, nursing expertise, and the values and preferences of the individuals, families and communities who are served" (Sigma Theta Tau International, 2003, "Evidence-Based Nursing," p. 4).

Knowledge of EBP is understanding the precepts necessary for EBP. The subjects' self-perceived knowledge of EBP will also be measured by the EBEQ score (Al Hadid et al., 2011). A higher score equates to higher EBP knowledge level.

The master's degree in nursing is an advanced nursing degree that is the minimum degree required for NP practice.

Nurse Generalists are licensed registered nurses with a nursing diploma, associate degree in nursing, or BSN who provide skilled nursing care in a variety of health settings.

Nurse practitioners are “licensed independent practitioners who practice in ambulatory, acute, and long-term care as primary and/or specialty care providers. According to their practice population focus, NPs deliver nursing and medical services to individuals and families” (American Association of Colleges of Nursing, 2013, “Nurse Practitioner Curriculum,” p. 1).

Utilization of EBP is defined as “engaging in relevant behaviors: seeks and appraises scientific evidence; shares evidence or data with colleagues or patients; collects and evaluates outcome data; and uses evidence to change practice” (Melnik et al., 2008, p. 210). As with beliefs and knowledge, subjects utilization of EBP will be measured by the EBEQ score (Al Hadid et al., 2011). A higher score equates to a higher level of EBP implementation (Appendix A).

Assumptions

For the purposes of this study, the researcher held several assumptions drawn from the literature review:

- NPs perceptions of facilitators and barriers are valid and valuable measures of EBP beliefs. As such, NPs are key informants about resources and support needed for implementation of EBP.
- The study tool is a valid and reliable measure of the factors that influence NPs perceptions and utilization of EBP.
- NPs self-reported data about EBP beliefs, knowledge, and skills is meaningful.
- EBP is an essential component of DNP preparation.

- The TLT provides structure to explore NPs EBP beliefs, knowledge, and implementation so that they may be understood and validated.

Delimitations

The researcher acknowledges that this study had delimitations affecting the generalizability of the findings. First, the sample was limited to nurse practitioners and members of the AANP. Members of a national professional organization may not reflect characteristics of all NPs or all APRNs. Secondly, the researcher considered the instrumentation a limitation. Self-reported data may not have truly reflected knowledge and implementation of EBP. The tool may have introduced social desirability bias in that subjects answered questions in a way viewed favorably by others. The researcher attempted to circumvent social desirability bias by asking respondents to list sources of evidence used in their clinical practice. Listing of evidence resources such as colleagues, review articles, and textbooks would indicate low-level knowledge and application of EBP. Lastly, the study design was also a limitation. A correlational, cross-sectional design does not allow for causality, but is limited to establishing that relationships may exist between variables.

Significance

In the past 15 years, there have been resounding calls to transform health care in the United States into a safer and higher quality system (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003; Institute of Medicine, 2010; Lathrop & Hodnicki, 2014; Patient Protection and Affordable Care Act, 2010). One of the key recommendations to accomplish the transformation is the adoption of EBP (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003, Lathrop &

Hodnicki, 2014; Rice, 2013). Despite better healthcare outcomes when evidence-based care is rendered (Brooks, 2004; McGinty & Anderson, 2008; Newhouse et al., 2011), providers routinely fail to incorporate current evidence into practice (Balas & Boren, 2000; Cheng & Green, 2008; Lee et al., 2011; Perlen et al., 2013). In the nurse generalist setting key barriers to EBP practice include: lack of time and knowledge to understand and evaluate research, lack of support from interprofessional relationships, and inadequate resources to identify EBP (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Melnyk et al., 2004; Yoder, Kirkley, McFall, Kirksey, Stalbaum, & Sellers, 2014). Identified facilitators of nurse generalists' EBP include: collaboration among educators, clinicians, researchers, and administrators, work cultures that promote EBP, and APRNs as role models and mentors (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Melnyk et al., 2004; Yoder et al., 2014). EBP is vital to increasing the quality and safety of healthcare (Committee on Quality of Health Care in America, 2001) and NPs are positioned to make a significant impact in the implementation of EBP.

Furthermore, health care educators have been challenged to demonstrate the relationship between health care providers' education and quality of care (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003; IOM, 2010).

Paralleling the call for EBP is the conversion from the master's degree to the DNP as the terminal degree for NPs. The decision to move to the DNP as a terminal degree was based on the increasing demands and complexities of the current health care system (American Association of Colleges of Nursing, 2006). DNP programs build upon the traditional master's degree curriculum to include additional education on EBP, health care policy, quality improvement, and systems leadership. The DNP prepared NP should

translate and disseminate EBP with the end-point resulting in improved health care outcomes (American Association of Colleges of Nursing, 2006; Lathrop & Hodnicki, 2014).

The implementation of EBP is necessary to address today's healthcare complexities. As NPs role in primary care continues to grow, the need to assimilate EBP into the NPs clinical practice is clear. Furthermore, nurse educators have been mandated to incorporate EBP into nursing education programs in order to affect positive change in patient care outcomes. Proponents of the DNP advocate the degree to bridge the gap between research and practice (Brar et al., 2010; Magyary et al., 2006; Vincent et al., 2010). Ten years have passed since the first graduating class of DNPs, yet little empirical research exists examining if precepts taught in DNP programs have increased utilization of NPs dispensing EBP health care. United States healthcare employers are unclear about the differences and added benefits of the DNP compared to the master's degree prepared NP (Auerbach et al., 2014). Little empirical evidence demonstrates DNP prepared NPs positively affects healthcare outcomes to justify increased salaries or cost of continuing education of currently employed master's prepared NPs. Considering the added time and expense needed to obtain a DNP compared to the master's degree, researchers need to demonstrate added benefits empirically (Auerbach et al., 2014). Similarly, personal, professional, and practice characteristics influencing NPs adoption of EBP have not been fully addressed by researchers. Finally, there is scant literature addressing NPs barriers and facilitators of EBP. Identification of EBP barriers and facilitating factors becomes an important determinate in NPs EBP that may positively impact the ability of NPs to implement EBP in healthcare.

The DNP has been endorsed as the terminal degree for NPs despite lack of sufficient empirical evidence (Auerbach et al., 2014). Therefore, the overarching purpose of this study was to explore the beliefs and knowledge that influence NPs integration of EBP. In addition, the study describes potential relationships between beliefs and knowledge that may influence NPs integration of EBP and key personal, professional, and practice demographic variables. Finally, the study identified NPs facilitators and barriers to utilizing EBP. This study adds to the literature on NPs EBP by comparing these findings to other studies and directing further research.

Summary

Chapter One presented an argument for the need to study personal, professional, and practice factors affecting NPs beliefs, knowledge, and implementation of EBP. The background and literature review of the relevant issues led to a clear problem statement with researchable questions. The paucity of existing research in this area bolstered the study's significance. The researcher described assumptions, delimitations, and definition of terms unique to this study to ensure the reader understood the variables of interest. Additionally, Chapter One provided an overview of the TLT that offered a framework to guide the study's literature review and research questions. The research questions determined the quantitative, cross-sectional correlational study design. Chapter One laid the groundwork for a relevant and timely empirical inquiry. Chapter Two delves into an in-depth literature review of the study's contributing variables.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter serves to address key variables in the study. The chapter begins by linking the TLT to significant variables related to studying NPs EBP. This section also reviews health care research that fostered an increased understanding of the theory, demonstrated how educators used the theory's precepts when implementing teaching and learning experiences, and utilized the theory's constructs as its theoretical underpinnings. Next, the chapter provides a review of the empirical literature surrounding nurses' beliefs, knowledge, and implementation of EBP. Finally, the chapter reviews tools used in prior studies that measured nurses' EBP. Additionally, the last section discusses the tool choice for this study. The purpose of this literature review is to provide an understanding of the existing research using the TLT in health care education and nurses' beliefs and knowledge of EBP, as well as providing an evidence-based rationale for the researcher's choice of independent and dependent variables in this study.

Theory Support for the Study's Variables

The guiding developmental theory for this study is John Mezirow's TLT. The TLT is a cognitive and social psychological theory that seeks to explain precepts that allow the adult learner to undergo deep and sustainable changes in knowledge, beliefs, and skills (Mezirow, 2000). Although the concept of EBP is not new, the research concerning the implementation of research into practice is relatively new to health care education. The process of research implementation of EBP is complex, contextual, and poorly understood (Matthew-Maich, Ploeg, Jack, & Dobbins, 2010). Implementation of

EBP research is multi-faceted. Researchers must consider NPs individual attributes, as well as organizational, educational, and facilitation concepts.

Despite nurses' beliefs being cited as a barrier to research implementation, little attention has been paid to the development and role of beliefs regarding EBP (Matthew-Maich et al., 2010; Rice, 2013). Researchers have not addressed the process of how NPs EBP beliefs are shaped. Successful and sustained practice change requires a process to challenge and understand a person's way of knowing, thinking, and doing (Matthew-Maich et al., 2010). Therefore, research determining how NPs EBP beliefs are formulated is needed to facilitate implementation of EBP in NPs clinical practice.

The precepts of the TLT lends guidance to understanding the complex and poorly understood concepts surrounding implementation of EBP. Imperative to transformational learning is critical reflection and critical discourse. Critical reflection requires questioning long-standing beliefs that have developed through both recognized and unrecognized social influences (Mezirow, 1998). The process of examining established beliefs, fears, assumptions, and practices enables the possibility of change. Challenging old beliefs and incorporating new beliefs, empowers NPs to seek new evidence for practice (Matthew-Maich et al., 2010). Researchers need to determine key variables that influence the development and adoption of NPs EBP.

Secondly, critical discourse is the engagement of others in a dialogue about critical reflection (Mezirow, 1998). Critical discourse is a form of social learning that allows a mutual understanding and validation of beliefs and knowledge. Critical discourse is an essential component of examining existing beliefs and the development of new beliefs (Matthew-Maich et al., 2010). Transformational learning acknowledges the

impact of NPs personal, professional, and practice demographics on critical discourse. Furthermore, nurses are not passive recipients of knowledge, but actively form and transform beliefs through discourse with others. Estabrooks, Rutakumwa, O'Leary, Profetto-McGrath, Milner, Levers, and Scott-Findlay (2005) found that generalist nurses' prefer to learn and practice knowledge gained from trusted relationships in the practice environment rather than knowledge generated from research. Similar research is lacking in the advanced practice setting.

Organizational environment is another important aspect of EBP. Normally, EBP occurs in a health care setting. The health care physical work place setting provides a venue for critical discourse. Additionally, organizational facilitation of EBP fosters trust, relationships, and teamwork needed for EBP (Matthew-Maich et al., 2010). Leaders skilled in the precepts of transformation learning lends support for critical reflections and critical discourses (Matthew-Maich et al., 2010). Workplace factors that may facilitate or hinder critical discourse require examination.

Additionally, social influences may be further extrapolated in the context of the learning and organizational environment, such as educational preparation, education program length, program delivery methods, and practice setting variables (Matthew-Maich et al., 2010). Identifying the relationships between personal, professional, and practice variables and NPs EBP in environments of organizational settings is relevant. An organizational culture that supports and encourages learning and change is a key determinate of EBP.

Transformational Learning Theory Literature Review

Since the inception of the TLT 35 years ago, transformational learning has been the most researched and discussed adult learning framework (Taylor, 2007). In addition to health care, researchers have used the principles of TLT in such diverse disciplines as agriculture science, archeology, religious studies, critical media literacy, and spirituality (Taylor & Cranton, 2012). The TLT has been utilized heavily in research of health care students and health care educators in the formal classroom setting (Cragg, Plotnikoff, Hugo, & Casey, 2001; Eisen, 2001; Goldie, Schwartz, & Morrison, 2005; Jackson, Power, Sherwood, & Geia, 2013; MacLeod, Parkin, Pullon, & Robertson, 2003; Mallory, 2003; Matthew-Maich, Brown, & Royle, 2000; Morris & Faulk, 2007; Rush, 2008; Ruth-Sahd, Beck, & McCall, 2010), patients (Ntiri & Stewart, 2009), continuing education (McWilliam, 2007), and in nursing distance education (Cragg et al., 2001).

This literature review aims to identify, assimilate, and synthesize health care education studies that utilized the TLT as a framework as well as bring forth important study variables. The following databases were used: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Education Resources Information Center (ERIC), and PubMed. The researcher reviewed all articles found with no limitation on dates. Key search terms included: nursing, nurse practitioners, advanced practice providers, health care, education, transformational learning, and TLT. Studies that foster an understanding of the TLT in health care education and studies that utilized underpinnings of the TLT to design teaching and learning interventions in health care education are included in the literature review. Secondly, the TLT literature review discusses studies that underscored essential components of TLT in health care education. Thirdly, growing

trends in the use of TLT in health care education are discussed. Finally, the literature review summarizes what is known about the TLT in regard to health care education and what still needs to be explored.

Fostering Understanding and Implementing Teaching and Learning Strategies

The majority of the health care education research through the TLT lens were centered on fostering understanding of the transformational learning and implementing learning strategies based on the transformational learning in the formal classroom setting (Taylor & Cranton, 2012). Several qualitative studies utilized transformative learning in the prelicensure nursing education arena. Ruth-Sahd et al. (2010) qualitative research findings found transformative learning took place after a summer externship program. Seventy-eight nurse externs from BSN, associate, and diploma nursing programs participated in an eight-week summer urban hospital externship program. Interviews and reflective journals served as data sources that indicated a change or affirmation in perspective and beliefs concerning patient communication, the onus of patient care, the value of time, and what it means to be a nurse. Three themes emerged from the data: “affirming assumptions, validating values, and banishing core beliefs” (Ruth-Sahd et al., 2010, p. 78). Ruth-Saud et al. (2010) demonstrated nurse extern programs’ experiences as supporting the precepts of transformational learning.

Ruth-Sahd et al., (2010) findings supported those found by Matthew-Maich et al. (2000) in their study of BSN students. In a phenomenological approach, researchers explored the experiences of 24 senior BSN students in developing a professional portfolio that was a requirement for graduation. Faculty added a portfolio requirement to the curriculum as an outcome measure for education quality assurance. Themes emerged

from the interview data. The portfolio enabled students to reflect on the “journey” of their education. Students spoke of perspective transformation that led to self-discovery, personal growth, and empowerment. Additionally, students spoke of importance of sharing the portfolio with others. By sharing the portfolio, students gained a sense of trust, comfort, and community that enabled acceptance of transformation. Different from Mathew-Maich et al. (2000), Ruth-Saud et al. (2010) found students perceived critical thinking skills were enhanced.

Another study involving prelicensure nursing students fostered further understanding of the TLT and suggested learning and teaching activities based on transformational learning. In a phenomenological study conducted by Rush (2008), the involvement of utilizers of mental health services in the classroom setting was examined as a facilitating factor for transformational learning in nursing students. In semi-structured interviews, 24 mental health prelicensure diploma nursing students shared their thoughts and feelings of having a mental health patient participate in the delivering of the course theory content. The researcher found the students’ lived experiences of having a mental health patient be involved in classroom discussions resulted in new actions and new insights. The data analysis revealed, students reported transformation in beliefs about mental illness through reflection, role reversal, and exploring emotions. Additionally, the students found the relaxed environment of the classroom and subsequent engagement of discourse to be more conducive to self-reflection and learning. Like the previous studies (Matthew-Maich et al., 2000; Ruth-Sahd et al., 2010), Rush’s (2008) use of mental health patients in the classroom fostered transformational learning. Other independent factors, such as students’ ages, nursing experience, and prior personal

experiences with mental health issues may have contributed to what the students' reported; nevertheless, themes emerged that interactions with mental health patients fostered transformational learning. Rush's (2008) findings supported Estabrooks et al. (2005) work by further demonstrating generalist nurses' prefer to learn and practice knowledge gained from trusted relationships in the practice environment rather than knowledge generated from research.

Other qualitative studies that enhanced transformational learning in the classroom focused on post RN licensure education. Morris and Faulk (2007) examined behavioral changes in professionalism for returning adult RN-BSN students and identified teaching and learning activities that enhanced transformational learning. Ten recent graduates completed a survey of open-ended questions asking for examples of activities that fostered critical reflection and critical discourse leading to self-perceived professional transformation. Similar to Matthew-Maich et al. (2000), Rush (2008), and Ruth-Sahd et al. (2010), analysis of the data revealed common themes of empowerment, personal growth, and what it means to be a nurse. Different from previous studies (Matthew-Maich et al., 2000; Rush, 2008; Ruth-Sahd et al., 2010), Morris and Faulk (2007) extracted specific examples of learning activities that were associated with essential nursing roles and professional values, such as family assessment, community assessment, and a life review paper, which served to emphasize the concept of a patient as part of larger group.

In a similar study to Morris and Faulk (2007), Cragg et al. (2001) conducted a quantitative study examining students' perspective transformation in an on-line RN-BSN program. Cragg et al. (2001) used a professional values socialization scale to measure

differences between on-line RN-BSN students, on-site RN-BSN students, or a mixture of the two. Additionally, the researchers compared the socialization scale scores to traditional BSN graduates. The researchers found a significantly greater self-perceived professionalism transformation in the RN-BSN graduates compared to the traditional BSN graduates. Furthermore, on-line RN-BSN students had a significantly greater self-perceived professionalism transformation score than the traditional BSN students and RN-BSN who had a mix of on-site and on-line courses. Cragg et al. (2001) theorized the RN-BSN students had a readiness for change enhanced by life and work experience. Nurses with more life and work experience were able to internalize new information. The study served to underscore the importance of key demographic variables, such as age, program delivery method, years of nursing experience, and practice setting, when implementing transformational learning in educational programs.

Additionally, another qualitative case study demonstrated the use of the TLT to foster transformational learning in graduate nursing education classrooms. Jackson et al. (2013) used transformational learning to facilitate positive master's degree student engagement with sensitive material. The study explored 56 students' experiences after a one-day workshop designed to facilitate a deeper understanding of the health care needs of Australia's Indigenous people. The workshop consisted on personal stories, films, and interactive sessions with and about Australia's Indigenous people. Students were encouraged to participate in reflection and discussion during the workshop. Data analysis of the interviews revealed students found the workshop to be "transformative, profound, and a deeply meaningful educational event" (Jackson et al., 2013, p. 108). Jackson et al. (2013) findings lent further support to Cragg et al. (2001), Mallory (2003), Morris and

Faulk (2002), and Rush's studies that student engagement, relationships, and critical reflection are critical components of transformational learning. Furthermore, these studies (Jackson et al., 2013; Matthew-Maich et al., 2000; Morris & Faulk, 2007; Rush, 2008; Ruth-Sahd et al., 2010) demonstrated teaching and learning activities based on the underpinnings of the TLT resulted in transformational learning.

In addition to the research concerning curricular components of nursing programs, researchers have applied the TLT to the delivery of nursing theory content. In a quantitative study of prelicensure junior nursing students, researchers used transformational learning as a lens to examine the impact of palliative care education on beliefs toward caring for the dying (Mallory, 2003). In a quasi-experimental design, the intervention group was asked to complete an attitude toward the caring of the dying questionnaire before and after an experiential learning program designed to help students understand skills needed to care for the dying. The control group did not receive the palliative care intervention. The palliative care program included lecture, experiences at hospices, funeral homes, and anatomy laboratories, as well as role play activities. The researchers found significant differences in questionnaire scores between the experimental group and the control group. Furthermore, repeating the questionnaire six weeks later showed lasting effects on student attitudes toward the dying. The researchers theorized that transformational learning took place during the experiential learning program. Guided by the precepts of transformational learning, the program encouraged critical reflection and critical discourse. Similarly, Jackson (2013) demonstrated in graduate students that transformational learning could be used to increase student engagement with theory content. The Morris and Faulk (2007), Cragg et al. (2001), and

Mallory (2003) studies lent insight on how transformational learning may be implemented in nursing education programs. Furthermore, the Morris and Faulk (2007) and Cragg et al. (2001) studies served to emphasize the importance of individual student characteristics as independent variables.

In addition to studies with nursing students, research based on the TLT can be found in physician education. MacLeod et al. (2003) phenomenological study explored 58 first-year medical students' experiences after a program designed to spend time with a dying person and their family. The students developed a portfolio chronicling their personal experiences with the dying person and their family. Five themes emerged from analysis of the portfolios: identification of interactions different from what they had anticipated, emotional factors, spiritual components, personal meanings, and ways to better care for the dying. The researchers discussed how students positively transformed their previously held beliefs through self-reflection and critical discourse. Students reflected that the portfolio enabled a more personal approach to care of the dying.

In a similarly themed study, Goldie et al. (2005) examined medical students' beliefs and behaviors in the care of a fictitious child dying from cancer in a mixed-methods cohort design. The researchers examined how 162 medical students' beliefs changed about the rights of a 12-year-old child dying from cancer to be told of the terminal nature of her illness when the parents did not want her to know. The vignette was taken from a health care ethics survey. The medical students took the survey prior to beginning school and at the end of years one, three, and five. Scores on the survey did not change significantly. The interview data revealed students had strong paternalistic feelings that favored respecting the parents' wishes despite empirical evidence most

children should be told when an illness is terminal. The researchers theorized that the traditional method of delivering didactic knowledge in medical school does not allow for the self-reflection and critical discourse needed to change or embrace beliefs. The researchers offered transformational learning teaching and learning techniques may be better suited to enable medical students to learn ethical decision-making. These two studies supported Mallory (2003) and Rush's (2008) findings that transformational learning may be fostered through teaching and educational interventions.

In the only study found to evaluate the effect of transformational learning in patient education, Ntiri and Stewart (2009) studied functional health literacy in diabetic older African Americans. In the quantitative study, researchers measured pre- and post-test learning of 20 older African Americans with diabetes after interactive diabetic education activities that utilized precepts of transformational learning (Ntiri & Stewart, 2009). The researchers designed educational sessions that fostered self-reflection of old and new ways to self-manage diabetes. Topics included: what is diabetes, diet, exercise, medications, and effects of diabetes. Statistical analysis of the data revealed significant increases in pre- and post-test scores. The researchers concluded that transformational learning activities successfully motivated those living with DM to improve knowledge and self-management. Ntiri and Stewart's (2009) findings with patients supported educators findings with health care students (Cragg et al., 2001; Goldie et al., 2005; Jackson et al., 2013; MacLeod et al., 2003; Mallory, 2003; Matthew-Maich et al., 2000; Morris & Faulk, 2007; Rush, 2008; Ruth-Sahd et al., 2010) in that, transformational learning principles of self-reflection and critical discourse with others results in substantive change in beliefs. Different from these previous studies, Ntiri and Stewart

(2009) demonstrated the value of transformational learning outside the traditional classroom setting with health care students.

Multiple studies (Cragg et al., 2001; Goldie et al., 2005; Jackson et al., 2013; MacLeod et al., 2003; Mallory, 2003; Matthew-Maich et al., 2000; Morris & Faulk, 2007; Rush, 2008; Ruth-Sahd et al., 2010), fostered an understanding of the TLT and described how implementation of transformational learning the nature of learning and education activities informed some aspect of the TLT. Providing students' and learners with experiences that were direct, personally engaging, and stimulate reflection on the experience were powerful tools (Taylor & Cranton, 2012).

Relationships and Organizational Environment

Several health care education studies lent understanding to the essential components of transformational learning such as relationships and organizational environment. In a qualitative case study by Eisen (2001) peer and student relationships were found to be a transformational learning influencing factor in faculty continuing education. Eisen (2001) took the opportunity afforded by a peer learning faculty development initiative to conduct a case study of participants' perceptions of the program. Community college educators from multiple disciplines, including nursing faculty, were placed in a peer learning partnership. Partnered with another experienced educator, the initiative's participants provided formative reciprocal feedback. Each participant developed individual teaching goals. Over two semesters, partners observed each other in the classroom setting, gathered data from students, and regularly met to explore how self-developed goals could be better met through alternative teaching and learning approaches. Faculty were encouraged to write reflective journals during the

program. Eisen (2001) conducted in-depth interviews with 20 teaching partners and analyzed their journals. Common themes emerged that illustrated the importance of establishing trusting relationships in the environment of learning communities. Development of trust through non-evaluative feedback was an important theme. Furthermore, relationships formed in peer-learning partnerships must become equalized and have shared goals for manifestation of learner empowerment. Equalization of the relationship was important for learner autonomy and development of trust. Eisen's (2001) study served to illustrate the TLT's precepts of critical reflection and critical discourse in a safe environment. Participants perceived learning to have taken place with a subsequent change in teaching pedagogy. The study served to reinforce the strong connection between learning through critical self-reflection and critical discourse with others.

Macdonald (2002) also examined relationships as a necessary component for critical reflection and critical discourse. In a narrative analysis, Macdonald (2002) found providing a safe environment for critical self-reflection and critical discourse necessary for unlearning of old behaviors to allow replacement of evidence-based nursing interventions. By focusing on positioning of an infant after feedings, Macdonald's (2002) narrative traces the path of unlearning years of anecdotal dogma that placing infants supine after feedings prevented aspiration. As research demonstrated the link of sudden infant death syndrome to prone positioning, health care workers needed to unlearn years of authoritative tenets to embrace a change in practice and patient education. Changing infant post-feeding positioning to supine required a time intensive process of self-reflection that acknowledged prior practices may have actually harmed

patients. By engaging in critical discourse of these feelings and current research with colleagues, students, and administrators, unlearning is facilitated and new beliefs and practices emerged. These findings supported Eisen's (2001) study that suggested fostering relationships and consideration of learning environments are essential components of transformational learning.

Use of Scales and Surveys

In the past, the TLT as a research framework was limited to qualitative studies. A growing trend is using the TLT as a lens for quantitative health care studies. By using scales and surveys in the study designs, subjects' change in perspective about a particular phenomenon can be measured (Taylor, 2007). Cragg et al. (2001) used the Professional Values Scale to measure professional perspective transformation in on-line RN-to-BSN students compared to traditional on-site RN-to-BSN students. Ntiri and Stewart (2009) utilized the Diabetes Knowledge Test, the Test of Functional Literacy, and the Literacy for Diabetes scales to measure if learning occurred in older African-Americans with diabetes after a transformational learning workshop.

Additionally, two palliative care studies utilized quantitative instruments to measure changes in beliefs after experiencing patient death. Mallory (2003) used the Frommelt Attitude Toward the Care of the Dying scale to measure nursing students change in beliefs before and after care of the dying educational interventions. Goldie et al. (2005) utilized a mixed method design to examine medical students' changes in beliefs about death. In addition to interviews, the Ethics in Health Care Instrument was used in the study. The trend of utilization of surveys and scales allowed participant sampling to be based on criteria characteristic of transformational learning and allow

quantitative measurement of essential components of the TLT such as critical reflection and belief transformation (Taylor & Cranton, 2012).

Innovative Approaches

In addition to the trend of utilizing quantitative and mixed methods research, innovative approaches to collect data were employed to further study the TLT in health care education (Taylor & Cranton, 2012). In common with Mallory (2003) and Goldie et al. (2005), the TLT was utilized in palliative care research to highlight creative data collection. For example, medical students were required to compile a reflective personal portfolio of experiences with dying patients (Macleod et al., 2003). Maich, Brown, and Royle (2000) also utilized a portfolio to gather qualitative data where senior nursing students reflected on the process of developing a professional portfolio. By utilizing a portfolio, rich data were gathered to further understand TLT. According to Taylor (2007), creative data collection overcame shortcomings of purely retrospective recall of experiences seen in qualitative research.

Another growing research trend is utilization of health care transformational learning outside of the formal classroom setting (Taylor & Cranton, 2012), such as workshops. King's (2009) study also supported the importance of learning environments and relationships. King's mixed method study (2009) sought to determine the ways and extent that health care workers' voice, satisfaction, beliefs, relationships, problem solving improved as workers and managers participated in a workshop training program designed and delivered through the lens of transformational learning. The six-day continuing education workshop was a training program in gerontology and palliative care for long-term care workers participants. Additionally, follow up training sessions occurred over

subsequent months. Qualitative data, such as interviews and participant observation, were used to understand the depth of the learners' experiences, while quantitative data collected with pre- and post-test surveys measured change and participants' demographic data. In a stratified sampling technique, 136 participants completed the surveys and 28 participated in the post workshop interviews. Participants included nurses, administrators, occupational therapists, housekeepers, and secretaries. The study lent insight to the usefulness of transformational learning as a method of instruction. As found by Matthew-Maich et al. (2000) analysis of nursing students' portfolios, the workshop's participants spoke of transformation that led to self-discovery, personal growth, and empowerment. Furthermore, the study expanded on Matthew-Maich et al. (2000) findings. Transformational learning resulted in personal empowerment, but changed the worker-organizational relationship. Ntiri and Stewart (2009) supported Eisen's (2001), King's (2009), and Macdonald's (2002) findings that transformational learning was applicable to settings other than the traditional health care education classroom.

Section Summary

Although the health care education studies that use the TLT as a lens were widely divergent in scope, participants, purpose, and methodology, the need to critically self-reflect and engage in critical discourse with others was the common thread between them all. The qualitative studies were limited by not being able to show causality; however, the studies lent important insight to individual's learned experience. The quantitative studies used valid and reliable scales that provided evidence of change in beliefs and knowledge when the precepts of transformational learning are utilized. Although the

literature clearly demonstrated the value of the TLT in implementing teaching and learning activities in many health care areas and the precepts of transformational learning were demonstrated in various health care education areas, similar literature is lacking in the advance nursing practice education arena. Furthermore, much of the research using TLT focused on formal classroom settings. Little attention has been given to non-formal settings, such as practice environments. Few studies focused on transformational learning in relation to a person's unique characteristics, such as age, years of experience, employment positionality, workplace environment, and educational variables (Taylor & Cranton, 2012). In common, these studies supported the precepts of transformational learning: consideration of relationships and the environment, critical reflection, and critical discourse to change beliefs and subsequent practice.

In summary, the TLT offered guidance to determine the key variables of NPs EBP. The theory's precepts provided a sound base for the emergence of key independent and dependent variables related to NPs EBP. Understanding NPs beliefs, knowledge, barriers, and facilitating factors of EBP is imperative to foster sustained change.

Evidence-Based Practice in Nursing Literature Review

EBP in nursing is not a new concept. In the past decade, nursing literature is replete with information regarding teaching and implementation of EBP. The call to implement EBP in healthcare to affect patient care outcomes positively is clear. Although EBP decreases mortality, morbidities, medical errors, and the geographic variations of health care, there is a disconnect in implementation (Melnik, Fineout-Overholt, Gallagher-Ford, & Kaplan, 2012). In order to meet the IOM's goals of 90% of all health care decisions being evidence based by 2020, strategies are needed to improve

EBP (McClellan, McGinnis, Nabel, & Olsen, 2007; Melnyk et al., 2012). This literature review aims to identify, assimilate, and synthesize empirical studies that focused on clinical EBP beliefs, knowledge, barriers, and facilitating factors in nursing. The following data-bases were used: CINAHL, ERIC, Cochrane Library, ProQuest Global Dissertations and Theses, and PubMed. The researcher reviewed all articles found with no limitation on dates. Key search terms included: nurses, nursing, nurse practitioners, advanced practice providers, EBP, evidence-based nursing, health care, and education. The researcher selected studies that fostered an understanding of what is known about barriers and facilitating factors for EBP in clinical nursing. Furthermore, the literature review served to allow emergence of key variables, which are included in this study. The empirical literature research is presented from earliest to latest to underscore evolutionary changes in EBP studies.

Nurse Generalists

The literature repeatedly demonstrated consistent barriers and facilitating factors to EBP in the generalist nursing setting. Major reported barriers are related to nurses' personal, practice, and professional factors, such as insufficient time to implement new ideas, lack of EBP knowledge, educational preparation, and lack of authority to change practice. Furthermore, barriers related to institutional settings are cited, such as lack of support from colleagues and inadequate infrastructure within the facility (Eizenberg, 2010; Gerrish & Clayton, 2004; Koehn & Lehman, 2008; McCloskey, 2008; Melnyk et al., 2004; Melnyk et al., 2012; Olade, 2003, 2004; Pravikoff, Tanner, & Pierce, 2005; Yoder et al., 2014). Facilitating EBP factors with the generalist nurse also appeared to be related to professional, practice, and personal characteristics, such as practice setting, age,

educational preparation, years of experience, number of hours worked, and beliefs (Eizenberg, 2010; Gerrish & Clayton, 2004; Koehn & Lehman, 2008; McCloskey, 2008; Melnyk et al., 2004; Melnyk et al., 2012; Olade, 2003, 2004; Pravikoff et al., 2005; Yoder et al., 2014).

Multiple barriers to nurse generalists' EBP emerged from the literature: Lack of time, knowledge, support by colleagues, research mentors or consultants, and interest in research. Olade (2003) focused on beliefs of nurses in rural practice settings toward research. In a correlational, cross-sectional study with a convenience sample methodology, 106 RNs from six counties in a south-western state were given a researcher developed survey that contained both closed and open-ended questions. Subjects ranged in age from 21 to more than 50 years-old. One-half of the subjects were staff nurses. Years of nursing experience ranged from one to 20 years. Fifty-six percent of the subjects had a diploma, associate's degree in nursing or were licensed vocational nurses. In a Likert-style response format, questions focused on research values and skills. A higher score reflected a more positive attitude toward research. Olade (2003) found 76% of the subjects had either an unfavorable or neutral attitude toward research. Furthermore, Olade (2003) found 76% of the nurses reported a desire for research utilization of barriers to be minimized. Only 21% of the subjects reported utilization of EBP. The remaining 79% cited lack of time, lack of knowledge, and no interest as reasons for not integrating EBP. Additionally, demographic variables influenced nurses' beliefs concerning research. Education of the nurses ($r = 0.51, p = .01$), position ($r = 0.45, p = .01$), and participation in research activities ($r = 0.81, p = .001$) had a

statistically significant relationship to research beliefs. Age, years of nursing experience in nursing, and practice setting were not found to be statistically significant.

In 2004, Olade published more findings from her self-reported data survey. Using data from open-ended questions, Olade (2004) sought to determine the extent to which rural nurses utilize EBP guidelines in the clinical setting, participation in past and current research, and identify specific EBP barriers. Olade (2004) found only 21% of the subjects reported current EBP utilization. The four most common areas of research utilization were pain management, pressure ulcer prevention and management, and intravenous management. Forty-four of the subjects (42%) reported prior involvement in research activities. BSN prepared nurses were more likely to integrate research into practice.

The Olade (2003, 2004) studies were limited by the methodology. The sample was one of convenience with in a limited geographic setting, which limits generalizability of both of the studies' findings. Secondly, all data were self-reported. The researcher-designed tool had limited validity and reliability psychometrics. Olade (2003, 2004) hypothesized rural nurses face unique EBP barriers related to geographic isolation.

Building on Olade's (2003, 2004), Gerrish and Clayton (2004) further explored EBP barriers and added nurses' sources of EBP knowledge and nurses self-perceived ability to find, review, and implement EBP. In a modified tool, Gerrish and Clayton (2004) surveyed 330 British nurse generalists in a descriptive, cross-sectional study.

The first section of the tool measured utilization of clinical practice knowledge sources from a list of 18 listed selections in a Likert-type response format ranging from one (never) to five (always). The three top ranked sources of clinical practice knowledge

included: (a) informational learned from each patient as an individual ($M = 4.37$, $SD = 0.678$), (b) nurses personal experience of caring for patients over time ($M = 4.08$, $SD = 0.675$), and (c) information from colleagues ($M = 3.85$, $SD = 0.607$). Information from hospital conferences ($M = 3.58$, $SD = 0.776$) and hospital policy and procedures ($M = 3.57$, $SD = 0.831$), were ranked number five and six respectively. Nurses' intuition was ranked at number eight ($M = 3.36$, $SD = 0.719$). Use of articles published in research journals was ranked at number 13 ($M = 2.92$, $SD = 0.828$).

In the second section of the tool, nurses' barriers to finding and reviewing evidence were also measured in nine items with a Likert-type response format ranged from one (strongly agree) to five (strongly disagree). The findings indicated nurses' greatest barriers were related to lack of time ($M = 2.29$, $SD = 0.889$) and availability of information ($M = 2.75$, $SD = 0.912$). Nurses were not confident in their own ability to judge research quality ($M = 3.01$, $SD = 1.045$) and did not understand research reports ($M = 3.12$, $SD = 0.993$) (Gerrish & Clayton, 2004).

The third section of the tool measured nurses' perceived barriers to implementing EBP. Identified barriers to changing practice to evidence-based echoed those found in finding and reviewing evidence (Gerrish & Clayton, 2004). Nurses cited insufficient time, resources, and unsupportive supervisors and colleagues. The findings indicated nurses were more comfortable with non-evidence based practice information, such as intuition and hospital policy and procedure manuals in contrast to evidence-based sources of knowledge, such as journals. Few nurses considered themselves knowledgeable in EBP and are not supported by colleagues and administrators.

The information gleaned from the study has limited generalizability as it is descriptive. The researchers provided no data on the sample's characteristics nor on the validity and reliability of the tool (Gerrish & Clayton, 2004).

Pravikoff et al. (2005) also examined nurse generalists' perceptions of their own skills in obtaining evidence and their access to evidence. Furthermore, the researchers wished to determine whether nurse generalists were aware of the need for implementation of EBP. Lastly, the researchers wished to define the nurse generalists' perceptions of EBP barriers. The study was a descriptive, exploratory design with a geographically stratified survey random sample of 3,000 nurses generated from a publishing company's list of two million United States RNs. The survey had a 37% ($n = 1097$) response rate. Of the returned surveys, 760 identified themselves as RNs employed in the clinical setting. These RNs became the study's sample ($n = 760$). The researchers excluded those who identified themselves as administrators or educators. Different from Melnyk et al. (2004) and Olade (2003, 2004), the sample reflected characteristics of nurses nation-wide in terms of sex, gender, ethnicity, practice setting, and education.

Pravikoff et al. (2005) utilized a modified 93-item questionnaire that posed questions in various formats that included dichotomous variables, ranking items, and fill-in-the blank items. For example, subjects were asked if they were aware of electronic resources, such as CINAHL. Subjects were also asked to rank EBP barriers from a list. Different from Melnyk et al. (2004) and Olade (2003, 2004), subjects were asked resource availability and use. Also unique to Pravikoff et al. (2005), subjects were asked how often they needed information to support their practice. In addition to inquiring about individual EBP barriers, Pravikoff et al. (2005) asked subjects to provide EBP

barriers at the institutional level. The researchers provided no information on the tool's reliability and validity.

The typical respondent was Caucasian, 40 to 49 year old nurse generalist with a diploma or an associate's degree (Pravikoff et al., 2005). Sixty-one percent of the respondents sought information at least once a week in clinical practice; however, 67% of the time this information was obtained from a colleague. In fact, 58% reported never using journals to support their clinical practice. Furthermore, 82% never used a hospital library. Forty-six percent of the respondents were unfamiliar with the term EBP. Although most considered themselves internet savvy (83%), few searched on line data-bases, such as CINAHL (76%) or MEDLINE (58%). The majority (64%) reported that their employers did not provide access to electronic data-bases. Twenty-nine percent did not know if electronic data-bases were available at the workplace.

As lack of time was a common EBP barrier in the literature (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Melnyk et al., 2004; Olade, 2003, 2004), Pravikoff et al. (2005) asked respondents to list other EBP barriers. Lack of value for research in practice, lack of understanding electronic data-bases, and difficulty accessing research materials were cited most frequently. Additionally, nurses were asked to rank institutional EBP barriers. Presence of other priorities, difficulty recruiting and retaining clinical staff, and cost of research resources were cited most frequently. The study was limited by its methodology. The study was a descriptive, exploratory design intended only to gather data. Secondly, the tool had no psychometric testing. However, the sample adequately reflected the sampling pool of all United States nurses. As found by other researchers (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Olade, 2003,

2004), Pravikoff et al. (2005) determined nurses were unprepared and lacked education and resources necessary for EBP. Secondly, Pravikoff et al. (2005) supports Gerrish and Clayton's (2004) findings, which underscored the importance of organizational culture in supporting EBP.

Melnyk et al. (2004) also sought to determine generalist nurses attitudes, barriers, and facilitating factors concerning EBP; however, findings differed from Olade's (2003, 2004) and Pravikoff's et al. (2005) studies. Melnyk et al. (2004) also utilized a correlational, cross-sectional design with a convenience sampling methodology ($N = 160$). Most of the subjects were currently practicing ($n = 117$, 73%) and the remaining were educators ($n = 68$, 43%). In a 52-item researcher developed survey, seven questions measured knowledge, beliefs, and extent of EBP on a 0 to 100 scale. Additionally, nine dichotomous items asked subjects' about implementation of EBP. Finally, 13 open-ended questions collected further EBP implementation data. In a sample of 160 nurses from four states who were attending an EBP conference, the nurses reported 46% of their current practices were evidence-based. Compared to Olade's (2003, 2004), this represents a substantial difference in utilization of EBP. This finding supports Olade's (2003, 2004) hypothesis that rural nurses EBP may be affected by geographic isolation and practice and professional variable influences. Additionally, the difference may be accentuated by Melnyk et al. (2004) sample of nurses attending an EBP conference reflecting possible sampling bias. Gerrish and Clayton (2004), Melnyk et al. (2004), Olade (2003), and Pravikoff et al. (2005) found similar EBP barriers. Melnyk et al. (2004) EBP barriers included: lack of time, lack of access to resources, knowledge, colleague support, and mentors. Melnyk et al. (2004) found three additional barriers:

closed mind peer attitudes, too many journals, and lack of financial support.

Furthermore, Melnyk et al. (2004) found nurse generalist and nurse educator EBP facilitating factors. EBP facilitating factors included: nursing faculty, APRNs, library resources, colleague and peer discussion of EBP, administrators, research departments, continuing education activities, such as conferences, and professional organizations.

Also different from Olade (2003, 2004) and Pravikoff et al. (2005), Melnyk et al. (2004) found enthusiastic support for EBP. For example, nurses who held stronger beliefs about the importance of EBP positively affecting patient care outcomes were more likely to incorporate evidence-based care ($r = .32, p < .001$). Similarly, Melnyk et al. (2004) found nurses who reported having greater knowledge of EBP correlated with a greater extent of EBP ($r = .42, p < .0001$).

Melnyk et al. (2004) study had significant limitations that affected generalizability of the results. The study's tool was researcher developed with limited validity and reliability testing. Secondly, the sampling methodology was one of convenience from limited geographic location. Finally, selection bias was a consideration as the sampling took place at an EBP conference.

Similar to Gerrish and Clayton (2004), Melnyk et al. (2004), Olade (2003, 2004), and Pravikoff et al. (2005), Koehn and Lehman (2008) investigated nurses' perceptions of EBP. Like Melnyk et al. (2004) and Olade (2003, 2004), a cross-sectional, correlational design with a survey methodology was used. The Clinical Effectiveness and Evidence-Based Practice Questionnaire (CEEBPQ) was administered to all nurses in a large Midwestern urban medical center in the United States. The survey included 24 Likert-type questions designed to measure nurses' use of EBP, beliefs of EBP, and

knowledge/skills of EBP. Items were scored on a scale of one to seven. Higher scores indicated a more positive EBP belief or knowledge. According to Koehn and Lehman (2008), the CEEBPQ has good internal consistency with a Cronbach alpha coefficient for the entire tool reported at .87; however, the questionnaire is new with limited usage in research studies. In the Koehn and Lehman (2008) study, the Cronbach alpha was .94. The survey was distributed to a sample of 1,031 nurses with a 41% response rate ($N = 422$). The sample included nurse generalists ($n = 328$, 78%), clinical nurse specialists, staff development educators, and non-direct care nurses ($n = 41$, 10%), and unit managers ($n = 53$, 13%). Additionally, 53% ($n = 224$) with a BSN or higher degree returned the survey. Respondents ranging in age from 41-50 ($n = 144$, 35%) and those with more than 20 years of experience (40%) returned the most questionnaires. Unique to Koehn and Lehman's (2008), demographic data of subjects' subscription and/or reading of professional nursing journals was collected with 47% ($n = 193$) responding "yes:" 53% ($n = 214$) responded "no" to subscription and/or reading of professional journals.

The overall mean score for the questionnaire was 4.89 (0.90) (Koehn & Lehman, 2008). Scores for EBP implementation ($M = 5.21$, $SD = 1.32$) and attitude ($M = 5.19$, $SD = 1.10$) were moderate. Scores for EBP knowledge was the lowest ($M = 4.67$, $SD = 0.98$). Statistically significant differences were seen among the different educational levels of nurses. The BSN group demonstrated statistically significant differences in EBP beliefs when compared to the associate's degree educational preparation ($F(3, 20.8) = 6.013$, $p = 0.001$). Because diploma and master's degree groups were small, categories were collapsed to form two categorical variables: diploma/associates degree ($n = 184$) and BSN/ master's degrees ($n = 223$). Statistically significant differences were found

when comparing diploma/associates degree and BSN/ master's degree ($F(3, 403) = 6.11$, $p = .000$) EBP attitudes. No other statistically significant differences were found. The statistically significant differences in EBP beliefs and educational levels supported Olade's (2003) findings.

Koehn and Lehman (2008) found EBP barriers similar to Gerrish and Clayton (2004), Melnyk et al., (2004), Olade (2003, 2004), and Pravikoff et al. (2005). In an open-ended question format, nurses were asked to list barriers to EBP. Nurses' cited no time (39%), too costly (11%), no knowledge/limited knowledge of research (23%), lack of mentors (9%), and lack of administrative interest (5%). Different from previous literature (Melnyk et al., 2004; Olade, 2003, 2004) respondents reported "there are no barriers to EBP" (Koehn & Lehman, 2008, p. 213) in a pick all that apply and an open-ended formatted question.

Koehn and Lehman's (2008) study had limitations. The sample was one of convenience and self-reported data was collected. The researchers conducted the study at one site. At the time of the study, the medical center was pursuing American Nurses Credentialing Center's (ANCC) Magnet status designation; therefore, subjects may have felt more acutely aware of the need for an organizational culture that favors EBP resulting in positively skewed results. However, as found by Pravikoff et al. (2005), organizational culture emerges as a key facilitator of EBP. Finally, the CEEBPQ had good internal consistency; however, there was minimal variation across scores suggested the tool's limited ability to discriminate between items, which indicated revision is needed.

In another correlational, cross-sectional design, McCloskey (2008) compared relationships of professional, practice, and personal relationship to nurses' perceptions of EBP. Different from prior studies (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Melnyk et al., 2004; Olade, 2003, 2004; Pravikoff et al., 2005), McCloskey's (2008) sample included APRNs. Nurses in five hospitals within the same cooperative entity that had ANCC Magnet status designation were sent the Research Utilization Questionnaire (RUQ) ($N = 270$). The 46-item tool was divided into four factors that measured EBP beliefs, evidence availability, EBP support, and evidence use. Respondents were asked to answer questions on a five-point Likert-type scale. Scores were calculated by adding the items. A higher score denoted a more positive EBP perception. The tool's psychometrics were good with internal consistency in prior research that ranged from .84 to .94 (McCloskey, 2008).

Convenience sampling was used. The mean age of the respondent was 43 years old with a mean of 17 years of nursing experience. The majority of the nurses had a BSN ($n = 131$, 49%). Associate's degree nurses made up 32% ($n = 85$) of the sample and master's degree prepared nurses made up 20% ($n = 54$) of the sample. APRNs comprised 8% ($n = 8$) of the sample.

Like Koehn and Lehman (2008) and Olade (2003, 2004), McCloskey (2008) found statistically significant differences in regards to education. Based on educational levels significant differences were found in each of the tool's factors. Nurses with master's degrees significantly differed in attitude ($F = 14.401$, $df = 2$, $p = .001$), support ($F = 10.166$, $df = 2$, $p = .001$), use ($F = 11.340$, $df = 2$, $p = .001$), and availability ($F = 5.585$, $df = 2$, $p = .001$) when compared to nurses with less education. The study's results

had limited generalizability since convenience sampling from one magnet hospital system was utilized. In addition to educational preparation of nurses, organizational environment and culture emerged as a key variable in EBP (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; McCloskey, 2008; Melnyk et al., 2004; Pravikoff et al., 2005).

Eizenberg (2010) also examined relationships between Israeli nurses' personal and professional factors and EBP. In a cross-sectional, correlational survey design with a convenience sampling methodology, 243 nurses completed a four-part questionnaire adopted from different sources. Two of the four parts were modified versions of existing tools. The two remaining parts were researcher developed. The first tool part contained personal and professional demographic data. The second tool part consisted of 12 statements divided into three EBP domains: implementation of research (Cronbach's $\alpha = .69$), impact of research on the status of the nursing profession ($r = .294, p < .001$), and attitudes toward research as an integral part of the nursing profession (Cronbach's $\alpha = .65$). Each domain had a Likert-type response format ranging from one (totally disagree) to five (totally agree) about EBP beliefs. The third part of the tool consisted of four subscales. The first subscale had 17 statements with a Likert-type response format ranging from one (never) to five (always) that related to nurses sources of EBP (Cronbach's $\alpha = .85$). The second subscale had 16 statements that referred to EBP knowledge sources (Cronbach's $\alpha = .84$). The third subscale had six items that referred to nurses' skills in finding, understanding, and implementing EBP (Cronbach's $\alpha = .89$). The questions were with a Likert-type response scale ranging from one (totally inexperienced) to five (totally experienced). The forth subscale had nine items that referred to environmental influences of EBP (Cronbach's $\alpha = .85$). These questions were

also formatted in a Likert-type response format ranging from one (not at all true) to five (very true). Higher scores on Likert-type formatted questions denoted a more positive EBP perception. The final part of Eizenberg's (2010) tool inquired about the respondents' frequency of seeking evidence for clinical practice.

The study's demographics reflected a mean age of 37 years old with a mean of 13 years of nursing experience and 86% of the sample reported a BSN or higher education. In common with previous studies (Koehn & Lehman, 2008; McCloskey, 2008; Olade, 2003, 2004), Eizenberg (2010) found nurses with a BSN or higher education had statistically significant more EBP behavior than those without a degree ($r^2 = .34$, $F(1,230) = 3.20$, $p = .01$, 95% CI [1.37-7.50]). Eizenberg's (2010) findings support the importance of an EBP workplace environment (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; McCloskey, 2008; Menyk et al., 2004; Pravikoff et al., 2005). Eizenberg (2010) found the greater the workplace environment support, the greater the respondents' EBP ($r^2 = .34$, $F(1,230) = 0.39$, $p = .01$, 95% CI [0.20-0.75]). Different from previous studies, Eizenberg (2010) found the more sources of knowledge were based on experience or intuition, the respondent was more likely to report EBP utilization ($r^2 = .34$, $F(1,230) = 1.75$, $p = .04$, 95% CI [1.03-2.99]). Like Gerrish and Clayton (2004) and Pravikoff et al. (2005), Eizenberg (2010) questioned the nurses' sources of evidence. If the nurses' sources of evidence-based knowledge stemmed from colleagues, the less likely EBP behavior was reported ($r^2 = .34$, $F(1,230) = 0.39$, $p = .01$, 95% CI [0.20-0.75]). Further building on the findings of Melnyk et al. (2004), and Pravikoff et al. (2005), Eizenberg (2010) found EBP was more likely if nurses had access to library resources with medical ($p = .04$) and nursing ($p = .10$) journals and access to computers

with internet in the workplace ($p = .01$). Respondents' roles and EBP attitudes did not predict evidence-based behavior (Eizenberg, 2010).

Eizenberg's (2010) study had limitations. As the tool was modified and developed by the researcher and used for the first time in this study, its validity and reliability are limited. Secondly, the data were self-reported, which may result in desirability bias. Thirdly, Eizenberg's (2010) sample was composed primarily of nurses with BSN degrees or higher, which is not reflective of all nurses. As such, the finding's generalizability was limited.

Recent research found similar themes with research of the past decade. Melnyk et al., (2012) conducted a national, randomized correlational study with a survey methodology to assess nurses' EBP perceptions. Using modified versions of the Evidence-Based Practice Beliefs (EBPB) scale and the Evidence-Based Practice Implementation (EBPI) scale, researchers asked 18 items with Likert-type response scales ranging from one (strongly disagree) to five (strongly agree). A higher score denoted more positive EBP perceptions. The researchers reported the modified tool's internal consistency at .88 (Melnik et al., 2012). Seven additional items assessed respondents' needs regarding EBP. These Likert-type formatted questions ranging from one (not needed) to five (greatly needed) had no psychometrics reported.

The sample ($N = 1015$) was randomly selected from the American Nurses Association's (ANA) membership list. The respondents average age was 51 years old and were mostly female ($n = 72$, 93%). Over half of the sample held a master's degree or higher ($n = 561$, 56%). Almost half of the respondents ($n = 400$, 47%) were employed at community hospitals and 23% ($n = 195$) were employed at an academic medical center.

The remainder of respondents reported practicing in a primary care setting ($n = 420$, 30%). Employment at a Magnet designated facility was reported by 25% ($n = 251$) of the respondents.

Supportive workplace environments emerged as a significant facilitator of EBP and lack of time emerged as the leading barrier to EBP (Melnik et al., 2012). Using modified versions of the EBPB scale and the EBPI scale, researchers examined nurses' self-perceptions of EBP. Different from previous studies, the researchers' wanted to know nurses' perceived needs to facilitate EBP implementation. Additionally, researchers sought to determine differences in EBP perceptions between master's degree prepared nurses and non-master's degree prepared nurses. Finally, the researchers' aimed to determine if nurses who were employed at Magnet designated facilities differed from nurses employed in non-Magnet facilities.

In contrast to Olade (2003) and Pravikoff et al. (2005) findings, nearly 54% ($n = 544$) of the respondents indicated EBP was consistently implemented in their practice. Supporting the findings of Koehn and Lehman (2008), Melnik et al. (2004), Olade (2003), Pravikoff et al. (2005), nurses believed it was important to receive more EBP education ($n = 773$, 76%). Melnik et al. (2012) findings supported earlier research which highlighted the importance of environmental or workplace EBP culture (Eizenberg, 2010; Koehn & Lehman, 2008; McCloskey, 2008; Melnik et al., 2004; Pravikoff et al., 2005). The positive implications of a Magnet facility designation has emerged as a key variable in EBP research (Koehn & Lehman, 2008; McCloskey, 2008). Melnik et al. (2012) supported the importance of Magnet facility designations. Nurses in Magnet facilities

reported higher levels of EBP implementation, availability of EBP experts and mentors, administrative support, EBP educational offerings, and recognition of EBP efforts.

As found in previous studies (Koehn & Lehman, 2008; McCloskey, 2008; Olade, 2003, 2004), statistically significant differences in educational preparation were found. In comparing non-master's degree nurses to master's degree nurses a significant differences were found (Melnyk et al., 2012). Nurses with more education reported greater clarity in steps necessary for EBP ($p = <.001$) and greater confidence of EBP implementation ($p = .001$) (Melnyk et al., 2012). Non-master's degree prepared nurses responded that is important to gain more EBP knowledge and skills than master's degree prepared nurses ($p = <.001$).

In contrast to Olade's (2003) findings, Melnyk et al. (2012), found years of nursing experience negatively correlated to EBP perceptions of gaining more knowledge and skills in EBP ($r = -0.12, p <.01$) and interest in receiving more education about EBP skills ($r = -0.10, p <.01$). In other words, respondents with more years of clinical practice experience felt gaining EBP education and skills was not important.

Melnyk et al. (2012) found similar EBP barriers reported in previous studies (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Melnyk et al., 2004; Olade, 2003, 2004). Time emerged as the leading barrier to EBP, followed by non-supportive organizational environment and lack of EBP education and knowledge. Barriers not frequently cited in prior literature included lack of evidence to support EBP ($n = 15, 2\%$) and available clinical practice evidence ($n = 55, 8\%$). Nurses reported more EBP education, enhanced access to EBP information, and time would facilitate their own EBP.

Melnyk et al. (2012) findings were limited by several factors. The sample did not reflect educational preparation of United States nurses as a population. Nurses with ANA membership were better educated. Secondly, sampling highly educated nurses may have resulted in sampling bias that may have positively reflected on EBP, thereby skewing findings. Finally, the tool was researcher developed with limited use in research, which was needed to substantiate validity and reliability.

A recent study of 794 nurse generalists supported past literature. In a cross-sectional, descriptive design with a survey methodology, Yoder et al. (2014) examined the extent to which nurses utilized research findings in practice, what EBP sources are utilized, and EBP barriers and facilitators. Using a convenience sampling of 10 hospitals in one health care system, nurses were sent a 53-item survey. The survey was a modified version of the Research Utilization in Nursing tool. The tool consistent of six subscales: (a) attitude toward research (Cronbach $\alpha = .78$), (b) trust that research is useful in practice (Cronbach $\alpha = .87$), (c) belief that research findings are similar to values of the nurse (Cronbach $\alpha = .84$), (d) importance of using research findings in practice (Cronbach $\alpha = .81$), (e) supportiveness of the organizational environment (Cronbach $\alpha = .89$), and (f) access to technology or library support (Cronbach $\alpha = .74$). Item responses were in a five-point Likert-scale format with a range of one (never) to five (very often). Other parts of the survey were demographic-type, inventory, and open-ended questions, which could not be analyzed for validation. The sample consisted of mostly females ($n = 655$, 88%) with 70% ($n = 556$) employed at a Magnet designated facility. Almost half the respondents ($n = 380$, 49%) had a BSN, while 44% ($n = 341$) had diplomas or associate's degrees. The remaining nurses processed a master's degree or higher. The majority of

the nurses had six or more years of nursing experience (68%) with a mean of 13 years of nursing experience. The nurses' ages ranged from 22 to over 60 years old with an average age of 41.5 years old. The majority of the nurses held no certification (70%, $n = 554$) and did not belong to a professional organization (63%, $n = 497$).

In contrast to Olade (2003, 2004) and Pravikoff et al. (2005) findings, Yoder et al. (2014) found only 11% had limited EBP knowledge. Nurses reported high utilization in some aspect of their practice with 45% reporting the use of EBP often or very often. Most of the respondents reported using EBP to change their own practice (83%), while most would use evidence to persuade a patient to make a change (63%). Additionally, the majority of respondents' EBP made a positive difference in patient care (84%). As Eizenberg (2010) and Pravikoff et al. (2005) found, nurses continued to rely on personal experience (79%) and information gleaned from colleagues, such as physicians (57%) and peers (55%) to guide practice (Yoder et al., 2014). In contrast to Pravikoff et al.'s (2005) findings, nurses used electronic databases for EBP information (45%). Similar to Pravikoff et al.'s (2005) findings, few nurses utilized on-site library sources for information (10%). A majority of the nurses (57%) reported using professional journals as a source of information, which reflected an increase from Koehn and Lehman's (2008) findings. In open-ended question responses, nurses reported workplace support as an important EBP facilitator. Nurse specifically cited supportive administrators and EBP mentors as important facilitators (Yoder et al., 2014), which supported Koehn and Lehman (2008), Melnyk et al. (2004), and Pravikoff et al.'s (2005) findings.

Yoder et al.'s (2014) study had limitations. As the tool was modified and developed by the researcher and used for the first time in this study, its validity and

reliability were limited. Secondly, the data were self-reported, which may result in desirability bias. Finally, the researchers conducted the study in one health care system, which may limit generalizability of the findings.

Nurse Generalists' Section Summary

In summary, barriers to nurse generalists' EBP has not changed through the past decade of research. Nurse generalists' EBP research has been predominately cross-sectional in design utilizing descriptive or correlational methodology with self-reported data. Since tools measuring EBP beliefs, knowledge, and skills had been researcher developed, modified, and not used in repeated studies, inadequate validity and reliability psychometrics prevailed in the previously discussed research. Despite the acknowledged importance of EBP, lack of time, mentors, education, and organizational support emerged from the reviewed literature as consistent barriers to nurse generalists' EBP. An organizational culture that promoted EBP was a common facilitating theme throughout the reviewed literature. Although each reviewed study had flawed methodology that limited generalizability, changing themes over time could be elucidated. The literature revealed an increased awareness of EBP, an increasingly positive perspective on EBP, and increased use of electronic sources. In recent years, nurses appeared to be more willing to implement current evidence into practice; however, they continued to rely on colleagues, mentors, supervisors, and hospital policies as primary sources of knowledge. Additionally, nurses continued to rely on personal experience to guide their clinical practice, which indicated nurses were not active consumers of research.

Advanced Practice Registered Nurses

In the past decade, researchers have examined practice, professional, and personal factors among APRN's EBP; however, the literature is scant in comparison to the nurse generalist research. The complexities of EBP becomes increasingly evident with the introduction of medical practice and decision making as part of NPs', NMWs', and NAs' role. The pool of clinical evidence increases when considering available medical literature. Furthermore, much of clinical care provided by APRNs has yet to be proven in research (Bogdan-Lovis & Sousa, 2006). Available EBP medical literature is limited by researchers interests, values, and funding support. Furthermore, journals may selectively publish results. Finally, the precept of patient preferences also influences APRN's implementation of EBP. APRN's roles also introduce complexities. APRNs may serve in mentoring capacities to nurse generalists. In common with nurse generalists, APRN's EBP is dependent on education, time, and supportive workplace environments.

Promoting Evidence-Based Practice Among Nurse Generalists

In a qualitative study, Profetto-McGrath, Bulmer, Hugo, Taylor, and El-Hajj (2007) explored CNSs' EBP implementation of EBP in a descriptive exploratory design. The researchers identified gaps in the literature pertaining to EBP from CNS's own perspective. Although considered APRNs, CNSs traditionally act as consultants for nurse generalists and do not perform medical decision making care (Profetto-McGrath et al., 2007; Smith, Donze, Cole, Johnston & Giebe, 2009). However, CNSs serve an important role as nurse generalists' bridge for implementation of EBP at the bedside (Profetto-McGrath et al., 2007; Profetto-McGrath, Negrin, Hugo, & Smith, 2010). Seven

participants with an average of five years of CNS experience from a large Canadian health care system were interviewed using semi-structured open-ended questions. No other demographic data was provided. One of the emerging themes from the data was that multiple sources of evidence were used that included peers, research evidence, internet, and past clinical experience. Additionally, participants felt strongly not just one source of information should be utilized when seeking evidence-based answers to clinical questions. Participants spoke to the importance of libraries and helpful librarians. Participants utilized reference journals and electronic databases, such as CINAHL, Medline, and Pub Med as primary sources of clinical evidence while information in textbooks were not considered up to date. Different from nurse generalists, participants spoke to the importance of interdisciplinary teams that included physicians, pharmacists, and nurses in implementing EBP. Different from prior studies, participants used email as a means to communicate with others about EBP.

Confusion on appropriate sources of evidence to guide practice emerged as a theme (Profetto-McGrath et al., 2007). Participants spoke about listening to patients and nurse generalists for evidence. In other words, participants felt clinical data obtained from bedside nurses and patients were a source of clinical evidence. Participants relied heavily on experiential knowledge in making clinical decisions, although the importance of advanced degrees in providing education on how to evaluate research critically emerged from the data.

Finally, researchers sought to elicit participants' thoughts on EBP barriers and facilitating factors (Profetto-McGrath et al., 2007). As with nurse generalists, lack of time emerged as a predominate theme. The pressure of immediate clinical needs

interfered with searching for evidence. Furthermore, lack of time precluded participants search and synthesis of EBP source options, such as journals.

Different from prior research, participants were asked what barriers precluded CNSs from disseminating EBP to nurse generalists (Profetto-McGrath et al., 2007). Participants cited resistant workplace environments as an EBP dissemination barrier. Different from the nurse generalist literature, multiple levels of workplace environment resistance were revealed. Participants cited lack of nurse generalists and administrators acceptance of practice change. Additionally, participants felt nursing culture does not encourage nurses to question current practice. In other words, nurses may feel a lack of authority and hold to the traditional medical paternalistic environment. Furthermore, participants reported nurse generalists do not value nursing research in comparison to medical research. Participants felt nurse generalists reluctance to change is hampered by futilistic feelings of “even if (practice) is based on research, research will change shortly anyway” (Profetto-McGrath et al., 2007, p. 91). Finally, participants expressed concern that existing hospital policies and procedures do not allow flexibility to implement new research findings.

Profetto-McGrath et al. (2007) also found CNS role confusion to be a theme. Participants expressed concern that nurse generalists and administrators do not understand their advanced practice role in regards to evidence use. Furthermore, participants expressed concern over budgetary issues. Development of knowledgeable nurse generalists and implementation of evidence often conflicted with participants’ perceived messages of institutional fiscal constraint.

Finally, Profetto-McGrath et al. (2007) identified EBP facilitating themes. In contrast with previously discussed nurse generalists' literature, participants identified nurse educators as strong sources of EBP knowledge. Nurse educators were seen as resources who appreciated and advocated for EBP. Secondly, participants' advocated for multiple ways to disseminate information and legitimize EBP to nurse generalists. Participants felt decreasing nurse generalists' resistance to change was a priority. They suggested in-services, journal clubs, and conferences as ways to increase nurse generalists EBP perceptions.

Supporting the importance of APRNs acting as nurse generalists EBP mentors (Profetto-McGrath et al., 2007), Gerrish et al. (2012) also sought to identify factors that facilitated APRNs' ability to promote nurse generalists' EBP with a qualitative methods approach. Paralleling Profetto-McGrath et al. (2007) assertions, little is known about EBP mentoring of nurse generalists from APRNs perspective. Different from Profetto-McGrath et al. (2007) who interviewed CNSs, Gerrish et al. (2012) included NPs. In a multiple case study of 23 APRN's from seven hospital and primary care centers in England, data were collected through interviews and observations of APRNs. Four facilitating factors or themes emerged from the data: (a) personal attributes of APRNs, (b) relationships with stakeholders including nurse generalists, administrators, and physicians, (c) role of the APRN, and (d) the workplace environment.

The researchers identified APRNs personal attributes as a theme. Personal attributes included EBP expertise, clinical credibility, and leadership style. Participants commonly agreed graduate study was an important factor in EBP expertise and clinical knowledge. Generally, participants felt comfortable in evaluating evidence-based clinical

guidelines, but less comfortable with evaluating research reports. All read professional journals, but how much journals were accessed varied. Physicians were used as a common source of evidence-based knowledge. Secondly, participants felt clinical expertise was developed by an in-depth knowledge of clinical practice gained through experience, graduate education, networking with other experts, and self-motivation. These factors increased credibility with nurse generalists. Thirdly, leadership style emerged as an important personal attribute. Participants' cited motivation of nurse generalists EBP provided positive gains in EBP. APRNs needed to maintain and convey enthusiasm for EBP.

Related to leadership style, relationships with stakeholders emerged as a theme. In addition to interactions with nurse generalists', relationships with administrators and physicians was felt to be of importance. Establishing collegial relationships was helpful in introducing EBP changes. However, APRNs needed to be given autonomy in EBP initiatives. By working within an interprofessional team framework, participants' felt EBP changes were facilitated.

Responsibilities of role and workload also emerged as a theme. If APRNs' role had a substantial clinical component, EBP was facilitated. Direct contact with nurse generalists' allowed both formal and informal means to introduce EBP changes in the clinical setting. Additional APRNs' responsibilities and heavy workloads spread across multiple facilities prevented interfered with direct contact time with nurse generalists, which resulted in decreased stakeholder engagement.

The final theme to emerge that impacted APRNs' ability to act as nurse generalists' EBP mentors was workplace environments. The overarching impact of EBP

culture impacted all other themes. APRNs revealed administrators' expectations set the EBP culture. Participants' spoke to the importance of a workplace infrastructure that facilitated EBP, such as tracking patient care outcomes, ensuring organizational wide support for EBP implementation, supporting continuing education for APRNs and nurse generalists, investing in EBP resources, such as electronic data bases and library support, and supporting staffing ratios that enable nurse generalists time to engage in EBP.

Both Gerrish et al. (2012) and Profetto-McGrath et al. (2007) qualitative studies shared the same limitations, transferability of the insight gained is limited. As the literature was lacking, the studies were designed to gain insight from APRNs' perspective. The perspectives shared cannot be assumed for all APRNs who act in an EBP mentoring role. Further quantitative research is warranted to assess generalizability of findings.

Paralleling nurse generalists' literature (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Melnyk et al., 2004; Olade, 2003, 2004), Pravikoff et al. (2005), CNSs felt lack of time was the most significant EBP barrier. Gerrish et al. (2012) findings with all APRNs supports this assertion. Similar to nurse generalists (Eizenberg, 2010; Gerrish & Clayton, 2004; Koehn & Lehman, 2008; McCloskey, 2008; Menyk et al., 2004; Pravikoff et al., 2005), CNSs do not feel EBP is supported in the workplace environment. Gerrish et al. (2012) found supportive workplace environment a facilitating EBP factor. In contrast to nurse generalists' relying on experiential knowledge, intuition, peers, and physicians for EBP information (Gerrish & Clayton, 2004; Koehn & Lehman,), APRNs are comfortable with formal sources of EBP information, such as journals and electronic data-bases, but also utilize colleagues. Koehn and Lehman (2008), Olade, (2003, 2004),

and Pravikoff et al. (2005) supported Profetto-McGrath et al. (2007) assertions that nurse generalists do not value EBP and are unknowledgeable about EBP concepts. However, Profetto-McGrath et al. (2007) found confusion amongst CNSs' sources of evidence. This finding was not supported by Gerrish et al. (2012). In common with Koehn and Lehman's (2008) findings with nurse generalists, CNSs were also concerned with the cost of EBP (Profetto-McGrath et al., 2007).

Nurse Practitioner Educators

In the only study addressing NP educators, Melnyk et al. (2008) examined perceived knowledge, beliefs, and strategies regarding teaching EBP. Additionally, the researchers sought to compare the sample's demographic data to the tool's score. Finally, the researchers sought to describe EBP education barriers and facilitating factors. A descriptive study of NP educators, who were members of NONPF and the Association of Faculties of Pediatric NPs (AFPNP), was conducted. Using a convenience sampling methodology, AFPNP members were asked to complete surveys at a national conference. Researchers randomly selected 160 names from NONPF's database and sent surveys electronically. The final sample size was 79 subjects. All subjects were educators in an NP program and 82% ($n = 65$) indicated they practiced clinically. The average length of time as an NP faculty member was 17 years ($n = 79$).

The researcher-developed survey had 51 questions (Melnyk et al., 2008). The researchers provided no psychometric validity and reliability data. In addition to demographic questions, 10 questions measured knowledge and beliefs about teaching EBP on a scale of 0 (nothing or not at all) to 100 (expert or all). Fifteen dichotomous

(yes or no) questions elicited information about EBP teaching. Finally, 18 open-ended questions sought to gather EBP teaching and implementation strategies.

Respondents reported a high knowledge of EBP, although there was a wide variation in responses ($n = 79$, $M = 76$, $SD = 19$); however, less reported being knowledgeable about teaching EBP ($n = 79$, $M = 70$, $SD = 21$) and comfortable with teaching EBP ($n = 79$, $M = 70$, $SD = 22$). Respondents reported high beliefs in EBP positively affecting patient care outcomes ($n = 79$, $M = 86$, $SD = 16$); however, their beliefs were less enthusiastic regarding the extent of EBP utilization in clinical practice ($n = 79$, $M = 47$, $SD = 22$). Respondents reported their own clinical practice to be evidence-based, but with a wide variance ($n = 69$, $M = 75$, $SD = 19$).

Although most of the educators stated one of their school's missions was to teach EBP ($n = 54$, 68%), nearly all reported teaching EBP precepts to their students ($n = 77$, 98%). Respondents reported the two top resources for information for teaching EBP were the library ($n = 83$, 37%) and on-line resources ($n = 83$, 37%). Respondents provided 75 examples of EBP teaching strategies. The top teaching strategies were (a) supporting clinical actions with a single clinical study ($n = 32$), (b) requiring clinical logs or case studies ($n = 12$), and (c) EBP papers with clinical studies as references ($n = 5$).

Respondents reported barriers and facilitating factors to teaching EBP. Barriers engendered 19 responses to the open-ended questions. The top barriers listed were: (a) resources, time and money ($n = 7$), (b) traditional mindsets and beliefs ($n = 5$), and (c) a focus on evidence generation ($n = 4$). Respondents reported 25 EBP teaching facilitating factors. The top three included: (a) teamwork ($n = 8$), (b) mentorship ($n = 7$), and (c) education or information about EBP ($n = 5$).

EBP knowledge scores demonstrated statistical significance when compared to multiple variables, including EBP beliefs (a) improves clinical care ($p = .004$), (b) improves patient outcomes ($p = .01$), (c) research evidence has guided practice ($p = .02$), and (d) teaching EBP will advance the profession ($p = .004$), how comfortable the educators felt in teaching EBP ($p = .000$), and whether their own practices were evidence-based ($p = .02$). There was no relationship found between EBP knowledge scores and years of education experience; however, number of years teaching negatively correlated to belief that EBP improves patient outcomes (Melnyk et al., 2008).

Although Melnyk et al. (2008) sample characteristics differed from previously reviewed studies, commonalities may be drawn. Melnyk et al. (2008) found the majority of NP educators supported and believed in the value of EBP and reported their knowledge of EBP high, which supports Gerrish et al. (2012) and Profetto-McGrath et al. (2007) findings. However, as did Gerrish et al. (2012) and Profetto-McGrath et al. (2007), Melnyk et al. (2008) found APRNs confused on EBP precepts. Almost half of the APRN educators offered they use single study referenced assignments as opposed to synthesis of evidence sources (Melnyk et al., 2008). Supporting previously reviewed nurse generalists' literature (Koehn & Lehman, 2008; Melnyk et al., 2004; Melnyk et al., 2012; Yoder et al., 2014) and APRNs (Profetto-McGrath et al., 2007), mentors were found to be key facilitating factors in implementation of EBP ($n = 35$, 8%). Melnyk et al. (2008) found nurse educators EBP precepts were self-taught through reading, literature, and clinical practice ($n = 35$, 83%). Only one respondent cited the formal education as where EBP precepts were learned ($n = 35$, 2%). Furthermore, only 15 % ($n = 12$) of the respondents indicated EBP was offered as a stand-alone course in the curriculum. The

study underscored the importance for instilling EBP precepts into student NPs during formal education.

Melnik et al. (2008) study had limitations. Surveys were distributed in two different ways and the response rate was low, which may result in sampling bias. Sampling bias may affect the generalizability of the results. Additionally the data were self-reported, which may result in desirability bias. Finally, no reliability or validity psychometrics were reported for the researcher-developed tool.

Utilization of Evidence-Based Practice Among Advanced Practice Registered Nurses

In addition to NP educators' EBP barriers and facilitating factors, researchers have addressed clinically practicing APRNs approaches and utilization of evidence. In a descriptive, cross-sectional design, Profetto-McGrath et al. (2010) examined approaches used by CNSs to select and use EBP and to determine barriers and facilitating EBP factors in performance of their job. Using a telephone survey methodology, 94 CNSs were purposively sampled from a Western Canadian province. The researcher-developed tool had 117 questions: 10 demographic, three open-ended, five dichotomous (yes/no), and 97 Likert-type response format. The Likert-type formatted responses ranged from one (never) to five (very often) or one (strongly disagree) to five (strongly agree). Higher scores denoted more positive EBP attributes. The tool had seven categories: sources of evidence, evidence use, facilitators, barriers, challenges of CNSs' roles, overall beliefs, and capacity to access, utilize, and disseminate evidence. No psychometric validity or reliability data was provided.

The mean age of the sample was 49 years ($N = 94$, $SD = 8$). The sample was predominately female ($n = 92$, 98%) with an average of 9 years of APRN experience (SD

= 6). The majority of the respondents had completed a university degree ($n = 61$, 76%) and over one-third had a graduate degree ($n = 36$, 36%).

Sources of CNSs EBP information was divided into written and people-based (Profetto-McGrath et al., 2010). The top five sources of EBP information CNSs utilized were: (a) literature tailored to specialty ($n = 86$, 92%), (b) clinical practice guidelines ($n = 58$, 62%), (c) internet at work ($n = 58$, 62%), (d) nursing literature ($n = 55$, 60%), and (e) medical literature ($n = 54$, 57%). Among the least utilized sources were: (a) libraries ($n = 21$, 24%), and (b) popular media ($n = 19$, 20%). Among the people-based sources of EBP information CNSs utilized, personal experience ($n = 84$, 90%) and what has worked in the past ($n = 63$, 72%), and physicians were the top three choices ($n = 65$, 71%). Nurse generalists ($n = 58$, 68%) and patients/families ($n = 52$, 57%) were also chosen as sources of EBP information.

CNSs use of evidence was reported (Profetto-McGrath et al., 2010). CNSs overwhelming used evidence to facilitate improvements in patient care outcomes ($n = 82$, 93%). In addition, evidence was used in discussions with nurse generalists ($n = 78$, 84%) and to develop patient care policies and procedures ($n = 70$, 77%). Additionally, CNSs barriers and facilitating factors of EBP were reported. CNSs reported communication skills was the most important EBP facilitating factor ($n = 87$, 96%), followed by tailoring information to the recipient ($n = 84$, 91%), then one's own knowledge and skills as a nurse ($n = 82$, 89%). Librarians and journal clubs were ranked the lowest EBP facilitating sources. In common with previously reviewed research, CNSs listed heavy workloads ($n = 60$, 65%), time constraints ($n = 58$, 64%), and unsupportive workplace environments ($n = 53$, 57%) as the top barriers.

As found in previous studies, researchers found better educated nurses had positive beliefs in the value of EBP. Most all CNSs agreed practice is improved by EBP and positive patient outcomes are enhanced by EBP ($n = 90$, 97%). As expected by APRNs organizations (AACN, 2014; NONPF, 2012), EBP is a role expectation ($n = 90$, 97%). Paralleling Profetto-McGrath et al. (2007) and Melnyk et al.'s (2008) earlier studies, CNSs exhibited confusion on appropriate sources of evidence by relying on past experiences and patients/families. Supporting Melnyk et al. (2008) findings, CNSs' open-ended question responses included a desire for an EBP multi-disciplinary approach. Different from previous findings, CNSs commented measuring nursing outcomes in the context of EBP was an important research question that needed addressed in future studies. Profetto-McGrath et al. (2010) echoed the importance of workplace support to increase CNSs ability to use, disseminate, and mentor EBP precepts found in previous studies (Gerrish et al., 2012; Melnyk et al., 2008).

Profetto-McGrath et al. (2010) study had limitations. The tool was researcher developed with no psychometric analysis. Additionally, data were self-reported. Finally, the sample was non-randomized. All of these factors limit the generalizability of the findings.

Bogdan-Lovis and Sousa (2006) also investigated APRNs knowledge and implementation of EBP. In a quantitative design, researchers privately interviewed 21 NMWs from two mid-West practice sites. Quantitative data and subsequent analysis were extracted from recorded structured interviews. The practice sites included an urban site with an underserved clientele that did not engaged in midwifery education and a large, suburban regional academic center that did support a midwifery school. The

researchers sought to explore differences in knowledge, practice, and sources of EBP between the two samples. To assess the respondents' knowledge of EBP, responses were coded for key words that reflected EBP acumen, such as evidence-based, Cochrane Review, systematic review, PubMed, Medline, and best evidence. Furthermore, qualitative transcript analysis served to elicit themes between self-reported congruence of NMWs' knowledge, practice, and reliance on EBP. Self-reported knowledge of induction of labor, use of episiotomies and epidurals were compared to evidence based guidelines. Respondents were asked to report the number of labor inductions, episiotomies, and epidurals in their past five deliveries. The researcher-developed tool had no psychometric validity or reliability data reported. There was no statistical significance comparing time since graduation ($p = .22$) and number of years at their current facility ($p = .85$) between the two sample groups.

The researchers found statistically significant difference between the two sample's knowledge and use of EBP. Internet access was readily available at both practice sites. The semantics and knowledge of EBP ($p = .01$) and the Cochrane Review ($p = .05$) was significantly better at the academic setting in comparison to the urban center. Furthermore, academic center NMWs were significantly more likely to have accessed an evidence-based electronic database in the six months prior to the interview ($p = .01$). Reasons for accessing evidence-based electronic databases revealed minimal variation between the two samples. Respondents' cited using evidence-based electronic databases to revise protocols and guidelines. Only one respondent from the urban site sample utilized the evidence-based electronic database to challenge a physician's clinical opinion. The researchers' hypothesized that urban practice NMWs were more insulated;

therefore, they lacked exposure to academic stimulation that would result in use of electronic databases.

Respondents' self-reported implementation of common obstetrical interventions, such as induction of labor and use of episiotomies and epidurals, were compared to evidence-based guidelines. Generally, both samples adhered to their respective unit protocols for labor induction. When comparing the two unit based protocols, EBP differences were found. Interestingly, all but two of the respondents were certain their unit protocols were based on the best available evidence. Mixed results were demonstrated in epidural and episiotomy rates for the two samples. There was a statistically significant difference found between the two samples when comparing epidural rates ($p = .01$), but not the episiotomy rate ($p = .81$).

Explanations for the researchers' findings may be explained by the complexities of the mid-wife's practice and training. Arbitrary induction of labor for practitioner and/or patient convenience has no support in the literature. Additionally, routine use of episiotomies is medically unnecessary. Both of these evidence-based recommendations are well-supported in the evidence based literature and followed by their physician colleagues; therefore, finding no statistical differences in the sample's practices is not surprising. However, despite the clear NMW's model of non-pharmacological pain relief during labor, withholding epidurals is at odds with social expectations and allopathic medicine practices. NMWs' in the urban center sample may feel less pressure to administer epidurals than their academic-center counterparts.

Different from aforementioned studies, which found increased use of arbitrary EBP electronic sources in recent years, Bogdan-Lovis and Sousa (2006) found

respondents using evidence-based electronic databases that synthesized research. Also different from previous studies, evidence was used to challenge a physician. In common with previous research, APRNs self-report their own practice is evidence based, however, Bogdan-Lovis and Sousa (2006) found APRN's actual practice may not be based on the best evidence.

Bogdan-Lovis and Sousa's (2006) study is limited by several factors. The researcher-developed tool had no psychometric testing or use in any other research. Furthermore, the sample was limited to two practice sites in the same geographic area. Both of these factors negatively affect generalizability of the findings to all NMWs. Finally, the litigious nature of obstetrical practice may negatively affect implementation of EBP by bending to patient expectations.

Whereas previous studies focused on other APRN's, the final two studies in the reviewed literature were specific to NPs self-reported beliefs, knowledge, and implementation of EBP. In an exploratory descriptive design, 500 NPs were randomly selected from Tennessee's State Board of Nursing's data-base (Butler, 2011) with a response rate of 18% ($N = 90$). Butler (2011) utilized two EBP tools: (a) the EBPB scale with 16 items (Cronbach's $\alpha = .90$), and the (b) EBPI scale with 18 items (Cronbach's $\alpha = .96$). Both scales utilized a Likert-type response format. The EBPB scale responses ranged from one (strongly disagree) to five (strongly agree). Higher scores denoted more positive EBP attributes. The EBPI scale responses ranged from 0 to ≥ 8 times that assessed how often each item applied to the respondents in the last eight weeks. The items measured how respondents utilized EBP components including accessing EBP resources, discussing research reports with colleagues, collecting data or evaluating

outcomes. A higher score indicated higher utilization of EBP. Surveys were mailed to potential participants. Open-ended questions allowed respondents to give explanations of why they did not implement EBP.

Butler (2011) collected demographic data. The average age of respondents was 42 years old with a range of 24 to 59 years old. Most of the respondents were female ($n = 77$, 86%) and Caucasian ($n = 83$, 92%). The average time as an NP was eight years. All of the respondents had a master's degree or above. Respondents practice specialties varied: (a) family NP (61%), (b) adult NP (12%), (c) geriatric NP (1%), (d) pediatric NP (7%), (e) women's health NP (3%), (f) psychiatric/mental health NP (4%), (g) acute care NP (10%), and (h) neonatal NP (1%). All were nationally certified. Practice settings were also varied: (a) outpatient/office ($n = 61$, 68%), (b) hospital ($n = 14$, 16%), (c) retail clinic ($n = 4$, 4%), (d) public health ($n = 3$, 3%), (e) urgent care ($n = 1$, 1%), and (f) other ($n = 6$, 7%). Respondents practice location was reported: (a) urban ($n = 43$, 48%), (b) suburban ($n = 25$, 28%), and (c) rural ($n = 17$, 19%). Finally, only one respondent indicated no internet access.

Butler (2011) calculated tool scores. The mean score for the EBPB scale was 59 ($SD = 7$), which indicated NPs held fairly positive beliefs about EBP. The mean score for the EBPI scale was 17 ($SD = 10$), which indicated NPs did not implement EBP actively. Gender, ethnicity, NP degree, and internet access were not found to be statistically significant when compared to the tools scores. Correlation of age and years in NP practice to tool scores were not found to be statistically significant. Correlation of NP specialty, practice setting, and practice location were not found to be statistically significant when compared to tool scores. A power analysis was not provided.

Respondents indicated time was an EBP constraint. Furthermore, respondents felt physician driven practices, not keeping up with EBP literature, reliance on peer guidance, EBP does apply to every patient, unsure of EBP definition, and EBP is not a priority were offered as EBP limitations (Butler, 2011).

In contrast to previous APRNs EBP research (Bogdan-Lovis & Sousa, 2006; Gerrish et al., 2012; Melnyk et al., 2008; Profetto-McGrath et al., 2007; Profetto-McGrath et al., 2010) respondents did not actively implement EBP and were unaware of EBP precepts (Butler, 2011). Although results indicated a need for EBP education for NPs and its importance in positively affecting patient care outcomes, the study had limitations. The sample was drawn from a geographically limited setting. The response rate was low. Both of which may negatively impact generalizability of the findings. Self-reported data may be affected by desirability bias.

In the second study to examine NPs EBP exclusively from other APRNs, Roper (2011), found similar results to Butler (2011). In a convenience sample of 202 NPs was obtained at a national NP conference in Nevada. Three existing tools were incorporated into one survey, which measured NPs self-reported beliefs and knowledge of EBP. Additionally, self-reported implementation of EBP hypertension (HTN) guidelines was measured.

In common with Butler (2011), Roper (2011) utilized the EBPB scale with 16 items (Cronbach's $\alpha = .90$), and the EBPI scale with 18 items (Cronbach's $\alpha = .96$). Additionally, Roper (2011) added the 17-item PREVIEW scale, which evaluated knowledge and implementation of widely accepted guidelines for HTN management. Although no validity or reliability data were provided, the PREVIEW scale has been used

extensively in prior HTN management research (Roper, 2011). The survey, including demographics had 63 items. Respondents completed a paper and pencil survey or accessed the survey electronically.

The sample's demographics were collected. The median age of the respondent was 52 years old with a range of 22 to 77 years old. The majority of the respondents were female ($n = 192$, 95%) and nearly all had a master's degree or higher: (a) certificate NP ($n = 13$, 7%), (b) master's degree ($n = 174$, 86%), and (c) doctorate ($n = 14$, 7%). NP specialty was varied, but all practiced in primary care: (a) family NP ($n = 145$, 76%), (b) adult NP ($n = 15$, 17%), (c) geriatric NP ($n = 4$, 2%), and (d) other ($n = 8$, 5%). The average years of NP practice was nine years.

As found in previous APRN studies (Bogdan-Lovis & Sousa, 2006; Gerrish et al., 2012; Melnyk et al., 2008; Profetto-McGrath et al., 2007; Profetto-McGrath et al., 2010), respondents believed or strongly believed in EBP. Supporting Butler's (2011) findings, respondents indicated EBP was not implemented in practice more than three times in the preceding eight weeks ($M = 1.42$, $SD = .76$). Furthermore, respondents indicated EBP HTN knowledge, but did not follow EBP HTN guidelines ($M = 9$, 69%). Few significant correlations were found between the samples demographics and tool scores in correlational analysis, which further supports Butler's (2011) findings. However, the doctorally prepared NPs were statistically more likely to score higher on the EBPB $F(2,200) = 3.35$, $p = .037$ and EBPI $F(2,200) = 4.06$, $p = .019$ scale scores than less educated NPs. A power analysis was not provided.

Roper's (2011) study had limitations. Sample characteristics did not reflect the United States population of NPs, which affects generalizability of the results. Secondly,

the survey was long, which may have resulted in survey fatigue. Finally, convenience sampling was utilized to collect self-reported data, which may have resulted in sampling bias.

Advanced Practice Registered Nurses Section Summary

Literature pertaining to APRNs' beliefs, knowledge, and implementation of EBP is limited. Formal preparation in EBP precepts appearing to be lacking. EBP courses in APRN programs are not common. Additionally, APRN educators are not completely comfortable in teaching EBP precepts. Graduates prior to APRN EBP research and EBP textbooks may be inadequately prepared to integrate EBP precepts in clinical practice.

Although APRNs' perceived themselves as knowledgeable in EBP, knowledge gaps persisted. APRNs' reported confusion on appropriate sources of evidence. APRNs appeared to lack EBP knowledge and resources for evidence. However, APRNs indicated more comfort with electronic databases than nurse generalists. With the exception of the McGrath et al. (2007) and Pravikoff et al. (2005) findings, use of libraries and reviewed journals was an anomaly.

In common with nurse generalists, APRNs relied on personal experiences, hospital policy and procedures, peers, physicians for clinical practice evidence as sources of clinical practice evidence. APRNs were staunch supporters of EBP positively influencing patient care outcomes; however, few used EBP to challenge physicians in clinical practice decisions. APRNs' EBP implementation in clinical practice was limited. APRNs in academic centers demonstrated increased EBP behaviors, such as use of electronic data-bases that provided synthesized research findings. However, Butler (2011) and Roper's (2011) findings did not support demographic variables as influencing

EBP factors with the notable exception of doctoral education. Finally, APRNs may be subject to social pressures that do not always coincide with EBP, such as the use of epidurals for labor pain management.

Barriers and facilitating factors influenced APRNs' EBP. As found in the nurse generalists' literature, time is an oft-cited barrier. APRNs cited burdensome workloads as a barrier to accessing and disseminating clinical practice evidence. NPs and NMWs spent more time with direct patient care; whereas, CNSs' roles included nurse generalist education and consultation. APRNs routinely acted as EBP mentors to nurse generalists. Advanced education coupled with clinical acumen placed APRNs in EBP champion roles. APRNs reported nurse generalists are not knowledgeable or supportive of EBP.

Workplace support was found as an important factor in APRN EBP. The concept of teamwork emerged from the APRN literature. APRNs cited nurse educators as an EBP resource. Collegial relationships with nurse generalists, physicians, and administrators were cited as an EBP facilitating factor. Supportive workplace environments provided continuing education, up to date resources, and time to track patient care outcomes. APRNs also reported non-supportive workplace environments.

In summary, APRN EBP provided insight to this study's independent and dependent variables. Time, EBP education, practitioner education, and a supportive workplace environment emerged consistently from the literature. The aforementioned studies were limited in methodology. All used self-reported data. Researcher developed tools were lacking in psychometrically established validity and reliability. Most tools were not used in repeated studies. Finally, all studies were descriptive or correlational in

design and most utilized convenience sampling methodology. None of the quantitative studies provided power analysis data.

Measurements

Nursing researchers have utilized multiple tools to measure nurses' beliefs, knowledge, and self-perceived implementation of EBP. Aforementioned tools used to measure nurses' EBP have been researcher developed with limited psychometric assessment. Furthermore, existing tools have had limited repeated use. Additionally, tools developed for nurse generalists' population have been used for APRN EBP research without regard to validation and reliability in different population contexts. Finally, EBP researchers have routinely modified existing tools, but not psychometrically evaluated the revised tool to demonstrate validity and reliability.

The Evidence-Based Education Questionnaire

Based on the lack of reliable and valid tools proven in the APRN population, the researcher chose the Evidence-Based Education Questionnaire (EBEQ) for use in this study (see Appendix A). The researcher obtained written permission to use, modify, and publish the 45-item Likert-type scale developed by Al Hadid et al. (2011), which determines subjects' beliefs, knowledge, and self-perceived ability to implement EBP. The tool is divided into five factors: Knowledge in educational principles, finding and reviewing evidence, clinical practices, change in clinical strategies/practices, and finding and judging evidence. The tool is a five-point bipolar scale that ranges from strongly agree to strongly disagree with a not applicable option (strongly agree, agree, disagree, strongly disagree, not applicable). A higher score indicates an increasingly positive sentiment of subject's beliefs, knowledge, and self-perceived ability to implement EBP.

The tool was originally developed for use with nurse educators. The tool was found to be valid and reliable in the context of nurse educators. The Cronbach's alpha for the entire questionnaire was .926. The scale's five factor correlations ranged from .86 to .89. The Guttman split-half coefficient was .84, which indicates an acceptable item correlation. The tool has not been used in any APRN EBP research.

The researcher and a Robert Morris University DNP student conducted a test-retest study to determine the EBEQ's validity and reliability in the context of APRNs (Jerry & Hellier, 2014). The tool was sent to 1,606 clinically practicing APRNs in Western Pennsylvania. Survey one was attempted by 149 APRNs and survey two was attempted by 117 APRNs. However, 59 complete surveys were found usable for psychometric analysis. The usable survey response rate was 3.7%. Respondents were mostly female ($n = 50$, 85%) ranging in age from 24 to 65 years old with a mean age of 45 and 11.8 ($SD = 10.1$) years of clinical practice experience. A Pearson's correlation coefficient from the total score on tool one to tool two was calculated. A positive correlation was found between the two variables ($r = .82, p < .000$). This value suggested survey responses were reasonably consistent from point one to point two. Secondly, the tool's internal consistency was calculated using a Cronbach's alpha coefficient. The Cronbach's alpha coefficient was .93, which suggested excellent internal consistency reliability for the survey with this sample.

The researcher chose this tool for several reasons. First, existing tools that measure nurses' EBP were flawed (Koehn & Lehman, 2008). All were researcher-developed tools with limited psychometric testing. Few studies have measured NPs EBP (Butler, 2011; Roper, 2011); therefore, no existing tool has been extensively utilized, nor

provided valid and reliable psychometric testing in the context of NPs. Secondly, Dr. Al Hadid allowed her tool to be modified for use in NPs and undergo psychometric testing with advanced practice providers prior to the implementation of this study.

Summary

In summary, Chapter Two provided a review of the literature relevant to the study of APRNs' beliefs, knowledge, and self-perceived ability to implement EBP. TLT served as the study's theoretical framework. A synthesis of the empirical literature surrounding uses of transformational learning was discussed. The theory's precepts provided a sound base for the emergence of key independent and dependent variables related to EBP. Review of the empirical literature surrounding nurses' EBP offered guidance to determine key demographic variables to be included in this study. The chapter included empirical review of nurse generalists' and APRNs beliefs, knowledge, and implementation of EBP in clinical practice. Finally, the chapter reviewed measurement tools used in quantitative EBP nursing research. Rationale and psychometric data were provided to support the study's use of the EBEQ. Understanding NPs beliefs, knowledge, barriers, and facilitating factors of EBP is imperative to foster sustained change. Chapter Three describes the study's methodology.

CHAPTER THREE

METHODOLOGY

This chapter serves to describe the study's methodology. The chapter begins by describing the study's design. Next the study's sample is described. Attributes of the study's tool, the EBEQ, are discussed. Procedures for how the study's data were collected is discussed. Finally, a plan for analysis of the study's data is reviewed. The purpose of this chapter is to provide a detailed plan for how this cross-sectional, correlational study was conducted.

Study's Aims

In the past 15 years there has been a resounding call to transform the current United States health care system and health care education. One of the key recommendations is the adoption of EBP (Committee on Quality of Health Care in America, 2001). The IOM has set a goal that 90% of all clinical health care decisions should be evidence based by 2020 (Institute of Medicine, 2009). Despite the ubiquitous presence of EBP in health care literature, actual practice results are mixed (Balas & Boren, 2000; Brooks, 2004; Cheng & Green, 2008; Lee et al., 2011; McGinty & Anderson, 2008; Newhouse et al., 2011; Perlen et al., 2013; Vincent et al., 2010). Paralleling the call for increased EBP are changes in the education of NPs. Despite little empirical evidence for the change, the doctorate of nursing practice has been endorsed as the terminal degree for NPs (American Association of Colleges of Nursing, 2014; National Organization of Nurse Practitioner Faculties, 2012).

The specific aims of this cross-sectional, correlational study were to:

1. What is the relationship between NPs personal, professional, and practice demographics and the five factors comprising the EBEQ: knowledge of EBP, finding EBP, integration of evidence-based practices, changing practice based on evidence, and judging evidence?
2. Identify NPs facilitators and barriers to utilizing EBP.
3. Identify NPs sources of information for clinical practice decisions.

Design

The study was a correlational, cross-sectional design with a survey data collection methodology. The study sought to explore relationships between independent variables and NPs EBP. Although correlational studies do not show cause and effect between variables, relationships may be demonstrated. A correlational study is an appropriate choice as the researcher has no control over the dependent variable (Polit & Beck, 2012). As data were collected at a single point in time, the study was designated as a cross-sectional design. According to Polit and Beck (2012), cross-sectional designs are appropriate to describe a phenomenon or describe relationships, such as factors affecting integration of EBP among nurse practitioners. Additionally, Mezirow's TLT has been heavily studied in qualitative designs (Taylor & Cranton, 2012). Quantitative studies measuring transformational learning are needed to further understand the theory. Finally, a correlational, cross-sectional study is cost and time effective, which further demonstrates the design is an appropriate choice for dissertation research.

Setting/Sample

In the broadest conceptualization, the intent of this study was to address all NPs in the United States; however, this was an unrealistic goal. Therefore, the researcher drew

the sample from a delimited setting. The sample was selected randomly from the membership of the AANP. With 50,000 members, AANP is the largest organization representing NPs. The researcher gained access through AANP's research department, which has a sampling program in place. For a fee, randomly selected mailing addresses of clinically active members were generated for the study. Although AANP has 50,000 active members, 27,000 met the study's eligibility requirements. To be eligible for the study, potential subjects must have been members of AANP, speak and read English, and be practicing NPs in the clinical setting. AANP's Research Coordinator entered eligibility criteria into SPSS and 1,200 potential subjects home mailing addresses were randomly generated. Exclusion criteria included inability to speak and read English and not practicing as an NP in the clinical setting. As the study was a cross-sectional design, retention was not a consideration.

Both AANPs and national NP demographics are available that will allow the researcher to generalize the study's findings. The AANP membership diversity data is 92% female: 97% are not Hispanic or Latino. The racial distribution of the membership is: American- Indian/Native Alaskan 0.9%; Asian 3.7%; Black/African-American 5.7%; Native Hawaiian/Pacific Islander 0.4%; and White 90.3% (American Association of Nurse Practitioners, 2010). AANP's membership demographics compare favourably to the United States Department of Health and Human Services 2012 National Sample Survey of NPs. The national survey found the NP workforce was largely homogeneous in gender and race/ethnicity (U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2014). Approximately 86% of the United States NPs are White and non-Hispanic, 3%

are Hispanic/Latino, 5% are Black (non-Hispanic), and 6% are of other non-Hispanic groups. Approximately 7% of NPs are male. The study's sample represented the greater population of NPs. A quantitative, correlational, cross-sectional design with a survey data collection methodology was utilized to allow for a large randomized sample representing the ethnic diversity of the United States from a greater geographic area allowing generalizability of the findings.

A preliminary step in designing an evidence-based approach to a new study is performing a power analysis. Clinically meaningful data demands attention to effect size. The researcher calculated an approximate sample size necessary to achieve a power of .80 as a function of an estimated effect size of .35 for a population correlation, with an alpha equal to .05 (Polit & Beck, 2012). The study needed a minimum sample of 62 subjects to achieve a plausible effect, or in other words, avoid a Type II error. The AANP reported an estimated 5%-10% return rate on mailed surveys; therefore, 1,200 surveys were mailed.

Instrument

The dependent variable is the NPs beliefs, knowledge, and self-perceived ability to implement EBP. The researcher measured these variables with the modified The EBEQ (see Appendix A). The researcher obtained written permission (Appendix B) to use, modify, and publish the 45-item Likert-type scale developed by Al Hadid et al., (2011), which determines subjects' beliefs, knowledge, and self-perceived ability to implement EBP. The tool is divided into five factors: Knowledge in educational principles, finding and reviewing evidence, clinical practices, change in clinical strategies/practices, and finding and judging evidence. The tool is a five-point bipolar

scale that ranges from strongly agree to strongly disagree with a not applicable option (strongly agree, agree, disagree, strongly disagree, not applicable). In analysis, answers were coded as “4,” “3,” “2,” “1,” and “0.” A higher score indicated an increasingly positive sentiment of the subject’s beliefs, knowledge, and self-perceived ability to implement EBP.

The tool was originally developed for use with nurse educators. The tool was found to be valid and reliable in the context of nurse educators. The Cronbach’s alpha for the entire questionnaire was .928. The scale’s five factor correlations ranged from .86 to .89. The Guttman split-half coefficient was .84, which indicates an acceptable item correlation.

A test-retest study was conducted to determine the validity and reliability in the context of APRNs (Jerry & Hellier, 2014). Separated by two weeks, 1,606 clinically practicing APRNs employed at a large academic medical center in Western Pennsylvania, were electronically sent the EBEQ twice. Survey one was attempted by 149 APRNs and survey two was attempted by 117 APRNs. However, 59 complete surveys were found usable for psychometric analysis. The usable survey response rate was 3.7%.

Respondents were mostly female ($n = 50$, 85%) ranging in age from 24 to 65 years old with a mean age of 45 and 11.8 ($SD = 10.1$) years of clinical practice experience. A Pearson’s correlation coefficient from the total score on tool one to tool two was calculated. A positive correlation was found between the two variables ($r = .82$, $p < .000$). This value suggested good instrument reliability from point one to point two. Secondly, the tool’s internal consistency was calculated using a Cronbach’s alpha

coefficient. The Cronbach's alpha coefficient was .93, which suggested excellent internal consistency reliability for the survey with this sample.

The researcher chose this tool for several reasons. First, existing tools that measure nurses' EBP are flawed (Koehn & Lehman, 2008). All are researcher developed tools with limited psychometric testing. Few studies have measured NPs EBP (Butler, 2011; Roper, 2011); therefore, no existing tool has been extensively utilized, nor provided valid and reliable psychometric testing in the context of NPs. Secondly, Dr. Al Hadid allowed her tool to be modified for use in NPs and undergo psychometric testing with advanced practice providers prior to the implementation of this study.

Procedures

This section outlines step-by-step the procedures in collecting the study's data. Firstly, the researcher obtained a letter of study support from the AANP that served to assure Indiana University of Pennsylvania's (IUP) Institutional Review Board (IRB) of an anonymous and feasible sampling pool (see Appendix C). Secondly, the researcher obtained a letter of permission from Dr. Lourance Al Hadid, the EBEQ's author, to use, modify, and publish the EBEQ in the researcher's dissertation work (see Appendix B). Both letters were appendices in the IUP IRB application. Prior to any data collection, the researcher obtained IRB approval from IUP. After IRB approval, the researcher submitted a formal request via email and a credit card payment to the AANP to generate the study's sample. Approximately 1,200 randomly selected potential subjects were invited to complete the survey. Potential subjects were \$0.25 per mailing address for a one-time rental use. Mailing addresses were selected randomly from the memberships list serve by the AANP's Research Department's Coordinator. The mailing addresses

were then emailed to the researcher. Potential subjects received the study information packet at mailing addresses recorded with the AANP. The packet contained a one-page invitation to participate in the study that includes elements of informed consent, and the survey. No follow-up surveys or reminder correspondence were sent. The EBEQ has 45 questions regarding factors assessing health care providers' knowledge, access, and beliefs concerning evidence-based practice. The survey included key demographic questions that served to describe the sample and provided data to correlate to respondents' tool score. The subjects returned the survey to the researcher's home in a preaddressed postage paid envelope. There was no compensation for participation.

This was a cross-sectional, correlational design. As the study was mailed to potential subjects' home addresses, a signed consent form was not needed. However, the cover letter included the general elements of informed consent (see Appendix D). Completion and return of the survey implied consent to participate. There were no risks or benefits to participation. Participation was voluntary. There were no associated risks or direct benefits to participating in the study; however, the researcher advised potential subjects that participation may contribute to the state of the science in NPs education. The potential subject may have freely chosen to not return the survey. The researcher could not link survey results to an individual. No names or other identifying information were gathered. The survey responses were anonymous. Data were kept in a locked file cabinet in the researcher's office. Only the researcher had access to the file cabinet. Data will be destroyed five years after completion of the study. This study was approved by the IUP's IRB.

Data Analysis

The researcher manually entered paper surveys into SPSS data-analytic software version 22. The researcher cleaned and verified the raw survey data by evaluating the frequency distributions of each variable. Histograms were used to evaluate data for possible skewness, kurtosis, and outliers. A Kolmogorov-Smirnov test was conducted to test the level of normality reflected in the responses for key outcome variables. Missing data were evaluated for type and frequency and deleted on a pairwise basis. The researcher analyzed the demographic data, which described the sample's characteristics. Descriptive information about the subjects' gender, age, years of NP experience, hours worked, practice specialty area, education level, NP training program delivery method, DNP program length and delivery method, and NP practice setting were reported. Additionally, the researcher calculated means, modes, ranges, and standard deviations for continuous variables. Percentages were calculated for categorical variables. The researcher evaluated the internal consistency of the overall EBEQ, along with the five, individual factors using Cronbach's alpha. The researcher also calculated group means and standard deviations on the survey scores. The level of significance was set at a minimum of .05.

Each of the following research questions were analyzed:

1. What is the relationship between NPs personal, professional, and practice demographics and the five factors comprising EBEQ: knowledge of EBP, finding EBP, integration of evidence-based practices, changing practice based on evidence, and judging evidence?

The researcher utilized the Pearson Product Moment correlations and linear regression to explore relationship strengths between survey scores and continuous demographic variables such as age, years of NP practice, length of DNP program, and number of hours worked weekly. A scatterplot was used to check for violation of the assumptions of linearity and homoscedasticity. Prior to conducting statistical tests with overall EBEQ scores and its five factors as the outcome variables, the data were subjected to a Kolmogorov-Smirnov test of normality. The assumption of normality for overall score (Total 5 Factors Score) and the five, individual factors was rejected at the 0.01 level of significance. Additionally, the researcher utilized a one-way analysis of variance (ANOVA) to compare NP education, certification area, practice specialty, gender, clinical practice setting, and DNP program delivery type to survey scores. Post-hoc comparisons using Bonferroni's method were utilized to determine which groups were significantly different from each other. A Levene's Test was conducted to determine equal variances in each group for independent *t*-tests.

2. What are NPs facilitators and barriers to utilizing EBP?

Survey questions that specifically reflect facilitating and impeding factors of EBP were regarded as categorical data and analyzed as frequencies and percentages.

3. What are NPs sources of information for clinical practice decisions?

Survey questions that specifically reflect NPs sources of information for clinical practice decisions were regarded as categorical data and analyzed as frequencies and percentages.

Summary

This chapter discussed the study's methodological components. The chapter discussed the study's design and sample. The study's tool, the EBEQ, was discussed. Furthermore, the chapter discussed the researcher's plan for data collection and data analysis. The chapter provided a detailed plan for how this cross-sectional, correlational study was conducted. The researcher presents the study's results in Chapter Four.

CHAPTER FOUR

RESULTS

Chapter Four presents results from this study. Results are presented in five sections. The first section contains information about the sample's characteristics. The second section discusses the EBEQ tool's performance in this study. The third section describes the results of relationships between the sample's demographic variables to NPs' beliefs, knowledge, and self-perceived ability to implement EBP. The fourth section describes NPs self-reported barriers and facilitating factors of EBP. Finally, the fifth section describes sources of clinical practice decisions.

Sample Characteristics

The study's sample was selected randomly from the AANP membership, which is the largest national organization representing NPs. The researcher gained access through AANP's research department. Randomly selected mailing addresses of clinically active members were generated for the study. Although AANP has 50,000 active members, 27,000 met the study's eligibility requirements. To be eligible for the study, potential subjects must have been members of AANP, speak and read English, and be practicing NPs in the clinical setting. AANP's Research Coordinator entered eligibility criteria into SPSS and 1,200 potential subjects home mailing addresses were randomly generated. Exclusion criteria included inability to speak and read English and not practicing as an NP in the clinical setting.

The researcher mailed 1,200 surveys to potential participants. The researcher received 480 surveys, which represented a 40% return rate. The survey's demographics served to describe the sample's characteristics as well as provide independent variables

for statistical analysis. Percentage totals which do not sum to 100% represent missing data. The letter “*n*” represents the number of non-missing responses, thus this may vary from variable to variable. Personal demographics were collected. The majority of the participants were female ($n = 428$, 90%) and far fewer participants were men ($n = 46$, 10%). Participants ranged in age from 27 to 73-years-old with a mean age of 50 years ($n = 468$, $SD = 11$).

Nurse practitioner professional demographics were collected. Participants’ years of nurse practitioner clinical experience were widely dispersed. Nurse practitioner clinical experience ranged from 0.6 to 40 years with a mean of 11 years ($n = 475$, $SD = 8$). Participants were clinically practicing NPs. Additionally, weekly worked hours were widely dispersed, ranging from two to 100 with a mean of 37 ($n = 475$, $SD = 12$). The majority of participants were nationally certified ($n = 406$, 85%). Participants who were certified reported area of national certification. Over one-half of participants were certified in family practice ($n = 276$, 69%). The second most common certification was adult-geriatric ($n = 89$, 22%). Other possible board certifications included: (a) acute care ($n = 22$, 5%), (b) women’s health ($n = 10$, 2%), (c) pediatrics ($n = 7$, 2%), and (d) and psychiatry ($n = 2$, 0.5%). Additionally, participants were asked to report clinical specialties. Almost half of participants reported working in family practice ($n = 200$, 42%). Participants were given the option to report an “other” area of specialty practice. This group, which represented the second largest specialty practice area ($n = 126$, 28%), was quite varied (Table 1). Other cited areas of specialty practice included: (a) adult care ($n = 46$, 10%), (b) women’s health ($n = 16$, 4%), (c) emergency medicine ($n = 15$,

3%), (d) geriatrics ($n = 14$, 3%), (e) pediatrics ($n = 14$, 3%), (f) hospitalists ($n = 8$, 2%), (g) psychiatry ($n = 8$, 2%), and (h) urgent care settings ($n = 5$, 1%).

Table 1

Participant “Other”

Cited Practice Specialty Areas	Number of Participants
Military immunization	1
Gynecological oncology	1
Student health	1
Ear, nose, throat	2
Infectious disease	2
Physical medicine and rehabilitation	1
Interventional radiology	2
Nephrology	4
Occupational health	6
Pulmonary	5
Orthopedics	6
Dermatology	8
Endocrine	11
Neurological critical care	1
Pain management	4
Hematology/oncology	9
Cardiology	18
Gastrointestinal	5
Urology	3
Anesthesia	1
Neurology	3
Palliative care	5
Allergy	2
Wound care	2
Rheumatology	2

Table 1 (continued)

Participant “Other”

Cited Practice Specialty Areas	Number of Participants
Surgery:	1
General surgery	1
Neurological surgery	7
Trauma surgery	3
Colorectal surgery	1
Plastic surgery	1
Geriatric surgery	1
Cardiac surgery	1
Kidney transplant	1
Bariatric medicine	3

Note. $n = 125$.

NPs' educational preparation was varied. The majority of participants possessed master's degrees ($n = 408$, 86%), bachelor degrees ($n = 6$, 1%), DNPs ($n = 45$, 10%) and PhDs ($n = 13$, 3%) educational preparation were represented. Diploma and associate degree prepared NPs were in the minority ($n = 4$, 1%). Additionally, current doctoral student enrollment data were collected. Four percent of participants ($n = 19$) reported enrollment in a DNP program and 1% of participants reported enrollment in a PhD program ($n = 4$). The majority of participants were educated in face-to-face nurse practitioner programs ($n = 280$, 61%). Five percent ($n = 21$) of participants reported their NP education was delivered entirely on-line and 34% ($n = 154$) reported a combination face-to-face/on-line format.

Participants' practice characteristics were collected. Participants reported the community setting where they practiced. Data were distributed relatively evenly between

urban settings ($n = 180$, 38%), suburban settings ($n = 170$, 36%), and rural settings ($n = 115$, 24%). Two percent ($n = 8$) reported working in two or more community settings. Data were collected reflecting if participants worked in a teaching facility. The majority of participants worked in a non-academic facility ($n = 333$, 74%) and 27% ($n = 120$) worked in an academic setting. Furthermore, participants were asked about types of employment settings. Most NPs reported working in a clinic setting ($n = 174$, 39%), followed by work in a hospital ($n = 128$, 28%) or private practice ($n = 109$, 24%). Participants were given the opportunity to indicate an alternative practice environment with an “other” fill-in-the-blank option ($n = 41$, 9%) (Table 2). The majority of participants did not work in a Magnet designated facility ($n = 360$, 80%).

Table 2

Participant “Other”

Cited Practice Settings	Number of Participants
Birthing Centers	2
Senior Living Facilities	6
Rural Healthcare Centers	1
Clinics and Hospitals	7
Clinics, Hospitals, and Private Offices	3
Home-Based Health	8
Rehabilitation Centers	1
Correctional Facilities	1
Hospice	1
Managed Care (insurance companies)	1
Research	1
Student Health	4
Clinics and Private Offices	2
Other (non-specified)	3

Note. $n = 41$.

Tool Reliability Data

Inter-item reliability coefficients were conducted to assess internal consistency for the entire EBEQ, as well as the five factors that comprise the EBEQ. The Cronbach's alpha coefficient for the overall scale achieved alpha was .91 ($n = 368$), which exceeded the recommended minimum level of 0.70. Inner-item reliability was also assessed for each of the five factors. For the five individual factors, the Cronbach alpha coefficients ranged from .57 to .87 (Table 3). Four of the five factors exhibited desirable internal consistency.

Table 3

Cronbach's Alpha for Five Factors

Individual EBEQ Tool Factors	Items	Alpha	n
Knowledge of evidence-based practice	10	.79	455
Finding evidence	8	.73	469
Integration of evidence-based practices	12	.57	426
Changing practice based on evidence	7	.87	445
Judging evidence	8	.77	452

Relationships Between the Sample's Demographic Variables to

Nurse Practitioners' Beliefs, Knowledge, and Self-Perceived

Ability to Implement Evidence-Based Practice

Prior to conducting statistical tests with overall EBEQ score and its five factors as the outcome variables, the EBEQ was subjected to a Kolmogorov-Smirnov test of normality. The assumption of normality for the EBEQ overall score (Total 5 Factors Score) and its five individual factors were rejected at the 0.01 level of significance. Because the Kolmogorov-Smirnov is sensitive to sample size, the test statistic was likely

inflated. In addition, the statistical tests used in the study (t -tests and regression) are robust to violations of normality. Finally, Histograms and Normal Q-Q Plots provided visual evidence that the distributions were not markedly different from normal. A histogram and Q-Q Plot for the overall EBEQ are provided in Figure 2 and Figure 3.

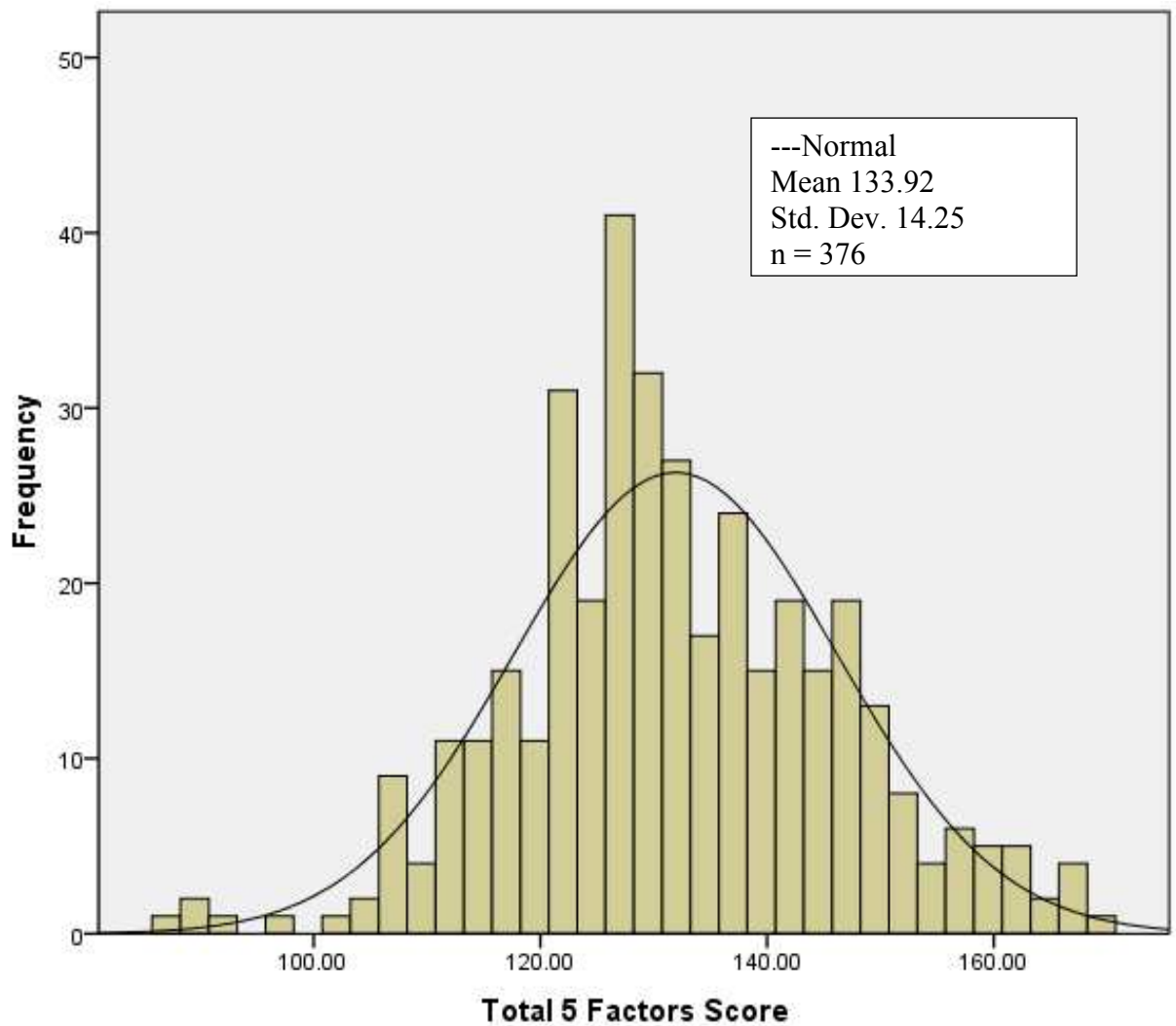


Figure 2. Histogram for evidence-based education questionnaire overall scores.

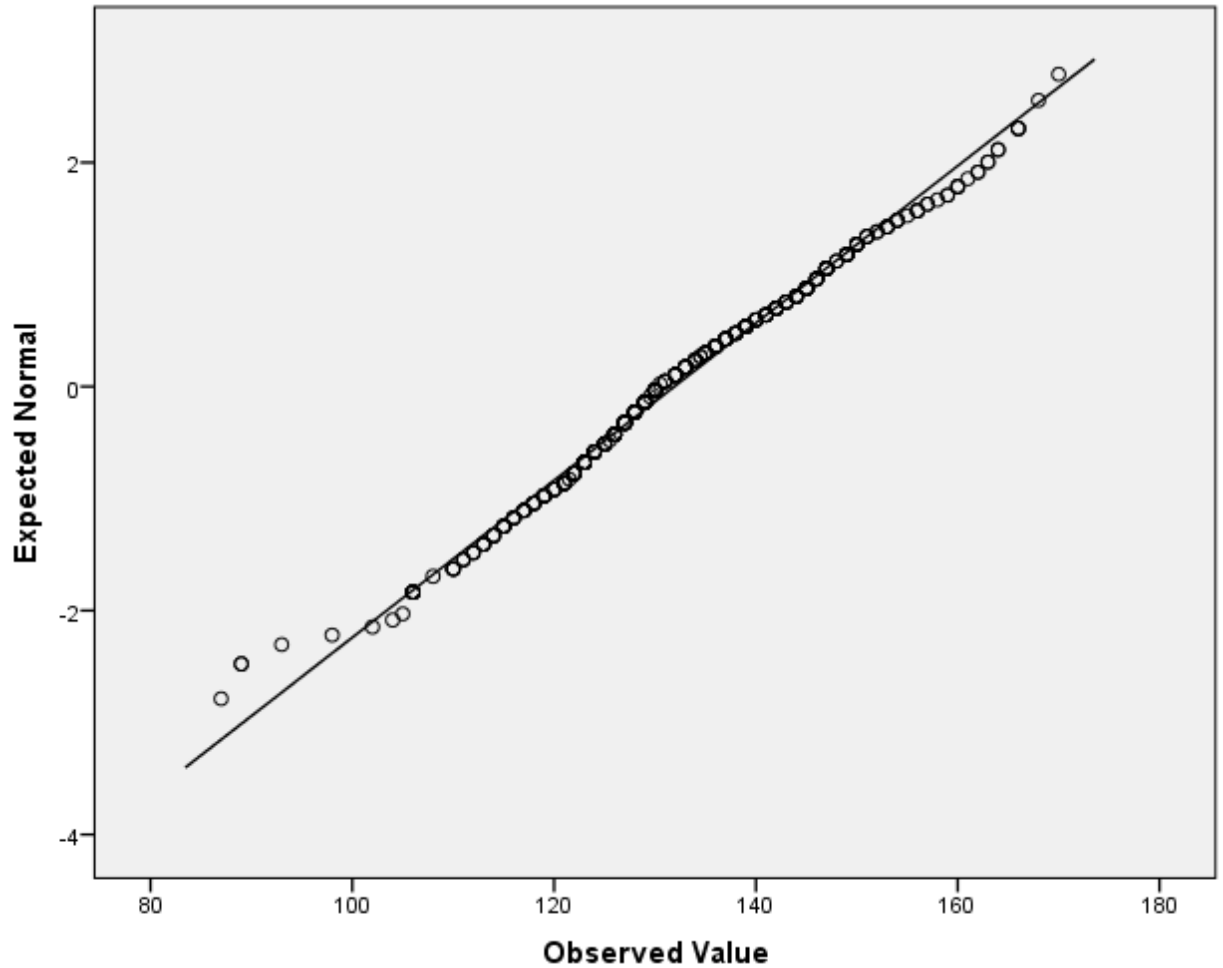


Figure 3. Normal Q-Q plot for evidence-based education questionnaire overall scores.

A series of independent *t*-tests were conducted to assess potential differences in EBEQ score and gender. Only the “finding evidence” factor emerged as marginally significant, $t = 1.721$, $df = 465$, $p = 0.086$ (two-tailed). Male participants reported marginally higher scores in the “finding evidence” factor ($M = 23.26$, $SD = 3.07$) than did females ($M = 22.38$, $SD = 3.33$). The *t*-tests are provided in Table 4.

Table 4

Gender and Evidence-Based Education Questionnaire Factors Using T-Test for Equality of Means

	Males		Females		<i>p</i>
	M	SD	M	SD	
Total Five Factors	133.11	17.04	131.78	13.91	0.581
Knowledge Factor	32.56	4.97	32.31	4.36	0.722
Finding Evidence Factor	23.26	3.07	22.37	3.32	0.086*
Integration of EBP Factor	31.56	3.64	31.91	3.41	0.532
Changing Practice Factor	19.86	4.29	20.56	3.66	0.231
Judging Evidence Factor	24.96	4.59	24.48	3.81	0.452

Note. M = Mean. SD = Standard Deviation. * $p < 0.10$.

A Pearson Correlation Matrix was conducted with overall EBEQ score, the five factor scores, and age as the variables of interest. Age significantly correlated with overall EBEQ score ($r = -0.113, p = 0.029$), “knowledge of EBP” ($r = -0.168, p < 0.001$), and “changing practice based on evidence” ($r = -0.112, p = 0.017$). Age was inversely related to the overall EBEQ score, as well as the “knowledge of EBP” and “changing practice based on evidence” scores. In other words, as participant age increased, the overall EBEQ decreased. Data from the correlations are presented in Table 5.

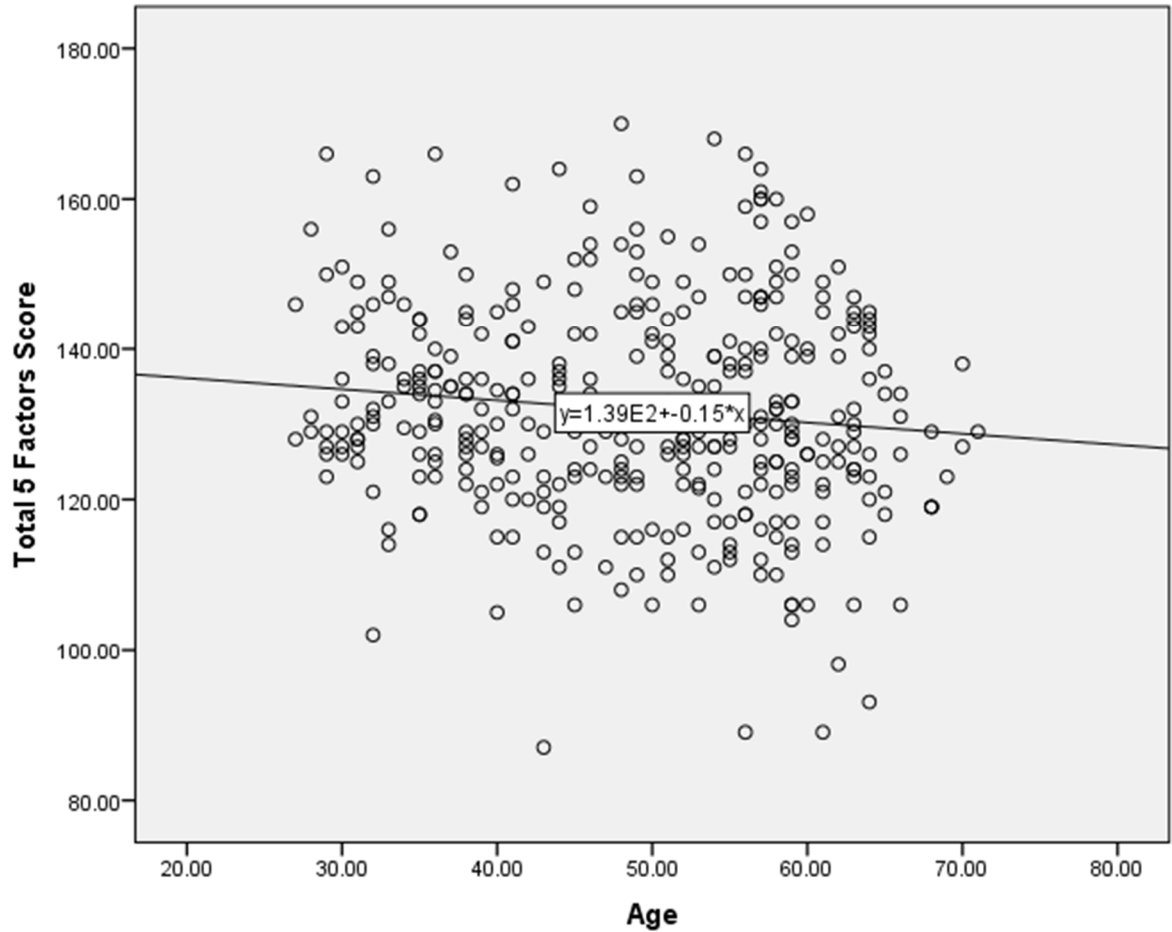
Table 5

Correlation of Evidence-Based Education Questionnaire with Age

EBEQ Score	<i>n</i>	Age (<i>r</i>)	<i>p</i>
Total Five Factors	373	-.113*	0.029*
Knowledge Factor	445	-.168**	0.000**
Finding Evidence Factor	461	-.060	0.199
Integration of EBP Factor	421	-.052	0.285
Changing Practice Factor	453	-.112*	0.017*
Judging Evidence Factor	443	-.026	0.591

Note. *r* = Pearson's Product-Moment Correlation Co-efficient. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

A scatter plot of overall EBEQ score and age includes a simple, linear regression function indicating that for each additional 10 years of age, the overall EBEQ score decreased by 1.5 points. Whereas the slope (age vs. overall score) was statistically significant, the change in score per 10 years represented only 3% of the range of scores (Range = 46) and about 10% of the standard deviation of the overall score (*SD* = 14.25). The graph is provided in Figure 4.



Note. Total 5 Factors Score and age are the calculated means. The plotted linear regression line demonstrates the inverse relationship of age to the overall EBEQ score.

Figure 4. Scatterplot exploring the relationship between the overall evidence-based education questionnaire score and age.

A series of one-way ANOVAs were conducted with overall EBEQ score and its five factors as the dependent measures and education level (other, bachelor degrees, master's degree, DNP, PhD) as the independent, categorical factor. Only the "integration of evidence-based practices" factor was not statistically significant. Overall EBEQ, "knowledge of EBP," "finding evidence," "changing practice based on evidence," and "judging evidence" achieved observed level of significance ≤ 0.01 , providing strong

support for the relationship between education level and EBEQ score. The ANOVA data are provided in Table 6.

Table 6

ANOVA Data Presenting the Overall Evidence-Based Education Questionnaire Score and its Five Factors with Highest Degree of Education

Factor	<i>F</i>	Within Group <i>df</i>	Mean Square	<i>p</i>
Total Five Score	7.37	371	190.18	0.00**
Knowledge of EBP	5.51	446	18.79	0.00**
Finding Evidence	5.96	464	10.49	0.00**
Integration of EBP	1.49	421	11.68	0.205
Changing Practice	3.34	453	13.73	0.01*
Judging Evidence	12.98	445	13.69	0.00**

Note. ANOVA = analysis of variance. * $p < 0.01$. ** $p < 0.001$.

Post-hoc multiple comparisons using the Bonferroni Method indicated a number of important differences. DNPs scored significantly higher than master's degree holders on overall EBEQ score (Mean Difference = 9.28, $p < 0.001$), on the "finding evidence" factor (Mean Difference = 1.96, $p = 0.002$), and on the "judging evidence" factor (Mean Difference = 3.50, $p < 0.001$). In addition, DNPs scored significantly higher than bachelor degree holders on the "knowledge of EBP" (Mean Difference = 6.69, $p < 0.004$). Only one case among the 24 comparisons (6 factors x 4 levels of educational comparisons) indicated a marginally lower score for DNPs. DNPs scored marginally lower than PhDs on the "changing practice based on evidence" factor, (Mean Difference = -3.36, $p < 0.083$). The multiple comparisons table is provided in Table 7.

Table 7

Post Hoc Comparisons for Highest Degree (Doctor of Nursing Practice vs. Four Other Levels)

Factor Score	Highest Degree	Mean Difference	Std. Error	<i>p</i>
Total Five Factors	Other	-0.8	8.27	1.000
	Bachelor	13.5	6.06	.267
	Master	9.28***	2.39	0.001***
	PhD	-7.16	4.91	1.000
Knowledge of EBP	Other	4.61	2.26	.424
	Bachelor	6.69***	1.88	0.004***
	Master	1.66	.69	.172
	PhD	-1.47	1.41	1.000
Finding Evidence	Other	-0.98	1.69	1.000
	Bachelor	1.46	1.4	1.000
	Master	1.96***	.51	0.002***
	PhD	-0.55	1.02	1.000
Integration of EBP	Other	-2.44	2.04	1.000
	Bachelor	0.88	1.49	1.000
	Master	0.8	.57	1.000
	PhD	-0.44	1.09	1.000
Changing Practice	Other	-0.4	1.93	1.000
	Bachelor	0.46	1.61	1.000
	Master	0.65	.58	1.000
	PhD	-3.30*	1.24	.083*
Judging Evidence	Other	1.8	1.93	1.000
	Bachelor	3.22	1.6	.457
	Master	3.5****	.58	0.000****
	PhD	-1.11	1.2	1.000

Note. The Bonferroni Method adjusted P-values by a factor of 10. * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$. **** $p < 0.001$.

The highest level of observed significance was the comparison between DNPs and master's holders on the "judging evidence" factor. A Means Plot for the "judging

evidence” factor is given in Figure 5. It represents the common pattern observed among the overall EBEQ score and the five factors and education level.

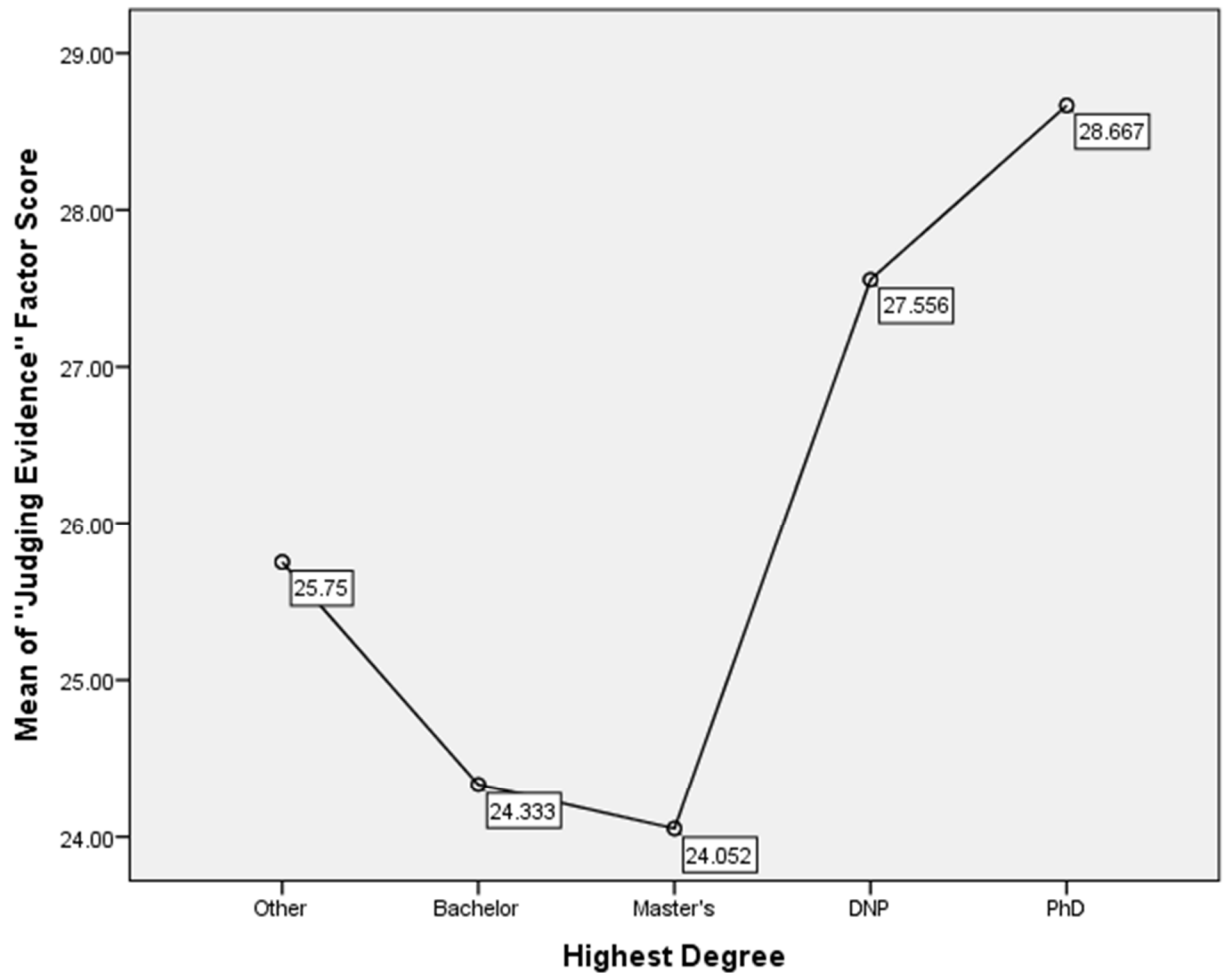


Figure 5. Means plot for the “judging evidence” factor.

A more detailed analysis of the “finding evidence” factor revealed that DNPs reported higher scores than did master’s holders on two key questions: “I can understand research reports easily,” and “I can identify research implications for my own practice.” In addition, independent *t*-tests verified the significant differences: $t = 3.46, p = 0.001$

and $t = 3.29$, $p = 0.001$ (two-tailed), respectively. The descriptive statistics and t -tests are provided in Table 8.

Table 8

Sample Descriptives Comparing Two Key Evidence-Based Education Questionnaire Questions for Master's Educated Nurse Practitioners vs. Doctor of Nursing Practice Educated Nurse Practitioners Using T-Test for Equality of Means

		<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
“I can understand research reports easily”	Master’s	2.82	.67	-3.46	450	.001*
	DNP	3.17	.61			
“I can identify research implications for my own practice”	Master’s	3.11	.65	-3.29	451	.001*
	DNP	3.44	.55			

Note. M = Mean. SD = Standard Deviation. * $p < .01$.

A Pearson Correlation Matrix was conducted with overall EBEQ score, the five factor scores, and number of years practicing as an NP as the variables of interest. Number of years practicing as an NP emerged as a significant correlation with the “knowledge of EBP” factor ($r = -0.195$, $p < 0.001$). Number of years practicing as an NP was inversely related to scores on the “knowledge of EBP” factor. Correlation data are presented in Table 9.

Table 9

Correlation of Overall Evidence-Based Education Questionnaire Score and the Five Factors that Comprise the Evidence-Based Education Questionnaire with Number of Years Practicing as a Nurse Practitioner

EBEQ	n	Years Practicing (r)	p
Total Five Factors	376	-.072	0.164
Knowledge of EBP Factor	450	-.195**	0.001**
Finding Evidence Factor	468	-.022	0.639
Integration of EBP Factor	426	-.004	0.939
Changing Practice Based on Evidence Factor	458	-.022	0.645
Judging Evidence Factor	450	.032	.500

Note. r = Pearson's Product-Moment Correlation Coefficient. **Correlation is significant at the 0.01 level (2-tailed).

A Pearson Correlation Matrix was conducted with overall EBEQ, the five factor scores, and hours worked per week as the variables of interest. Hours worked per week emerged as significant correlation with the overall EBEQ score ($r = -0.132$, $p = 0.01$). Thus, hours worked per week were inversely related to overall EBEQ score. Because this result was somewhat counterintuitive, the data were explored in more detail. The file was split by highest degree, with two specified levels—DNP and master's degree. Next, simple, linear regression models were conducted for both levels of degree (DNP and master's degree), using overall EBEQ score as the outcome variable and hours worked per week as the predictor. The results indicated that model for master's degree holder was statistically significant, $F(1, 315) = 5.69$, $p = 0.018$, whereas the model for DNPs was non-significant, $F(1, 35) = 0.388$, $p = 0.537$. Thus, hours per week had a significant

effect on overall EBEQ scores only for master's holders. For master's degree holders, the coefficient for hours worked per week ($b = -0.170$) indicated that for each additional 10 hours worked, master's degree holders' overall EBEQ scores decreased by about two points. In contrast, hours worked per week was positively related to EBEQ scores ($b = 0.081$) for DNPs—though statistically non-significant. Although the model for master's degree holders was statistically significant, it should be noted that only about 2% of the proportion of variation in overall EBEQ scores for master's degree holders can be explained by the hours worked per week ($r^2 = 0.018$). The F-test for regression data is provided in Table 10.

Table 10

F-Test and Coefficients Results Displaying Estimated Change in Evidence-Based Education Questionnaire Scores for Hours Worked Weekly by Master's vs. Doctor of Nursing Practice Educated Nurse Practitioners

Highest Degree	Coefficient (b)	F	df	Mean Square	R^2
Master's	-0.170	5.687	315	187.67	0.018
DNP	0.081	.388	35	136.68	0.537

Note. R^2 = R square.

A scatter plot of overall EBEQ scores and hours worked per week for master's degree holders shows the downward sloping line, which indicated the inverse relationship between hours worked per week and overall EBEQ scores. The zero-sloped line represented the master's degree holders average overall EBEQ score ($M = 130.5$). The graph is provided in Figure 6.

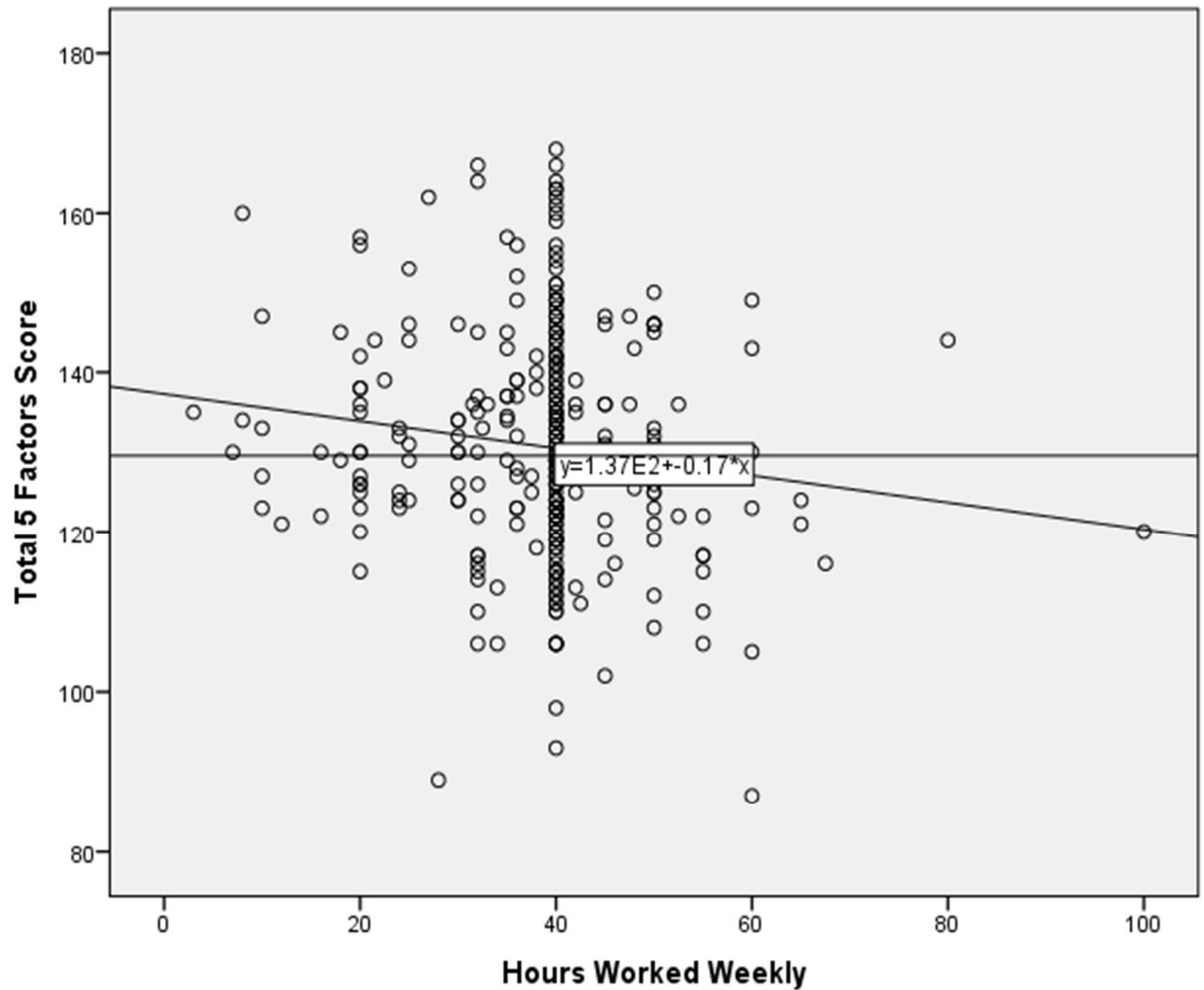


Figure 6. Scatterplot exploring the relationship between hours worked per week by the master's NP and decreased overall evidence-based education questionnaire score.

A series of one-way ANOVAs were conducted with overall EBEQ scores and its five factor scores as the outcome variables and clinical setting (urban, suburban, rural, mixed) as the independent, categorical factor. No statistical relationship emerged among EBEQ score and clinical setting, $p > 0.10$. Thus, clinical setting was not related to EBEQ scores.

Similarly, a series of independent *t*-tests were conducted with overall EBEQ scores and the five factor scores as the outcome variables and clinical setting (academic vs. non-academic) as the independent variable. Only the “changing practice based on evidence” factor emerged significant, $t = 2.29$, $df = 430$, $p = 0.023$. Practitioners in an academic setting scored significantly higher on the “changes” factor ($M = 21.2$, $SD = 3.38$) than did practitioners in a non-academic setting ($M = 20.3$, $SD = 3.85$).

A series of independent *t*-tests were conducted to assess potential differences in EBEQ scores and Magnet designation (yes/no). Only the “changing practice based on evidence” factor emerged as statistically significant, $t = 2.61$, $df = 431$, $p = 0.01$ (two tailed). Participants who were employed at Magnet designated facilities reported marginally higher scores ($M = 21.42$, $SD = 2.99$) than did non-Magnet participants ($M = 20.27$, $SD = 3.89$).

Finally, a series of one-way ANOVAs were conducted with overall EBEQ scores and its five factors as the dependent measures and DNP educational delivery method (face-to-face, online, and combination) as the single, independent factor. No significant differences emerged with *p* values ranging from 0.102 to 0.984. Thus, DNP educational delivery method was not related to EBEQ scores. Descriptive statistics and *F* values are provided in Table 11.

Table 11

Descriptive Statistics with ANOVA for Overall Evidence-Based Education Questionnaire and its Five Factors and Education Delivery Method of Doctor of Nursing Practice Education

Factors		<i>N</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Total Five Score	face to face	211	132.05	14.58	.016	0.984
	online	19	131.44	13.26		
	combo	128	131.97	14.27		
	Total	358	131.99	14.37		
Knowledge of EBP	face to face	262	32.05	4.73	2.294	0.102
	online	21	31.95	3.91		
	combo	148	33	3.89		
	Total	431	32.37	4.44		
Finding Evidence	face to face	277	22.48	3.35	.008	0.992
	online	22	22.45	3.86		
	combo	151	22.44	3.26		
	Total	450	22.46	3.34		
Integration of EBP	face to face	248	31.83	3.69	.029	0.972
	online	19	31.63	2.81		
	combo	142	31.81	3.21		
	Total	409	31.81	3.48		
Changing Practice	face to face	264	20.58	3.81	.388	0.678
	online	22	19.88	3.44		
	combo	149	20.43	3.65		
	Total	435	20.5	3.73		
Judging Evidence	face to face	257	24.73	3.79	.734	0.481
	online	22	24.04	2.90		
	combo	148	24.32	4.20		
	Total	427	24.55	3.90		

Note. ANOVA = analysis of variance. *M* = Mean. *SD* = Standard Deviation. *P* > 0.10.

Despite the non-significant ANOVAs, EBEQ scores for participants receiving face-to-face DNP education were compared directly to participants receiving on-line

DNP education via a series of independent *t*-tests. No significant differences emerged. Thus, EBEQ scores did not differ between face-to-face and on-line DNP education

A Pearson Correlation Matrix was conducted with overall EBEQ scores, the five factor scores, and length of DNP education (in semesters) as the variables of interest. None of the EBEQ variables that emerged significantly correlated with length of DNP programs. Thus, length of DNP program was not statistically related to EBEQ.

Facilitating Factors and Barriers to Evidence-Based Practice

Extrapolating from the EBEQ data, the researcher was able to determine NPs self-perceived facilitating factors and barriers to EBP. Participants cited education preparation as a facilitating factor in knowledge of EBP. The majority of participants reported their undergraduate education supported EBP ($n = 382$, 80%). Additionally, participants with graduate degrees reported higher education supported preparation for EBP ($n = 448$, 94%) and were taught EBP precepts ($n = 459$, 96%).

Participants reported their own knowledge, beliefs, and skills as EBP facilitating factors. Overall, participants reported their EBP knowledge high ($n = 454$, 97%). Participants cited their own beliefs in the value of EBP ($n = 460$, 96%) and EBP education to affect patient care outcomes positively ($n = 468$, 99%). Participants reported their own efforts as NPs promote EBP ($n = 468$, 99%). Moreover, participants reported using EBP literature to update their clinical practice ($n = 435$, 91%), as well as basing practice on evidence ($n = 430$, 91%). The majority of participants reported high confidence in judging ($n = 366$, 77%) and understanding ($n = 351$, 74%) research quality. Also, participants were able to find appropriate research reports ($n = 426$, 89%). Most

participants reported empirical evidence as an acceptable mode of clinical practice change ($n = 311$, 67%).

The EBEQ asked questions about EBP support and resources. Participants reported supportive superiors ($n = 403$, 85%), workplaces ($n = 420$, 89%), and colleagues ($n = 427$, 90%) as EBP facilitating factors. EBP workplace cultures ($n = 395$, 83%) and models ($n = 382$, 81%) were also facilitating factors. Participants felt workplace resources were adequate in facilitating EBP ($n = 386$, 81%) and knew how to use these resources to find evidence for practice ($n = 461$, 98%).

EBP barriers were also extrapolated from the EBEQ. A misunderstanding of EBP precepts emerged from the descriptive data. Only 59% ($n = 281$) felt EBP applied to all clinical decisions. Lack of knowledge of EBP precepts also emerges. Use of intuition ($n = 407$, 86%) and textbooks ($n = 198$, 44%) were cited as guiding clinical decisions. In contradiction to overall strong feelings of being able to judge the quality and use of research, participants found understanding statistics difficult ($n = 281$, 59%). Finally, time was cited as an EBP barrier. Participants reported lack of time to find research reports ($n = 282$, 59%) and lack of time to implement EBP changes ($n = 268$, 56%).

In summary, the researcher extrapolated facilitating factors and barriers for NPs' EBP from the EBEQ questions (Table 12). Facilitating factors for NPs included strongly positive EBP beliefs, skills, and knowledge. Additionally, NPs reported EBP as valuable. Precepts of EBP in undergraduate and graduate education were a facilitating factor. Workplace and colleague support was a cited facilitating EBP factor. Barriers to EBP included lack of understanding statistics and lack of time to find research reports and implement EBP changes.

Table 12

Self-Reported Nurse Practitioners' Evidence-Based Practice

Facilitating Factors	Barriers
Undergraduate education	Lack of knowledge of EBP precepts
Graduate education	Lack of time
Knowledge of EBP	Lack of statistics knowledge
Confidence in using EBP	
Value in EBP	
Supportive superiors, workplaces, and colleagues	
Adequate resources	

Reported Sources of Clinical Decision Information

Participants were asked to choose from a list of options that reflected which sources they turn to when they require information to make a clinical decision. In a pick-all-that-apply format, participants could choose more than one source. Furthermore, an “other” option with a fill-in-the-blank was provided in order to capture any additional sources. The majority of NPs utilized on-line data-bases for clinical decision insight ($n = 400$, 88%). Similarly, physicians ($n = 393$, 86%) and other advanced practice colleagues ($n = 368$, 81%) were another frequent source of information. Journals were cited by 78% ($n = 356$) of participants. Reliance on past experience was cited by 62% ($n = 284$) of participants. Additionally, information from textbooks ($n = 248$, 55%) and practice site policies and procedures ($n = 244$, 54%) were cited by approximately one-half of participants. Using intuition for decisions was cited by one-third of participants ($n = 157$, 35%). “Other” sources of clinical decision making information was varied and represented the minority of choices ($n = 29$, 6%) (Table 13).

Table 13

Respondent “Other” Cited Sources of Evidence for Clinical Decision Making

	Number of Participants
Multidisciplinary Cancer Conferences	1
Patient History	1
Research Abstracts	1
Patient Input (shared decision making)	3
Pharmaceutical Representatives	1
Conferences	2
Managers	1
Pharmacists	2
Continuing Medical Education	3
Evidence-Based Guidelines	4
Prayer to God	1
Available Resources	1
Research Protocols	1
Registered Nurses	1
Veteran’s Administration Informational Sources	1
Employer	1
Best Practice Alerts on Computer	1
Medical Records	1
Clinical Decision Making Apps	1
Shared Articles	1

Chapter Summary

This chapter discussed the study’s data analysis results as related to the research questions. The chapter presented the study’s descriptive data of the participants’ demographics. Additionally, the chapter provided internal reliability data of the overall EBEQ and its individual five factors. Furthermore, the chapter provided data analysis of the relationships between the study demographics and the EBEQ. Finally, the chapter identified facilitating factors and barriers to NPs’ EBP, as well sources of NPs’ information when making clinical decisions. Chapter Five explores the meaning and implications of the results to NPs’ clinical practice.

CHAPTER FIVE

DISCUSSIONS AND IMPLICATIONS

Chapter Five offers a discussion about this study's data. The results of Chapter Four are further explained and interpreted. The study's findings are compared and contrasted to nursing's EBP literature. Furthermore, the results are presented in the context of the TLT, which was the conceptual framework for this study. Additionally, limitations of the study are discussed. Implications for nurse practitioner's practice, education, and policy are discussed. Integrated within the implication section are recommendations for further research.

Discussion

Review of the Problem

This cross-sectional, correlational quantitative study sought to explore the relationship between NPs' personal, professional, and practice demographics that affect self-reported utilization of EBP. Additionally, the study sought to reveal NPs' barriers and facilitators to utilizing EBP and sources of information for clinical practice decisions. The need to assimilate EBP into NPs' clinical practice is clear. Federal laws, national mandates and national nursing education policies, including the ACA (Patient Protection and Affordable Care Act, 2010), the IOM (Committee on Quality of Health Care in America, 2001; Greiner & Knebel, 2003; Institute of Medicine, 2010), and AACN's *Essentials of Doctoral Education for Advanced Practice Nursing* (2006), clearly delineate the importance of EBP in today's healthcare. Scant research exists exploring NPs' personal, practice, and professional variables to adoption of EBP. The Nurse Practitioner Core Competencies (National Organization of Nurse Practitioner Faculties,

2012) specifically addresses the expectation of integration of evidence-based practice precepts in clinical practice for all NPs regardless of educational preparation.

Additionally, the AACN supports the DNP as a terminal degree for NPs. The AACN's *Essentials of Doctoral Education for Advanced Practice Nursing* specifies that DNP prepared NPs should translate and disseminate EBP with the end-point resulting in improved health care outcomes (American Association of Colleges of Nursing, 2006). Furthermore, little empirical data exists supporting the contribution of the DNP to NPs' EBP.

Key Findings

The findings of this study revealed how specific practice, personal, and professional variables correlated to EBEQ scores. The EBEQ is a valid and reliable tool that was used to obtain NPs beliefs and knowledge of EBP. Demographics were collected in which the researcher identified as potential independent variables to the dependent variable of the EBEQ score. Collection of demographic variables and calculating the overall EBEQ score and its five factors allowed for a correlational study design.

Key findings emerged. Specifically, DNP educated NPs had significantly higher EBEQ scores than master's degree educated NPs. Interestingly, how the NP received the DNP education, whether on-line or face-to-face or length of the program, did not significantly correlate to EBEQ scores. Furthermore, personal, practice, and professional variables such as NPs' gender, age, number of hours worked weekly also correlated to higher EBEQ scores. Nurse practitioners' practice settings, such as Magnet status designation and employment at an academic center also significantly correlated to EBEQ

scores. Other practice setting variables, such as where the practice is located, did not significantly correlate to EBEQ.

Additionally, the study's findings revealed NPs' self-reported confidence in adopting and utilizing EBP. Overwhelmingly, NPs support and recognize the value of EBP; however, the study revealed discrepancies in implementation. Many NPs reported sources of clinical information are clearly not evidence-based, such as use of intuition to make clinical practice decisions. Finally, the data reveals NPs' self-reported facilitating factors and barriers to EBP are similar to those of nurse generalists.

Results of this study indicated that the DNP education transforms NPs self-reported adoption and utilization of EBP; whereas, other practice, personal, and professional variables have less influence in EBP. Encouragingly, NPs were overwhelmingly supportive of EBP. However, the study demonstrated NPs have a lack of understanding of EBP precepts. Finally, the study elucidated NPs' facilitating factors and barriers to EBP.

Demographic Characteristics

In the United States, there are approximately 155,000 licensed NPs (U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2014). With over 60,000 members, the AANP is the largest national organization representing NPs (American Association of Nurse Practitioners, 2010). Twelve-hundred randomly generated mailing addresses were obtained from the membership rolls of AANP. Participants were clinically practicing NPs. Four-hundred eighty surveys were returned, which represents a 40% return rate. The demographic data analyzed for this study

included: (a) sex, (b) age, (c) education level, (d) how NP education programs were delivered, (e) years of NP practice, (f) hours worked weekly as an NP, (g) clinical practice setting, (h) national certification, (i) clinical practice specialty, and (j) length of DNP education. Overall, this study's participants reflected national and AANP's membership demographic representation of practicing NPs.

The study's demographics compared favorably to both AANP's membership demographics as well as national NPs' demographics when equivalent data were available. The AANP membership is 92% female (AANP, 2010). Nationally, approximately 93% of NPs are female (U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2014). In this study, the majority of the participants were female ($n = 428$, 90%) and far fewer participants were men ($n = 46$, 10%). Nationally, the average age of a practicing NP is 48-years-old (U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2014). In this study, participants ranged in age from 27 to 73-years-old with a mean age of 50 years ($n = 468$, $SD = 11$).

Nationally, the majority of NPs hold a master's degree as their highest degree (86%) and only 5% hold a doctoral degree. Additionally, nationally only 6 % of NPs are without a graduate degree (U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2014). The AANP (2010) reports similar figures: (a) 82% hold a master's degree, (b) 10% hold a post-master's certificate, and (c) 5% hold a doctoral degree. Only 3% of AANP's membership do not have a graduate degree. Neither the United States

Department of Health and Human Services nor the AANP report type of doctoral degree held. In this study, the majority of participants possessed master's degrees ($n = 408$, 86%). Bachelor degrees ($n = 6$, 1%), DNPs ($n = 45$, 10%), and PhDs ($n = 13$, 3%) educational preparation were represented. Diploma and associate degree prepared NPs were in the minority ($n = 4$, 1%).

On average, AANP (2010) reports members have 11 years of NP practice experience, which corresponds favorably to this study. In this study, participants clinical experience ranged from 0.6 to 40 years with a mean of 11 years ($n = 475$, $SD = 8$).

Demographic data are available for practice settings. Nationally, 36% of NPs work in a private office and 21% work in a hospital setting (U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2014). In alignment with national demographics, AANP (2010) reported 32% of NP members work in private practice. In this study, less participants reported working in private practice ($n = 109$, 24%). Furthermore, in this study the majority of participants reported working in a clinic setting ($n = 174$, 39%), followed by work in a hospital ($n = 128$, 28%). Participants were given the opportunity to indicate an alternative practice environment with an "other" fill-in-the-blank option ($n = 41$, 9%). Nationally, 32% of NPs work in a clinic setting, in comparison to the AANP membership where 37% reported clinic employment. Slight discrepancies in national, AANP membership, and this study's NPs' clinical practice site data may be attributed to self-reported data or incongruent survey labelling options.

Additional favorable comparisons to of this study's demographics to national demographics includes certification. Nationally, nearly all of the NPs in the United

States are certified (96%). Moreover, nearly half of the NPs in the United States are certified in family practice (49%). In this study, the majority of participants were nationally certified ($n = 437$, 96%). Participants who were certified reported area of national certification. Over one-half of participants were certified in family practice ($n = 276$, 58%).

The study's demographics reflected NPs' diversity in practice, which favorably compared to the national statistics and AANP's membership. Nationally, the majority of NPs work in primary care (48%). "Other" specialties non-specified represent 21% of NPs, followed by internal medicine (13%), surgical specialties (9%), psychiatry (6%), and pediatrics (3%) (U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2014). AANP (2010) reports NP clinical practice with different terminology; nevertheless, the overall results are similar. According to AANP (2010), 63% of NPs work in family practice and 22% work in internal medicine. Acute care (6%), geriatrics (3%), pediatrics (2%), psychiatry (2%), and women's health (3%) represent the remaining NP specialties. In this study, almost half of participants reported working in family practice ($n = 200$, 42%). Participants were given the option to report an "other" area of specialty practice. This group, which represented the second largest specialty practice area ($n = 126$, 28%), was quite varied. Other cited areas of specialty practice included: (a) adult care ($n = 46$, 10%), (b) women's health ($n = 16$, 4%), (c) emergency medicine ($n = 15$, 3%), (d) geriatrics ($n = 14$, 3%), (e) pediatrics ($n = 14$, 3%), (f) hospitalists ($n = 8$, 2%), (g) psychiatry ($n = 8$, 2%), and (h) urgent care settings ($n = 5$, 1%). Slight discrepancies in national, AANP membership, and this study's NPs clinical specialty data may be

attributed to self-reported data and incongruent survey labelling options. For example, generally, primary care is considered to be family, adult, pediatric, or gerontology.

Other practices setting demographics collected in this study had no national nor AANP membership data to make comparisons. For example, no national or AANP demographics were found related to NP practice for Magnet designation at practice setting, delivery method of education, academic or non-academic practice setting, or designation of practice setting as urban, suburban, or rural. Based on the review of the literature, the researcher felt these demographics were important independent variables; thereby, they were included in the survey.

Overall, this study's demographics, national demographics, and AANP membership demographics are aligned. This alignment allows for generalizability of the study's findings to all NPs in the United States.

The Relationships Between Nurse Practitioners Demographics and the Evidence-Based Education Questionnaire

Research question one sought to identify the relationship between NPs' personal, professional, and practice demographics and the five factors comprising the EBEQ: (a) "knowledge of EBP," (b) "finding evidence," (c) "integration of evidence-based practices," (d) "changing practice based on evidence," and (e) "judging evidence." The first EBEQ factor, "knowledge of EBP," measured participants' beliefs on how their own education established personal foundations for EBP. Secondly, the "finding and reviewing evidence" factor measured participants' access to EBP, such as journals, reports, and databases as well as their comfort in understanding evidence significance. Thirdly, the "integration of evidence-based practices" factor identified participants'

ability to locate and evaluate sources of evidence and their ability to integrate EBP in clinical settings. Fourthly, the “changing practice based on evidence” factor determined if participants’ felt supported by colleagues and administration when implementing EBP. The final factor, “judging evidence,” measured participants’ self-perceived ability to select, deduce, and disseminate clinically relevant evidence. The EBEQ is a reliable and valid tool utilized to gather NPs’ beliefs and attitudes about knowledge, use, and implementation of EBP. Statistical analysis compared the tool’s overall score and its five individual factors to the NPs demographic data.

A surprising finding in this study was male participants reported marginally higher scores in the “finding evidence” factor ($M = 23.26$, $SD = 3.07$) than did females ($M = 22.38$, $SD = 3.33$), which emerged as marginally significant ($t = 1.721$, $df = 465$, $p = 0.086$) (Table 4). The “finding evidence” measured participants’ access to EBP, such as journals, reports, and databases as well as their comfort in understanding evidence significance. This finding was in contrast to Butler (2011) and Roper’s (2011) findings that found no correlation between gender and tool scores. Several factors may have influenced these results. Butler (2011) and Roper’s (2011) sampling may have influenced their findings leading to a Type 1 error. This study indicated male NPs appear to have higher self-perceived ability to access evidence and understand its relevance to clinical practice. However, this finding may be reflective of the relatively small number of male participants, which may have skewed the results. Moreover, the finding may be clinically insignificant.

A second finding in this study to emerge as significant was age. Increasing age correlated with the overall EBEQ score ($r = -0.113$, $p = 0.029$). For each additional 10

years of age, the overall EBEQ score decreased by 1.5 points. Additionally, “knowledge of EBP” ($r = -0.168, p < 0.001$), and “changing practice based on evidence” ($r = -0.112, p = 0.017$) significantly correlated with age. In other words, as participant age increased, the “knowledge of EBP” and “changing practice based on evidence” factor scores decreased (Table 5). Again, this was in contrast to Butler (2011), Roper (2011), and Olade’s (2003) findings that found no correlation between age and tool scores. Butler (2011), Roper (2011), and Olade’s (2003) sampling methodology may have influenced their findings leading to a Type 1 error. This study’s sample size, as demonstrated by the aforementioned power analysis, avoided the possibility of similar Type 1 errors.

Relationships between increasing age and decreasing EBP knowledge and environmental support EBEQ scores may be related to NP education and experience. As the emphasis of EBP is a newer concept in NP education, older NPs may not have had the precepts of EBP as clearly integrated in their educational programs as younger NPs. Furthermore, older NPs may possess more cynicism toward clinical practice. Younger, less proficient NPs may be forced to rely on evidence and supportive work environments for practice decisions than their more experienced colleagues.

One striking similarity to this study and others was the influence of education in the precepts of EBP. In both the nurse generalists’ literature (Eizenberg, 2010; Koehn & Lehman, 2008; Melnyk et al., 2012; McCloskey, 2008; Olade, 2003, 2004) and the APRN literature (Profetto-McGrath et al., 2010; Roper, 2011), level of education consistently emerged as a statistically significant factor in beliefs and self-perceived ability to implement EBP. In the APRN EBP research, which looked at education level as a determinant of EBP precepts, only Butler (2011) did not find significance, which

may be attributable to her sampling methods. In the present study, level of education emerged as a predictor of EBP. The overall EBEQ score and its five factors as the dependent measures were compared to education level (other, bachelor degrees, master's degree, DNP, PhD) as the independent, categorical factor. Only the "integration of evidence-based practices" factor was not statistically significant. This may be attributed to the "integration of evidence-based practices" factor's Cronbach's alpha coefficient reflecting relatively low internal consistency reliability at .57 for this study (Table 3). Secondly, the non-statistically significant finding may be attributed further to the wide variety of NPs clinical practices leaving the factor's questions open to participants' interpretation, which may have further lowered the factor's reliability (Table 1 and Table 2).

The overall EBEQ score, "knowledge of EBP," "finding evidence," "changing practice based on evidence," and "judging evidence" achieved an observed level of significance ≤ 0.01 , providing strong support for the relationship between education level and EBEQ score (Table 6). In post-hoc multiple comparisons indicated a number of important differences (Table 7). DNPs scored significantly higher than master's degree holders on overall EBEQ score (Mean Difference = 9.28, $p < 0.001$), on the "finding evidence" factor (Mean Difference = 1.96, $p = 0.002$), and on the "judging evidence" factor (Mean Difference = 3.50, $p < 0.001$). In addition, DNPs scored significantly higher than bachelor degree holders on the "knowledge of EBP" (Mean Difference = 6.69, $p < 0.004$). Only one case among the comparisons indicated a marginally lower score for DNPs. DNPs scored marginally lower than PhDs on the "changing practice based on evidence" factor, (Mean Difference = -3.36, $p < 0.083$). The highest level of

observed significance was the comparison between DNPs and master's holders on the "judging evidence" factor (Figure 5). In two key questions from the "finding evidence" factor revealed that DNPs reported higher scores than did master's holders: "I can understand research reports easily," ($t = 3.46, p = 0.001$) and "I can identify research implications for my own practice" ($t = 3.29, p = 0.001$) (Table 8). The questions are key to understanding evidence and utilization of evidence in NPs' clinical practice. The findings that showed significant differences in DNP educated NPs to master's educated NPs and PhD educated NPs are unique to this study. Roper's (2011) study showed statistically significant findings in all doctorally prepared NPs' EBP beliefs, knowledge, and use of evidence compared to master's educated NPs. In Roper's (2011) study, specific degrees of doctorally educated NPs were collapsed into one category due to sample size; however, in doing so, the researcher was unable to look for relationships of EBP precepts of specific doctoral degrees to other levels of NP degrees. This study's findings demonstrated the importance of continuing education in the form of academic degrees. NPs with a DNP degree appeared to have higher beliefs, knowledge, and self-perceived ability to integrate the precepts of EBP in clinical practice than their master's degree colleagues.

Unique to this study, delivery method of DNP education and length of DNP program in semesters were compared to the EBEQ score. The overall EBEQ scores and its five factors as the dependent measures and DNP educational delivery method (face-to-face, online, and combination) as the single, independent factor were examined. No significant differences emerged with p values ranging from 0.102 to 0.984 (Table 11). DNP educational delivery method was not related to EBEQ scores. Recognizing the

sample size discrepancies between DNP education delivery method groups, a further analysis of DNP education delivery comparing face-to-face with completely on-line programs was performed. A series of independent *t*-tests showed no statistical differences. Thus, EBEQ scores did not differ between face-to-face and on-line DNP education. These findings support the value of the growing number of completely on-line DNP programs.

Closely related to how to the method of DNP education delivery is the length of the DNP program. In this study, the overall EBEQ score and its five factor scores were compared to the length of DNP education (in semesters). Participants reported their DNP programs ranging in length from three to 12 semesters with a mean of six semesters. Surprisingly, none of the EBEQ variables correlated with length of DNP programs. Thus, length of DNP program was not statistically related to EBEQ scores. Although this result was somewhat counterintuitive, transformational learning appears to take place even in shorter educational programs. This finding also supports the growing number of DNP programs.

Number of years practicing as an NP emerged significantly correlated with the “knowledge of EBP” factor ($r = -0.195, p < 0.001$) (Table 9). Number of years practicing as an NP was inversely related to scores on the “knowledge of EBP” factor. The “knowledge of EBP” factor referred to NPs’ beliefs on how their own education established personal foundations for EBP. Nurses with less clinical experience reported being better prepared by undergraduate and graduate education in precepts of EBP. These findings were similar to Melnyk et al. (2012) research with nurse generalists, as the number of years in practice increased, nurses were less interested in applying EBP skills

or gaining EBP knowledge. Olade (2003) found no correlation to number of years worked by nurse generalists and interest in EBP. Further supporting Olade's (2003), Bogdan-Lovis and Sousa's (2006) study with NMW's also found no correlation to time from graduation to EBP precepts. In support of this study's findings, Melnyk et al.'s study (2008) also found a relationship between number of years worked and negative EBP beliefs. NP educators' years of teaching experience negatively correlated to beliefs that EBP improves patient outcomes (Melnyk et al., 2008). The explanation for this study's findings may be found in nursing education. The greater the number of years practicing indicates more time removed from the educational system. In the past, the precepts of EBP were less emphasized in the curriculum.

Unique to this study, number of hours worked weekly were examined as an independent variable to the dependent variable of the EBEQ score. Hours worked per week emerged as a significant correlation with the overall EBEQ score ($r = -0.132, p = 0.01$). Thus, hours worked per week were inversely related to overall EBEQ score. Because this result was somewhat counterintuitive, the data were explored in more detail. The file was split by highest degree, with two specified levels—DNP and master's degree. Next, simple, linear regression models were conducted for both levels of degree (DNP and master's degree), using overall EBEQ score as the outcome variable and hours worked per week as the predictor. The results indicated that the master's degree holder was statistically significant, $F(1, 315) = 5.69, p = 0.018$, whereas the DNP holder was non-significant, $F(1, 35) = 0.388, p = 0.537$ (Table 10). Thus, hours worked per week had a significant effect on overall EBEQ scores only for master's holders. For master's degree holders, the coefficient for hours worked per week ($b = -0.170$) indicated that for

each additional 10 hours worked, master's degree holders' overall EBEQ scores decreased by about two points. In contrast, hours worked per week was positively related to EBEQ scores ($b = 0.081$) for DNPs—though statistically non-significant. Although the model for master's degree holders was statistically significant, it should be noted that only about 2% of the proportion of variation in overall EBEQ scores for master's degree holders can be explained by the hours worked per week ($r^2 = 0.018$). Prior EBP nursing studies did not examine the variable of hours worked per week. In this study, the explanation for the divergence of master's prepared NPs and DNP educated NPs may again be explained by education. The transformation of beliefs, knowledge, and utilization of EBP were embedded in the NP while in the DNP program. The DNP curriculum allowed for NPs to break down prior beliefs, example the belief, and assimilate new ways of thinking.

Characteristics of practices settings were examined. In this study, the researcher looked for a relationship between urban, suburban, rural practices sites and the EBEQ overall score. No statistical relationship emerged among EBEQ score and clinical setting, $p > 0.10$. Thus, clinical setting was not related to EBEQ scores. Results from past studies on characteristics of community practice settings lacked consensus, but all had flawed sampling methodology. Olade's (2003, 2004) entire sample was from a rural setting. Olade (2004) postulated rural nurse generalists' face unique EBP barriers related to geographic isolation. Past research examined APRN's use of technology to implement evidence in practice. Specifically, Bogdan-Lovis and Sousa (2006) study examined NMW's EBP. Urban site practicing NMWs were less likely to utilize electronic databases for clinical decisions (Bogdan-Lovis & Sousa, 2006). In agreement with

Olade's (2003, 2004) views on isolation, Bogdan-Lovis and Sousa (2006) postulated that urban NMWs were more insulated; therefore, they lacked exposure to academic stimulation that would result in use of electronic databases. In agreement with this study, Butler (2011) found no statistically significant differences in rural, urban, and suburban practice sites to nurse generalists' EBP, despite her study's sample of NPs being limited geographically limited to one southern state. In this study, practice community setting (urban, rural, or suburban) do not appear to have a relationship to NPs' beliefs, knowledge, or self-perceived ability to utilize evidence in clinical practice.

This study also examined the clinical practice setting in regards if the NPs worked in an academic or a non-academic facility. Only the "changing practice based on evidence" factor emerged significant ($t = 2.29$, $df = 430$, $p = 0.023$). The "changing practice based on evidence" factor examined if participants felt supported by colleagues and administration when implementing EBP. Nurse practitioners in an academic setting scored significantly higher on the "changing practice based on evidence" factor ($M = 21.2$, $SD = 3.38$) than did practitioners in a non-academic setting ($M = 20.3$, $SD = 3.85$). In the only other study to use academic settings as a study variable, Bogdan-Lovis and Sousa (2006) examined NMW's EBP. In her study, the semantics and knowledge of EBP ($p = .01$) and use of the Cochrane Review ($p = .05$) was significantly better at the academic setting in comparison to the non-academic center participants. Furthermore, academic center NMWs were significantly more likely to have accessed an evidence-based electronic database in the six months prior to the interview ($p = .01$). The Bogdan-Lovis and Sousa (2006) study supports this study's findings. Academic centers have a constant influx of students, thus exposing practitioners to newer thinking. Furthermore,

academic centers may be better equipped with up to date sources of evidence including internet access and library resources. Academic centers may be more conducive to change, thus positively affecting practitioners EBP.

The final practice-setting variable to be examined in this study was participants' employment at a Magnet designated facility. In this study, only the "changing practice based on evidence" factor emerged as statistically significant ($t = 2.61$, $df = 431$, $p = 0.01$). The "changing practice based on evidence" factor examined if participants felt supported by colleagues and administration when implementing EBP. Participants who were employed at Magnet designated facilities reported marginally higher scores ($M = 21.42$, $SD = 2.99$) than did non-Magnet participants ($M = 20.27$, $SD = 3.89$). Melnyk et al. (2012) also noted statistical differences with nurse generalists employed in Magnet designated facilities. Melnyk et al.'s (2012) found higher levels of EBP, institutional support, continuing education, and recognition of EBP efforts. As EBP is an essential component for obtaining Magnet designation, this study's findings are not surprising. Magnet facilities provide a positive and solid infrastructure necessary for EBP.

Transformational Learning Theory Integration

Framing the study's findings within the context of the TLT enhances the possibility of understanding meaningful clinically relevant outcomes. The TLT seeks to explain how adults learn with a subsequent change in beliefs and actions. In applying the precepts of the TLT, NPs' thinking appears to transform when doctoral degrees are obtained. Transformational learning asserts individuals learn from subjective experiences and focuses on how knowledge is internalized into new beliefs and subsequent actions. As evidenced by this study's findings, doctoral programs, such as the DNP, incorporated

educational strategies that lead students to consider new concepts, question prior beliefs and actions, and make decisions to embrace or reject information. DNP students achieved a sense of empowerment. Transformational learning allows students to understand how learning experiences are perceived and how these perceptions lead to actions. Learning does not come from the experience alone, but rather the reflection on the experience. To learn, one must critically analyze the experience. Utilizing the precepts of EBP require skills taught through transformational learning. The transformation occurred with the DNP degree, regardless of how the program was delivered or the length of the program. The results of this study indicated the transformation to incorporate EBP precepts occurred primarily with education. The process of obtaining a DNP degree appeared to allow the student to challenge old beliefs and incorporate new beliefs, thus lending empowerment to seek new evidence for practice (Matthew-Maich et al., 2010) regardless about how the program was delivered or the length of the program. In part and in accordance with the TLT, this study's findings demonstrated NP EBP beliefs are shaped in the academic setting. Other variables studied, such as community practice settings, did not appear to have the same impact as DNP degree education.

Nurse Practitioner Facilitators and Barriers to Utilizing Evidence-Based Practice

Survey question two sought to identify factors that specifically reflect facilitating and impeding factors of NPs' EBP (Table 12). The researcher extrapolated the data from the EBEQ. Participants cited education preparation as a facilitating factor in knowledge of EBP. The majority of participants reported their undergraduate education supported EBP ($n = 382$, 80%). Additionally, participants with graduate degrees reported higher

education supported preparation for EBP ($n = 448$, 94%) and were taught EBP precepts ($n = 459$, 96%). Multiple studies from the TLT body of evidence support transformational learning in the academic environment (Cragg et al., 2001; Goldie et al., 2005; Jackson et al., 2013; MacLeod et al., 2003; Mallory, 2003; Matthew-Maich et al., 2000; Morris & Faulk, 2007; Rush, 2008; Ruth-Sahd et al., 2010). The academic environment fostered an understanding of EBP precepts. The importance of teaching EBP precepts in the academic environment is supported further in Melnyk et al.'s (2008) study of NP educators. Nearly all of Melnyk et al.'s (2008) study's sample reported teaching EBP precepts in a variety of ways. When the academic environment provided students with direct, personally engaging, and promoted reflection, learning occurred (Taylor & Cranton, 2012). In this study, participants indicated formal education in both the undergraduate and graduate settings provided a strong preparation for use of EBP in the clinical setting.

In this study, participants were overwhelming supportive of EBP precepts. Furthermore, participants indicated they had high ability to judge, understand, and integrate evidence into practice. Overall, participants reported their EBP knowledge high ($n = 454$, 97%). Participants cited their own beliefs in the value of EBP ($n = 460$, 96%) and EBP education to affect patient care outcomes positively ($n = 468$, 99%). Participants reported their own efforts as NPs promote EBP ($n = 468$, 99%). Moreover, participants reported using EBP literature to update their clinical practice ($n = 435$, 91%), as well as basing practice on evidence ($n = 430$, 91%). The majority of participants reported high confidence in judging ($n = 366$, 77%) and understanding ($n = 351$, 74%) research quality. Additionally, participants were able to find appropriate research reports

($n = 426$, 89%). Most participants reported empirical evidence as an acceptable mode of clinical practice change ($n = 311$, 67%). Compared to the participants in this study, nurse generalists were notably less confident in their ability to understand, judge, use, and the value of evidence in practice (Gerrish & Clayton, 2004; Koehn & Lehman, 2008; Yoder, 2014; Olade, 2003, 2004). The notable exception to these findings was Melnyk et al.'s (2004) study, collected at an evidence-based nursing conference, which found nurse generalists to be supportive of the value of evidence and confident in its use. Literature from APRN EBP research provides mixed support of this study's findings. Profetto-McGrath et al.'s (2010) study of CNSs found similar results to this study. CNSs were overwhelmingly supportive of EBP and used evidence in clinical decision-making. Both Roper (2011) and Butler (2011) found NPs to be supportive of EBP, but fell short in actual clinical implementation. Furthermore, Melnyk et al.'s (2008) study found NP educators also supportive of EBP; however, the educators doubted the actual use of evidence in clinical practice.

In this study, the final facilitating factor is linked to the NPs' workplace environment. The EBEQ asked questions about EBP support and resources. Participants reported supportive superiors ($n = 403$, 85%), workplaces ($n = 420$, 89%), and colleagues ($n = 427$, 90%) as EBP facilitating factors. EBP workplace cultures ($n = 395$, 83%) and models ($n = 382$, 81%) were also facilitating factors. Participants felt workplace resources were adequate in facilitating EBP ($n = 386$, 81%) and knew how to use these resources to find evidence for practice ($n = 461$, 98%). In comparison, the nurse generalists' literature cited institutional settings as barriers, such as lack of support from colleagues and inadequate infrastructure within the facility (Eizenberg, 2010; Gerrish &

Clayton, 2004; Koehn & Lehman, 2008; McCloskey, 2008; Melnyk et al., 2004; Melnyk et al., 2012; Olade, 2003, 2004, Pravikoff et al., 2005; Yoder et al., 2014). The APRN literature supports this study's findings that evidence information resources are adequate (Bogdan-Lovis & Sousa, 2006); however, the importance of a supportive environment is less clear.

Barriers to NPs' EBP were also examined in this study. A misunderstanding of EBP precepts emerged from the descriptive data. In agreement with Butler's (2011) findings, only 59% ($n = 281$) felt EBP applied to all clinical decisions. Lack of knowledge of EBP precepts also emerged as a barrier as evidenced by the use of intuition ($n = 407$, 86%) and textbooks ($n = 198$, 44%) in guiding clinical decisions. In contradiction to overall strong feelings of being able to judge the quality and use of research, participants found understanding statistics difficult ($n = 281$, 59%). Finally, time was cited as an EBP barrier. Participants reported lack of time to find research reports ($n = 282$, 59%) and lack of time to implement EBP changes ($n = 268$, 56%). Lack of time as a barrier to EBP is a consistent theme across all the nursing literature.

A consistent finding in the APRN literature was the support for EBP and the acknowledgement that EBP has a positive impact on patient care outcomes. As confirmed in this study, NPs' reported adequate EBP knowledge. With this said, equally apparent in the literature is the self-reported lack of integration of evidence into practice. However, isolated practices or practices that do not actively support EBP become barriers.

In summary, this study's findings indicated a clear delineation between nurse generalists and APRN beliefs, knowledge, and self-perceived ability to implement EBP.

The literature indicated the nurse generalists working environment is an important determinate of implementation of EBP; whereas, the APN is less dependent on the workplace environment relying more heavily on confidence gained through advanced degrees. The literature reflected nurse generalists do not feel as supported in EBP as APRNs.

Sources of Information for Nurse Practitioners' Clinical Decisions

The third research question in this study sought to reveal sources of evidence NPs turn to when making clinical practices decisions. As noted in the literature, there seems to be a disconnect with available evidence-based information and actual implementation (Balas & Boren, 2000; Brooks, 2004; Cheng & Green, 2008; Lee et al., 2011; McGinty & Anderson, 2008; Newhouse et al., 2011; Perlen et al., 2013; Vincent et al., 2010). As discussed earlier, EBP is defined in the medical literature, as the “conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett et al., 1996, p. 3). Nursing literature modified this definition to include clinician’s expertise and patient’s preferences. The Honor Society of Nursing, Sigma Theta Tau International (STTI) defined EBP as “an integration of the best evidence available, nursing expertise, and the values and preferences of the individuals, families and communities who are served” (Sigma Theta Tau International, 2003, “Evidence-Based Nursing,” para. 4). The medical literature’s definition of EBP is clear: Clinical decisions are based on high quality research findings. There is little room for interpretation. On the other hand, nursing’s definition allows for multiple influencers of clinical practice. Nursing’s definition leads to possible practitioner confusion as to which sources are evidence-based when making clinical decisions.

In the study's survey, participants were asked to choose from a list of options that reflected which sources they turn to when they require information to make a clinical decision. In a pick-all-that-apply format, participants could choose more than one source (Table 13). Although this study clearly found NPs' beliefs, knowledge, and self-perceived ability to implement EBP to be high, the findings also indicated NPs do not always utilize evidence-based sources for clinical decision making. For example, the majority of NPs utilized on-line databases ($n = 400$, 88%) and journals quite frequently ($n = 356$, 78%) for clinical decision insight. Clearly, these are solid evidence based sources of information. However, participants also cited sources that are clearly not evidence based. For example, participants cited physicians ($n = 393$, 86%) and other advanced practice colleagues ($n = 368$, 81%) as common sources of evidence-based information. Despite assumed confidence in our peer's knowledge, colleagues are not considered evidence-based in a purist's definition. Colleague advice may or may not be based on evidence. Additionally, participants cited textbooks ($n = 248$, 55%) as a common source of evidence-based information. Clinical practice information contained in textbooks may be outdated. Practice site policies and procedures ($n = 244$, 54%) were another often cited source of information used by approximately one-half of participants. Institution policies may or may not contain up-to-date practice information. Although reliance on past-experience is considered a credible form of a source of clinical practice decision information (Sigma Theta Tau International, 2003), only 62% ($n = 284$) of participants choose this option. Of concern, participants cited intuition as a source to make of clinical practice decisions ($n = 157$, 35%). Intuition, different from reliance on past-experience, implies basing practice decisions on a hunch, rather than current research evidence.

Using intuition to base clinical practice decisions is not evidence-based. Participants may have not have appropriately discriminated between the terms “past experience” and “intuition” when completing the survey.

Furthermore, an “other” option (fill-in-the blank) was provided in order to capture any additional sources. “Other” sources of clinical decision-making information represented the minority of choices ($n = 29$, 6%); however, the answers were varied and interesting. “Evidence-based guidelines,” “best practice alerts (on the computer),” and “clinical decision making apps” are considered evidence-based sources. Participants disclosed several non-evidence-based sources. Only “Reading (the) abstracts” of research reports indicates the NP did not fully read the entire report. One wonders if the NP has the research acumen to evaluate the results fully and if results are truly worthy of inclusion in practice. “Prayer to God,” while reflective of faith and conviction, is clearly not evidence-based. In the literature focusing exclusively on NPs EBP, this study’s findings are congruent with that of Roper (2011) and Butler (2011) who found NPs are supportive of EBP; however, there appears to be a disconnect in applying evidence to actual practice.

Reasons for using non-evidence-based sources for clinical decision-making is varied; however, the answers are embedded in barriers to NPs’ EBP. NPs purported knowledge, support, and enthusiasm for the benefits of positively affecting patient care outcomes were clear in this study’s findings: Lack of knowledge of the precepts of EBP was also apparent. Many NPs may be surprised to learn that turning to a colleague to ask direction is not considered evidence-based practice. Lack of time and pressure to see patients may influence how decisions are made. Admittedly, it is faster to turn to a

colleague for advice than delve into an electronic database or consult evidence-based guidelines. Consistent with the nurse generalists' literature (Estabrooks et al., 2005; Rush, 2008), NPs appeared to prefer knowledge gained from trusted practice environment relationships than knowledge generated from research. Additionally, confidence in the reliability of information contained in workplace policies and procedures and outdated reference texts may be misplaced. Non-supportive workplace environments may further be hampering EBP. Thirdly, NPs far removed from the academic environment may not fully understand the precepts of EBP.

In summary, this study sought to answer three specific questions about factors that affect NPs implementation of EBP. Firstly, what was the relationship between NPs personal, professional, and practice demographics and their beliefs, knowledge, and self-perceived ability to implement EBP. The findings revealed NPs were overall confident in their knowledge and ability to understand and integrate evidence into practice. They reported using evidence to make clinical practice decisions and saw the value in EBP. Furthermore, DNP prepared NPs have increased beliefs, knowledge, and self-perceived ability to integrate EBP when compared to the more commonly prepared master's degree NP. Transformational learning appeared to occur when an NP acquired a DNP regardless of how the DNP was delivered (face-to-face or on-line) or the length of time it took to receive the degree. Other personal and practice variables appeared to affect EBP. Employment in a Magnet designated center or in an academic center appeared to influence EBP positively. Age, years of practice, and number of hours worked weekly appeared to affect EBP negatively. Secondly, this study extrapolated facilitators and barriers to NPs' EBP. Educational preparation in EBP, confidence in using EBP, and

knowledge of EBP precepts were seen as facilitating factors. Additionally, NPs saw workplace factors, such as adequate resources and supportive colleagues as facilitators. Time to find evidence and implement research findings, as well as lack of statistical knowledge were seen as barriers to EBP. Thirdly, this study sought to discover sources of information NPs turn to when seeking clinical practice decision information. NPs utilized multiple and varied sources when seeking clinical practice guidance. These sources were a mixture of evidence-based sources of clinical practice information as well as sources not considered evidence-based.

Limitations

Despite the robust sample size and representative sample demographics, there were several limitations of this study. The EBEQ has had limited use in research. This was the first study to utilize the EBEQ with NPs. Although the entire EBEQ had excellent internal consistency in this study, the “integration of evidence-based practices” showed less than desirable reliability.

Although the sample size was robust ($N = 480$), there was missing data. Not all participants completed the survey in its entirety. Another limitation for consideration was collecting self-reported data. Participants may have answered survey questions in a manner deemed more desirable or acceptable to the researcher. Fill-in-the-blank questions, practice site questions, and NPs’ practice specialty questions may have reflected participants’ interpretation of the question, thus becoming a threat to internal validity. Sampling bias may have occurred. Although the sample was generated randomly, those with an interest in EBP may have been more inclined to return the

survey. Secondly, the sample was generated from the membership of AANP. Members of a national organization may not truly reflect perceptions of all practicing NPs.

Implications

The purpose of this study was to explore factors that influenced NPs' adoption of EBP in clinical settings. The study had three specific aims. First, the study compared relationships between beliefs and knowledge that influence NPs' integration of EBP and key demographic variables, such as educational preparation, DNP program delivery method, DNP program length, age, gender, practice setting, area of practice, years of practice experience, amount of direct patient care, and sources of evidence. Secondly, the study helped to identify barriers and facilitators of NPs' EBP. Finally, the study sought NPs' sources of information for clinical practice decisions. Results of this study may offer insight for NPs' practice, education, policy, and further nursing research.

Male participants reported marginally higher scores in the "finding and reviewing evidence" factor. The "finding and reviewing evidence" factor measured participants' access to EBP, such as journals, reports, and databases, as well as their comfort in understanding evidence significance. Of the five comparisons of gender to the EBEQ's overall score and its other four factors, only the "finding evidence" factor emerged as marginally significant. It is unknown if this finding is of any clinical significance. Further research is indicated to investigate the role of gender in EBP.

As increasing age was found to be related inversely to EBEQ scores, age has implications for NPs and employers of NPs. Employers need to consider continuing education targeted to increase NPs' awareness of EBP precepts. Furthermore, employers need to consider strategies to enable current NPs to integrate evidence into practice.

Additionally, NPs need to recognize the importance of continuing to stay abreast of evidence-based precepts throughout their careers.

The DNP has been endorsed as the terminal degree for NPs (American Association of Colleges of Nursing, 2014; National Organization of Nurse Practitioner Faculties, 2012); however, thus far all of the evidence that the DNP adds value to NPs' practice has been anecdotal. This study supports that advanced degrees have a positive relationship to NPs' beliefs, knowledge, and self-perceived ability to implement EBP. With the growing number of universities changing from master's degree NP programs to DNP programs and offering master's degree to DNP programs, the results of this study should be encouraging. Additionally, universities offering a DNP on-line should be encouraged that transformational learning appears to take place no matter how the degree is delivered or the length of the program. National policy makers for NP education, the AACN and the NONPF, as well as students who are pursuing or thinking of obtaining a DNP, should also find the results of this study reassuring. Finally, the IOM, one of the national policy makers for healthcare in the United States, has issued mandates to increase the number of doctorally prepared nurses and base more clinical practice decisions on evidence. This study's findings provide foundational knowledge to enable reaching these goals. The DNP prepared NP appears to have additive value in EBP.

The DNP appears to increase NPs' self-perceived ability to understand research reports and recognize the implications of research in practice. NPs with advanced degrees can use these findings as leverage for increased salaries and career promoting endeavors. Employers need to recognize the additive value of the DNP and base hiring decisions based on degrees. Employers should support and enable practicing master's

degree prepared NPs to pursue a doctoral degree. Further research of the DNP prepared NP in the workplace is warranted. The DNP NPs' effect on patient care outcomes warrants research.

NPs employed in Magnet designated healthcare facilities appear to have differences in EBP beliefs than NPs in non-Magnet designated organizations. Employment in a Magnet designated facilities appear to have a positive effect on NPs' EBP. Facilities contemplating seeking Magnet designation should consider this study's findings as an additional motivation to obtain the designation.

Community setting appears to have no effect on NPs' beliefs, knowledge, or perceived ability to implement EBP. Healthcare agencies based in various community settings who employ NPs and the NPs employed in these settings should be reassured that their beliefs, knowledge, and self-perceived ability to integrate evidence into practice are equal whether the practice setting is rural, urban, or suburban.

This study sought to discover facilitating factors and barriers to NPs' EBP. If the IOM's mandate to use evidence to make 90% of all clinical decisions is to be realized (Institute of Medicine, 2009), employers and policy makers need to take steps to address barriers, such as lack of time, in the workplace setting. Additionally, facilitating factors, such as advanced degrees and supportive environments need to be promoted. Innovative restructuring of the current education system is warranted. Further research in this area is recommended.

Lastly, The DNP has been endorsed as the terminal degree for NPs (American Association of Colleges of Nursing, 2014; National Organization of Nurse Practitioner Faculties, 2012); however, thus far all of the evidence that the DNP adds value to NPs

practice has been anecdotal. This study supports that advanced degrees have a positive relationship to NPs beliefs, knowledge, and self-perceived ability to implement EBP. With the growing number of universities changing from master's degree NP programs to DNP programs and offering a master's degree to DNP programs, the results of this study should be encouraging. Additionally, universities offering a DNP on-line should be encouraged that transformational learning appears to take place no matter how the degree is delivered or the length of the program. National policy makers for NP education, the AACN and the NONPF, as well as students who are pursuing or thinking of obtaining a DNP, should also find the results of this study reassuring. Finally, the IOM, one of the national policy makers for healthcare in the United States, has issued mandates to increase the number of doctorally prepared nurses and base more clinical practice decisions on evidence. This study's findings provide foundational knowledge to enable reaching these goals. The DNP prepared NP appears to have additive value in EBP.

The DNP appears to increase NPs' self-perceived ability to understand research reports and recognize the implications of research in practice. NPs with advanced degrees can use these findings as leverage for increased salaries and career promoting endeavors. Employers need to recognize the additive value of the DNP and base hiring decisions based on degrees. Employers should support and enable practicing master's degree prepared NPs to pursue a doctoral degree. Nurse researchers interested in EBP may consider further investigation as to why NPs routinely turn to non-evidence based sources.

Conclusions

This study sought to expand the body of knowledge of factors that affect NPs' implementation of EBP. This study's findings reflect the complex variables of NPs' EBP, thus providing nurse educators, nurse researchers, and policy makers with foundational information regarding NPs' EBP. This study's findings extorted the added benefit of the DNP degree to the implementation of NPs EBP in the clinical setting. The implications of this study may be used to guide further research.

In summary, few studies have examined NPs' EBP. Thus far, all of the EBP nursing research has been descriptive in design. Further EBP research should strive to move beyond descriptive research. Nursing researchers need to develop and conduct experimental research methods. Experimental research may elucidate which interventions positively affect NPs' EBP. Furthermore, practitioners, educators, employers, and policy makers may find these results lend insight to NPs' EBP and its ramifications on today's healthcare environment.

References

Advancing the Nation's Health Needs: NIH Research Training Programs. (2005).

Retrieved from http://www.nap.edu/download.php?record_id=11275#

Al Hadid, L. A., Hasheesh, M. A., & Al Momani, M. (2011). Validating a tool that explores factors influencing the adoption of principles of evidence-based practice. *Journal of Nursing Education*, 50, 681-687.

American Association of Colleges of Nursing. (1996). *The essentials of master's education for advanced practice nursing*. Retrieved from <http://www.aacn.nche.edu/education-resources/MasEssentials96.pdf>

American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing practice*. Retrieved from <http://www.aacn.nche.edu/publications/position/DNPEssentials.pdf>

American Association of Colleges of Nursing. (2014). *AACN fact sheet: The doctor of nursing practice*. Retrieved from <http://www.aacn.nche.edu/media-relations/fact-sheets/dnp>

American Association of Nurse Practitioners. (2014). *AANP celebrates 50,000 member milestone*. Retrieved from <http://www.aanp.org/component/content/article/16-press-room/1484-aanp-celebrates-50-000-member-milestone>

American Association of Nurse Practitioners. (2013). *Nurse practitioner curriculum*. Retrieved from <http://www.aanp.org/images/documents/publications/curriculum.pdf>

- Auerbach, D. I., Martsolf, G., Pearson, M. L., Taylor, E. A., Zaydman, M., Muchow, A., ... Dower, C. (2014). *The DNP by 2015: A study of the institutional, political, and professional issues that facilitate or impede establishing a post-baccalaureate doctor of nursing practice program*. Retrieved from Rand Health: <http://www.aacn.nche.edu/DNP/DNP-Study.pdf>
- Balas, E. A., & Boren, S. A. (2000). *Managing clinical knowledge for health care improvement*. Bethesda, MD: National Library of Medicine.
- Bogdan-Lovis, E. A., & Sousa, A. (2006). The contextual influence of professional culture: Certified nurse-midwives' knowledge of and reliance on evidence based practice. *Social Science & Medicine*, 62, 2681-2693.
doi:10.1016/j.socscimed.2005.11.027
- Brar, K., Boschma, G., & McCuaig, F. (2010). The development of the nurse practitioner preparation beyond the master's level: What is all the debate about? *International Journal of Nursing Education Scholarship*, 7(1). doi:10.2202/1548-923X.1928
- Brooks, W. (2004). The use of practice guidelines for urinary incontinence following stroke. *British Journal of Nursing*, 13, 1176-1179.
- Butler, K. D. (2011). Nurse practitioners and evidence-based nursing practice. *Clinical Scholars Review*, 4(1), 53-57.
- Cheng, N., & Green, M. (2008). Osteoporosis screening for men. *Canadian Family Physician*, 54, 1140-1141.
- Committee on Quality of Health Care in America. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academy Press.

- Cragg, C. E., Plotnikoff, R. C., Hugo, K., & Casey, A. (2001). Perspective transformation in RN-to-BSN distance education. *Journal of Nursing Education*, 40, 317-322.
- Cronenwett, L., Sherwood, G., Pohl, J., Barnsteiner, J., Moore, S., Sullivan, D. T., ... Warren, J. (2009). Quality and safety education for advanced nursing practice. *Nursing Outlook*, 57, 338-348. doi:10.1016/j.outlook.2009.07.009
- Dreher, H. M. (2011). Seeking evidence: Practice knowledge development in the doctor of nursing practice degree. *Clinical Scholars Review*, 4(1), 51-52.
doi:10.1891/1939-2095.4.1.51
- Eisen, M. (2001). Peer-based professional development viewed through the lens of transformative learning. *Holistic Nursing Practice*, 16(1), 30-42.
- Eizenberg, M. M. (2010). Implementation of evidence-based nursing practice: nurses' personal and professional factors. *Journal of Advanced Nursing*, 67(1), 33-42.
doi:10.1111/j.1365-2648.2010.05488.x
- Estabrooks, C. A., Rutakumwa, W., O'Leary, K. A., Profetto-McGrath, J., Milner, M., Levers, M. J., & Scott-Findlay, S. (2005). Sources of practice knowledge among nurses. *Qualitative Health Research*, 15, 460-476.
doi:10.1177/1049732304273702
- Gerrish, K., & Clayton, J. (2004). Evidence-based practice: An organizational approach. *Journal of Nursing Management*, 12, 114-123.
- Gerrish, K., Nolan, M., McDonnell, A., Tod, A., Kirschbaum, M., & Guillaume, L. (2012). Factors influencing advanced practice nurses' ability to promote evidence-based practice among frontline nurses. *Worldviews on Evidence-Based Nursing*, 30-39. doi:10.1111/j.1741-6787.2011.00230.x

- Goldie, J., Schwartz, L., & Morrison, J. (2005). Whose information is it anyway? Informing a 12-year-old patient of her terminal prognosis. *Journal of Medical Ethics, 31*, 427-434.
- Greiner, A. C., & Knebel, E. (Eds.). (2003). *Health professions education: A bridge to quality*. Washington, DC: National Academies Press.
- Hamric, A. B., Spross, J. A., & Hanson, C. M. (2009). *Advanced practice nursing: An integrated approach* (4th ed.). St. Louis, MO: Elsevier Saunders.
- Institute of Medicine. (2009). *Leadership commitments to improve value in health care: Finding common ground: Workshop summary*. Washington, DC: National Academies Press.
- Institute of Medicine. (2010). *The future of nursing: Leading change, advancing health*. Retrieved from <http://iom.edu/Reports/2010/The-Future-of-Nursing-Leading-Change-Advancing-Health.aspx>
- Jackson, D., Power, T., Sherwood, J., & Geia, L. (2013). Amazingly resilient Indigenous people! Using transformative learning to facilitate positive student engagement with sensitive material. *Contemporary Nurse, 46*(1), 105-112.
- Jerry, T. M., & Hellier, S. D. (2014). [*Test-retest study of the evidence-based education questionnaire for use in advanced practice providers*]. Unpublished data.
- King, K. P. (2009). Workplace performance-PLUS: Empowerment and voice through professional development and democratic processes in health care training. *Performance Improvement Quarterly, 21*(4), 55-74.

- Kitchenham, A. (2008). The evolution of John Mezirow's transformational learning theory. *Journal of Transformative Education*, 6(2), 104-123.
doi:10.1177/1541344608322678
- Koehn, M. L., & Lehman, K. (2008). Nurses' perceptions of evidence-based nursing practice. *Journal of Advanced Nursing*, 62(2), 209-215. doi:10.1111/j.1365-2648.2007.04589.x
- Lathrop, B., & Hodnicki, D. L. (2014). The affordable care act: Primary Care and the doctor of nursing practice nurse. *Online Journal of Issues in Nursing*, 19(2).
Retrieved from http://www.medscape.com/viewarticle/827834_3
- Lee, J. W., Berkowitz, Z., & Saraiya, M. (2011). Low-risk human papillomavirus testing and other nonrecommended human papillomavirus testing practices among U.S. health care providers. *Obstetrics and Gynecology*, 118(1), 4-13.
- MacLeod, R. D., Parkin, C., Pullon, S., & Robertson, G. (2003). Early clinical exposure to people who are dying: Learning to care at the end of life. *Medical Education*, 37(1), 51-58.
- Macdonald, G. (2002). Transformative unlearning: Safety, discernment and communities of learning. *Nursing Inquiry*, 9(3), 170-178.
- Magyary, D., Whitney, J. D., & Brown, M. A. (2006). Advancing practice inquiry: Research foundations of the practice doctorate in nursing. *Nursing Outlook*, 54, 139-151. doi:10.1016/j.outlook.2006.03.004
- Mallory, J. L. (2003). The impact of a palliative care educational component on attitudes toward care of the dying in undergraduate nursing students. *Journal of Professional Nursing*, 19(5), 305-312.

- Matthew-Maich, N., Brown, B., & Royle, J. (2000). 'Becoming' through reflection and professional portfolios: The voice of growth in nurses. *Reflective Practice*, 1(3), 309-324.
- Matthew-Maich, N., Ploeg, J., Jack, S., & Dobbins, M. (2010). Transformative learning and research utilization in nursing practice: A missing link. *Worldviews on Evidence-Based Nursing*, 7(1), 25-35.
- McClellan, M. B., McGinnis, M., Nabel, E. G., & Olsen, L. M. (2007). *Evidence-based medicine and the changing nature of health care*. Washington, DC: The National Academies Press.
- McCloskey, D. J. (2008). Nurses' perceptions of research utilization in a corporate health care system. *Journal of Nursing Scholarship*, 40(1), 39-45. doi:10.1111/j.1547-5069.2007.00204.x
- McGinty, J., & Anderson, G. (2008). Predictors of physician compliance with American Heart Association guidelines for acute myocardial infarction. *Critical Care Nursing Quarterly*, 31(2), 161-172.
- McWilliam, C. L. (2007). Continuing education at the cutting edge: Promoting transformative knowledge translation. *Journal of Continuing Education in the Health Professions*, 27(2), 72-79.

- Melnyk, B. A., Fineout-Overholt, E., Feinstein, N., Li, H., Small, L., Wilcox, L., & Kraus, R. (2004). Nurses' perceived knowledge, beliefs, skills, and needs regarding evidence-based practice: Implications for accelerating the paradigm shift. *Worldviews on Evidence-Based Nursing, 1*, 185-193. doi:10.1111/j.1524-475X.2004.04024
- Melnyk, B. M., & Fineout-Overholt, E. (Eds.). (2014). *Evidence-based practice in nursing and healthcare* (3rd ed.) New York, NY: Wolters Kluwer.
- Melnyk, B. M., Fineout-Overholt, E., Feinstein, N., Sadler, L., & Green-Hernandez, C. (2008). Nurse practitioner educators' perceived knowledge, beliefs, and teaching strategies regarding evidence based practice: Implications for accelerating the integration of evidence-based practice into graduate programs. *Journal of Professional Nursing, 24*, 7-13. doi:10.1016/j.profnurs.2007.06.023
- Melnyk, B. M., Fineout-Overholt, E., Gallagher-Ford, L., & Kaplan, L. (2012). The state of evidence-based practice in US nurses. *The Journal of Nursing Administration, 42*(9), 410-417. doi:10.1097/NNA.0b013e3182664e0a
- Melnyk, B. M., Fineout-Overholt, E., & Mays, M. Z. (2008). The evidence-based practice beliefs and implementation scales: Psychometric properties of two new instruments. *Worldviews on Evidence-Based Nursing, 5*, 208-216. doi:10.1111/j.1741-6787.2008.00126.x
- Mezirow, J. (1998). On critical reflection. *Adult Education Quarterly, 48*(3), 185-198.
- Mezirow, J. (Ed.). (2000). *Learning as transformation: Critical perspectives on a theory in progress*. San Francisco, CA: Jossey-Bass.

- Morris, A. H., & Faulk, D. (2007). Perspective transformation: Enhancing the development of professionalism in RN-to-BSN students. *Journal of Nursing Education, 45*, 445-451.
- National Organization of Nurse Practitioner Faculties (2012). *Nurse practitioner core competencies*. Retrieved from <http://c.ymcdn.com/sites/www.nonpf.org/resource/resmgr/competencies/npcorecompetenciesfinal2012.pdf>
- National Task Force on Quality Nurse Practitioner Education. (2012). *Criteria for evaluation of nurse practitioner programs*. Retrieved from <http://www.aacn.nche.edu/ccne-accreditation/Crosswalk-2013-Standards-and-2012-NTF-Criteria.pdf>
- Newhouse, R. P., Stank-Hutt, J., & White, K. M. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economics, 29*(5), 1-21.
- Ntiri, D., & Stewart, M. (2009). Transformative learning intervention: Effect on functional health literacy and diabetes knowledge in older African Americans. *Gerontology & Geriatrics Education, 30*, 100-113.
- Olade, R. A. (2003). Attitudes and factors affecting research utilization. *Nursing Forum, 38*(4), 5-15. doi:10.1111/j.0029-6473.2003.00005.x
- Olade, R. A. (2004). Evidence-based practice and research utilization activities among rural nurses. *Journal of Nursing Scholarship, 36*, 220-225. doi:10.1111/j.1547-5069-.2004.04041.x
- Patient Protection and Affordable Care Act*, 111-148 U.S.C. § 1 (U.S. Government Printing 2010).

- Perlen, S., Brown, S. J., & Yelland, J. (2013). Have guidelines about smoking cessation support in pregnancy changed practice in Victoria, Australia? *Birth*, 40(2), 81-87.
- Petterson, S. M., Liaw, W. R., Phillips, R. L., Rabin, D. S., Meyers, D. S., & Bazemore, A. W. (2012). Protecting U.S. primary care physician workforce needs: 2010-2025. *Annals of Family Medicine*, 10, 503-509. doi:10.1370/afm.1431
- Polit, D., & Beck, C. (2012). *Nursing research: Generating and assessing evidence for nursing practice* (9th ed.). Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Williams.
- Pravikoff, D. S., Tanner, A. B., & Pierce, S. T. (2005). Readiness of U.S. nurses for evidence-based practice. *American Journal of Nursing*, 105(9), 40-51.
- Profetto-McGrath, J., Negrin, K. A., Hugo, K., & Smith, K. B. (2010). Clinical nurse specialists' approaches in selecting and using evidence to improve practice. *Worldviews on Evidence-Based Nursing*, 7(1), 36-50. doi:10.1111/j.1741-6787.2009.00164.x
- Profetto-McGrath, J., Smith, K. B., Hugo, K., Taylor, M., & El-Hajj, H. (2007). Clinical nurse specialists' use of evidence in practice: A pilot study. *Worldviews on Evidence-Based Nursing*, 4(2), 86-96.
- Rice, M. (2013). Evidence-based practice: A model of clinical application. *Journal of the American Psychiatric Nurses Association*, 19(4), 217-221.
- Roper, S. (2011). *Evidence-based practice among primary care nurse practitioners* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3495232)

- Rush, B. (2008). Mental health service user involvement in nurse education: A catalyst for transformative learning. *Journal of Mental Health, 17*, 531-542.
- Ruth-Sahd, L. A., Beck, J., & McCall, C. (2010). Transformative learning during a nurse externship program: The reflections of senior nursing students. *Nursing Education Perspectives, 31*(2), 78-83.
- Sackett, D. L., Richardson, S. W., Rosenberg, W., & Haynes, R. B. (1996). *Evidence-based medicine*. London, England: Churchill Livingstone.
- Schmidt, N. A., & Brown, J. M. (Eds.). (2015). *Evidence-based practice for nurses* (3rd ed.). Burlington, MA: Jones & Bartlett.
- Sigma Theta Tau International, Honor Society of Nursing. (2003). *Evidence-based nursing position statement*. Retrieved from http://www.nursingsociety.org/aboutus/PositionPapers/Pages/EBN_positionpaper.aspx
- Smith, J. R., Donze, A., Cole, F. S., Johnston, J., & Giebe, J. M. (2009). Neonatal advanced practice nurses as key facilitators in implementing evidence-based practice. *Neonatal Network, 28*(3), 193-201.
- Straus, S. E., Richardson, W. S., Glasziou, P., & Haynes, R. B. (2010). *Evidence-based medicine: how to practice and teach it* (4th ed.). Philadelphia, PA: Elsevier.
- Taylor, E. W. (2007). An update of transformative learning theory: A critical review of the empirical research (1999-2005). *International Journal of Lifelong Education, 26*(2), 173-191. doi:10.1080/02601370701219475
- Taylor, E. W., & Cranton, P. (2012). *The handbook of transformative learning*. San Francisco, CA: Jossey-Bass.

- U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. (2014).*
<http://bhpr.hrsa.gov/healthworkforce/supplydemand/nursing/nursepractitionersurvey/npsurveyhighlights.pdf>
- Udlis, K. A., & Mancuso, J. M. (2012). Doctor of nursing practice programs across the United States: A benchmark of information. Part 1: Program characteristics. *Journal of Professional Nursing, 28*(5), 265-273.
- Vincent, D., Johnson, C., Velasquez, D., & Rigney, T. (2010). DNP prepared nurses as practitioner-researchers: Closing the gap between research and practice. *The American Journal of Nursing, 114*(11/12), 28-34.
- Yoder, L. H., Kirkley, D., McFall, D. C., Kirksey, K. M., Stalbaum, A. L., & Sellers, D. (2014). Staff nurses' use of research to facilitate evidence-based practice. *American Journal of Nursing, 114*(9), 26-37.
doi:10.1097/01.NAJ.0000453753.00894.29

Appendix A

Evidence-Based Education Questionnaire

Knowledge in educational principles	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
1. My undergraduate preparation supported evidence-based practice.	☐	☐	☐	☐	☐
2. As a graduate student, I was taught how to utilize research findings.	☐	☐	☐	☐	☐
3. The focus of my graduate education was on how to conduct research.	☐	☐	☐	☐	☐
4. My graduate preparation supported evidence-based practice.	☐	☐	☐	☐	☐
5. I know how to find evidence for practice.	☐	☐	☐	☐	☐
6. My effort as an advance practice provider could promote evidence-based practice.	☐	☐	☐	☐	☐
7. The educational model in my organization supports adopting evidence-based practice.	☐	☐	☐	☐	☐
8. Resources are adequate to implement evidence-based practice.	☐	☐	☐	☐	☐
9. We have enough authority to base practice on evidence.	☐	☐	☐	☐	☐
10. I have adequate knowledge of principles of evidence-based practice.	☐	☐	☐	☐	☐
Finding and reviewing evidence	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
1. I have sufficient time to find research reports.	☐	☐	☐	☐	☐
2. Research reports are readily available.	☐	☐	☐	☐	☐
3. I feel confident in judging the quality of research reports.	☐	☐	☐	☐	☐
4. Databases are readily available.	☐	☐	☐	☐	☐
5. I can understand research reports easily.	☐	☐	☐	☐	☐
6. I can identify research implications for my own practice.	☐	☐	☐	☐	☐
7. I find it difficult to understand statistics.	☐	☐	☐	☐	☐
8. I know how to find appropriate research reports.	☐	☐	☐	☐	☐

Clinical Practices	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
1. I get my evidence through intuition.	☐	☐	☐	☐	☐
2. My clinical practices are based on literature.	☐	☐	☐	☐	☐
3. I get my information from text books.	☐	☐	☐	☐	☐
4. There is sufficient time at work to implement changes in practice.	☐	☐	☐	☐	☐
5. There are sufficient resources to change practice.	☐	☐	☐	☐	☐
6. I can overcome barriers to apply evidence-based practice.	☐	☐	☐	☐	☐
7. I lack the authority in the workplace to change practice based on evidence.	☐	☐	☐	☐	☐
8. The culture of my department is receptive to changing practice based on evidence.	☐	☐	☐	☐	☐
9. I feel confident about beginning to change practice.	☐	☐	☐	☐	☐
10. I think that evidence-based practice affects my practice positively.	☐	☐	☐	☐	☐
11. Lack of consensus recommendations of evidence promotes disparity (lack of agreement) in my area.	☐	☐	☐	☐	☐
12. Affirmed experiences in clinical practice promote strong evidence for my practice.	☐	☐	☐	☐	☐
Changes in educational strategies/ practices	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
1. Empirical evidence is acceptable as mode of change of practice in my facility.	☐	☐	☐	☐	☐
2. My colleagues are supportive of changing practice based on evidence.	☐	☐	☐	☐	☐
3. My superiors are supportive of changing practice based on evidence.	☐	☐	☐	☐	☐
4. My organization supports changing practice based on evidence.	☐	☐	☐	☐	☐
5. The continuous education activities support adopting evidence-based principles.	☐	☐	☐	☐	☐

Changes in educational strategies/ practices	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
6. Evidence-based practice applies in all situations in my area of practice.	☐	☐	☐	☐	☐
7. The model adopted in my facility supports applying evidence-based practice.	☐	☐	☐	☐	☐
Finding and judging evidence	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
1. I am familiar with the process of selecting evidence for my practice.	☐	☐	☐	☐	☐
2. I can participate in the process of selecting evidence for our practice.	☐	☐	☐	☐	☐
3. I can determine the quality of evidence.	☐	☐	☐	☐	☐
4. I can verify the evidence applicable to my area of practice.	☐	☐	☐	☐	☐
5. I can judge evidence applicability in my area of practice.	☐	☐	☐	☐	☐
6. I can deduct evidence through knowledge translation.	☐	☐	☐	☐	☐
7. I update my practices by applying reliable and valid research findings.	☐	☐	☐	☐	☐
8. Implementing evidence-based practice in education promotes better quality patient care.	☐	☐	☐	☐	☐

Demographics:

46. Gender: Male ☐ Female ☐

47. Year born? 19__

48. Highest degree obtained (Circle answer/ fill-in-the-blank):

Bachelor's ☐ Master's ☐ DNP ☐ PhD ☐ Both DNP and PhD ☐ Other: _____

49. Are you currently enrolled in a DNP program?

Yes ☐ No ☐

50. Are you currently enrolled in a PhD program?

Yes ☐ No ☐

51. How many years of experience as a nurse practitioner do you have? _____

52. Number of hours worked weekly in clinical practice? _____

53. Which best describes your clinical practice setting (pick one)?

Urban ☐ Suburban ☐ Rural ☐

54. Which best describes your clinical practice setting (pick one)?

Academic ☐ Non-academic ☐

55. Which best describes your clinical practice setting (pick one)?

Clinic ☐ Hospital-based ☐ Private-office ☐ Other _____

56. Does your facility have a Magnet designation?

Yes ☐ No ☐

57. Was your nurse practitioner education delivered:

Face-to-face ☐ On-line ☐ A combination of on-site and on-line ☐

58. Are you nationally certified?

Yes ☐ No ☐

59. If nationally certified, in what area? _____

60. What is your clinical advanced practice specialty? _____

61. When you require practice decision information, indicate the sources you utilize (pick all that apply):

- ☐ Advance practice colleagues
- ☐ Physicians
- ☐ On-line data bases
- ☐ Practice site policies and procedures
- ☐ Textbooks
- ☐ Journals
- ☐ Reliance on past experience
- ☐ Intuition
- Other _____

If you have a DNP, complete the following:

62. Length of DNP program in semesters _____

63. Was your DNP education delivered (pick one):

On-site ☐ On-line ☐ A combination of on-site and on-line ☐

Appendix B

Permission to Use, Modify, and Publish

Al-Ghad International College for Applied
Medical Sciences - Tabuk

Under supervision of ministry of higher education



كلية الغد الدولية للعلوم الطبية التطبيقية
تبوك

تحت إشراف وزارة التعليم العالي

October 19, 2014

Hilliary Creely, J.D., Ph.D.
Assistant Dean for Research
Indiana University of Pennsylvania
School of Graduate Studies and Research
Stright Hall
Indiana, Pennsylvania 15705

Dear Dean,

Susan Hellier DNP, FNP-BC has my permission to use, modify, and publish my tool, the Evidenced-Based Nursing Education Questionnaire, in her Indiana University of Pennsylvania research work and final dissertation.

Thank you,

Lourance A. E. Al Hadid, RN, MSN, CCNS, Ph.D.
Al-Ghad International College for Applied Medical Sciences
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Appendix C
Letter of Study Support



The Voice of the Nurse Practitioner®

October 15, 2014

Susan Hellier DNP, FNP-BC, PhD-C
Robert Morris University
School of Nursing and Health Sciences
6001 University Boulevard
Moon Township, PA 15108

Dear Dr. Hellier,

I am writing to confirm that the American Association of Nurse Practitioners (AANP) is supportive of your research project and that you are approved to access a sample of AANP member mailing addresses. Having reviewed your specific aims, we understand your survey plan and look forward to learning about your findings. Our tentative approval is contingent on your submission of the required documents, final Institutional Review Board (IRB) approval, and payment for the mailing list.

If you have any questions, please do not hesitate in contacting me!

Sincerely,

A handwritten signature in blue ink, which appears to read "Michelle L. Cook".

Michelle L. Cook, PhD(c), MPH
Associate Vice President of Research

Appendix D



Invitation to Participate in Research Regarding Nurse Practitioners' Beliefs and Knowledge of Evidence-Based Practice

As a valued colleague, I am requesting your help with my doctoral studies. This study is part of the course requirements at the University of Indiana located in Indiana, Pennsylvania. I am studying nurse practitioners' beliefs and knowledge regarding evidence-based practice. The survey has 63 questions and will take 10-15 minutes to complete. Although you may be reluctant to participate in this study, I want to emphasize how important your participation is to further what we know about NPs use of EBP.

There are no risks or obligations with completing this survey. Your participation is voluntary. Your responses will be kept completely confidential. All information will be used in the aggregate, to be compared to other respondents. There are no risks or benefits to you in completing this survey. Please return the completed survey in the enclosed posted paid envelope.

If you have any questions about the survey, please contact the investigator and/or the faculty sponsor at the contact information below. Your time and feedback is much appreciated. Thank you very much!

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This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects (Phone: 724.357.7730).