2011

Exploration of contextual factors and the use of evidence-based nonpharmacological pediatric pain management practices in emergency departments

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EXPLORATION OF CONTEXTUAL FACTORS AND THE USE OF EVIDENCE-BASED NONPHARMACOLOGICAL PEDIATRIC PAIN MANAGEMENT PRACTICES IN EMERGENCY DEPARTMENTS

by

Sarah Jean Kuker Wente

An Abstract

Of a thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Nursing
in the Graduate College of
The University of Iowa

December 2011

Thesis Supervisor: Associate Professor Charmaine Kleiber

ABSTRACT

The uptake of evidence in practice remains a challenge for healthcare professionals including nurses and providers. Increased use of evidence-based practices in healthcare settings may improve patient conditions such as pain and decrease the cost of healthcare. A wealth of literature can be found describing barriers and facilitators of evidence-based practice (EBP), and a movement in research has begun to focus on what influences the use of EBP. This study explored the relationships of context including the elements of individual, unit, and hospital and the use of evidence-based nonpharmacological pediatric pain management practices (EBNPP) using an existing data set of nurses and providers, defined as Doctors of Medicine and Osteopathy, Nurse Practitioners, and Physician Assistants, caring for children in the Emergency Department.

Initial analysis found several significant correlations with individual, unit, and hospital context elements and EBNPP. A significant correlation was not found between evaluation and EBNPP and Magnet Status and EBNPP for nurses or providers. Nurse regression analyses showed knowledge and continuing education were significant predictors of EBNPP. Overall context was a significant predictor of EBNPP for both the nurse and provider models. A pooled regression analysis with Registered Nurses and providers found nurses had a significant increased use of EBNPP when compared to providers. Regression analyses found that while overall context is a significant predictor of EBNPP, no single element was significant when all three were added to the model. The effect of context on EBNPP did not differ by profession in this sample.

Results of this study indicate that while context is important in the uptake of EBNPP, one area does not have more influence than another. The variables explored in this study account for 13% of the variance in EBNPP. Future research should focus on the overall influence of context on EBP and consider other factors that may play a role in the uptake of EBP.

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CERTIFICATE OF APPROVAL

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PH.D. THESIS

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This is to certify that the Ph.D. thesis of

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To my family

Life is a dream, realize it. Life is a challenge, meet it. Life is a duty, complete it. Life is a promise, fulfill it. Life is a song, sing it. Life is struggle accept it. Life is life, fight for it.

Mother Teresa

ACKNOWLEDGMENTS

I feel blessed to have had so many wonderful people support me on this amazing journey, throughout my doctoral program and dissertation. First, gratitude to my advisor, Dr. Kleiber for her guidance, patience, and encouragement every step of the way. Through her I gained an abundance of knowledge and experience. Her flexibility and responsiveness helped me persevere throughout the years. To my dissertation committee, Dr. McCarthy, Dr. Lynn, Dr. Specht, and Dr. Clark for their kindness, expertise, and insightful comments. I am grateful for their willingness to work with me via a distance and help me continue to grow and learn. A special thanks to Dr. Stineman a dedicated teacher and excellent role model.

To my family and friends, countless thanks for everything you have done to help me reach for the stars. To my parents, Paul and Yvonne, for their unconditional love and helping take care of my children while I studied, wrote, and made trips to Iowa City. Especially to my mom for always going above and beyond whenever I needed your help. To my brother Michael for listening, encouraging, and teaching me with dedication anything is possible. My brother David, for always being there when I need it most and for his endless hours of computer assistance. Finally, I would like to thank my husband, Jeremy and children Emma and Noah. Jeremy has given me the strength to see this through, always believing in me. His calmness and positive outlook has helped me during difficult times. To Emma and Noah we have grown together on this journey. Although you are small you supported me in big ways. I couldn't have done it without all of you.

ABSTRACT

The uptake of evidence in practice remains a challenge for healthcare professionals including nurses and providers. Increased use of evidence-based practices in healthcare settings may improve patient conditions such as pain and decrease the cost of healthcare. A wealth of literature can be found describing barriers and facilitators of evidence-based practice (EBP), and a movement in research has begun to focus on what influences the use of EBP. This study explored the relationships of context including the elements of individual, unit, and hospital and the use of evidence-based nonpharmacological pediatric pain management practices (EBNPP) using an existing data set of nurses and providers, defined as Doctors of Medicine and Osteopathy, Nurse Practitioners, and Physician Assistants, caring for children in the Emergency Department.

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Results of this study indicate that while context is important in the uptake of EBNPP, one area does not have more influence than another. The variables explored in this study account for 13% of the variance in EBNPP. Future research should focus on the overall influence of context on EBP and consider other factors that may play a role in the uptake of EBP.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Despite available research and evidence to support nursing practices in healthcare, there continues to be a gap between theory and practice which results in diminished patient care and inefficient nursing (Billings & Kowalski, 2006). Studies have reported that only a moderate number of nurses use research as a basis for their nursing practice and about half of patients with certain chronic diseases receive the recommended care (Leasure, Stirlen, & Thompson, 2008; McGlynn et al., 2003). Providers, defined as Doctors of Medicine and Osteopathy, Advanced Registered Nurse Practitioners, and Physician Assistants, are no exception to the gap in research and practice. Providers have not succeeded in changing practice based on research and do not routinely use evidence-based practice guidelines (Parker et al., 2008; Tanios, De Wit, Epstein, & Devlin, 2009). It is imperative that best practices be implemented in order to improve quality of care; interventions that are not evidence-based may increase healthcare costs and do not improve patient outcomes.

Moving evidence into practice is a persistent challenge in healthcare for all professionals. Prior research has focused on individual factors that influence the use of evidence-based practice (EBP). Lack of implementation of EBP has been attributed to individual nurse characteristics such as inadequate knowledge, or insufficient research skills (Cummings, Hutchinson, Scott, Norton, & Estabrooks, 2010; Brown, Wickline, Ecoff, & Glaser, 2009; Johansson, Fogelberg-Dahm, & Wadensten, 2010; Melnyk et al., 2004). The gap between research and practice is not always due to a nurse's inability to keep up with current knowledge, but may also be due to organizational and environmental barriers (Leasure et al., 2008).

Numerous studies have reported nurse barriers and facilitators to the uptake of EBP. The main barriers reported by nurses include insufficient time, lack of authority to

implement findings, limited organizational support, difficulty in understanding research, and lack of knowledge (Brown, et al., 2009; Fink, Thompson, & Bonnes, 2005; Retsas, 2000; Rycroft-Malone et al., 2004). Research on providers identified some of the same barriers as nurses including lack of time, insufficient knowledge, and organizational constraints to implementing EBP (Kersten, Thompson, & Frohna, 2008; Parker et al., 2008; Scales et al., 2008; Tanios et al., 2009). Additional barriers reported by providers included methodology inadequacies, ambiguous study results, and lack of randomized control trials. Providers also noted lack of nursing acceptance, decreased autonomy in physician practice, increased healthcare costs, and patient factors such as patient condition or preference as barriers to the uptake of EBP (Kersten et al., 2008; Knops, Vermeulen, Legemate, & Ubbink, 2009; Parker et al., 2008; Scales et al., 2008; Tanios et al., 2009; Toma et al., 2010).

Moving evidence into practice is difficult due to a variety of reasons including the complexity of organizations, individual healthcare practitioners, leadership, and changing healthcare environments (Titler, 2008). With the majority of nurses working in complex organizations, it is important to focus research efforts in the area of context to help better understand the influence of context on the uptake of EBP. Context is the environment where practice occurs and includes organizational culture, leadership, and evaluation (McCormack et al., 2002). A context of uncertainty within an organization, such as inconsistent management has been found to impede nurses from using research in practice (Scott & Pollock, 2008). Contextual barriers of EBP use have also been reported for providers (Parker et al., 2008; Scales et al., 2008). Recent studies found that nurses identifying high levels of context, including supportive and empowering work environments, open feedback, and clear leadership, reported higher levels of the application of research findings (Cummings et al., 2010; Estabrooks, Midodzi, Cummings, & Wallin, 2007). Although the role of context has been described as a key factor in the uptake of EBP, a thorough investigation of the role of context has not been

explored. An in-depth understanding of the role of context in EBP is needed to help develop successful interventions that will change practice.

One area of EBP interest is pediatric pain management. A gap between evidence and practice is evident in pediatric pain management in the Emergency Department (ED), with inadequate assessment and under treatment of children's pain (Probst, Lyons, Leonard, & Esposito, 2005; Tanabe, Ferket, Thomas, Paice, & Marcantonio, 2002). A gap in knowledge exists about the role of context and the use of evidence-based pediatric pain management practices in EDs. Examining factors that influence the use of EBP in nursing care is an important step in the development of interventions to facilitate research into everyday practice and are necessary to improve patient care.

A unique opportunity exists to complete a secondary analysis of an existing data set that includes individual, unit, and hospital elements of context along with measures of specific evidence-based pediatric pain management practices. The existing data set is from a descriptive cross-sectional study that gathered data from Emergency Department nurses and providers via a self-reported, electronically delivered survey. The survey asked about the frequency with which 14 evidence-based pain management practices were used. This secondary analysis focused on eight evidence-based nonpharmacological pediatric pain management practices (EBNPP). The nonpharmacological practices can be initiated by any healthcare professional without an order and require limited resources. The original dataset contained 1,177 usable nurse surveys and 259 useable provider surveys from 117 hospitals in a Midwest state. For the purposes of this secondary analysis nurses are of primary interest. Data from the providers will also be analyzed, but results may be less robust due to the smaller number of respondents.

The existing data set contains measures of context including individual, unit, and hospital elements with aspects of culture, leadership, and evaluation. In addition to these variables, the variable of hospital Magnet status, an indicator of hospital context, is

readily available and was added to the existing data set. Magnet designation is awarded to hospitals that demonstrate excellence in nursing, including the application of evidence into practice.

This study adds to the understanding of how context influences the uptake of evidence-based practice, using pediatric pain management in EDs as an exemplar. Knowledge gained from this study will help in the development of future interventions to increase the use of EBP by identifying areas of context that have the most impact on use of EBP.

Purpose

The specific purpose of this secondary analysis was to explore relationships among contextual variables at the individual, unit and hospital levels and the use of evidence-based non-pharmacological pediatric pain management practices in Emergency Departments. Existing data from 1,177 nurses and 259 providers from a study on pain assessment and management of children in Emergency Departments in a rural state were available for analysis. The specific research questions of this secondary analysis follow.

Research Questions

1. What individual, unit, and hospital contextual elements are associated with the use of evidence-based nonpharmacological pediatric pain management practices by RNs?
2. What individual, unit, and hospital contextual elements are associated with the use of evidence-based nonpharmacological pediatric pain management practices by providers?
3. What contextual elements (individual, unit, and hospital) explain the most variation in use of evidence-based nonpharmacological pediatric pain management practices by RNs?

4. What contextual elements (individual, unit, and hospital) explain the most variation in use of evidence-based nonpharmacological pediatric pain management practices by providers?
5. What are the differences between explanatory models for RNs and providers?

Conceptual Model and Definitions

The conceptual model for this study was developed from the Promoting Action on Research Implementation in Health Services (PARIHS) framework (Kitson, Harvey, & McCormack, 1998b). The PARIHS framework is a model that describes how evidence moves into practice. This process is identified as a function of the evidence, aspects of context, how evidence is introduced and the way the process is facilitated (Kitson et al., 2008). The areas of evidence, context, and facilitation are all viewed as vital pieces in the successful implementation of evidence into practice. Context was the specific area of the PARIHS framework that was explored in this secondary analysis. A more in-depth discussion of the PARIHS framework and conceptual model used for this study is presented in Chapter II.

In this study, the conceptual definition of context is the environment where practice occurs and includes organizational culture, leadership, and evaluation (McCormack et al., 2002). The operational definition of context is individual, unit, and hospital elements of context including aspects of culture, leadership, evaluation, and Magnet status.

The concept of EBP is described as a total process that includes knowing what questions to ask, and how to find, appraise, and apply evidence in conjunction with clinical expertise into practice (DePalma, 2000; Titler, 2008). In addition, EBP takes into consideration characteristics unique to patient needs and values, and then evaluates the effectiveness of care to continuous improvement (DePalma, 2000). The operational definition of implementation of EBP is the self-reported use of evidence-based non-

pharmacological pediatric pain management practices (EBNPP) addressed in the existing data set.

Significance

Getting evidence into practice continues to be a challenge in healthcare. Pediatric pain management in Emergency Departments is no exception to this challenge. Identification of variables that have the most impact on the use of EBP is pertinent to developing successful interventions, thereby decreasing the time from discovery to implementation and increasing the use of EBP, in turn improving the care of children in pain.

This study was important for several reasons. First, it added to the limited research on the relationship between context and EBP. Second, there was no research exploring context and the implementation of EBP in Emergency Departments. EDs present unique challenges when addressing pediatric pain; they are often busy, noisy, with a rapidly changing environment and staff that are not always trained in caring for pediatric patients (Ramponi, 2009). In addition, children are frequently cared for in EDs that are not dedicated to seeing pediatric patients (Tracy, 2007). Third, a better understanding of context and EBP use in children in the ED will contribute to the future development of interventions to increase EBP use, improving pediatric pain management.

The existing database offers a wealth of information with respect to context at the individual, unit, and hospital level, including nurse and provider information. Adding the variable Magnet status contributes a unique hospital variable to the dataset. By exploring areas of context, key variables that play a role in EBP use may be found. Differences could also be discovered that shed light on how nurses and providers may need different interventions to help increase their use of EBP.

Summary

This secondary analysis included an exploration of contextual variables using individual, unit, and hospital elements and the use of evidence-based nonpharmacological

pediatric pain management practices in Emergency Departments. Data from nurses and healthcare providers were examined. EDs may have unique findings due to the environment, which is rapidly changing, and where nurses and providers care for patients of all ages. Published studies find that pediatric pain management remains inadequate. Exploring contextual variables is an important first step to the future development of interventions that increase the use of evidence-based pediatric pain management practices. Pertinent context areas identified in this study may be useful in developing interventions to increase EBP uptake in other areas throughout healthcare organizations.

Chapter II presents the model that guided the original study, along with the related literature. Research on the barriers and facilitators of EBP for nurses and providers are described. Literature related to context and EBP, Magnet, and evidence-based nonpharmacological pediatric pain management practices in EDs are addressed. The conceptual model for this study, Predictors of Uptake of Evidence-Based Nonpharmacological Pediatric Pain Management Practices, was adapted from the PARIHS framework, and is explained in Chapter II.

CHAPTER II

LITERATURE REVIEW

Introduction

This chapter discusses evidence-based practice (EBP), barriers and facilitators to EBP, context, nonpharmacological pediatric pain management, and the PARIHS framework used to guide this study. Literature searches using the Cumulative Index to Nursing and Allied Health Literature **(**CINAHL) and Pubmed were completed to identify literature relevant to barriers and facilitators of EBP, context related to EBP, including Magnet status, and nonpharmacological pediatric pain management practices in Emergency Departments. Articles published in English between 1990 and 2011 were reviewed. Several literature searches were carried out to provide a comprehensive review of the literature. Reference lists of main articles were also reviewed to identify articles. The results of the literature searches along with the theoretical model follow.

Evidence-Based Practice

Evidence-based practice is a concept that gained attention in the 1980's and continues to be recognized as a vital component of improving patient care and reducing cost in health care. EBP is using current best evidence along with clinical expertise and patient values to guide patient care (DePalma, 2000; Titler, 2008). EBP includes knowing what questions to ask, how to apply evidence and evaluating the effectiveness of care (DePalma, 2000; Titler, 2008). Although the importance of EBP is widely acknowledged, the uptake of EBP is a constant challenge for all those in healthcare, including nurses and providers. A large amount of research has focused on self-reported barriers and facilitators to EBP. Barriers are elements that have the potential to limit implementing EBP change, while facilitators are elements that increase the likelihood of implementing change (Blair, 2008). Although identification of barriers and facilitators to implementing EBP is important, a shift in research has begun to focus on what areas have

the most impact on EBP implementation and the development of interventions to increase the uptake of EBP.

Barriers to and Facilitators of EBP Identified by Nurses

Research examining barriers and facilitators for nurses has primarily emphasized nurses working within in-patient hospital settings with a wide range of hospital sizes, both teaching and non-teaching facilities. The majority of nurses surveyed were from varying in-patient units and have different educational backgrounds and varying years of experience as a nurse. Research identifying barriers and facilitators to EBP has been conducted in the United States and throughout the world. While barriers and facilitators tended to be similar, one barrier reported by countries outside the United States was research being published in a foreign language (Oranta, Routasalo, & Hupli, 2002).

Over the past 15 years the most frequently cited barriers and the extent of the perceived barriers to nurses' implementing EBP have been unchanged (Carlson & Plonczynski, 2008). In large hospital settings, barriers to implementing evidence-based practice change identified by nurses include insufficient time to implement new ideas; inadequate knowledge; insufficient time to read research; limited access to research findings and computers; format of information; not enough resources including equipment, finances, and staff; work environment, including lack of administrative support both on nursing units and within the organization; healthcare practitioners not receptive to change; lack of authority and autonomy; lack of self-confidence; difficulty in understanding statistics; inadequate facilities for implementation; and lack of physician, nurse, and multi-disciplinary cooperation/collaboration (Adib-Hajbaghery, 2007; Brown et al., 2009; Carroll et al., 1997; Closs, Baum, Bryar, Griffiths, & Knight, 2000; Fink et al., 2005; Gerrish et al., 2007; Glacken & Chaney, 2004; Hutchinson & Johnston, 2004; Kajermo et al., 2008; Koehn & Lehman, 2008; Logsdon, Davis, Hawkins, Parker, &

Peden, 1998; Melnyk et al., 2004; Oranta et al., 2002; Retsas, 2000; Rycroft-Malone, 2004; Yava et al., 2009).

In rural hospital settings, the most frequently reported barriers by nurses included lack of time, limited organizational support, lack of computer access, insufficient knowledge, lack of financial resources, isolation from nurse researchers, and few role models available (Lenz & Barnard, 2009; Olade, 2004). Similar barriers are described by nurses in larger and rural hospitals, although nurses practicing in rural hospitals tended to rank lack of computer access and financial resources higher than nurses in larger hospitals.

Most studies surveyed nurses from a variety of adult nursing units. Some studies have also been carried out to look specifically at nursing specialties. The most frequently reported barriers by in-patient pediatric nurses included no time to read research, relevant literature not compiled in one place, hard to understand statistical analysis, insufficient authority to change practice, and not enough time on the job to implement new ideas (Brenner, 2005; McCleary & Brown, 2003). In one study in-patient pediatric nurses were less likely to see physicians' lack of cooperation, inadequate facilities, and administration blocking as barriers to research use than previously surveyed nurses (McCleary & Brown, 2003). Among a small sample of Post Anesthesia Care Unit (PACU) nurses the greatest barriers were related to the characteristics of the organization, including lack of doctor cooperation, not enough authority to change practice and not enough time to read and implement findings (LaPierre, Ritchey, & Newhouse, 2004). A study focused on surgical nurses working in the operating room (OR) reported lack of awareness of research reports and a lack of time for reading research and to implement new ideas as barriers. Facilitators were interactive education, constant involvement of evidence-based surgery in daily practice, and availability of computer systems to support practice (Knops et al., 2009). A recent study of Emergency Room nurses identified individual factors

such as lack of knowledge and organizational factors such as lack of administrative support as barriers to understanding and using research in practice (Chan et al., 2011).

It should be noted that many of the studies used the same instrument, the BARRIERs Scale (Funk, Champagne, Wiese, & Tornquist, 1991), to assess barriers. Therefore, the barriers were predetermined and nurses were identifying to what extent they felt the factors were barriers to implementing EBP. For many studies an open-ended question was added to the survey for nurses to report additional barriers and facilitators, with few new barriers or facilitators identified. The majority of the studies focused on the global concept of evidence-based practice, as opposed to asking questions about specific evidence-based practices.

Facilitators of implementing EBP change in healthcare organizations described by nurses are often the counterpart to barriers. Nurse reported facilitators are reading journals that publish research; journal clubs; nursing research committees; education and knowledge; key champions or change agents; teamwork; learning environments; communication of research results; having faculty, clinical nurse specialists or nurse practitioners accessible, and library resources available; availability of and easy to understand evidence; colleague and administrative support; using a broad evidence base including research, clinical experience and patient experience; educational and research opportunities; self-confidence; nursing education; and access to the internet (Adib-Hajbaghery, 2007; Brown et al., 2009; Carroll et al., 1997; Glacken & Chaney, 2004; Hutchinson & Johnston, 2004; Kajermo et al., 2008; Leasure et al., 2008; Logsdon et al., 1998; Melnyk et al., 2004; Oranta et al., 2002; Rycroft-Malone et al., 2004).

Barriers to and Facilitators of EBP Identified by Providers

Providers are no exception to the challenges of the uptake of EBP; they too fail to use available science (Berwick, 2003). This failure to use current evidence can not only harm the patient, but also be costly to the organization. Yew and Reid (2008) found most

physicians interviewed did not regularly use EBP, but instead relied on colleagues as a source of information. Numerous barriers and facilitators to implementing EBP have been reported by providers.

Major barriers reported by surgeons were conflicting results, unclear implications for practice, and methodological inadequacies (Knops et al., 2009). Other barriers to implementing EBP, including EBP guidelines, identified by providers include insufficient time and heavy workloads (Astin, 2007; Grol & Wensing, 2004; Kersten et al., 2008; Majumdar, Simpson, & Marrie, 2004; Toma et al., 2010; Yew & Reid, 2008), lack of knowledge (Grol & Wensing, 2004; Kersten et al., 2008; Parker et al., 2008), professional competence (Astin, 2007; Berenholtz & Pronovost, 2003; Toma et al., 2010) and organizational constraints (Grol & Wensing, 2004; Lugtenberg, Burgers, Zegers-van Schaick, & Westert, 2010; Majumdar et al., 2004), availability of medications and materials (Kersten et al., 2008; Lugtenberg et al., 2010; Toma et al., 2010), quality of the evidence such as methodology inadequacies, ambiguous results, and lack of randomized trials (Freeman & Sweeney, 2001; Grol & Wensing, 2004; Majumdar et al., 2004; Scales et al., 2008), complexity of evidence being implemented (Parker et al., 2008; Toma et al., 2010), lack of nursing acceptance, decreased autonomy in physician practice, culture, including leadership (Berenholtz & Pronovost, 2003; Tanios et al., 2009; Toma et al., 2010), increased costs and lack of financial incentive (Grol & Wensing, 2004; Scales et al., 2008; Yew & Reid, 2008), and patient factors (Freeman & Sweeney, 2001; Majumdar et al., 2004; Parker et al., 2008; Scales et al., 2008; Tanios et al., 2009). A review of the literature by Cabana et al. (1999) identified seven main categories of barriers to EBP: lack of awareness or lack of familiarity with the guidelines; lack of agreement; lack of self efficacy; lack of outcome expectancy; the inertia of previous practice; and external barriers (usually factors associated with the structure of the guideline or local systems of care). To facilitate evidence-based practice providers recommend interactive education,

constant involvement of evidence-based surgery in daily practice and availability of computer systems to support practice (Knops et al., 2009).

Although nurses and providers do report some of the same barriers and facilitators, one study showed that nurses and physicians had very different perceptions of the major barriers. Nurses believed that physicians failed to specify what position the patient should be placed in and physicians identified nursing preference for a different patient position as the major barrier to using semi-recumbent positioning in implementing effective ventilator practices for the prevention of pneumonia (Cook, Meade, Hand, & McMullin, 2002). Research comparing nurse and provider factors that influence the uptake of EBP is limited. This study will address this gap in knowledge. A comparison of the literature from nurse and provider reported barriers and facilitators of EBP demonstrate some differences. Providers identified lack of financial incentive as barriers and patient factors, while nurses did not. Providers also noted the quality of evidence as a barrier more often than nurses. While nurses described not having enough autonomy to implement EBP, physicians described EBP guidelines decreased their autonomy in practice. Differences between nurses and providers may also be present in areas of context, requiring further research.

Context and EBP

Context, the environment where practice occurs, is frequently cited as a barrier to the uptake of EBP (Brown et al., 2009; Fink et al., 2005; Grol & Wensing, 2004; Lugtenberg et al., 2010; Retsas, 2000; Scales et al., 2008). Although context is considered important, little is understood about organizational factors that may influence health care providers' use of EBP (Stevens et al., 2011). An abundance of expert opinion literature can be found describing various contextual factors believed to impact the uptake of EBP, but few research studies were identified that explored relationships between contextual factors and EBP.

Cummings et al. (2010) examined the relationship between characteristics of context and research utilization with nurses working in pediatric units. Nurses reporting more positive perceptions of their context, including culture, leadership, evaluation, social capital, informal interactions, formal interactions, structural and electronic resources, and organizational slack (time, space, and human resources), reported higher instrumental and conceptual research use (Cummings et al., 2010). Instrumental research use was defined as the direct application of research findings and conceptual research use was defined as practitioners becoming aware of research findings which alter their way of thinking and practicing (Cummings et al., 2010). This is consistent with Cummings, Estabrooks, Midodzi, Wallin, & Hayuk (2007) previous study using secondary data from 1998 with nurses working in adult units, where nurses reported significantly higher research utilization when practicing in contexts that had aspects of positive culture, leadership and evaluation. Context characteristics identified by nurses to increase research use included empowering work environments, open feedback on performance evaluation and supportive leadership (Cummings et al., 2010). Limitations of this study were the small sample size, focus on inpatient units, did not measure specific evidence-based practices, and the dataset analyzed was over ten years old.

Melnyk, Fineout-Overholt, and Giggleman (2010) also found that nurses implemented evidence-based care to a greater extent when they perceived their culture as more supportive and ready for EBP. This study also had a small sample. In addition, the sample may have been biased as nurses were selected by the manager, based on their interest in participating. Vaughn et al. (2002) used chart audits at ambulatory settings to explore factors that influenced the use of clinical practice guidelines and found organizational factors as an important predictor. Organizational context factors such as professionalism, organization's mission, and capacity, including organizational resources, were found to have a significant relationship with the influence of clinical practice guideline adherence.

Another study examined the implementation of nursing best practice guidelines (BPG) on skin assessment and found that even with a culture of learning and transformational leadership present, nurses only had partial implementation of BPG (Marchionni & Ritchie, 2008). This was a small study and researchers acknowledged they may have established too high of a target for change in practice behavior. Pepler et al. (2006) in a qualitative study found unit culture promoted the use of research. In this case, culture included sub-themes of mutual respect, motivation to learn, goal orientation, and maximization of resources. An ethnography of a pediatric critical care unit was conducted to look at nursing unit culture and research utilization (Scott & Pollock, 2008). Researchers found four areas that were important in shaping nurses' use of research in practice. Cultures with a hierarchical authority structure, emphasizing clinical experience to teach nurses to do as they were told, routine practices, and discouragement of innovations all contributed to lack of research utilization on the pediatric unit (Scott & Pollock, 2008). A qualitative study using 16 focus groups with 147 health care professionals in three neonatal intensive care units (NICU) in Canada found three main themes when exploring the influence of context on optimal pain practices in the NICU (Stevens et al., 2011). The three main themes were support for EBP and culture of collaboration, threats to autonomous decision making, and complexities in care delivery (Stevens et al., 2011). A quantitative study examining factors affecting the implementation of evidence-based procedural pain care in neonates found that the presence of high nurse-physician collaboration significantly increased the likelihood of using evidence-based pain care during heel lance and intravenous insertion procedures in neonates (Latimer, Johnston, Ritchie, Clarke, & Gilin, 2009).

Further exploration of contextual factors is required to identify contextual factors that influence the uptake of EBP. Interventions can then be focused on the elements of context that may have the most influence on EBP. Studies examining context at the individual, unit and hospital level, including Magnet status, are limited. No research was

found comparing nurses and providers on the influence of context on the uptake of EBP. Previous studies have focused on the global use of EBP, not on specific evidence-based practices. These are areas to address when exploring context, to increase the understanding of the impact of context on the use of EBP prior to developing interventions to improve context.

Overview of Magnet Program

The American Nurses Credentialing Center (ANCC) developed the Magnet Recognition Program to "recognize health care organizations that provide nursing excellence" (American Nurses Credentialing Center, 2011). The early 1980s was a time of significant nursing shortage in the United States. Select hospitals were not as affected by this shortage and were noted for their ability to attract new nurses and retain their current nursing workforce (McClure & Hinshaw, 2002). A task force was established in 1981 by the American Academy of Nursing (AAN) to examine these organizations in order to identify organizational characteristics that supported nursing environments. The original study included 163 hospitals, 41 of which were described as "magnet" hospitals based on fourteen characteristics that demonstrated their ability to recruit and retain nurses during times of nursing shortages (American Nurses Credentialing Center, 2011). The original intent of the study was not focused on patient outcomes, it was to demonstrate how hospitals differed in their ability to attract and maintain nurses. The initial descriptive study found three broad categories, administration, professional practice, and professional development as the key ingredients of magnetism that contributed to their positive nursing work environments and assisted in nurse recruitment and retention (McClure & Hinshaw, 2002). The study gathered data from staff nurses and directors of nursing and discovered that although their perspectives differed, "the elements that they identified as significant in making for magnetism in their hospitals did not" (McClure & Hinshaw, 2002, p.8). The original hospitals identified as Magnet in the

early studies did not receive the formal Magnet accreditation from the ANCC, this process began in the early 1990s.

In 1994 the first hospital was designated as a Magnet organization by the ANCC. The program over time has expanded to include healthcare organizations abroad in 2000. Since the ANCC Magnet program began in the 1990s, the body of literature has grown which supports that nurses practicing in Magnet hospitals report better work environments than nurses in non-Magnet hospitals (Lacey, Teasley, & Cox, 2009; Schmalenberg & Kramer, 2008; Ulrich et al., 2007; Upenieks, 2003). The Magnet program evaluates organizations based on fourteen forces of Magnetism and in 2008 a new conceptual model was introduced that grouped the 14 forces into five key components: Transformational Leadership; Structural Empowerment; Exemplary Professional Practice; New Knowledge, Innovations, and Improvements; and Empirical Outcomes. Quality improvement has always been a part of the Magnet process, but in the new model application of existing and new evidence is more apparent as described in the New Knowledge, Innovations, and Improvements section. The Magnet program shows a continuous commitment to improving nursing practice. "Magnet organizations have an ethical and professional responsibility to contribute to patient care, the organization, and the profession in terms of new knowledge, innovations, and improvements" (American Nurses Credentialing Center, 2011). Magnet hospitals have been described as not only organizations with superior nursing environments, but also improved patient outcomes when compared to non-Magnet hospitals.

Context and Magnet Designation

A review of the research found positive aspects of the Magnet program in respect to work environment when compared to non-Magnet hospitals. Patient outcomes studied showed mixed results when comparing Magnet and non-Magnet hospitals. The Magnet process is an expensive and time intensive process that may help the nursing work

environment and improve certain patient outcomes in organizations. Further rigorous research is needed to explore patient outcomes. The majority of research has included convenience samples of organizations and nurses and had limited valid and reliable measures for assessing the presence of magnet characteristics in settings (Lundmark, 2008). Research is needed to understand what, if any impact Magnet designation in an organization has on the uptake of evidence-based practices. Theoretically Magnet hospitals should have increased use of EBP due to the supportive and collaborative context of Magnet hospitals and the emphasis on evidence-based practice care.

Pediatric Pain Management in EDs

The importance of pediatric pain management has been recognized for decades. In 1992, The Agency for Healthcare Policy and Research (AHCPR), now known as The Agency for Healthcare Research and Quality (AHRQ), published the Acute Pain Management Clinical Guideline, including specific recommendations for pediatric pain management. A multidisciplinary team of physicians, nurses, a psychologist, physical therapist, ethicist, and patient consumer was convened to develop the Acute Pain Management Clinical Guideline. This publication helped draw attention to the need for improvement in pediatric pain management. In 1992, it was widely recognized that children's (infants to adolescents) pain was not managed as well as pain in adults, despite the availability of effective pain management techniques (Agency for Health Care Policy and Research, 1992). The Guideline addressed pain assessment and the importance of both pharmacological and nonpharmacological interventions for pain management in children. The committee emphasized the need for interventions to be developmentally appropriate and addressed the negative outcomes of unrelieved pain in children (Agency for Health Care Policy and Research, 1992).

Although progress has been made in pediatric pain management over the last two decades, opportunity for improvement still exists. A decade after the Guideline was

published, a quarter of hospitalized children reporting pain received no analgesia and of those that received analgesia, half continued to report moderate to high levels of pain (Vincent & Denyes, 2004) and a disparity between pediatric pain management and adult pain management still exists (Furyk & Sumner, 2008; Gonzalez, Routh, & Armstrong, 1993).Only 37% of children with fractures and/or sprains treated in the ED received pain medication at discharge (Tanabe et al., 2002). Even with orders in place, nurses give as little as 23-43% of the pain medications ordered (Jacob & Puntillo, 1999; Vincent & Denyes, 2004) , and when standard of care in the ED included using a skin anesthetic, either buffered lidocaine or ELA-Max, for IV insertion, 64% of children did not receive a skin anesthetic (Jacob & Puntillo, 1999; Sparks, Setlik, & Luhman, 2007; Vincent & Denyes, 2004).

Inadequate pain control in neonates can lead to alterations in future pain response and pain perception and in oncology patients can result in increased pain scores during later painful procedures (Zempsky & Cravero, 2004). Pain that is untreated and uncontrolled can prevent healing, prolong recovery, lead to chronic pain, non-adherence to treatment, and even death (Eland, 1990; Schechter, Berde, & Yaster, 2003; Weiss, 1994).

Despite the recommendations in 1992 and advances in pediatric pain management, children continue to experience inadequate pain management. Multiple approaches are necessary to improve pain management for children in the particularly challenging Emergency Department setting.

Nonpharmacological Pediatric Pain Management Practices in EDs

As explained previously, the database available for this secondary analysis explored the use of 14 evidence-based pediatric pain management practices. Some of these practices required the presence of specific resources, such as topical analgesic

agents, or a medical order to initiate. This secondary analysis focused solely on the nonpharmacological practices that can be initiated independently by any nurse or practitioner without a medical order. In the original study eight nonpharmacological practices were examined. The following is a brief discussion of the evidence supporting those nonpharmacological practices.

Essential aspects of caring for children in pain include assessment, use of nonpharmacological approaches such as distraction, sucrose with or without pacifier, and pressure at intramuscular injection site. The goals of nonpharmacological interventions are to decrease fear, reduce distress and pain, and give parents and children a sense of control (Khan & Weisman, 2007). Nonpharmacological support is essential to providing a comfortable environment for the child (Zempsky & Cravero, 2004). Nurses can independently implement nonpharmacological interventions when caring for children and encourage parents to be active partners. Along with decreasing pain in children, the distress that parents and healthcare providers experience when a child is upset during a procedure can also be reduced through the use of nonpharmacological interventions for the child.

Two descriptive studies described distraction as helpful for decreasing pain or discomfort as reported by parents, children, or resource staff (Winskill & Andrews, 2008; Young, Griffin, Phillips, & Stanley, 2010). Approximately half of the resource staff interviewed reported that the use of distraction boxes reduced the need for pain medication in children undergoing procedures and thought the use of the distraction boxes minimized anxiety and pain in children in the ED (Winskill & Andrews, 2008).

Significantly less behavioral distress, decreased pain, and more prepared children was reported in four studies using distraction (Goymour, Stephenson, Goodenough, & Boulton, 2000; Malone, 1996; Press et al., 2003; Tanabe et al., 2002). Parent and CLS reports of fear were significantly lower in the experimental group in one study (Cavender, Goff, Hollon, & Guzzetta, 2004). Distress as perceived by the parent/guardian was

significantly less in the intervention group for children <10 years (Sinha, Christopher, Fenn, & Reeves, 2006). In children ≥ 10 years situational anxiety was significantly less in the intervention group compared to the nonintervention group (Sinha et al., 2006). In general, even when pain was not statistically less in the intervention group, self-report of pain tended to be lower in the intervention group when compared to the control group.

The use of sucrose and/or pacifiers are important nonpharmacological interventions that should be considered in infants with pain. In Rogers et al. (2006) subgroup analysis of infants 1-30 days, infants receiving sucrose were significantly less likely to cry during the procedure, had a smaller change in mean pain scores, and their behavior returned so baseline sooner after catheter removal compared to the placebo group. Sucrose compared to placebo and pacifier compared to no pacifier had significantly less crying time. The pacifier group showed a clinically significant change in average Face, Legs, Activity, Cry, Consolability (FLACC) score from 4.3 no pacifier to 2.5 pacifier and crying time was significantly reduced for pacifier vs. non-pacifier in both younger groups. The use of sucrose and pacifier should be considered to reduce pain and distress, especially in younger infants, as demonstrated by decreased crying time and clinically significant change in FLACC scores.

Summary

Numerous barriers and facilitators to the uptake of EBP have been identified throughout the literature for nurses and providers. Different barriers and facilitators have been reported by nurses and providers. Differences have been found in aspects of autonomy and providers have identified lack of financial incentives and patient preferences as barriers. Although both nurses and providers have reported context as a barrier/facilitator, no studies have explored if the influence of context on EBP differs by profession, nurses compared to providers. With previous literature supporting some differences in barriers and facilitators between nurses and providers the potential for

differences may also be found in how context may impact the uptake of EBP and therefore both nurses and providers will be examined.

Research has begun to explore contextual variables that may influence the implementation of EBP. Contextual factors may be key to improving the uptake of EBP. Magnet is one area of context that has not been examined specific to EBP. It is not understood what elements of context may have the most impact on the uptake of EBP or if there are differences between nurses and providers.

Literature supports the benefits of nonpharmacological interventions for pediatric pain management in EDs, but children continue to experience inadequate pain management. Exploring nurse and provider perceptions of context and their relationships to evidence-based nonpharmacological pediatric pain management practices in the ED may shed light on what contextual factors are most important and differences that exist between nurses and providers.

Conceptual Model

The conceptual model for this study, Predictors of the Uptake of Evidence-Based Nonpharmacological Pediatric Pain Management Practices, is based on the Promoting Action on Research Implementation in Health Services (PARIHS) framework. The PARIHS framework captures the complexities that are involved in implementing evidence into practice (Kitson et al., 2008). The original model was developed in the late 1990s, acknowledging that successful implementation of evidence into practice is not a hierarchy or linear process. The elements of evidence and context must be considered simultaneously when deciding on the most appropriate facilitation methods (Kitson, Harvey, & McCormack, 1998a). Key aspects identified in the implementation of EBP by the PARIHS framework are the "nature and type of the evidence (E), the qualities of context (C) in which evidence in being introduced, and the way the process is facilitated (F)" (Kitson, 2008, p. 1749). The elements of evidence and context can be viewed on a

continuum of "high" to "low" (Kitson et al., 1998a), later changed to "strong" to "weak" (Kitson et al., 2008; McCormack et al., 2002).

The development of the PARIHS model has occurred over three phases. In Phase 1 from 1998-2002 development and concept analysis was undertaken with face and construct validity confirmed. This is when successful implementation of new ideas including evidence and guidelines was identified as having three main elements, evidence, context, and facilitation. Phase 2 from 2001-2003 used empirical case studies to look at what factors practitioners identified as important in moving evidence into practice. The model is currently in Phase 3, further evaluation of the framework, including the development of diagnostic/evaluation tools.

Attributes of evidence, (including research, clinical experience, and patient preference), context (including culture, leadership, and measurement, later changed to evaluation), and facilitation (including characteristics, role, and style) were all placed on a continuum of low to high, with the most successful implementation occurring when all elements are high. The framework recognizes the importance of context and that some contexts are more conducive to successful implementation of evidence into practice (Kitson et al., 2008). The PARIHS conceptual framework aims at not only identifying elements and mapping interrelationships, but also providing the potential for researchers and practitioners to use as a practical guide for implementing evidence into practice (Kitson et al., 2008). A limited, but growing body of knowledge supports the PARIHS framework demonstrating it has conceptual integrity and concept validity (Kitson et al., 2008; Rycroft-Malone et al., 2004).

The data used for this study was collected in 2009 prior to the development of a context instrument guided by the PARIHS framework used to measure context. The Alberta Context Tool (ACT) was developed to measure eight dimensions of organizational context in healthcare settings from the perspective of healthcare professionals and should be considered in future studies exploring context (Estabrooks,

Squires, Cummings, Birdsell, & Norton, 2009). The evidence for the practices assessed in this study was widely supported in the literature and the context items were based on the PARIHS framework.

Although the PARIHS framework does not include all variables that may influence the uptake of evidence-based practices it provides a reference for some of the key foundations needed in exploring and implementing EBP. With context as the main focus of this study the PARIHS framework is an appropriate selection for guiding this dissertation. Below is a discussion of each of the PARIHS elements as they pertain to the proposed work.

Context

Context is the focus of this study. Context is defined by the PARIHS framework as "the environment or setting in which the proposed change is to be implemented" (Kitson et al., 1998a, p. 150). Originally context was subdivided into three main elements, culture, leadership, and measurement. In 2002 a concept analysis by McCormack et al. refined the sub-element of measurement to evaluation to encompass various methods of assessing effectiveness. Indicators of strong context are clearly defined boundaries, appropriate and transparent decision making process, power and authority that is understood, appropriate resources, feedback and information systems in place, and receptiveness to change. Within the sub-element of culture is the ability to define prevailing values and beliefs, valuing individual staff and clients, consistency of individual's role and experience to value. The indicators of the sub-element of leadership are transformational leadership, role clarity, effective teamwork, effective organizational structures, a democratic inclusive decision making process, enabling and empowering approaches to teaching, learning, and managing. Key indicators of strong evaluation are feedback on individual, team, and system performance, use of multiple evaluation methods including clinical, performance, economic, and experience.

Context throughout the PARIHS framework is recognized as occurring at different levels. Evaluation at the individual, team, and system level are identified as characteristics of a strong context (McCormack et al., 2002). Individual values, aspects of unit teamwork, and effective organizations are all an important part of an environment conducive to the uptake of evidence into practice.

Evidence

In 1998 evidence was described as being derived from three dimensions; research, clinical experience, and patient preferences (Kitson et al., 1998a). Rycroft-Malone et al. (2004) expanded on evidence in Phase 2 to include information from the local context with the criteria of valued as evidence, collected and analyzed systematically and rigorously, evaluated and reflected upon, and conclusions drawn. The sub-elements of research, clinical experience, patient experience and information/data from local context are all viewed as sources of knowledge key to the acceptance of new evidence into practice in the PARIHS model. In addition, it is the combination of these dimensions of evidence that need to be considered for successful implementation.

Facilitation

Facilitation is the third main factor identified in the successful implementation of EBP in the PARIHS model. Kitson et al. (1998a) originally defined facilitation as "a technique by which one person makes things easier for others" (p.152). The PARIHS framework facilitators have a vital role in assisting both individuals and teams in understanding what and how they need to change (Harvey et al., 2002). Facilitation includes three main elements; characteristics, role, and style. Aspects under personal characteristics of the facilitator are respect, empathy, authenticity and credibility. Clearly defined role involves access, authority, change agenda, and position in organization successfully negotiated. The third element of facilitation appropriate styles of working

contains range and flexibility of style, and consistent and appropriate presence and support (Kitson et al., 1998a).

Harvey et al. in 2002, carried out a concept analysis on facilitation as it relates to implementing evidence into practice. From this study they acknowledge that the concept is partially developed. They provide clarification from the 1998 article by stating a facilitation is an appointed role, the role may be an internal, external, or a combined internal/external approach to the organization where the change is being implemented, the role is described as helping and enabling, not telling or persuading with a range of possible facilitator roles (Harvey et al., 2002). Within the PARIHS framework it is recognized that facilitation requires more research and refinement. Examination of the context where the change will occur and assessment of health care practitioners' acceptance and understanding of the evidence/new knowledge is needed for facilitation to be successful (Kitson et al., 2008). Facilitation is an area of the PARIHS framework to explore in future studies, but was not a focus of this study.

Outcomes

The PARIHS framework depicts the key factors of evidence, context, and facilitation in the successful uptake of evidence into practice. The authors recognize they may not have included all factors in this framework. Individual variables that may influence the implementation of EBP are not described in this framework, but are prominent throughout the literature (Cummings et al., 2010; Rycroft-Malone, 2008). Therefore, individual variables were included in the conceptual model for this study. The primary aim in implementing evidence-based practice is to improve patient outcomes. For this reason, patient outcomes were included in the conceptual model. Although no information on patient outcomes was available in this dataset, patient outcome variables should be considered in future studies. The Predictors of Uptake of Evidence-Based Nonpharmacological Pediatric Pain Management Practices Model (see Figure 1), was

based on the PARIHS framework, acknowledging that individual variables may play a role. This study focused on the exploration of contextual factors and included individual variables as covariates.

In this study the conceptual definition of implementation of evidenced-based practice was specific to examining nurse and provider reported use of actual evidence-based pediatric pain management practices. The majority of research studies published focus on the global idea of implementing EBP, but do not examine whether specific evidence-based practices were used. The dependent variable was provider or nurse self-report of nonpharmacological pediatric pain management practices. Table 1 depicts the concepts, variables explored, and instruments.

Summary

The PARIHS framework was used to guide the development of the Predictors of Uptake of Evidence-Based Nonpharmacological Pediatric Pain Management Practices Model. Individual factors reported in the literature were included in the conceptual model. Information from the existing data set was used to identify contextual variables that influence the uptake of specific EBP. Nurse and providers have reported aspects of context such as lack of support and leadership, and communication as barriers to implementing EBP (Fink et al., 2005; Grol & Wensing, 2004; Retsas, 2000; Scales et al., 2008). Limited research has found nurses who perceive a higher context have increased implementation of EBP (Cummings et al., 2010; Estabrooks et al., 2007; Melnyk et al., 2010). A gap in knowledge exists in what factors of context may have the most impact on the uptake of EBP, the role of Magnet status, and if there are differences between nurse and providers in context.

Figure 1. Predictors of Uptake of Evidence-Based Nonpharmacological Pediatric Pain Management Practices Model

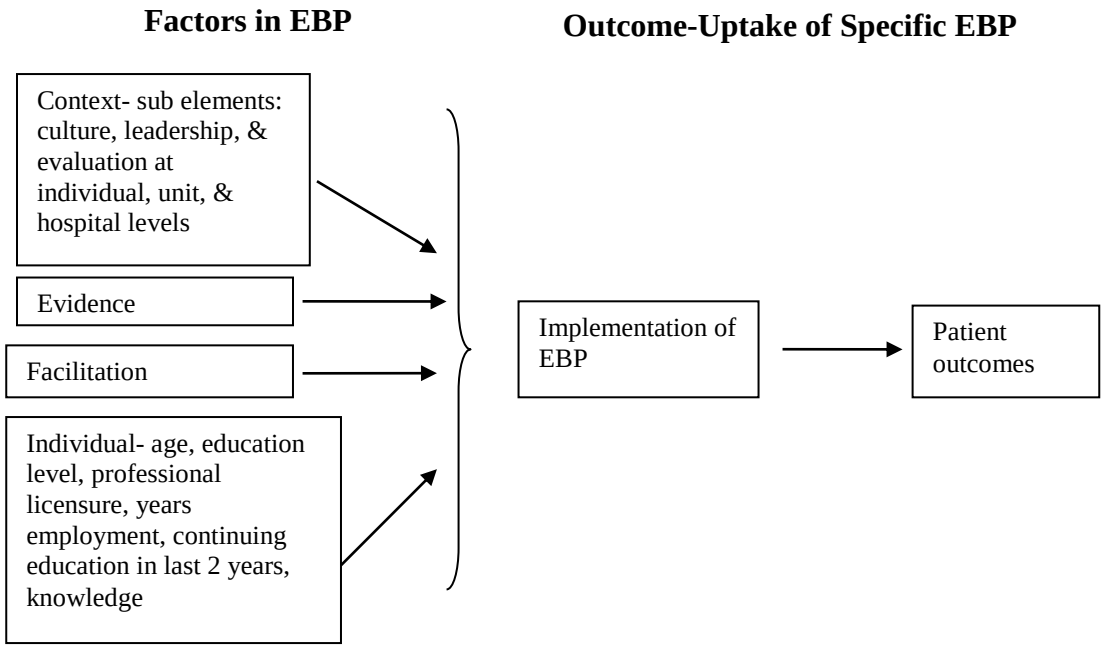

Table 1. Concepts, Variables, and Instruments

Concepts	Variables	Instruments
EBP Uptake	Nonpharmacological pediatric pain management practices	Use of Evidence from original survey
Context	Context including individual, unit, and hospital elements Magnet Status	Context Measure from original survey Identified from ANCC
Individual	Age Education level Professional licensure Years employment Continuing education	All from Demographic Information from original survey
Knowledge	Knowledge of Nonpharmacological pediatric pain management practices	Knowledge measure from original survey

CHAPTER III

METHODOLOGY

Introduction

The purpose of this dissertation was to explore relationships among contextual variables including individual, unit and hospital elements and the use of evidence-based nonpharmacological pediatric pain management practices (EBNPP) in Emergency Departments. This study employs a data set of Emergency Department nurses and providers self-reported EBNPP for analysis. In this chapter, I describe the data source and my analytical plan.

Data Source

The data employed in this study comes from the Pediatric Pain Assessment and Management in Rural Emergency Departments study (Kleiber, Jennissen, McCarthy & Ansley, 2011). The main purpose of the original study was to examine the frequency with which 14 pharmacological and nonpharmacological pediatric pain management practices were used in Emergency Departments, comparing rural and urban hospitals. The original study also collected data on context, knowledge levels, barriers and facilitators to implementing EBP, and attitudes that might explain variations in EBP use. (See Appendix A for complete survey, Appendix B for original study procedure). This secondary analysis focused on the relationship between the eight nonpharmacological practices in the original study and measures of context.

Original Study Sample

For the original study, a survey was delivered via email to an estimated available population of 1,045 providers, defined as Doctors of Medicine (MDs), Doctors of Osteopathy (DOs), Physician Assistants (PAs), and Advance Registered Nurse Practitioners (ARNPs), and 2,245 nurses, between October 2008 to February 2009. All

nurses, Registered Nurses (RNs) and Licensed Practical Nurses (LPNs), and providers, who provided care for children in the ED at least once a month were invited to participate. There were 1,177 usable nurse surveys, for a 52% return rate, and 259 useable provider surveys, for a 25% return rate, included in the final dataset after eliminating blank and duplicate surveys. The sample included nurses and providers from 117 different hospitals across the state of Iowa. (See Appendix C for number of respondents and pediatric ED visits per hospital). The data from the original study included the responses from a significant portion of ED nurses across the state of Iowa. The data from providers was less representative of the total accessible population.

Study Sample for Secondary Analysis

For this secondary analysis, responses from LPNs and those not identifying licensure were excluded from analysis. LPNs were excluded due to limited sample number (N=15), the focus of literature on Registered Nurses, and different licensing and practice standards that apply to LPNs. All provider respondents were maintained in the sample for analysis.

Original Measures

This discussion is limited to the original survey items that were pertinent to this secondary analysis. The survey tool was developed by the researchers. The dependent variables for the original study were fourteen evidence-based pediatric pain management practices. The choice of practices was based upon the strength of evidence supporting the practices and national and international pain management guidelines recommending the practices. Survey participants were presented with each practice and asked how often they used it with children. There were six answer selections available: I never use this; I use this 10% of the time; 25%; 50%; 75%; or 100% of the time.

The knowledge measure of the survey was developed from “Knowledge and Attitudes Survey Regarding Pain” (Ferrell & McCaffery, 2008) and from the Core

Curriculum for Pediatric Emergency Nursing (Baker, 2003). The Ferrell and McCaffery (2008) measure has a test-retest reliability of $r>.80$, and internal consistence of $r>.70$. Additional questions specifically about pediatric pain were derived from the Baker (2003) publication. The 14 knowledge items included both pharmacological and nonpharmacological knowledge.

The context measure was derived from the PARIHS model and contained sixteen likert-type items and four "True/False/I don't know" items. The questions contained elements at the individual, unit, and hospital level, and included aspects of culture, leadership, and evaluation. The Cronbach's alpha for the 16 likert-type context questions was 0.86.

The entire survey was pilot tested with 30 ED nurses and physicians from a large general hospital and a children's hospital outside the state of Iowa. Questions that were confusing were reworded and items that demonstrated no variance were deleted from the survey. Items were reviewed by experts in pediatric pain management. Respondents from the pilot study were asked for suggestions of other evidence-based pediatric pain management practices to be included in the survey; no suggestions were given. This demonstrates content validity of the independent variable list.

Study Measures for Secondary Analysis

Dependent Variable

A total of eight nonpharmacological items were available from the original data. In the original study respondents selected one of six different frequencies indicating their use of the evidence-based pediatric pain management practice. However, the recommended standard of care is that these practices are performed all the time, unless contraindicated by patient condition or patient preference. I considered responses of 50% of the time or less to be unacceptable patient care. Therefore I categorized responses as low and high. Responses of "I use this never, I use this 10% of the time, 25% of the time

or 50% of the time" were assigned a 0, indicating low use, and responses of 75% of the time or 100% were given a 1, indicating high use. Low and high responses were totaled for a composite nonpharmacological EBP score with a possible range of 0 to 8. Table 2 provides the dependent variable questions.

Independent Variables

Context was the independent variable in this study. The context measure for the survey was derived from the PARIHS model and contained sixteen items with responses ranging from "strongly disagree" to "strongly agree" and four items about evaluation that respondents answered as "Yes, No, or I Don't Know". Context included individual, unit, and hospital elements designed around aspects of culture, leadership, and evaluation. One context question from the original survey was not used in this analysis. The question "my physician assistant (PA) and nurse practitioner (NP) colleagues in the ED are receptive to changing practice" was dropped for analysis because 21% of nurses had missing data and 17% of providers had missing data. PAs and NPs are not on staff in all EDs and may account for the large amount of missing data on this question.

The original data set did not contain information on Magnet status of the hospital. Magnet status is a variable that was obtained from the American Nurses Credentialing Center and was added to the database as an indicator of hospital context. Table 3 gives the context independent variable questions including elements of individual, unit, and hospital and culture, leadership and evaluation.

Covariate Variables

Covariates were selected based on review of the literature and standard demographic data included in analysis. The number of annual pediatric ED visits was used as a proxy for size of hospital. Five covariate variables were conceptualized as individual variables and were analyzed at the individual level. For nurses this included

age, level of education, experience, continuing education, and knowledge. For providers this was age, professional licensure, experience, continuing education, and knowledge.

The covariate variable of knowledge focused on nonpharmacological knowledge items, because this study examined only nonpharmacological practices. A total of seven items from the original survey reflected nonpharmacological knowledge. Correct items were coded as 1 and incorrect answers including "I don't know" were coded as 0. The scores from the seven items were combined to give a nonpharmacological total, ranging from 0 to 7. The total nonpharmacological knowledge score was used for analysis. Table 4 shows the covariate variables.

Analysis

Research Questions and Analytic Strategy

Research Questions 1 and 2: What individual, unit, and hospital contextual elements are associated with the use of evidence-based non-pharmacological pediatric pain management practices by RNs? What individual, unit, and hospital contextual elements are associated with the use of evidence-based non-pharmacological pediatric pain management practices by providers?

First the data was examined visually via scatter plots to look for trends in linearity. Then, to identify relationships between context and EBNPP, bivariate correlation analysis was conducted. Performing correlational analysis provided information on the nature of the relationship, positive or negative, and the strength of the relationship. Initial correlation analyses were conducted with each context item and the EBNPP total measure. Correlation matrices for the variables of interest were explored to identify which of the elements had the strongest correlation with the uptake of EBNPP. Due to the nature of the data Pearson's *r* correlation was performed. Although it is difficult to hypothesize which context variables would have the strongest correlation,

based on previous research I expect a positive correlation between all context items and EBP uptake.

Research Questions 3 and 4: What contextual elements (individual, unit, hospital) explain the most variation in use of evidence-based non-pharmacological pediatric pain management practices by RNs? What contextual elements (individual, unit, hospital) explain the most variation in use of evidence-based nonpharmacological pediatric pain management practices by providers?

An OLS regression model with covariates including demographic and knowledge variables was conducted to explore the relationship between evidence-based nonpharmacological pediatric pain management practices. Then a regression exploring a set of models that looked at various elements of context was explored. Individual, unit, and hospital context items selected as having the strongest correlation with EBNPP uptake were included in the regression analysis. These items were identified from questions 1 and 2 of the study. The models build on the basic regression previously described. The first model contained control variables. The second model added individual context. The third model included unit context. In the fourth model hospital context was added. Model 5 included Magnet status. The analysis was completed separately for nurses and providers. Table 5 presents the models that were analyzed. Individual context was added to the model first as this is a logical progression of contextual elements in an organization, from individual to unit to hospital context. Based on previous research I expect to find a positive relationship between nursing education level, continuing education, and knowledge, and EBNPP. I hypothesize that context will be significantly related to EBNPP use after controlling for other covariates. No relationship between context and EBNPP use or a negative relationship would not be supported by the literature.

Research Question 5: What are the differences between explanatory models for RNs and providers?

Nurse and provider models were compared to identify differences in the significance of the elements of context. Previous research has identified some differences between nurse and provider barriers to implementing evidence-based practice, including limitations in autonomy, increased cost, and patient factors (Kersten et al., 2008; Knops et al., 2009; Parker et al., 2008; Scales et al., 2008; Tanios et al., 2009; Toma et al., 2010). Although both nurses and providers have reported context as a barrier to the uptake of EBP, limited information is found comparing nurse and providers on influence of context and EBP. Since this data set contained both nurse and provider responses, it was of interest to see if differences existed. Interaction variables were created for professionals, nurses and providers, on the selected individual, unit, and hospital context variables. A regression analysis using interaction variables was conducted to explore if there were significant differences between providers' and nurses' context or covariate variables on nonpharmacological EBP use.

Ethical Considerations

After submitting documentation to The University of Iowa Institutional Review Board (IRB) for study approval the committee determined that the project was not human subject research. Data used in this analysis was de-identified. See Appendix D for IRB documentation.

Summary

This secondary data analysis used an existing dataset of nurse and provider reports of evidence-based pediatric pain management practices in Emergency Departments. The focus of this study was the exploration of the role of context in the use of evidence-based nonpharmacological pediatric pain management practices, including examination of contextual elements of individual, unit, and hospital. Nurse and provider results were compared, in order to identify potential context differences.

Table 2. Dependent Variable Items: Evidence-Based Nonpharmacological Pediatric Pain Management Practices

1.	I use non-drug interventions (such as controlled breathing, imagery or distraction) with children during painful procedures.
2.	I show or tell parents how to distract their children during procedures.
3.	I tell children what will happen before a procedure begins.
4.	If a child's pain rating is 6 (on a scale of 10) at triage, I give or seek an order to give pain medication.
5.	I ask school aged children to rate their pain on a scale.
6.	I ask parents to rate the pain of their school aged children. (Reverse scored)
7.	I provide sucrose or sucrose pacifier to neonates for a painful procedure.
8.	I apply pressure at the injection site before giving an IM injection.

Table 3. Independent Variable Questions: Context

Culture		
Individual	**Unit**	**Hospital**
I have sufficient time to review my hospital's information (guidelines/protocols).	My nursing colleagues in the ED are receptive to changing practice.	There is a culture of continuous improvement in my hospital.
I have the power to change practice in my ED.	My physician colleagues in the ED are receptive to changing practice.	I feel there is open communication and dialogue in my hospital.
	There is a culture of continuous improvement in my ED.	My hospital organization places great importance on pain management.
	I feel there is open communication and dialogue in my ED.	Magnet Designation (Yes/No)
	My ED places great importance on pain management.	
	My ED's standard of practice for pediatric pain management allows me sufficient autonomy in managing pain.	
	The medications I need to treat pain in the ED are readily available to me	
	There is insufficient time at work for our ED to implement changes in practice. (Reverse scored)	
Leadership		
Individual	**Unit**	**Hospital**
	I am clear about avenues for making practice changes in my ED.	
	My ED leadership builds effective teamwork.	
Evaluation		
Individual	**Unit**	**Hospital**
I am individually evaluated on my assessment of pain. (T/F I don't know)	My ED is evaluated on the assessment of pain. (T/F I don't know)	
I am individually evaluated on my treatment of pain. (T/F I don't know)	My ED is evaluated on treatment. (T/F I don't know)	

Table 4. Covariate Variable Questions: Demographics and Knowledge

Age	Age in years
Nursing Education level	Highest level of RN education: Technical School, Diploma Program, Associate Degree, Bachelors, Masters, Doctorate
Professional licensure of Provider	Advanced Registered Nurse Practitioner, Certified Physician Assistant, Medical Doctor, Doctor of Osteopathy
Experience	Number of years of nursing, MD, DO, PA, NP employment
Continuing Education	In the past two years attended any continuing education classes or sessions about pediatric pain management
Knowledge (Correct response)	Parent and child reports of pain intensity are usually the same. (False)
	Young infants have less pain sensitivity than older children. (False)
	An observable change in vital signs should be used to verify a child's complaint of severe pain. (False)
	Sucrose pacifiers are most effective for reducing venipuncture pain in very young infants. (True)
	If a child can be distracted from pain, the pain intensity is not high. (False)
	Telling children about an upcoming procedure makes the pain worse. (False)
	The most accurate judge of the intensity of an 8 year old child's pain is the child. (True)

Table 5. OLS Regression Models for Evidence-Based Practice

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Age	X	X	X	X	X
Nursing Education Level (For Nurses Only)	X	X	X	X	X
Professional Licensure (For Providers Only)	X	X	X	X	X
Experience	X	X	X	X	X
Continuing Education	X	X	X	X	X
Knowledge	X	X	X	X	X
Number of Pediatric ED Visits Per Year	X	X	X	X	X
Individual Context		X	X	X	X
Unit Context			X	X	X
Hospital Context				X	X
Magnet Status					X

CHAPTER IV

RESULTS

Introduction

This dissertation used data from the Pediatric Pain Assessment and Management in Rural Emergency Departments study (Kleiber et al. 2011). The study used both provider and nurse responses to examine context and the use of evidence-based non-pharmacological pediatric pain management practices (EBNPP) in Emergency Departments. In this chapter, descriptive information and the results of research questions 1 through 5 are presented.

Prior to analysis of the data, data cleaning measures were conducted. Frequencies of each variable were performed and data was searched for values outside of the appropriate range of values for individual variables. Missing data was identified and is reported.

Demographics

As described in Chapter III, the sample included data from 1,161 Registered Nurses (RNs). The age for nurses ranged from 21 to 61 years of age with a mean age of 40.94 (SD = 10.55). Of the RNs, 137 (11.8%) had a diploma, 622 (53.6%) had an associate degree, 363 (31.3%) had a bachelors degree, and 30 (2.6%) had a masters degree. Nationally the average age of nurses is 46.8 years, slightly older than the sample mean of 40.9 years. In this sample 97.3% reported Caucasian/White as their race. In the state of Iowa 88.4% reported Caucasian/White as their ethnicity while the other 9.6% reported Black/African American, Asian/Pacific Islander or Hispanic (Iowa Department of Public Health, 2006). This sample had a higher percentage of Caucasian/White than the national average, although this is typical of Midwest states where there are less diverse populations. Other national data for nurse demographics was not found.

There were 259 Providers (Doctors of Osteopathy, Doctors of Medicine, Advanced Registered Nurse Practitioners, and Physician Assistants) in the sample. The age for providers ranged from 25 to 61 years of age with a mean age of 43.13 years (SD = 9.58). Of the providers, 127 (49%) were MDs, 48 (18.5%) were DO, 36 (13.9%) were ARNP, and 37 (14.3%) were PAs. No national descriptive information for providers was identified in the literature. Table 6 presents additional sample characteristics.

Comparison of the nurse provider samples demonstrated the nurse sample had a much higher percentage of female respondents, as is typical of nurse samples. The provider sample had a greater number of respondents identifying "other: as their ethnicity. This difference may be due to Emergency Department providers being locum tenens who work in multiple different hospitals and a shortage of US born providers with more diverse recruitment. Nurse and provider samples were similar on years employed, and year employed in the ED, and percentage attending continuing education.

Dependent Variable Descriptive Data

The dependent variable (DV) for this study, evidence-based nonpharmacological pediatric pain management practices (EBNPP), was measured based on self-reported practices that were grouped by the researcher as high or low, as previously described in Chapter III. The distribution of the dependent variable for nurses and providers was examined visually. Skewness, a measure assessing whether a distribution trails off in one direction or another due to the respondents scores on the survey, and kurtosis, which examines how wide the tails of the distribution are related to the variance of the scores were both calculated (Acock, 2008). The nurse distribution was found to have significant negative skewness (-0.44, $p<.001$) and normal kurtosis (3.07, $p=.657$), jointly χ^2 $p=.001$. The distribution for providers had normal skewness (.045, $p=.777$) and kurtosis (2.64, $p=.264$), jointly χ^2 $p=.515$. To address the concern of the DV for nurses not being

normally distributed robust estimates were used in the regression. The robust regression has standard errors that do not assume normality in the data (Acock, 2008).

Descriptive data for each of the eight EBNPP items and the EBNPP total score used for analysis is presented in Table 7. The EBNPP that nurses and providers used most frequently in the "high use" group was, "I tell children what will happen before a procedure begins", 1,099 (95%) by nurses and 238 (92%) by providers, followed by, "I ask school aged children to rate their pain on a scale", 960 (83%) by nurses and 211 (82%) by providers. The most frequent EBNPP in the "low use" category was, "I provide sucrose or sucrose pacifier to neonates for a painful procedure", with 874 (75%) of nurses and 190 (73%) of providers using it less than 75% of the time. The EBNPP total measure for nurses ranged from 0 to 8, had a mean of 5.09 and SD of 1.42. Providers' responses ranged from 0 to 8, with a mean of 4.11 and SD of 1.51.

Independent Variable Descriptive Data

The independent variable in this study was context. Context was measured with the 15 item context survey developed by Kleiber et al. (2011), four evaluation questions at the individual and unit levels, and Magnet status at the hospital level. These are discussed separately.

Context Survey Results

Each context question along with an overall context measure was examined. The overall context measure was created by adding the subjects' responses for each of the fifteen context questions that were measured via a 5 point Likert scale ranging from 0, "strongly disagree" to 4, "strongly agree" and dividing by the total number of questions, fifteen. Cronbach's Alpha was 0.87 for the overall context measure. The nurse overall context measure ranged from 0.60 to 4.00 with a mean of 2.55 and SD of 0.51. The provider overall context measure ranged from 0.80 to 4.0 with a mean of 2.75 and SD of

0.56. Table 8 provides descriptive data for context items and the overall context measure.

Evaluation Questions at the Individual and Unit Levels

Evaluation items at the individual and unit levels had a large amount of missing data for nurses and providers. Missing data ranged from 17% to 38% on the evaluation items. Nurses reported individually being evaluated on the assessment and treatment of pain approximately 50%. Unit evaluation on assessment and treatment of pain was higher, about 75% of the nurses reported this as "True". Providers were lower on both individual and unit being evaluated on assessment and treatment of pain, approximately 34% and 67% respectively. Table 9 reports the number and percentages of subjects' responses to evaluation items.

Magnet Status

Magnet status, the indicator of hospital level context, was obtained from the American Nurses Credentialing Center (ANCC). Seven of the 117 (6%) hospitals across the state of Iowa had Magnet designation at the time of the original study. The percentage of Magnet hospitals in Iowa is similar to the national percentage. To date, approximately 6.71% of registered hospitals in the United States have achieved the Magnet Recognition status awarded by the ANCC (AHA, Fast Facts on US Hospitals, 2011). As expected, the majority of respondents were from non-Magnet hospitals; RN 978 (84.2%) provider 196 (75.7%).

Research Question Number 1

What individual, unit, and hospital contextual elements are associated with the use of evidence-based nonpharmacological pediatric pain management practices for RNs?

Scatter plots were examined prior to conducting correlation analysis. No strong linear relationships were visualized between the EBNPP measure and contextual

elements, although all nurse contextual elements were noted to have a positive relationship with EBNPP. After visual examination of the data, correlation analyses were conducted between the EBNPP measure and the overall context measure. All correlations were conducted using two-tailed tests. After the correlation between EBNPP total score and each context question was explored the correlation between the overall context measure and EBNPP was examined. All correlations were positive and eleven of the fifteen items were found to be significantly correlated with EBNPP. The overall context measure was also significantly correlated with EBNPP. Table 10 displays the context items from each area (individual culture, unit culture, hospital culture, and unit leadership) that were found to have the strongest correlation with EBNPP use for nurses. For all analysis an alpha level >.01 (two-tailed) was considered to be non-significant due to the large sample size. See Appendix E1 for the complete correlation matrix of all context items and EBNPP measure.

Individual and unit level evaluation items were analyzed separately due to the large amount of missing data (17-27%). Cross tabulations were conducted first and then Spearman correlation analyses were done. Table 11 displays the correlation results. (Refer to Appendix F1 for cross tabulation table). No significant correlations were found between evidence-based nonpharmacological pediatric pain management practices and the contextual elements of unit and individual evaluation.

Magnet status, the measure of hospital culture was analyzed separately since Magnet designation is not a nurse reported measure. Magnet status is a nominal variable, therefore cross-tabulation and Spearman Rho correlation was conducted. The correlation between Magnet status and EBNPP was not significant for nurses (ρ=-.024, p =.43). No correlation was found between Magnet status and overall context measure (ρ=.017, p=.58).

Research Question Number 2

What individual, unit, and hospital contextual elements are associated with the use of evidence-based nonpharmacological pediatric pain management practices?

Visual examination of the data via scatter plots was completed. Scatter plots revealed two negative relationships, although statistical analysis determined they were not statistically significant. Evidence-based nonpharmacological pediatric pain management practices and two unit culture items, "There is a culture of continuous improvement in my ED" and, "I feel there is open communication and dialogue in my ED" were negative. EBNPP and each context item was explored, followed by the examination of the overall context measure, previously described, and EBNPP. Correlations with a p value of $\leq .01$ (two-tailed) were considered significant. Two of the fifteen context items were found to have a significant correlation with EBNPP in the provider sample. The overall context and EBNPP was significant at the $p<.05$ level. Table 12 displays the context items from each area (individual culture, unit culture, hospital culture, and unit leadership) that were found to have the strongest correlation for providers. See Appendix G1 for the complete correlation matrix of all context items and EBNPP measure.

Evaluation at the individual and unit level was analyzed separately due to nominal nature of the data and the large amount of missing data (26-38%). Cross tabulations were conducted first, followed by Spearman correlation analysis. Table 13 displays the correlation results. (Refer to Appendix H1 for cross tabulation table). No significant correlations were found between provider evidence-based nonpharmacological pediatric pain management practices and the contextual element of evaluation including individual and unit treatment and assessment of pain. In the provider sample Magnet status was not significantly correlated with EBNPP ($\rho=-.062$, $p=.362$) or overall context ($\rho=.081$, $p=.209$).

Research Question Number 3

What contextual elements (individual, unit, and hospital) explain the most variation in use of evidence-based nonpharmacological pediatric pain management practices by RNs?

Initially, regression analyses were conducted using the item from the contextual elements of individual, unit, and hospital that were selected based on the strongest bivariate correlation with the DV described in question one. Items from the same element that were found in the correlation matrix to have a significant relationship with the item selected were added to the regression. After adding additional items from the same element it was discovered that these additional items impacted the relationship of the one item selected from question one. This was demonstrated by a change in coefficient and/or change in level of significance. This process was repeated for each context area of individual, unit, and hospital with the same findings. Since there were significant correlations among items within the same element, and the regression analysis showed a change in coefficients and/or significance, the decision was made to use an average measure for each of the context areas of individual, unit, and hospital. These average measures were used in the final regression analysis.

Listwise deletion was conducted in order to allow comparison across models. A total of 1,037 nurses were included in the regression analysis. This resulted in an approximate loss of 11% of the original sample of 1,162 nurses. The data missing on each of the items was less and ranged from 0.2% to 0.9% on context items.

The original set of models proposed included age and experience in the model along with nurse education level. Years employed as a nurse was highly correlated with age (r=0.77), therefore only age was included in the model. Age was selected as a proxy measure for experience based on the significant correlation between the two items and due to a decreased amount of missing data for the age item.

No correlation between individual and unit evaluation of assessment and treatment of pain and EBNPP was found. In addition, a large amount of data was missing and

therefore these items were not used in the final regression analysis. A bivariate regression of individual evaluation revealed an insignificant relationship (b=.539, p=.019) and only accounted for <1% of the variance. Unit leadership was not included in the analysis due to the correlation with unit culture (r=.614, p<.01) and no items from the survey measured leadership at the individual or hospital level.

A total of six nested models were used for examining individual, unit, and hospital context and evidence-based nonpharmacological pediatric pain management practices. Robust standard errors were used due to nurses being clustered within hospitals. Table 14 displays the regression results. Model 1 included only the control variables of age, number of pediatric ED visits per year, education, knowledge and continuing education. Knowledge (b=.244, p<.001) and continuing education (b=.386, p<.001) were both significantly positively correlated holding all other variables constant. According to Model 2, which individual culture was added to, individual culture had a significant positive effect on EBNPP, net of the control variables (b=.177, p=<.01). In the third model unit culture was included. When unit culture was added to the model, individual culture was no longer significant (b=.061, p=.458), and unit culture remained significant after controlling for individual context (b=.295, p<.01). Nonpharmacological knowledge (b=.236, p<.001) and continuing education (b= .363, p<.001) were the only variables that maintained a significant positive relationship with EBNPP use in Model 4. Nurses who attended continuing education classes or sessions about pediatric pain management in the last two years had a significantly increased use of EBNPP compare to those nurses who did not attend continuing education classes, net of other variables in the model. Model 5 added the hospital culture measure of Magnet status. Magnet status was not found to be a significant predictor of EBNPP (b=-.142, p=.458). The final model, Model 6, used the overall context measure including the individual, unit, and hospital elements of context. The results indicated that overall context had a significant positive effect on the use of EBNPP (b=.377, p<.001). For every one unit increase in context there was a .377

increase in EBNPP net of all other variables in the model. Knowledge and continuing education showed a significant positive affect throughout all six models.

Research Question Number 4

What contextual elements (individual, unit, and hospital) explain the most variation in use of evidence-based nonpharmacological pediatric pain management practices by providers?

The same approach was applied for the analysis of the provider sample as the nurse sample to explore context and evidence-based nonpharmacological pediatric pain management practices use. First individual, unit, and hospital context items selected in question two were used in the regression analysis. Other items in the same area that were found to be correlated with the item selected were then added to the regression analysis. A change in coefficients was noticed when additional items were added to the regression analysis. A decision to use the average score of individual, unit, and hospital culture in the regression analysis was made. The average score takes into account all items within each area, acknowledging these items are interrelated and one item alone does not represent individual, unit, or hospital culture.

Listwise deletion was conducted in order to allow comparison across models. A total of 195 providers were included in the regression analysis. This resulted in an approximate loss of 25% of the original sample of 259 providers. The data missing on each of the items was less and ranged from 0 to 1.5% on context items.

The items of age, evaluation, and unit leadership were excluded from the regression analysis. The age of providers and the number of years employed were significantly correlated (r=0.84), therefore age was included in the analysis as a proxy measure for experience. In addition, individual evaluated on the assessment of pain (ρ=.073, p=.397), individual evaluated on the treatment of pain (ρ=.109, p=.109), and unit evaluated on the assessment of pain (ρ=.076, p=.332) and treatment of pain (ρ=.103,

p=.196), were not significantly correlated with EBNPP for providers. A large amount of missing data was found for these items and therefore not included in the regression analysis. Unit leadership was also excluded from the model due to the significant correlation with unit culture (*r*=.689, *p*=<.01) and no measure of individual or hospital leadership was available from the data set.

After examination of the data the final analysis was composed of six regression models. Robust standard errors were used to account for providers being clustered within hospitals. The results are provided in Table 15. Model 1 with only the control variables of age, number of pediatric Emergency Department visits, professional licensure, nonpharmacological knowledge measure, and continuing education found no significant relationships. Use of EBNPP did not differ by professional licensure or attendance to continuing education classes in the provider sample. The control variables together explained 2% of the total variance in EBNPP use from the provider sample. In Model 2 individual culture had a significant positive effect on EBNPP net of all other predictors in the model (*b*=.302, *p*=.01). On average, a one unit increase in individual culture was associated with a 0.30 increase in EBNPP use, holding all other variables constant. Including individual context in the model explained 4% of the total variance in EBNPP from the provider sample. In the third model unit culture was added and individual culture was no longer significant. The change in coefficient and significance indicates a partial mediation where individual culture shapes unit culture, in turn affecting use of EBNPP. Model 4 included individual, unit, and hospital culture context variables. Although all three had positive relationships with EBNPP, none were found significant after controlling for other aspects of context. Six percent of the variation of EBNPP was accounted for in Model 4. In Model 5 Magnet status a measure of hospital culture was added to the model. Magnet status was not a significant predictor of EBNPP, net of all other variables. The final model, Model 6, included the overall context measure which included all three elements of individual, unit, and hospital culture. Context was found to

have a significant effect on EBNPP net of all the control variables in the model (*b*=.487, *p*=.001). On average, a one unit increase in context had a 0.49 increase in EBNPP, holding other variables constant. Despite the significant positive relationship of context with EBNPP, the magnitude of the relationship is relatively small.

Research Question Number 5

What are the differences between explanatory models for RNs and providers?

Visual examination of the six nurse models and six provider models showed that the control variables of knowledge and continuing education were significant predictors of evidence-based nonpharmacological pediatric pain management practice use for nurses only. Similar findings were found when the set of nurse and provider regression models were examined; individual culture was significant until adding unit culture to the model and in Model 6 context had a significant positive effect on EBNPP, net of all other variables.

Data was pooled from the nurse and provider databases which allowed for exploration of differences that existed between nurses and providers. Pooling data from the two data bases required nurse education and professional licensure to be dropped from the analysis in order to have the same variables in the model. Regression analysis for the nurse sample were run without the education variables and for the provider sample without the licensure variables and the results were essentially the same as when the variables were included. This verified valuable information was not lost when removing these variables from the pooled models. To determine if the relationship between EBNPP and context differed from nurses and providers an interaction term was created for individual, unit, and hospital culture, and the context average measure. Table 16 displays the results of the five nested models. Although there was a significant difference between nurse and providers use of EBNPP (*b*=-1.09, *p*<.001), none of the interactions were significant indicating the effect of context on EBNPP does not statistically differ

between nurse and providers net of all other predictors. On average nurses had a significant increased use of EBNPP compared to providers, holding other variables constant. In the pooled model 4% of the variance was explained in Model 1 using the control variables. Model 5 which added the overall context measure accounted for approximately 13% of the variation in EBNPP for the nurse and provider pooled sample. On average, for every one unit increase in a context there was a .371 increase in EBNPP, net of all other variables in the model.

Summary

Data was analyzed from an existing data set of nurses and providers caring for children in Emergency Departments. The purpose of this dissertation was to examine individual, unit, and hospital contextual factors and the use of evidence-based nonpharmacological pediatric pain management practices. Bivariate correlation and regression analysis were completed to explore the relationship between context and EBNPP use. Context was found to be a significant predictor of EBNPP, net of all other variables, although it accounted for a small proportion of the variance of EBNPP use in this sample. Nurses were found to have a significantly higher use of EBNPP than providers, but the effect of context on EBP did not statistically differ between nurse and providers.

Table 6. Nurse and Provider Characteristics

Nurses		N (Percentage)	**Providers**		N (Percentage)
Gender	Female	1075 (92.6%)	Gender	Female	107 (42.3%)
	Male	78 (6.6%)		Male	146 (57.7%)
Ethnicity	Caucasian/White	1130 (97.3%)	Ethnicity	Caucasian/White	220 (87.3%)
	Other	21 (1.8%)		Other	32 (12.7%)
Years Employed as a Nurse		Mean 15.12 Range 1-46 SD 10.43	Years Employed as a Provider		Mean 12.9 Range 1-46 SD 9.95
Years Employed in ED		Mean 10.31 Range 1-38 SD 8.24	Years Employed in ED		Mean 10.04 Range 1-34 SD 7.97
Continuing Education	Yes	348 (30%)	Continuing Education	Yes	86 (33.2%)
	No	794 (68.4%)		No	164 (63.3%)

Table 7. Summary Statistics for Dependent Variable

EBNPP Frequency High/Low	**Nurse** Low Use N (%)	High Use N (%)	Percentage Missing Data	**Provider** Low Use N (%)	High Use N (%)	Percentage Missing Data
I use non-drug interventions with children during painful procedures	315 (27)	815 (73)	0.30%	129 (50)	130 (50)	0%
I show or tell parents how to distract their children during procedures	321 (28)	836 (72)	0.30%	127 (50)	130 (50)	0.8%
I tell children what will happen before a procedure begins	56 (5)	1099 (95)	0.50%	20 (8)	238 (92)	0.4%
If a child's pain rating is 6 at triage, I give or seek an order	362 (31)	792 (68)	0.60%	121 (47)	133 (52)	1.9%
I ask school children to rate their pain on a scale	196 (17)	960 (83)	0.40%	47 (18)	211 (82)	0.4%
I ask parents to rate the pain of their school aged children (Reverse Scored)	362 (31)	792 (68)	0.60%	173 (67)	80 (40)	2.3%
I provide sucrose or sucrose pacifier to neonates for painful procedures	874 (75)	267 (23)	1.70%	190 (73)	62 (24)	2.70%
I apply pressure at the injection site before giving an IM injection	845 (73)	302 (26)	1.20%	154 (60)	77 (30)	10.8%

EBNPP High Use Total Score	**Total Score**	**Nurse Frequency**	**Percent**	**Total Score**	**Provider Frequency**	**Percent**
	0	2	0.2	0	1	0.3
	1	11	0.9	1	6	2.3
	2	33	2.8	2	27	10.4
	3	111	9.6	3	40	15.4
	4	182	15.7	4	63	24.3
	5	308	26.5	5	41	15.8
	6	303	26.1	6	31	12
	7	140	12.1	7	10	3.9
	8	27	2.3	8	2	0.8
Missing			3.8			14.7

Table 8. Summary Statistics for Context Items

Context Items [5 point scale; 4 Strongly Agree]	**Nurse**			**Provider**		
	Mean	SD	Missing	Mean	SD	Missing
Sufficient autonomy in managing pain	2.01	0.96	0.20%	3.01	0.85	0%
Medications need to treat pain readily available	2.77	0.89	0.20%	2.86	0.98	0.40%
Sufficient time to review hospital information	2.54	0.85	0.30%	2.54	0.99	1.20%
Insufficient time at work to implement changes in practice	2.52	0.85	0.40%	2.64	0.89	1.20%
Power to change practice	2.14	0.98	0.40%	2.5	1.03	0.00%
RN receptive to changing practice	2.46	0.85	0.20%	2.6	0.95	0.40%
MD receptive to changing practice	2.25	0.89	0.60%	2.66	0.79	1.50%
Culture of continuous improvement in ED	2.77	0.76	0.20%	2.94	0.83	0.80%
Culture of continuous improvement in hospital	2.78	0.77	0.30%	2.89	0.81	0.80%
Clear communication ED	2.76	0.86	0.40%	2.96	0.82	0.80%
Clear communication Hospital	2.4	0.97	0.30%	2.7	0.87	0.80%
ED places great importance on pain Management	2.79	0.77	0.30%	2.86	0.77	0.80%
Hospital places great importance on pain Management	2.85	0.74	0.30%	2.76	0.78	1.50%
Clear about avenues for making practice changes in ED	2.5	0.83	0.70%	2.59	0.94	0.40%
ED Leadership builds effective teamwork	2.64	0.84	0.90%	2.72	0.84	1.20%
Overall Context	2.55	0.51	2.8%	2.75	0.56	5.4%

Table 9. Evaluation Descriptive Data

Evaluation (T/F I don't know)	**Nurse**			**Provider**		
	True N (%)	False & I don't know N (%)	Missing N (%)	True N (%)	False & I don't know N (%)	Missing N (%)
I am individually evaluated on my assessment of pain	610 (52.5%)	253 (21.8%)	298 (25.7%)	87 (33.6%)	73 (28.2%)	99 (38.2%)
I am individually evaluated on my treatment of pain	572 (49.3%)	277 (23.9%)	312 (26.9%)	87 (33.6%)	76 (29.3%)	96 (37.1%)
My ED is evaluated on the assessment of pain	899 (77.4%)	64 (5.5%)	198 (17.1%)	181 (69.9%)	11 (4.2%)	67 (25.9%)
My ED is evaluated on treatment	862 (74.2%)	89 (7.7%)	210 (18.1%)	166 (64.1%)	21 (8.1%)	72 (27.8%)

Table 10. Nurse Relationship between EBNPP and Context

	r	***p***
Individual Culture: I have sufficient time to review my hospital's information	0.103	.001
Unit Culture: My ED places great importance on pain management	0.118	.000
Hospital Culture: My hospital organization places great importance on pain management	0.112	.000
Unit Leadership: I am clear about avenues for making practice changes in my ED	0.126	.000
Overall Context	0.154	.000

Table 11. Nurse EBNPP and Individual and Unit Evaluation Correlations

	ρ	***p***
My ED is evaluated on the assessment of pain	0.070	.032
My ED is evaluated on treatment of pain	0.078	.019
I am individually evaluated on my assessment of pain	-0.001	.982
I am individually evaluated on my treatment of pain	0.022	.530

Table 12. Provider Relationship between EBNPP and Context

	r	***p***
Individual Culture: I have sufficient time to review my hospital's information	0.151	0.025
Unit Culture: My ED places great importance on pain management	0.187	0.005
Hospital Culture: My hospital organization places great importance on pain management	0.264	0.000
Unit Leadership: I am clear about avenues for making practice changes in my ED	0.134	0.046
Overall Context	0.146	0.033

Table 13.Provider EBNPP and Individual and Unit Evaluation Correlations

	ρ	***p***
My ED is evaluated on the assessment of pain	0.076	0.332
My ED is evaluated on treatment of pain	0.103	0.196
I am individually evaluated on my assessment of pain	0.073	0.397
I am individually evaluated on my treatment of pain	0.109	0.194

Table 14. Nurse Regression Analysis Results

	Model 1 Coefficient (SE)	Model 2	Model 3	Model 4	Model 5	Model 6
Control Variables						.
Age (years)	.003 (.004)	.003 (.004)	.002 (.005)	.002 (.004)	.002 (.004)	.003 (.005)
Number of Pediatric ED Visits Per Year	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Education (Diploma reference)						
Associate Degree	-.062 (.134)	-.035 (.132)	-.015 (.132)	-.015 (.132)	-.022 (.132)	-.009 (.132)
Bachelors	-.015 (.141)	-.003 (.141)	.032 (.141)	.030 (.141)	.034 (.141)	.037 (.140)
Masters	.216 (.266)	.249 (.271)	.280 (.267)	.286 (.264)	.302 (.270)	.288 (.264)
Nonpharmacological Knowledge	.244 (.035)***	.231 (.035)***	.235 (.035)***	.236 (.035)***	.234 (.034)***	.235 (.036)***
Continuing Education (1=Yes)	.386 (.089)***	.370 (.087)***	.361 (.086)***	.363 (.086)***	.359 (.090)***	.363 (.086)***
Context Variables						
Individual Culture		.177 (.064)**	.061 (.075)	.056 (.076)	.052 (.076)	
Unit Culture			.295 (.091)**	.199 (.115)	.193 (.115)	
Hospital Culture				.117 (.097)	.125 (.097)	
Magnet Status (1=Yes)					-.142 (.191)	
Overall Context						.377 (.078)***
Constant	3.67	3.33	2.82	2.77	2.79	2.75
R^2	.065	.073	.081	.083	.084	.083

*p<.05; **p<.01; ***p<.001

**Footnote for table Mean VIF for models 1-5 ranged from 1.04 to 1.38; Influential data points were examined using cooks d and avplots a couple influential data points were identified, but it is noted that with the size of data set a few data points won't have that much influence over the coefficients.

Table 15. Provider Regression Analysis Results

	Model 1 Coefficient (SE)	Model 2	Model 3	Model 4	Model 5	Model 6
Control Variables						
Age (years)	.003 (.013)	.001 (.012)	.002 (.012)	.002 (.013)	.000 (.012)	.002 (.012)
Number of Pediatric ED Visits Per Year	0 (0)	0 (0)	0(0)	0 (0)	0 (0)	0 (0)
License(MD reference)						
DO	.040 (.313)	.058 (.312)	.082 (.314)	.084 (.317)	.012 (.304)	.096 (.313)
PA	-.613 (.333)	-.068 (.341)	-.096 (.342)	-.089 (.347)	-.158 (.342	-.087 (.336)
NP	.586 (.323)	.558 (.321)	.562 (.327)	.571 (.324)	.420 (.321)	.583 (.326)
Nonpharmacological Knowledge	.092 (.117)	.090 (.109)	.102 (.112)	.100 (.112)	.110 (.110)	.104 (.114)
Continuing Education (Yes reference)	.231 (.287)	.195 (.279)	.179 (.275)	.190 (.277)	.192 (.278)	.180 (.275)
Context Variables						
Individual Culture		.306 (.117)*	.163 (.169)	.171 (.174)	.158 (.168)	
Unit Culture			.312 (.194)	.199 (.306)	.280 (.289)	
Hospital Culture				.109 (.197)	.044 (.189)	
Magnet Status (Yes Reference)					-.429 (.229)	
Overall Context						.487 (.149)**
Constant	3.13	2.46	1.87	1.86	1.94	1.77
R^2	.041	.068	.075	.076	.086	.074

*p<.05; **p<.01; ***p<.001

**Footnote for table Mean VIF for models 1-5 ranged from 1.04 to 1.38; Influential data points were examined using cooks d and avplots a couple influential data points were identified, but it is noted that with the size of data set a few data points won't have that much influence over the coefficients.

Table 16. Pooled Nurse and Provider Regression Analysis Results

	Model 1Coefficient (SE)	Model 2	Model 3	Model 4	Model 5
Control Variables					
Age (years)	.004 (.004)	.004 (.004)	.003 (.004)	.003 (.004)	.003 (.004)
Number of Pediatric ED Visits Per Year	0 (0)	0 (0)	0(0)	0 (0)	0 (0)
Nonpharmacological Knowledge	.222 (.030)***	.213 (.029)***	.128 (.029)***	.218 (.029)***	.218 (.029)***
Continuing Education (Yes reference)	.361 (.087)***	.344 (.086)***	.332 (.084) ***	.337 (.085)***	.334 (.084)***
RNProvider (0=RN)	-1.094 (.120)***	-1.422 (.364)***	-1.634 (.473) ***	-1.596 (.484)**	-1.592 (.519)**
Context Variables					
Individual Culture		.175 (.063)**	.061 (.074)	.055 (.075)	
Unit Culture			.230 (.092)**	.193 (.114)	
Hospital Culture				.117 (.096)	
Overall Context					.371 (.079)***
IndivCx*RNProv		.117 (.123)	.044 (.180)	.058 (.184)	
UnitCx*RNProv			.118 (.233)	.082 (.311)	
HospitalCx*RNProv				.014 (.201)	
OverallContext*RNProv					.149 (.173)
Overall context	3.73	3.36	2.87	2.83	2.81
R^2	.043	.124	.133	.134	.134

*p<.05; **p<.01; ***p<.001

CHAPTER V

DISCUSSION

The purpose of this dissertation was to explore the relationship between context including individual, unit, and hospital elements and the use of evidence-based nonpharmacological pediatric pain management practices (EBNPP). This study was important for several reasons. Limited research on the relationship between context and evidence-based practice (EBP) is available and no research specifically examines EBP use in Emergency Departments (EDs). Unlike other studies, the dependent variable was constrained to nonpharmacological practices which can be implemented independently by nurses and requires few resources. Much of prior research has focused on asking global questions about EBP; no studies were found that examined nonpharmacological practices alone. A pre-existing database containing a sample from nurses and providers was available, which provided a unique opportunity to compare nurses' and providers' use of EBP and explore if there were differences of the effect of context on EBNPP based on profession. Finally, this study used a new approach to examine context that included individual, unit, and hospital elements to identify what area may have the most impact for nurses and providers.

An existing data set from Emergency Department nurses and providers in a Midwest state was analyzed (Kleiber et al., 2011). This study was conducted primarily with nurses and providers working in general hospitals rather than hospitals specializing in the care of children. Magnet status, an indicator of hospital context, was added to the data set to explore the relationship between Magnet designation and self-reported EBP use. Results from this study will assist in the understanding of EBP and context, in turn providing guidance for the development of future interventions to increase the uptake of EBP. A discussion of the findings from correlations and regression analyses follows.

Study limitations, practice implications, and directions for future research will also be presented.

Descriptive Data

Previous research has used various methods to measure EBP. In an ideal reality, use of evidence-based practices should occur 75-100% of the time, with variations only occurring due to patient preference or condition. However, a large variation in the application of evidence-based practice is reported and the use of EBP may differ based on the type of evidence-based practice. This was confirmed in the descriptive results of this study. Results from the descriptive data of the dependent variable, EBNPP, show that while some items had a large percentage of high users, a few items had a large number of lower users. The large number of low users indicates substandard use nonpharmacological pediatric pain management practices for infants and children in pain. Although the items of "providing sucrose or sucrose pacifier to neonates for a painful procedure" and "applying pressure at the injection site before giving an intramuscular (IM) injection" are well documented in the literature, they were not used routinely by nurses or providers in this study. Twenty-three percent of nurses were in the high use sucrose group and 24% of providers used sucrose frequently. The practice of applying pressure before an IM injection was used by just 26% of nurses and 30% of providers. This study demonstrates the persistent underuse of some evidence-based practices which may lead to inadequate pain management in infants and children.

Forty-two percent of nurses and 51% of providers correctly answered the knowledge question related to sucrose use. So despite some knowledge of the practice, professionals did not consistently use this evidence-based practice in the ED with children. This gap between knowledge and practice may occur for several reasons. Reasons may include: sucrose and/or sucrose pacifiers may not be readily available on the unit; parent preference or patient condition; or the practitioner experience may influence the use of this evidence-based practice. This finding is consistent with what

has been described in the literature that knowledge is required, but not sufficient to change practice (Titler, 2008). Unfortunately there was no item on the knowledge section specific to providing pressure for IM injections.

In the original study investigators created a context measure that was based on the PARIHS model. The scale was developed to measure overall context and included the elements of individual, unit, and hospital focused items. Although this scale was not tested in other populations or compared to other context measures, it demonstrated content validity and adequate internal consistency (Cronbach's alpha= 0.86). This secondary analysis attempted to isolate which elements, individual, unit, or hospital, might explain the most variation in EBP.

Discussion of Findings for Questions 1 & 2

Relationships between individual, unit, and hospital elements of context along with an overall context measure and EBNPP were examined. Correlational analyses found positive significant relationships between overall context and EBNPP for nurses and providers. These relationships verify previous statements about the importance of context and EBP (McCormack et al., 2002; Estabrooks et al., 2007).

A majority of the correlations were significant between the individual, unit, and hospital context items and EBNPP in the nurse sample. Eleven of the fifteen context items had a positive significant correlation with EBNPP (r.078 to .126; $p \leq .01$). The overall measure of context also had a significant positive correlation with EBNPP ($p \leq .01$). Nurses have frequently reported high context environments as facilitators of EBP, while low context environments have been cited as barriers to the uptake of EBP (Retsas, 2000; Rycroft-Malone et al., 2004; Yava et al., 2009; Brown et al., 2009; Oranta, Routasalo, & Hupli, 2002; Fink, Thompson, & Bonnes, 2005). The multiple positive correlations between context items and EBP demonstrate that there is a statistical relationship between context and EBP use; as the context increases so does the self-report use of EBNPP. It should be noted the correlations in this study were considered a weak

linear relationship with the *r* values ranging from 0.1 to 0.29, but should not be overlooked (Burns & Grove, 2005).

Providers had fewer significant correlations between context items and EBNPP when compared to nurses. Importance of pain management in the ED and hospital were the two significant correlations with EBNPP for providers (*r* .187 and .264 respectively $p<.01$). The correlation between the provider overall context measure and EBNPP was significant at the $\leq.05$ level, but not at the $\leq.01$. This could be due to context having less of an impact on EBP for providers when compared to nurses. Providers working within the ED may be less involved in or influenced by hospital and unit decisions when compared to nurses. In addition, providers may not be as affected by context when functioning in the role of locum tenens, working in multiple ED settings. Since context items on the placing importance of pain management in the ED and hospital was significant for providers and nurses, interventions that focus on cultivating a context that emphasizes the practice area of interest may be beneficial in increasing the uptake of EBP.

Items that were focused on evaluation of practice were also analyzed for the nurse and provider samples. The individual and unit elements of evaluation were not significantly correlated with EBNPP for the nurse or provider sample. The PARIHS model has described the importance of evaluation as a part of context in the uptake EBP implementation (Rycroft-Malone, 2002). Research regarding evaluation and its effect on the uptake of EBP is limited. Evaluation via monitoring quality indicators has been found to have a positive relationship with nurses' implementation of evidence-based guidelines in practice (Wallin, Bostrom, Harvey, Wikblad, & Ewald, 2000). The survey only asked respondents about evaluation of pain management practices. Additional assessments of evaluation and feedback mechanisms at individual, unit, and hospital levels are necessary to determine if a relationship between evaluation and successful implementation of EBP exists. A large amount of missing data was present in the

provider and nurse sample. Possible causes for this may be that questions were towards the end of the survey and while there was an option for "I don't know", respondents may have left this blank if they were unaware of evaluation measures. In the literature, research on evaluation and EBP has been included in the overall examination of context and not explored separately. Future studies should consider exploring evaluation aspects of context to further understand evaluation and EBP.

The addition of Magnet status as in indicator of hospital level context was also analyzed. Magnet status was not found to be significantly correlated with EBNPP in the nurse or provider sample. A significant correlation between Magnet status and the overall context measure was also not identified. Based on the principles of the ANCC Magnet program a significant positive relationship with both EBNPP and context was anticipated. Previous research found Magnet hospitals to have positive nursing environments with less turnover and ability to recruit and retain nurses (Aiken, Smith, & Lake, 1994; Lacey, Teasley, & Cox, 2009; Ulrich et al., 2007). Mixed results were found when looking at differences between Magnet and non-Magnet hospitals and patient outcomes (Aiken et al., 1994; Dunton, N., Gajewski, B., Klaus, S., & Person, B., 2007; McArthur, 2010) and no research was found comparing Magnet and non-Magnet hospitals on self-reported EBP. Although this study did not find a significant correlation between hospitals with Magnet designation and EBNPP this is a new area that needs further exploration. In 2008 the Magnet program introduced a new vision and conceptual model. The changes in the Magnet program were implemented after the data was collected for this study (ANCC, 2011). Additional research is needed to see what, if any, impact these changes have on the uptake of EBP.

Discussion of Regression Analyses for Questions 3, 4, & 5

The first set of regression models was designed to explore the best predictors of nurse and provider evidence-based practice behavior. The second set of models was designed to explore differences between nurse and provider predictors. In this discussion

the models predicting nurse behavior are provided first, followed by a discussion of provider behavior, and finally differences between nurses and providers.

Predictive Models for Nurses

Regression analyses with data from the nurse sample revealed that the control variables of nonpharmacological knowledge and continuing education were positive significant predictors of EBNPP, net of all other variables. Age in years, a proxy used from experience, number of pediatric ED visits per year, and nurse education level were not significant predictors of EBNPP use. Finding no significant relationship with age, the proxy for experience, is consistent with previous findings on experience and EBP (Coyle & Sokop, 1990; Estabrooks, 1999; Latimer et al., 2009; Michel & Sneed, 1995; Rodgers, 2000b; Winter, 1990). Pediatric ED visits was used as a proxy for hospital size and was not found to be a significant predictor of the uptake of EBNPP. Previous studies, including the original study, did find that increased hospital size increased the use of evidence-based practice (Estabrooks et al., 2007; Kleiber et al., 2011). The original study included both pharmacological and nonpharmacological evidence-based practices and found a significant difference based on hospital size, classified as urban, rural-referral, or critical access (Kleiber et al., 2011).

Although some research has found a significant difference between nurse level of education and the EBP use (Butler, 1995; Kajermo et al., 2008; Koehn & Lehman, 2008; Lacey, 1994; Logsdon et al., 1998; Michel & Sneed, 1995; Rodgers, 2000b), the results of this study add to the research finding of no significant relationship between nurse education level and EBP uptake (Carlson, 2006; Knops, Vermeulen, Legemate, & Ubbink, 2009; Latimer, et al., 2009). One reason for the finding of no significant difference in nurse education level may be due to the evidence-based practice movement within hospitals. It is possible that hospitals are educating staff on EBP more, which may decrease the difference between level of education of nurses. Earlier in the EBP

movement EBP was primarily taught in nursing school at the bachelor and master's level, which may explain some of the change in research findings.

Nonpharmacological knowledge and continuing education specific to pediatric pain management remained significant in all six models, demonstrating the importance of knowledge and continuing education on the uptake of EBP for nurses. These findings support previous research that found nurses who attend continuing education sessions and in-services had a positive relationship with EBP implementation (Coyle & Sokop, 1990; Estabrooks, 1999; Michel & Sneed, 1995; Rodgers, 2000b; Rutledge, Greene, Mooney, Nail, & Ropka, 1996; Winter, 1990). Two studies did not identify a significant relationship between continuing education and the implementation of EBP (Butler, 1995; Latimer et al., 2009). The relationship between continuing education and EBNPP may have been strengthened in this study because the continuing education question and practices asked about were both related to pediatric pain management. Knowledge findings are also supportive of previous research that showed a positive relationship between knowledge and implementing EBP (Brown, et al., 2009; Johansson, et al., 2010; Melnyk et al., 2004). In addition, nurses have frequently reported knowledge as a facilitator to implementing EBP (Brown, et al., 2009; Melnyk, et al., 2004; Kajermo, et al., 2008). Knowledge questions were specific to nonpharmacological practices, possibly strengthening the relationship in this study on EBNPP. Specific knowledge about a practice is a prerequisite to the implementation of an evidence-based practice. Knowledge must be applied in practice for the successful uptake of EBP. Educational interventions that emphasize the practice of interest and outcomes it may have, for example decreased pain, may increase the uptake of the EBP.

Context items in the regression analyses for nurses found that while individual culture was a significant predictor of EBNPP, net of the control variables, it was no longer significant after including unit culture in the model. In Model 4 when individual, unit, and hospital elements of context were included in the model, no one element

remained significant. Model 6 demonstrated that the overall context measure was a significant predictor of EBNPP. These results indicate it may not be possible to parse out individual, unit, and hospital context elements because they are interrelated and may overlap. The control variables and context accounted for a small percentage in the variance of the use of EBNPP (6.5% in Model 1 to 8.3% in Model 6). Magnet status was not found to be a significant predictor of EBNPP and interestingly was negatively associated with EBNPP, although not at a statistically significant level (p=.46). Nurses practicing in Magnet designated hospitals had a lower use of EBNPP when compared to nurses from Non-Magnet designated hospitals. It is possible due to the small size of many of the hospitals in the study and financial constraints of the economy, hospitals in the study may have possessed Magnet characteristics, but did not seek formal Magnet designation from the ANCC. It is noted that while the overall measure of context was statistically significant in predicting EBNPP only a small amount of what may be influencing EBNPP is accounted for in these models (R^2.083).

Predictive Models for Providers

Provider regression analyses revealed that none of the control variables were significant predictors of EBNPP. The literature review found limited previous research exploring the control variables and evidence-based practice. One study showed that shorter length of clinical practice for physicians was significantly associated with an increased use in evidence-based medicine guidelines (Allen et al., 2011). The results of this study using age as a proxy for clinical experience did not support this previous finding. Lack of knowledge has been cited as a barrier to the implementation of EBP by providers, but was not a significant predictor of EBNPP in this study (Grol & Wensing, 2004; Kersten et al., 2008; Parker et al., 2008). No significant differences were found in licensure of providers and EBNPP. This is a new finding, not previously reported in prior studies. In Model 2 individual culture was significant at the p<.05 level. In Model 3 unit culture was added and this rendered the relationship between individual culture and

EBNPP insignificant. Model 4 demonstrated no significant predictors of EBNPP. Model 5 added Magnet status and this was not found as a significant predictor of EBNPP for providers. Magnet status was also not found to be significant in the nurse regression analysis. Magnet designation is primarily focused on various aspects of nursing, with provider collaboration a small component of the overall assessment. Magnet status may not affect providers in the same way it is anticipated to affect nurse use of EBP and outcomes. In the final model, Model 6, a significant effect of the overall context measure on the use of EBNPP (b=.487, p<.01) was found, demonstrating the importance of overall context on the uptake of EBNPP. All together the control variables and context explain only 7.4% of the total variation of EBNPP use. Although the overall context measure is a significant predictor of EBNPP net of the control variables, only a small amount of what is influencing the uptake up EBP is accounted for in these models.

Predictive Models for Nurse and Provider Differences

A pooled regression analysis was conducted to examine if the effect of context on EBNPP varied based on profession. Although nurse and providers statistically differed (p<.001) on their use of EBNPP none of the profession specific context interactions were significant. In this pooled sample it was demonstrated that the effect of context on EBNPP did not differ significantly by profession.

Nonpharmacological knowledge and continuing education were positively correlated (p<.001) with EBNPP throughout all five models. To identify if the effect of these two variables on EBNPP varied by profession, additional analyses were conducted. Neither the professional specific knowledge or continuing education interaction terms were significant, indicating that effect of knowledge and continuing education on EBNPP does not differ by professions in this sample, although it is possible that the large nursing sample is driving the results for knowledge and education statistical significance.

Similar to the separate regression analyses conducted for nurse and providers, individual culture was significant (p<.01) in Model 2 and this became insignificant in

Model 3, when unit culture was added and unit culture ($p<.01$) remained significant. Model 4 demonstrated that when individual, unit, and hospital elements were all in the model no one element remained significant. The overall context measure was significant ($p<.001$), net of other variables in the model. An important finding is that while context is a significant predictor of EBNPP, no one aspect showed more of an influence on EBNPP than another. Individual, unit, and hospital context may not be able to be separated when examining context. Context is a challenging concept to measure and capturing all items in one survey would be difficult. Healthcare organizations have dynamic environments and the complexity of context can bring challenges for measurement and in successful implementation of EBP (McCormack et al., 2002). Previous literature notes that in any context there can be multiple cultures and that understanding these cultures within a context are important to achieve change (McCormack et al., 2002). The importance of context is described throughout the literature, but limited research in this area is found, which may be due to the difficulties in measurement.

Context measures have been developed to look at a variety of organizational aspects. Measures explore organizational readiness to adapt and use research, to assess overall where an organization is with leadership, culture and evaluation, and to examine before and after organizational changes. The Context Assessment Index (CAI) and the Alberta Context Tool (ACT) are two tools that may be useful in future studies. The CAI developed by McCormack et al. (2009) is a 37-item instrument that explores concepts of culture, leadership, and evaluation using a 5-point likert scale. The CAI aims at assessing and understanding the context in which clinicians work and the effect context has on the use of EBP. The ACT assesses multiple modifiable aspects of organizational context including culture, leadership, evaluation, social capital, informal and formal interactions resources an organizational slack. Use of instruments such as these may provide a more in-depth picture of context than what was captured with questions used in this data

analysis. Important aspects to consider when exploring context include leadership styles, collaboration, knowledge sharing, organizational resources including employee staff mix and staffing levels, and innovativeness of an organization. These areas may give further insight of the role of context in EBP. Of interest may also be comparison of objective context measures and staff perceptions of context to explore if these are congruent and which is a better predictor of EBP use.

Limitations

Several limitations of this dissertation study that used an existing data set from a cross-sectional sample of ED nurses and providers were noted. Using a secondary data analysis approach, data is limited to the measures from original study. The dataset did not contain leadership items at the individual or hospital level, and evaluation responses were not gathered at the hospital level. The survey used in this study was developed by the researchers, and although pilot data was gathered, this is a new method of measuring context that requires additional exploration. No follow up attempts could be made to decrease the amount of missing data. Another limitation was the small provider sample size and low return rate in the original study. While a return rate of 25% for the provider sample was disappointing, low return rates are not uncommon. McMahon et al. (2003) reported a return rate of 26% for an emailed survey to pediatricians that was not followed up with reminders. The data from this survey collected self-reported measures therefore it is possible that EBP practices reported by nurses and providers may differ from actual practices. Listwise deletion was used for analysis and may have biased the sample. Future studies should consider objective measures of evidence-based practice use. The survey was delivered via email to all nurses and providers caring for children in ED in one Midwest state. It is possible that professionals who do not routinely access their email were not aware of the survey and those that may have an interest in EBP may have a higher response rate than those that did not.

Implication for Practice and Future Research

Findings from this study provide valuable information and contribute to the limited research on context. This study is unique in that it used self-reported EBNPP measures as opposed to global evidence-based practice assessments. In addition, this study had two samples; one from nurse responses and one from providers. The two samples were then pooled to allow for examination of possible differences. An increased use of EBP for nurses when compared to providers is a new finding. More studies are needed to confirm if this difference occurs in other practice settings.

Overall context was found to be a significant predictor of EBNPP, but only counted for a small proportion of the variance. Additional measures to capture context should be explored along with other possible areas that might impact the uptake of EBP. Organizations should strive for supportive culture and leadership at all levels and place an emphasis on EBP to increase the uptake of EBP. These findings support that professionals who practice in "higher" context environments report increased use of EBP from general inpatient and pediatric units (Cummings et al. 2010; Estabrooks et al., 2007; Wallin et al. 2006).

Future research is needed to further understand the role of context and EBP. Additional measures of capturing the complexities of context are required to fully understand the influence that context may have on the uptake of EBP. Examination of professionals' self-reported use of nonpharmacological evidence-based practice has demonstrated that individual, unit, and hospital elements are enmeshed within one another and examination of overall context may be most useful in future research. Although more research is needed, targeting interventions at all levels is likely to have the most success based on these findings.

To expand research in the area of context and evidence-based practice examination of objective measures should be considered to go beyond using self-reported measures. Exploring types of culture and leadership styles at the hospital and unit level

along with including environments that are innovative, empowering, and focused on learning are areas of interest. Using chart audits to gather documented use of evidence-based practice or patient outcome data is one approach that could be taken. Exploring beyond EBP pain management practices and considering patient outcomes of EBP use such as number of urinary tract infections or pressure ulcers are a few areas to consider in future research. Examination of data from this approach may assist in the understanding of the relationship between context and EBP.

This sample consisted of only nurses and providers working in Emergency Departments in one Midwest State. Nurse characteristics of the sample were fairly representative of the larger population of nurses, while population data on providers was not available. Caution should be used when generalizing findings as the response rates for providers were low (25%) and may not be representative of the population. In addition this study only surveyed professionals from EDs, therefore caution should be used when generalizing to other areas within healthcare organizations. Future studies should expand beyond the ED and include more than one type of unit. This would allow for additional insights on differences and similarities of units within hospitals.

Summary

The purpose of this dissertation was to explore the influence of context on the use of evidence-based nonpharmacological pediatric pain management practices in EDs. The results of this study found that context was an important predictor in the use of EBNPP. No one element, individual, unit, or hospital, was found to prevail in influencing the uptake of EBNPP. This is a key finding in this study as these concepts may be difficult to examine separately therefore exploring overall context may be most useful. This study was also unique in having a sample from both nurses and providers. Pooled data analysis revealed nurses to have a significant increased use of EBNPP when compared to providers in this sample, although they did not differ on the effect of context on EBNPP. Contextual changes in one element (individual, unit, or hospital) may overlap to other

areas. Results further demonstrate the importance of knowledge and continuing education on the uptake of EBP. Knowledge gained from this study helps in the understanding of context and EBP, providing support for the importance of knowledge and continuing education and EBP, and may assist in the development of future interventions to increase the use of EBP. Additional studies examining context and EBP are needed, along with exploring what other variables may predict the use of EBP.

REFERENCES

Adib-Hajbaghery, M. (2007). Factors facilitating and inhibiting evidence-based nursing in Iran. *Journal of Advanced Nursing, 58*(6), 566-575.

Agency for Health Care Policy and Research (AHCPR). (1992). *Acute Pain Management: Operative or Medical Procedures and Trauma.* Retrieved 11/12, 2010, from http://www.ahrq.gov/clinic/cpgarchv.htm

Aiken, L., Buchan, J., Ball, J., & Rafferty, A. M. (2008). Transformative impact of Magnet designation: England case study. *Journal of Clinical Nursing, 17*(24), 3330-3337.

Aiken, L. H., Sloane, D. M., Lake, E. T., Sochalski, J., & Weber, A. L. (1999). Organization and outcomes of inpatient AIDS care. *Medical Care, 37*(8), 760-772.

Aiken, L. H., Smith, H. L., & Lake, E. T. (1994). Lower Medicare Mortality among a Set of Hospitals Known for Good Nursing Care. *Medical Care, 32*(8), pp. 771-787.

Allen, N. Schwartz, D., Sood, A., Mendelssohn, D., Verrelli, M., Tanna, G., & Sood, M. (2011). Perceived barriers to guidelines I peritoneal dialysis. *Nephrology Transplant, (26),* 1683-1689.

American Nurses Credentialing Center. (2011). *Magnet Program.* Retrieved January 4, 2011, 2011, fromhttp://www.nursecredentialing.org/Magnet/ProgramOverview.aspx

Astin, J. (2007). Barriers to the integration of new evidence in medicine: The importance of context. *Arthritis and Rheumatism (Arthritis Care and Research), 57*(7), 1116-1118.

Baker, P. (E.). (2003.) *Core Curriculum for Pediatric Emergency Nursing.* Boston: Jones and Barlett.

Berenholtz, S., & Pronovost, P. J. (2003). Barriers to translating evidence into practice. *Current Opinion in Critical Care, 9*(4), 321-325.

Berwick, D. (2003). Disseminating innovations in health care. *JAMA: Journal of the American Medical Association, 289*(15), 1969-1975.

Billings, D., & Kowalski, K. (2006). Bridging the theory-practice gap with evidence-based practice. *The Journal of Continuing Education in Nursing, 37*(6), 248-249.

Blair, F. (2008). *Evidence-based emergency nursing practice: State of the science and recommendations for the profession.* (Doctor of Philosophy, Texas Woman's Univeristy College of Nursing).

Brenner, M. (2005).Children's nursing in Ireland: barriers to, and facilitators of, research utilization. *Paediatric Nursing, 17*(4), 40-45.

Brown, C., Wickline, M., Ecoff, L., & Glaser, D. (2009). Nursing practice, knowledge, attitudes and perceived barriers to evidence-based practice at an academic medical center. *Journal of Advanced Nursing, 65*(2), 371-381.

Burns, N., & Grove, S. (2005). *The Practice of Nursing Research: Conduct, Critique, and Utilization* (5th ed.). St. Louis, Missouri: Elsevier Saunders.

Butler, L. (1995). Valuing research in clinical practice: a basis for developing a strategic plan for nursing research. *Canadian Journal of Nursing Research, 27*(4), 33-49.

Cabana, M., Rand, C., Powe, N., Wu, A., Wilson, M., Abboud, P., & Rubin, H. (1999). Why don't physicians follow clinical practice guidelines? *Journal of the American Medical Association, 282*(15), 1458-1468.

Carlson, C. L., & Plonczynski, D. J. (2008). Has the BARRIERS Scale changed nursing practice? An integrative review. *Journal of Advanced Nursing, 63*(4), 322-333.

Carroll, D. L., Greenwood, R., Lynch, K. E., Sullivan, J. K., Ready, C. H., & Fitzmaurice, J. B. (1997). Barriers and facilitators to the utilization of nursing research. *Clinical Nurse Specialist: The Journal for Advanced Nursing Practice, 11*(5), 207-212.

Cavender, K., Goff, M., Hollon, E., & Guzzetta, C. (2004). Parents' positioning and distracting children during venipuncture: effects on children's pain, fear, and distress. *Journal of Holistic Nursing, 22*(1), 32-56.

Choi, J., Bakken, S., Larson, E., Du, Y., & Stone, P. W. (2004). Perceived nursing work environment of critical care nurses. *Nursing Research, 53*(6), 370-378.

Cimiotti, J. P., Quinlan, P. M., Larson, E. L., Pastor, D. K., Lin, S. X., & Stone, P. W. (2005). The magnet process and the perceived work environment of nurses. *Nursing Research, 54*(6), 384-390.

Closs, S. J., Baum, G., Bryar, R. M., Griffiths, J., & Knight, S. (2000). Barriers to research implementation in two Yorkshire hospitals. *Clinical Effectiveness in Nursing, 4*(1), 3-10.

Cook, M., Meade, M., Hand, L., & McMullin, J. (2002). Toward understanding evidence uptake: Semirecumbency for pneumonia prevention. *Critical Care Medicine, 30*, 1472-1477.

Coyle, L. A., & Sokop, A. G. (1990).Innovation adoption behavior among nurses.*Nursing Research, 39*(3), 176-180.

Cummings, G. Estabrooks, C. Midodzi, W., Wallin, L., & Hayduk, L. (2007). Influence of organizational characteristics and context on research utilization. *Nursing Research, 56(4),* S24-29.

Cummings, G., Hutchinson, A. , Scott, S. , Norton, P. , & Estabrooks, C. (2010). The relationship between characteristics of context and research utilization in a pediatric setting. *BMC Health Services Research, 10,* 168-168.

DePalma, J. (2000). Evidence-based clinical practice guidelines. *Seminars in Perioperative Nursing, 9*(3), 115-120.

Dunton, N., Gajewski, B., Klaus, S., & Pierson, B. (2007).The relationship of nursing workforce characteristics to patient outcomes. *Online Journal of Issues in Nursing, 12*(3), 7-7.

Eland, J. (1990). Pain in children. *Nursing Clinics of North America, 25*(4), 871-884.

Estabrooks, C. (1999). Modeling the individual determinants of research utilization. *Western Journal of Nursing Research, 21*(6), 758-772.

Estabrooks, C., Midodzi, W. Cummings, G., & Wallin, L. (2007). Predicting research use in nursing organizations: a multilevel analysis. *Nursing Research, 56*(4), S7-23.

Estabrooks, C. A., Squires, J. E., Cummings, G. G., Birdsell, J. M., & Norton, P. G. (2009). Development and assessment of the Alberta Context Tool. *BMC Health Services Research, 9*, 234-234.

Ferrell, B., & McCaffery, M. (2008).*Knowledge and Attitudes Survey Regarding Pain.* Retrieved from http://prc.coh,org/Knowledge Attitude Survey updated 5-08.pdf

Fink, R., Thompson, C., & Bonnes, D. (2005). Overcoming barriers and promoting the use of research in practice. *Journal of Nursing Administration, 35*(3), 121-129.

Freeman, A., & Sweeney, K. (2001). Why general practitioners do not implement evidence: Qualitative study. *British Medical Journal, 323.*1-5.

Friese, C. (2005). Nurse practice environments and outcomes: implications for oncology nursing. *Oncology Nursing Forum, 32*(4), 765-772.

Funk, S. G., Champagne, M. T., Wiese, R. A., & Tornquist, E. M. (1991). BARRIERS: the barriers to research utilization scale. *Applied Nursing Research, 4*(1), 39-45.

Furyk, J., & Sumner, M. (2008). Pain score documentation and analgesia: a comparison of children and adults with appendicitis. *Emergency Medicine Australasia, 20*(6), 482-487.

Gerrish, K., Ashworth, P., Lacey, A., Bailey, J., Cooke, J., Kendall, S., & McNeilly, E. (2007). Factors influencing the development of evidence-based practice: a research tool. *Journal of Advanced Nursing, 57*(3), 328-338.

Glacken, M., & Chaney, D. (2004). Perceived barriers and facilitators to implementing research findings in the Irish practice setting. *Journal of Clinical Nursing, 13*(6), 731-740.

Gokenbach, V., & Drenkard, K. (2011). The outcomes of magnet environments and nursing staff engagement: a case study. *Nursing Clinics of North America, 46*(1), 89-105.

Gonzalez, J., Routh, D., & Armstrong, F. (1993). Differential medication of child versus adult postoperative patients: the effect of nurses' assumptions. *Children's Health Care, 22*(1), 47-59.

Goymour, K., Stephenson, C., Goodenough, B., & Boulton, C. (2000). Evaluating the role of play therapy in the paediatric emergency department. *Australian Emergency Nursing Journal, 3*(2), 10-12.

Grol, R., & Wensing, M. (2004). What drives change? Barriers to and incentives for achieving evidence-based practice. *The Medical Journal of Australia, 180*, S57-S60.

Harvey, G., Loftus-Hills, A., Rycroft-Malone, J., Titchen, A., Kitson, A., McCormack, B., & Seers, K. (2002). Getting evidence into practice: the role and function of facilitation. *Journal of Advanced Nursing, 37*(6), 577-588.

Hickey, P., Gauvreau, K., Connor, J., Sporing, E., & Jenkins, K. (2010).The relationship of nurse staffing, skill mix, and MAGNET recognition to institutional volume and mortality for congenital heart surgery. *Journal of Nursing Administration, 40*(5), 226-232.

Hughes, L., Chang, Y., & Mark, B. (2009). Quality and strength of patient safety climate on medical-surgical units. *Health Care Management Review, 34*(1), 19-28.

Hutchinson, A. M., & Johnston, L. (2004). Bridging the divide: a survey of nurses' opinions regarding barriers to, and facilitators of, research utilization in the practice setting. *Journal of Clinical Nursing, 13*(3), 304-315.

Iowa Department of Public Health (2006). *Status of the Nurse Workforce in Iowa February 2006.*

Jacob, E., & Puntillo, K. (1999). A survey of nursing practice in the assessment and management of pain in children. *Pediatric Nursing, 25*(3), 278-286.

Johansson, B., Fogelberg-Dahm, M., & Wadensten, B. (2010). Evidence-based practice: the importance of education and leadership. *Journal of Nursing Management, 18(1).*

Kajermo, K., Undén, M., Gardulf, A., Eriksson, L., Orton, M., Arnetz, B., & Nordström, G. (2008). Predictors of nurses' perceptions of barriers to research utilization. *Journal of Nursing Management, 16*(3), 305-314.

Kendall-Gallagher, D., & Blegen, M. A. (2009). Competence and certification of registered nurses and safety of patients in intensive care units. *American Journal of Critical Care, 18*(2), 106-114.

Kersten, H., Thompson, E. D., & Frohna, J. G. (2008). The use of evidence-based medicine in pediatrics: past, present and future. *Current Opinion in Pediatrics, 20*(3), 326-331.

Khan, K., & Weisman, S. (2007). Nonpharmacologic pain managment strategies in the pediatric emergency department. *Journal of Clinical Pediatric Emergency Medicine, 8*, 240-247.

Kitson, A., Harvey, G., & McCormack, B. (1998a). Enabling the implementation of evidence based practice: A conceptual framework. *Quality in Health Care, 7,* 149-158.

Kitson, A., Harvey, G., & McCormack, B. (1998b). Approaches to implementing research in practice. *Quality in Health Care, 7,* 149-159.

Kitson, A., Rycroft-Malone, J., Harvey, G., McCormack, B., Seers, K., & Titchen, A. (2008). Evaluating the successful implementation of evidence into practice using the PARiHS framework: theoretical and practical challenges. *Implementation Science, 3,* 1-1.

Kleiber, C., Jennissen, C., McCarthy, A. M., & Ansley, T. (2011). Evidence-based pediatric pain management in emergency departments of a rural state. *Journal of Pain, 12(8),* 900-910.

Knops, A., Vermeulen, H., Legemate, D., & Ubbink, D. (2009). Attitudes, awareness, and barriers regarding evidence-based surgery among surgeons and surgical nurses. *World Journal of Surgery, 33,* 1348-1355.

Koehn, M. L., & Lehman, K. (2008). Nurses' perceptions of evidence-based nursing practice. *Journal of Advanced Nursing, 62*(2), 209-215.

Knops, A., Vermeulen, H., Legemate, D., & Ubbink, D. (2009). Attitudes, awareness, and barriers regarding evidence-based surgery among surgeons and surgical nurses. *World Journal of Surgery, 33,* 1348-1355.

Kramer, M., & Hafner, L. P. (1989). Shared values: impact on staff nurse job satisfaction and perceived productivity. *Nursing Research, 38*(3), 172-177.

Kramer, M., & Schmalenberg, C. (1988). Magnet hospitals: institutions of excellence... part 1. *Journal of Nursing Administration, 18*(1), 13-24.

Kramer, M., & Schmalenberg, C. (2005). Revising the essentials of magnetism tool: there is more to adequate staffing than numbers. *Journal of Nursing Administration, 35*(4), 188-198.

Lacey, E. (1994). Research utilization in nursing practice -- a pilot study. *Journal of Advanced Nursing, 19*(5), 987-995.

Lacey, S., Teasley, S., & Cox, K. (2009). Differences between pediatric registered nurses' perception of organizational support, intent to stay, workload, and overall satisfaction, and years employed as a nurse in magnet and non-magnet pediatric hospitals: implications for administrators. *Nursing Administration Quarterly, 33*(1), 6-13.

Lake, E., Shang, J., Klaus, S., & Dunton, N. (2010). Patient falls: association with hospital magnet status and nursing unit staffing. *Research in Nursing & Health, 33*(5), 413-425.

LaPierre, E., Ritchey, K., & Newhouse, R. (2004). Barriers to research use in the PACU. *Journal of PeriAnesthesia Nursing, 19*(2), 78-83.

Latimer, M., Johnston, C., Ritchie, J., Clarke, S., & Gilin, D. (2009). Factors affecting delivery of evidence-based procedural pain care in hospitalized neonates. *JOGNN: Journal of Obstetric Gynecologic & Neonatal Nursing, 38(2),* 182-194.

Leasure, A., Stirlen, J., & Thompson, C. (2008). Barriers and facilitators to the use of evidence-based best practices. *Dimensions of Critical Care Nursing, 27*(2), 74-84.

Lenz, B., & Barnard, P. (2009). Advancing evidence-based practice in rural nursing. *Journal for Nurses in Staff Development, 25*(1), E14-9.

Logsdon, M., Davis, D., Hawkins, B., Parker, B., & Peden, A. (1998). Accent on research. Factors related to research utilization by registered nurses in Kentucky. *Kentucky Nurse, 46*(1), 23-26.

Lugtenberg, M., Burgers, J., Zegers-van Schaick, J., & Westert, G. (2010). Guidelines on uncomplicated urinary tract infections are difficult to follow: perceived barriers and suggested interventions. *BMC Family Practice, 11*(1), 51.

Lundmark, V. (2008). Chapter 46 Magnet Environments for Professional Nursing Practice. In R. Hughes (Ed.) *Patient Safety and Quality: An Evidence-Based Handbook for Nurses.* Rockville, Maryland. Agency for Healthcare Research and Quality. Retrieved from http://www.ahrq.gov/qual/nurseshdbk/

Majumdar, S., Simpson, S., & Marrie, T. (2004). Physician-perceived barriers to adopting a critical pathway for community-acquired pneumonia. *The Joint Commission Journal on Quailty and Safety, 30*(7), 387-95.

Malone, B. (1996). The effect of live music on the distress of pediatric patients receiving intravenous starts, venipunctures, injections, and heel sticks. *The Journal of Music Therapy, 33*, 19-33.

Marchionni, C., & Ritchie, J. (2008). Organizational factors that support the implementation of a nursing Best Practice Guideline. *Journal of Nursing Management, 16*(3), 266-274.

McArthur, A. (2010). Review summaries: evidence for nursing practice. A comprehensive systematic review of evidence on determining the impact of Magnet designation on nursing and patient outcomes: is the investment worth it? *Journal of Advanced Nursing, 66*(6).

McCleary, L., & Brown, G. (2003). Barriers to paediatric nurses' research utilization. *Journal of Advanced Nursing, 42*(4), 364-372.

McClure, M., & Hinshaw, A. (Eds.). (2002). *Magnet hospitals revisted: Attraction and retention of professional nurses*. Washington D.C.: American Nurses Publishing.

McCormack, B., Kitson, A., Harvey, G., Rycroft-Malone, J., Titchen, A., & Seers, K. (2002).Getting evidence into practice: the meaning of 'context'. *Journal of Advanced Nursing, 38*(1), 94-104.

McGlynn, E., Asch, S., Adams, J., Keesey, J., Hicks, J., DeCrostofaro, A., & Kerr, E. (2003). The quality of health care delivered to adults in the United States. *The New England Journal of Medicine, 348*(26), 2635.

McMahon, S. R., Iwamoto, M., Massoudi, M. S., Yusuf, H. R., Stevenson, J. M., David, F., . . . Pickering, L. K. (2003). Comparison of e-mail, fax, and postal surveys of pediatricians. *Pediatrics, 111*(4), e299-303.

Melnyk, B., 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*(3), 185-193.

Melnyk, B., Fineout-Overholt, E., & Giggleman, M. (2010). EBP organizational culture, EBP implementation, and intent to leave in nurses and health professionals. *Communicating Nursing Research, 43*, 310-310.

Michel, Y., & Sneed, N. (1995). Dissemination and use of research findings in nursing practice. *Journal of Professional Nursing, 11*(5), 306-311.

Olade, R. (2004). Strategic collaborative model for evidence-based nursing practice. *Worldviews on Evidence-Based Nursing, 1*(1), 60-68.

Oranta, O., Routasalo, P., & Hupli, M. (2002). Barriers to and facilitators of research utilization among Finnish registered nurses. *Journal of Clinical Nursing, 11*(2), 205-213.

Parker, D., Gramling, R., Goldman, R., Eaton, C., Ahern, D., Cover, R., & Borkan, J. (2008). Physicians' perceptions of barriers and facilitators regarding adoption of the National Cholesterol Education Program guidelines. *Preventive Cardiology, 11*(1), 29-35.

Parsons, M., Cornett, P., Sewell, S., & Wilson, R. (2004). Capacity building for magnetism at multiple levels: a healthy workplace intervention, part II -- an emergency department's health workplace process and outcomes. *Topics in Emergency Medicine, 26*(4), 296-304.

Pepler, C., Edgar, L., Frisch, S., Rennick, J., Swidzinski, M., White, C., & Gross, J. (2006). Strategies to increase research-based practice: interplay with unit culture. *Clinical Nurse Specialist: The Journal for Advanced Nursing Practice, 20*(1), 23-33.

Press, J., Gidron, Y., Maimon, M., Gonen, A., Goldman, V., & Buskila, D. (2003). Effects of active distraction on pain of children undergoing venipuncture: Who benefits from it? *The Pain Clinic, 15*(3), 261-269.

Probst, B., Lyons, E., Leonard, D., & Esposito, T. J. (2005). Factors affecting emergency department assessment and management of pain in children. *Pediatric Emergency Care, 21*(5), 298-305.

Ramponi, D. (2009). Reducing pain in pediatric procedures in the emergency department. *JEN: Journal of Emergency Nursing, 35*(4), 379-382.

Retsas, A. (2000). Barriers to using research evidence in nursing practice. *Journal of Advanced Nursing, 31*(3), 599-606.

Rodgers, S. (2000a). The extent of nursing research utilization in general medical and surgical wards. *Journal of Advanced Nursing, 32*(1), 182-193.

Rodgers, S. (2000b). A study of utilization of research in practice and the influence of education. *Nurse Education Today, 20*(4), 279-287.

Rogers, A., Greenwald, M., DeGuzman, M., Kelley, M., & Simon, H. (2006). A randomized, controlled trial of sucrose analgesia in infants younger than 90 days of age who require bladder catheterization in the pediatric emergency department. *Academic Emergency Medicine, 13*(6), 617-622.

Rutledge, D., Greene, P., Mooney, K., Nail, L., & Ropka, M. (1996). Use of research-based practices by oncology staff nurses. *Oncology Nursing Forum, 23*(8), 1235-1244.

Rycroft-Malone, J. (2004). The PARIHS framework -- a framework for guiding the implementation of evidence-based practice.Promoting Action on Research Implementation in Health Services. *Journal of Nursing Care Quality, 19*(4), 297-304.

Rycroft-Malone, J. (2008). Evidence-informed practice: from individual to context. *Journal of Nursing Management, 16*(4), 404-408.

Rycroft-Malone, J., Harvey, G., Seers, K., Kitson, A., McCormack, B., & Titchen, A. (2004). An exploration of the factors that influence the implementation of evidence into practice. *Journal of Clinical Nursing, 13*(8), 913-924.

Scales, C., Jr, Voils, C., Fesperman, S., Sur, R., Kubler, H., Preminger, G., & Dahm, P. (2008).Barriers to the practice of evidence-based urology. *The Journal of Urology, 179*(6), 2345-9.

Schechter, N., Berde, C., & Yaster, M. (Eds.). (2003). *Pain in infants, children, and adolescents* (2nd ed.). Philadelphia: Lippincott Williams & Wilkins.

Schmalenberg, C., & Kramer, M. (2008). Essentials of a productive nurse work environment. *Nursing Research, 57*(1), 2-13.

Scott, S., & Pollock, C. (2008). The role of nursing unit culture in shaping research utilization behaviors. *Research in Nursing & Health, 31*(4), 298-309.

Shinn, J. (1995). Keeping pace. Hospitals with strong nursing practice have better patient outcomes. *Progress in Cardiovascular Nursing, 10*(1), 47-48.

Sinha, M., Christopher, N., Fenn, R., & Reeves, L. (2006). Evaluation of nonpharmacologic methods of pain and anxiety management for laceration repair in the pediatric emergency department. *Pediatrics, 117*(4), 1162-1168.

Slater, P., McCormack, B., & Bunting, B. (2009). The development and pilot testing of an instrument to measure nurses' working environment: the Nursing Context Index. *Worldviews on Evidence-Based Nursing, 6*(3), 173-182.

Sparks, L. A., Setlik, J., & Luhman, J. (2007). Parental holding and positioning to decrease IV distress in young children: a randomized controlled trial. *Journal of Pediatric Nursing, 22*(6), 440-447.

Stevens, B., Riahi, S., Cardoso, R., Ballantyne, M., Yamada, J., Beyene, J., & Ohlsson, A. (2011). The Influence of Context on Pain Practices in the NICU: Perceptions of Health Care Professionals. *Qualitative Health Research, 21*(6), 757-770.

Tanabe, P., Ferket, K., Thomas, R., Paice, J., & Marcantonio, R. (2002).The effect of standard care, ibuprofen, and distraction on pain relief and patient satisfaction in children with musculoskeletal trauma. *JEN: Journal of Emergency Nursing, 28*(2), 118-125.

Tanios, M., de Wit, M., Epstein, S., & Devlin, J. (2009). Perceived barriers to the use of sedation protocols and daily sedation interruption: a multidisciplinary survey. *Journal of Critical Care, 24*(1), 66-73.

Titler, M. (2008).Chapter 7. The evidence for evidence-based practice implementation. In R. Hughes (Ed.), *Patient safety and quality: An evidence-based handbook for nurses*. Rockville, MD: Agency for Healthcare Research and Quality.

Toma, A., Bensimon, C., Dainty, K., Rubenfeld, G., Morrison, L., & Brooks, S. (2010). Perceived barriers to therapeutic hypothermia for patients resuscitated from cardiac arrest: a qualitative study of emergency department and critical care workers. *Critical Care Medicine, 38*(2), 504-509.

Tracy, M. (2007). Improving pediatric quality care in general care emergency departments. *JEN: Journal of Emergency Nursing, 33*(4), 399-401.

Ulrich, B., Woods, D., Hart, K., Lavandero, R., Leggett, J., & Taylor, D. (2007). Critical care nurses' work environments value of excellence in beacon units and magnet organizations. *Critical Care Nurse, 27*(3), 68-77.

Upenieks, V. (2003). The interrelationship of organizational characteristics of magnet hospitals, nursing leadership, and nursing job satisfaction. *Health Care Manager, 22*(2), 83-98.

Vaughn, T., McCoy, K., BootsMiller, B., Woolson, R., Sorofman, B., Tripp-Reimer, T., & Doebbeling, B. (2002). Organizational predictors of adherence to ambulatory care screening guidelines. *Medical Care, 40*(12), 1172-1185.

Vincent, C., & Denyes, M. (2004). Relieving children's pain: nurses' abilities and analgesic administration practices. *Journal of Pediatric Nursing, 19*(1), 40.

Wallin, L., Ewald, U., Wikblad, K. Scott-Findlay, S., & Arnetz, B., (2006). Understanding work contextual factors: A short-cut to evidence-based practice? *Worldviews on Evidence-Based Nursing, 3(4),* 153-164.

Weiss, R. (1994). Pediatric pain, predictive inference, and sensitivity analysis. *Evaluation Review, 18*(6), 651-677.

Winskill, R., & Andrews, D. (2008). Minimizing the 'ouch' -- a strategy to minimize pain, fear and anxiety in children presenting to the emergency department. *Australasian Emergency Nursing Journal, 11*(4), 184-188.

Winter, J. C. (1990). Brief: relationship between sources of knowledge and use of research findings. *Journal of Continuing Education in Nursing, 21*(3), 138-140.

Yava, A., Tosun, N., Cicek, H., Yavan, T., Terakye, G., & Hatipoglu, S. (2009). Nurses' perceptions of the barriers to and the facilitators of research utilization in Turkey. *Applied Nursing Research, 22*(3), 166-175.

Yew, K., & Reid, A. (2008). Teaching evidence-based medicine skills. *Family Medicine, 40*(1), 24-31.

Young, T., Griffin, E., Phillips, E., & Stanley, E. (2010). Music as Distraction in a Pediatric Emergency Department. *JEN: Journal of Emergency Nursing, 36*(5), 472-473.

Zempsky, W. T., & Cravero, J. P. (2004). Clinical report: relief of pain and anxiety in pediatric patients in emergency medical systems. *Pediatrics, 114*(5), 1348-1356.

APPENDIX A PEDIATRIC PAIN ASSESSMENT AND MANAGEMENT IN EMERGENCY DEPARTMENTS SURVEY

Pediatric Pain Assessment & Management in Emergency Departments

Funded by

Thank you for agreeing to participate in this survey. We want to know more about pediatric pain assessment and management practices in Iowa emergency departments (ED). Please tell us about your current practices, knowledge, and attitudes, along with the barriers you experience, in providing pediatric pain management.

We ask that you respond to all of the statements and questions that follow. Your responses are confidential and your identity will not be associated with any answers that you give.

Part A

Directions: Thinking about pediatric pain management in the ED of your hospital for **children 0-10 years of age**, please indicate how **your practice** matches the following statements.

1. Before IV insertions, I apply the following to skin. (Check only one response for each strategy.)	Never	10% of the time	25% of the time	50% of the time	75% of the time	100% of the time
a. EMLA or LMX						
b. Vapocoolants						
c. Buffered lidocaine injection						
d. J-tip or Zingolidocaine						
e. Other, please specify:						

2. Before blood draws, I apply the following to skin. (Check only one response for each strategy.)	Never	10% of the time	25% of the time	50% of the time	75% of the time	100% of the time
a. EMLA or LMX						
b. Vapocoolants						
c. Buffered lidocaine injection						
d. J-tip or Zingolidocaine						
e. Other, please specify:						

(Check only one response for each statement.)	Never	10% of the time	25% of the time	50% of the time	75% of the time	100% of the time
3. For children with abdominal pain who require a surgical consultation, I withhold pain medication until a complete assessment can be performed by a surgeon.						
4. I use non-drug interventions (such as controlled breathing, imagery or distraction) with children during painful procedures.						
5. I apply a topical analgesic (like LAT or TAC) to lacerations before suturing if the child is not deeply sedated.						
6. When I provide lidocaine for injection, it is buffered with bicarbonate.						
7. I show or tell parents how to distract their children during procedures.						
8. I tell children what will happen before a procedure begins.						
9. If a child's pain rating is 6 (on a scale of 10) at triage, I give or seek an order to give pain medication.						
10. I obtain an order for or suggest the use of anesthetic ear drops for children with ear pain.						

(Check only one response for each statement.)	Never	10% of the time	25% of the time	50% of the time	75% of the time	100% of the time
1. I ask school aged children to rate their pain on a scale.						
2. I ask parents to rate the pain of their school aged children.						
3. I provide sucrose or a sucrose pacifier to neonates for a painful procedure.						
4. I apply pressure at the injection site before giving an IM injection.						
5. I use lidocaine as a diluent for IM ceftriaxone.						

Part B

Directions: Please circle your response to each of the following statements.

1. Parent and child reports of pain intensity are usually the same.	T	F	I don't know
2. Unbufferedlidocaine is painful because of its acidic pH.	T	F	I don't know
3. Warming lidocaine to body temperature prior to injection reduces the pain of the injection.	T	F	I don't know
4. Young infants have less pain sensitivity than older children.	T	F	I don't know
5. Topical EMLA should be applied at least 60 minutes prior to a painful procedure.	T	F	I don't know
6. Topical LMX provides analgesia in approximately 30 minutes.	T	F	I don't know
7. An observable change in vital signs should be used to verify a child's complaint of severe pain.	T	F	I don't know
8. Midazolam (Versed) provides good pain relief.	T	F	I don't know
9. Sucrose pacifiers are most effective for reducing venipuncture pain in very young infants.	T	F	I don't know
10. If a child can be distracted from pain, the pain intensity is not high.	T	F	I don't know
11. Treating a child's abdominal pain before a thorough diagnostic work-up masks the diagnosis of appendicitis.	T	F	I don't know
12. Telling children about an upcoming procedure makes the pain worse.	T	F	I don't know
13. The most accurate judge of the intensity of an 8 year old child's pain is the child.	T	F	I don't know
14. The time to peak effect for morphine sulfate given IV is 10-15 minutes.	T	F	I don't know

Part C

Directions: Please indicate your level of agreement with the following statements.

(Check only one response for each statement.)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I am comfortable calculating pediatric pain medication doses.					
2. I am **un**comfortable having parents stay with their child when I do IV sticks.					
3. I think verbal children exaggerate the severity of their pain.					
4. I think parents exaggerate the severity of their child's pain.					
5. I feel that children who have had a painful medical procedure are more anxious with subsequent medical visits.					
6. I believe adults who had painful medical procedures as children have increased anxiety with medical care as an adult.					
7. I believe adults who had painful medical procedures as children are more likely to avoid routine medical care as adults.					
8. I believe uncontrolled pain should be considered negligence in patient care.					
9. I think topical anesthetics (e.g., EMLA, LMX) take too long to be effective in the ED setting.					
10. I think topical anesthetics make it harder to place an IV due to vasoconstriction.					
11. I had painful medical procedures as a child that I remember.					
12. I dread having medical procedures as an adult.					

Part C continued

Directions: Please indicate your level of agreement with the following statements.

(Check only one response for each statement.)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My ED's standard of practice for pediatric pain management allows me sufficient autonomy in managing pain.					
2. The medications I need to treat pain in the ED are readily available to me.					
3. I have sufficient time to review my hospital's information (guidelines/protocols).					
4. There is **in**sufficient time at work for our ED to implement changes in practice.					
5. I have the power to change practice in my ED.					
6. My nursing colleagues in the ED are receptive to changing practice.					
7. My physician colleagues in the ED are receptive to changing practice.					
8. My physician assistant and nurse practitioner colleagues in the ED are receptive to changing practice. (Skip if not applicable to your ED.)					
9. There is a culture of continuous improvement in my ED.					
10. There is a culture of continuous improvement in my hospital.					
11. I feel there is open communication and dialogue in my ED.					
12. I feel there is open communication and dialogue in my hospital.					
13. My ED places great importance on pain management.					
14. My hospital organization places great importance on pain management.					
15. I am clear about avenues for making practice changes in my ED.					
16. My ED leadership builds effective teamwork.					

Part C continued

Directions: Please indicate your thoughts about the effectiveness of the following practices to decrease pain in children.

(Check only one response for each statement.)	Never used or seen used	Not at all Effective	Effective some of the time	Effective	Very Effective
1. Topical anesthetics for IV placement (e.g., EMLA, LMX).					
2. Vapocoolant spray for blood draws					
3 Topical anesthetics (e.g., TAC, LET) for facial laceration repair.					
4. Buffering lidocaine prior to laceration repair.					
5. Pressure at the injection site prior to giving IM medication.					
6. Lidocaine as a diluents for IM Ceftriaxone					
7. Controlled breathing, imagery, distraction techniques.					
8. Sucrose for infants undergoing procedures.					
9. Anesthetic ear drops for ear pain.					
10. Urethral lidocaine gel for bladder catheterization					

Part C continued

Directions: Please circle your response to each of the following statements.

1. My ED is evaluated on the ***assessment*** of pain (e.g. quality improvement data).	T	F	I don't know
2. My ED is evaluated on the ***treatment*** of pain (e.g. quality improvement data).	T	F	I don't know
3. I am individually evaluated on my ***assessment*** of pain.	T	F	I don't know
4. I am individually evaluated on my ***treatment*** of pain.	T	F	I don't know

Part D

Directions: Please indicate if the following are barriers to providing pediatric pain management in your ED.

(Check only one response for each statement.)	Yes	No
1. Lack of ED standing orders for immediate pain medication administration or pain prevention techniques		
2. Lack of ED policy and procedure protocols for pediatric pain management		
3. Lack of time due to the care needs of other patients		
4. Inadequate staff knowledge about pain management principles		
5. Inadequate staff assessment of pain and pain relief		
6. Reluctance of nurses to administer analgesics		
7. Reluctance of medical staff to order analgesics		
8. Parent or child reluctance to ask for analgesics		

Part D continued

Directions: Please tell us what has facilitated evidence-based pain management practices in your ED.

Directions: Please tell us what would assist your ED in implementing additional evidence-based pediatric pain management practices.

Demographic Information

Directions: In order to fully analyze the information you have provided in this survey, we need some demographic information. Keeping in mind that all information will be kept confidential, please complete the following:

1. Hospital of ED Employment: _____
2. City & State of Hospital: _____
3. Gender (circle one): Male Female
4. Age : _____ years
5. Race – Ethnic Group (check only one response)
   - ____ Caucasian/White
   - ____ African American
   - ____ American Indian or Eskimo
   - ____ Asian/Pacific Islander
   - ____ Hispanic
   - ____ Latino
   - ____ Multiracial
   - ____ Decline to say
   - ____ Other (please specify) _____
6. Highest level of nursing education (check only one response)
   - ____ Technical School
   - ____ Diploma Program
   - ____ Associate Degree
   - ____ Bachelors
   - ____ Masters
   - ____ Doctorate
7. Professional Nurse Licensure (check only one response)
   - ____ Licensed Practical Nurse
   - ____ Registered Nurse
   - ____ Other (please specify) _____
8. Number of years of nursing employment: _____ years
9. Number of years of emergency department employment: _____ years
10. In the past two years, have you attended any continuing education classes or sessions about pediatric pain management? (circle one) Yes No

Thank you for your participation in this research project. To receive a $25 gift card as compensation for completing this survey, please provide us with the following information.

Name: _____

Mailing Address: _____

City: _____

State: _____

Zip Code: _____

Please indicate which gift card you prefer. (check only one response)

____ WalMart
____ Target
____ Lowes
____ Menards

To maintain confidentiality and assure that your identity is not associated with any of the information that you have provided,

1. Detach this page from the previous pages of this paper survey.
2. Fold this page in thirds and insert it into the attached envelope marked "CONFIDENTIAL"
3. Seal the envelope.
4. Place both the completed survey and "CONFIDENTIAL" envelope inside the attached, addressed and postage paid manila envelope.
5. Seal and drop in the mail.

APPENDIX B PROCEDURE FROM ORIGINAL STUDY

Subjects were recruited after approval from the Institutional Review Board at the University of Iowa and a designated contact person was asked to deliver a letter electronically that provided information on the study. Within the electronically delivered email, a link for the WebSurveyor© was given. Participants could access the survey via the link and complete the survey online. Hospitals that did not have access for staff to the internet or where staff could not receive emails with attachments were given paper copies of the survey to complete and return. A $25 gift card was available to those participants that completed the survey. The WebSurveyor© is a confidential, secure application. Participants giving name and address information for the gifts cards was not linked to the database for the survey to keep participant information confidential. Consent was implied via completion of the survey with IRB approval and each hospital was given a code number. The survey took approximately 20 minutes to complete. The online survey was developed using web software through the University of Iowa The WebSurveyor©. This allowed for a variety of nurse responses including multiple choice, Likert scales, and free text.

APPENDIX C NUMBER OF RESPONDENTS AND PEDIATRIC EMERGENCY DEPARTMENTS VISITS PER YEAR BY HOSPITAL CODE

Hospital data			
Hospital code	RN Respondents	Provider Respondents	2008 ED visits <18 years
1	2	1	684
2	22	1	741
3	12	0	4,026
4	12	1	1,636
5	8	0	1,136
6	1	0	257
7	8	0	226
8	21	7	3,691
9	3	1	860
10	5	2	2,079
11	11	2	603
12	6	2	1,468
13	10	5	1,069
14	30	4	8,115
15	22	6	10,708
16	6	1	1,197
17	1	1	720
18	12	2	1,128
19	4	0	760
20	14	0	1,057
21	5	1	773
22	15	1	3,375
23	11	0	258
24	15	1	618
25	13	0	4,968
26	4	1	720
27	2	10	1,390
28	25	1	14,045
29	28	3	14,045
30	7	4	1,345
31	2	1	1,537
32	16	6	2,051
33	12	8	3,770
34	26	4	20,224

35	12	2	1,380
36	17	9	12,775
37	8	2	941
38	20	1	3,204
39	23	5	4,325
40	4	0	343
41	9	1	188
42	12	1	601
43	6	1	831
44	6	1	1,137
45	17	3	5,059
46	7	3	2,890
47	16	0	340
48	6	3	2,322
49	12	4	448
50	7	2	696
51	10	2	257
52	11	0	263
53	9	0	585
54	12	2	1,132
55	5	1	220
56	2	1	678
57	4	1	683
58	14	5	834
59	12	7	4,280
60	45	23	6,575
61	8	2	1,081
62	7	1	821
63	6	1	3,039
64	2	1	489
65	12	0	1,368
66	9	0	561
67	15	1	1,293
68	13	3	622
69	7	4	1,486
70	11	0	220
71	6	2	1,055
72	3	0	954
73	24	3	6,529

74	13	2	765
75	7	3	314
76	7	1	1,767
77	9	5	3,182
78	9	5	469
79	15	2	2,321
80	13	1	1,319
81	3	0	932
82	8	0	951
83	3	1	539
84	4	1	859
85	3	2	1,947
86	3	1	6,000
87	11	0	1,760
88	6	0	1,543
89	10	0	454
90	8	4	88
91	6	4	1,246
92	5	0	303
93	5	1	298
94	2	0	370
95	1	0	521
96	2	0	521
97	15	0	222
98	8	1	468
99	7	6	1,044
100	1	2	5,772
101	19	2	6,754
102	6	1	1,648
103	9	0	1,594
104	9	0	291
105	20	0	710
106	6	1	1,673
107	8	3	4,233
108	17	2	5,119
109	8	4	725
110	6	0	1,584
111	3	3	1,254
112	18	3	5,725

	113	8	3	710
	114	3	4	1,093
	115	1	6	5,435
	116	0	1	4,298
	117	0	1	1,373
Total		1145	253	
Missing System		16	6	

APPENDIX D INSTITUTIONAL REVIEW BOARD DOCUMENTATION

Secondary analysis of evidence-based pediatric pain management in EDs

Form Review | Form Attachments | Form Workflow | Form Approval

This form has already been processed by the Human Subjects Office. This form's status is **Withdrawn (Withdrawn because it is not human subjects research)**. A history of the workflow associated with this form is shown below.

History

Time	Basket	Event
06/20/11 1500	Withdrawn	Arrived in Basket
06/20/11 1415	HSO Staff Review	Arrived in Basket
06/13/11 1456	PI Review	Arrived in Basket
06/13/11 1449	HSO Staff Review	Arrived in Basket
06/13/11 1415	IRB Chair Review	Arrived in Basket
06/13/11 1351	HSO Staff Review	Arrived in Basket
06/13/11 1345	Admin Prescreen	Arrived in Basket
06/10/11 1453	Admin Prescreen	Arrived in Basket

Correspondence

Sent: 06/13/11 1456 **By:** Brian Bishop **Contact Email:** brian-bishop@uiowa.edu **Phone:** 319.335.6563

Reply: 06/20/11 1415 **By:** Sarah Wente **Contact Email:** sarah-wente@uiowa.edu **Phone:** +1 319 335 7050

Question #1: The IRB chair has provided a preliminary review of the activity described and, since the dataset provided to the PI will have no identifiers (completely deidentified), this does not meet the definition of human subjects research. Thus, the IRB will not review and approve this activity and the application will be withdrawn. Please acknowledge receipt of this message in the comment box below and return the application for withdrawal. When completed, please route the HawkIRB application back to the HSO through the designated button at the bottom of this workflow page ('Return Routing Slip to the HSO' button). -Brian Bishop (brian-bishop@uiowa.edu)

Answer: I have received this message. Thank you for your review. Sarah Wente MSN, RN PhD Student College of Nursing

APPENDIX E CORRELATION MATRIX FOR CONTEXT AND EVIDENCE-BASED NONPHARMACOLOGICAL PEDIATRC PAIN MANAGEMENT PRACTICES AMONG NURSE SAMPLE

Table E1. Correlation Matrix for EBP and Context Among Nurse Sample

Pearson	EBNPP	ED Suff. auto-nomy	Meds available ED	Suff. time	Insuff. time at work in ED	Power to change pract.	Nurses recept. to change	MD recept. to change	CCI in ED	CCI in hosp.	Open comm. in ED	Open comm. in hosp.	ED import. on pain mgmt.	Hosp. import. on pain mgmt.	Clear Ave. for change ED	ED leader-ship team-work	Overall context
EBNPP	1																
ED Suff. Autonomy	.086**	1															
Meds available ED	.063*	.354**	1														
Suff. time	.103**	.192**	.293**	1													
Insuff. time at work in ED	.074*	.016	.090**	.348**	1												
Power to change practice	.077*	.131**	.131**	.176**	.279**	1											
Nurses receptive to change	.113**	.128**	.159**	.192**	.246**	.358**	1										
MD receptive to change	.054	.328**	.222**	.192**	.226**	.315**	.491**	1									
CCI in ED	.084**	.235**	.232**	.217**	.263**	.341**	.399**	.346**	1								
CCI in hosp.	.083**	.203**	.225**	.240**	.263**	.299**	.345**	.294**	.746**	1							
Open comm. in ED	.101**	.191**	.192**	.259**	.283**	.347**	.399**	.320**	.543**	.499**	1						
Open comm. in hosp.	.104**	.184**	.180**	.250**	.235**	.327**	.331**	.332**	.464**	.609**	.613**	1					
ED import. on pain mgmt	.118**	.387**	.339**	.228**	.158**	.176**	.249**	.301**	.378**	.366**	.337**	.328**	1				
Hosp. import. on pain mgmt.	.112**	.294**	.292**	.189**	.150**	.151**	.216**	.208**	.315**	.409**	.295**	.370**	.694**	1			
Clear ave.for change ED	.126**	.246**	.220**	.330**	.284**	.403**	.334**	.312**	.429**	.382**	.397**	.385**	.326**	.293**	1		
ED Leadership teamwork	.078**	.193**	.190**	.236**	.308**	.326**	.351**	.252**	.497**	.440**	.527**	.387**	.338**	.291**	.481**	1	
Overall context	.154**	.473**	.469**	.491**	.470**	.548**	.588**	.586**	.714**	.703**	.703**	.682**	.618**	.569**	.653**	.651**	1

*Correlation is significant at the 0.05 level (two-tailed).

**Correlation is significant at the 0.01 level (two-tailed)

CCI: Culture of Continuous Improvement

APPENDIX F EVIDENCE-BASED NONPHARMACOLOGICAL PEDIATRIC PAIN MANAGEMENT PRACTICES AND EVALUATION CROSS TABULATION FOR NURSE SAMPLE

Table F1. EBNPP and Evaluation Cross Tabulation for Nurse Sample

Nurse	ED evaluated on the assess. of pain (0)	ED evaluated on the assess. of pain (1)	Total	ED evaluated on treatment of pain (0)	ED is evaluated on treatment of pain (1)	Total	I am indiv. evaluated on my assessment of pain (0)	I am indiv. evaluated on my assessment of pain (1)	Total	I am indiv. evaluated on my treatment of pain (0)	I am indiv. evaluated on my treatment of pain (1)	Total
EBNPP												
0	0	2	2	0	2	2	0	1	1	0	2	2
1	0	5	5	0	5	5	3	5	8	2	6	8
2	2	21	23	3	22	25	7	14	21	7	12	19
3	10	84	94	17	75	92	29	57	86	38	47	85
4	16	145	161	21	139	160	41	98	139	46	91	137
5	9	246	255	12	236	248	55	172	227	57	163	220
6	16	236	252	17	232	249	71	163	234	77	156	233
7	3	111	114	10	103	113	31	68	99	35	64	99
8	2	22	24	3	21	24	7	15	22	6	14	20
Total	58	872	930	83	835	918	244	593	837	268	555	823

APPENDIX G CORRELATION MATRIX FOR CONTEXT AND EVIDENCE-BASED NONPHARMACOLOGICAL PEDIATRC PAIN MANAGEMENT PRACTICES AMONG PROVIDER SAMPLE

Table G1. Correlation Matrix for EBP and Context Among Provider Sample

Pearson	EBNPP	ED suff. auto-nomy	Meds available ED	Suff. time	Insuff. time at work in ED	Power to change pract.	Nurses recept. to change	MD recept. to change	CCI in ED	CCI in hosp.	Open comm. in ED	Open comm. in hosp.	ED import. on pain mgmt.	Hosp. import. on pain mgmt.	Clear ave.for change ED	ED leader-ship team-work	Overall context
EBNPP	1																
ED suff. autonomy	.111	1															
Meds available ED	.128	.511**	1														
Suff. time	.151*	.297**	.417**	1													
Insuff. time at work in ED	.163*	.316**	.255**	.416**	1												
Power to change practice	.089	.367**	.238**	.240**	.332**	1											
Nurses receptive to change	.073	.260**	.255**	.308**	.324**	.491**	1										
MD receptive to change	.088	.249**	.268**	.261**	.283**	.374**	.502**	1									
CCI in ED	-.017	.234**	.262**	.290**	.268**	.450**	.439**	.390**	1								
CCI in hosp.	.023	.234**	.171**	.194**	.262**	.419**	.432**	.337**	.779**	1							
Open comm. in ED	-.018	.342**	.297**	.228**	.291**	.574**	.566**	.500**	.771**	.708**	1						
Open comm. in hosp.	.014	.248**	.224**	.221**	.282**	.472**	.491**	.408**	.647**	.749**	.769**	1					
ED import. on pain mgmt	.187**	.365**	.457**	.271**	.303**	.347**	.432**	.328**	.488**	.462**	.534**	.425**	1				
Hosp. import. on pain mgmt.	.264**	.296**	.347**	.232**	.212**	.288**	.388**	.280**	.438**	.527**	.488**	.477**	.782**	1			
Clear ave.for change ED	.134*	.334**	.375**	.432**	.337**	.477**	.442**	.328**	.384**	.360**	.463**	.410**	.446**	.459**	1		
ED leadership teamwork	.032	.357**	.304**	.251**	.283**	.417**	.472**	.352**	.514**	.413**	.588**	.452**	.469**	.393**	.457**	1	
Overall context	.146*	.521**	.544**	.523**	.522**	.660**	.681**	.582**	.759**	.713**	.814**	.734[8]*	.723**	.664**	.671**	.669**	1

*Correlation is significant at the 0.05 level (two-tailed)

**Correlation is significant at the 0.01 level (two-tailed)

CCI: Culture of Continuous Improvement

APPENDIX H EVIDENCE-BASED NONPHARMACOLOGICAL PEDIATRIC PAIN MANAGEMENT PRACTICES AND EVALUATION CROSS TABULATION FOR PROVIDER SAMPLE

Table H1. EBNPP and Evaluation Cross Tabulation for Provider Sample

Provider	My ED is evaluated on the assessment of pain (0)	My ED is evaluated on the assessment of pain (1)	Total	My ED is evaluated on treatment of pain (0)	My ED is evaluated on treatment of pain (1)	Total	I am individually evaluated on my assessment of pain (0)	I am individually evaluated on my assessment of pain (1)	Total	I am individually evaluated on my treatment of pain (0)	I am individually evaluated on my treatment of pain (1)	Total
EBNPP												
0	0	1	1	0	1	1	0	1	1	0	1	1
1	0	5	5	0	5	5	1	2	3	1	2	3
2	2	21	23	3	17	20	7	7	14	8	6	14
3	1	26	27	3	25	28	14	15	29	16	16	32
4	6	37	43	10	33	43	22	20	42	21	20	41
5	0	32	32	2	29	31	8	17	25	9	17	26
6	1	21	22	1	20	21	9	9	18	9	11	20
7	0	10	10	0	10	10	1	4	5	1	4	5
8	0	2	2	0	2	2	0	1	1	0	1	1
Total	10	155	165	19	142	161	62	76	138	65	78	143