

NURSES' KNOWLEDGE, ATTITUDES AND PRACTICE
OF SUDDEN UNEXPECTED INFANT DEATH RECOMMENDATIONS AND SAFE SLEEP
EDUCATION: A SYSTEMATIC REVIEW

A Paper
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By

Jessica Beth Linneman

In Partial Fulfillment of the Requirements
for the Degree of
MASTER OF SCIENCE

Major Department:
Nursing

June 2016

Fargo, North Dakota

North Dakota State University
Graduate School

Title

Nurses' Knowledge, Attitudes and Practice of Sudden Unexpected Infant Death
Recommendations and Safe Sleep Education: A Systematic Review

By

Jessica Beth Linneman

The Supervisory Committee certifies that this *disquisition* complies with North Dakota State University's regulations and meets the accepted standards for the degree of

MASTER OF SCIENCE

SUPERVISORY COMMITTEE:

Dr. Norma Kiser-Larson

Chair

Dr. Daniel Friesner

Professor Jana Stenson

Approved:

07/21/2016

Date

Dr. Carla Gross, Associate Dean and Chair

Department Chair

ABSTRACT

This paper conducts a systematic literature review on nurses' knowledge, attitudes and practice regarding safe infant sleep practices. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework was used to guide the review of literature. Eighteen articles were evaluated for inclusion criteria and results indicated that nurses' lack sufficient knowledge and have conflicting attitudes towards infant sleep recommendations, as well as practice safe sleep recommendations inconsistently. In addition, it was found that nurses value policy when it comes to implementing safe sleep practices. A detailed discussion of how knowledge deficits, attitudinal barriers, and education and policy effect nursing practice and patient care provides supporting evidence for proposed interventions to change nursing behavior and practice. Proposed interventions include developing nurse education supported by research findings and rational, a new wide reaching public education campaign and policy development within organizations to support the use to current safe sleep recommendations.

TABLE OF CONTENTS

ABSTRACT	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
CHAPTER 1. INTRODUCTION	1
Nursing Problem	1
Background	6
Definitions	9
CHAPTER 2. METHODOLOGY	12
PRISMA Framework	12
Review Protocol	15
Databases	15
Search Terms	15
Inclusion Criteria	16
Exclusion Criteria	17
PRISMA Flow Diagram	17
CHAPTER 3. RESULTS	19
Overview of Selected Studies	19
Synthesis of Selected Studies	35
Knowledge Deficits of Infant Sleep Recommendations	36
Conflicting Attitudes Towards Infant Sleep Recommendations	40
Inconsistent Practice of Infant Sleep Recommendations	46
Importance of Policy in Nursing Practice	48
CHAPTER 3. DISCUSSION, RECOMMENDATIONS, AND CONCLUSION	51
Discussion	51

Knowledge Deficits Effect Nursing Practice and Patient Outcomes.....	51
Attitudinal Barriers to Recommendations are Persistent.....	53
Education and Policy Influence Nursing Decisions.....	56
Implications.....	57
Nurse Education.....	60
Public Education Campaign.....	62
Policy Development.....	64
Recommendations.....	65
Future Research	66
Closing Remarks.....	68
REFERENCES	70
APPENDIX. SEARCH TERMS.....	83

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Summary of Studies Included in the Systematic Review of Literature.....	19

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. PRISMA flow diagram of information through the different phases of a systematic review (Liberati et al., 2009).....	18
2. Theoretical Framework for nursing intervention development; adapted from Azjen's Theory of Planned Behavior (Côté, Gagnon, Houme, Abdeljelil, & Gagnon, 2012)	60

CHAPTER 1. INTRODUCTION

Nursing Problem

According to the Centers for Disease Control and Prevention (2015), 3,500 infants less than one year old die unexpectedly each year in the United States. The sudden and unexpected death of an infant less than one year is termed sudden unexpected infant death (SUID). Three commonly reported SUID events are sudden infant death syndrome (SIDS), unknown cause, and accidental suffocation and strangulation in bed (ASSB). In 2013, 45% or approximately 1,500 infants died of SIDS while 31% of SUID cases were identified as an unknown cause (Centers for Disease Control and Prevention [CDC], 2015). Of particular concern is the number of infants who were determined to have died from unsafe sleep environments known as ASSB. Suffocation by soft bedding, overlay by a caregiver sleeping with the infant, wedging, entrapment or strangulation are all considered forms of ASSB. In 2013, 14% of the SUID cases were determined to have died from ASSB (CDC, 2015) and that number increased to 25% in the year 2014 (CDC, 2016).

Given this tragic and staggering statistic, reducing infant mortality continues to be on the forefront of public health initiatives. Public health initiatives suggest it is possible to reduce the risk of SUID by following key safe sleep practice recommendations outlined by the American Academy of Pediatrics (AAP). The most current AAP (2011a) policy statement on safe sleep recommendations include “supine positioning; use of a firm sleep surface; breastfeeding; room-sharing without bed-sharing; routine immunizations; consideration of using a pacifier; and avoidance of soft bedding, overheating, and exposure to tobacco smoke, alcohol, and illicit drugs” (p.1030).

The AAP is not the only physician directed organization that has defined recommendations for infant sleep. The Academy of Breastfeeding Medicine (ABM) reports infant sleep location has a significant impact on the success of breastfeeding. While both the AAP and ABM have a key interest in improving the health outcomes of infants, their position statements differ on the location of infant sleep. The AAP recommends the infant share a room with parents but sleep in a separate bed. Room-sharing, not bed-sharing is meant to protect the child from death related to sleeping hazards found in adult beds (Blair et al., 1999; Carpenter et al., 2004; Tappin, Ecob, & Brooke, 2005). Conversely, the ABM recommends mothers, specifically breastfeeding mothers, co-sleep with their infant. The ABM explains co-sleeping in terms of bed-sharing and use the words interchangeably as well as together (i.e. co-sleeping/bed-sharing) throughout the protocol. Research by McKenna, Mosko, and Richard (1997) and Mosko, Richard, and Mckenna (1997a, 1997b) showed a strong relationship between a co-sleeping mother and infant and breastfeeding duration. Additionally, the ABM (2008) states “there is currently not enough evidence to support routine recommendations against co-sleeping” (p. 41). The ABM supports parents in making informed choices regarding infant sleep practices by recommending parents be educated about risks and benefits of co-sleeping, including bed-sharing. And yet, according to the AAP (2011b) “epidemiological studies have not demonstrated any bed-sharing situations as protective against SIDS or suffocation” and goes on to state:

“It is statistically much more difficult to demonstrate safety (ie, no risk) in small subgroups. Breastfeeding mothers who do not smoke and have not consumed alcohol or arousal-altering medications or drugs are 1 such subgroup. Furthermore, not all risks associated with bed-sharing (eg, parental fatigue) can be controlled. The task force,

therefore, believes that there is insufficient evidence to recommend any bed-sharing situation in the hospital or at home as safe” (p. e1351).

Bed-sharing is common in many cultures and has been shown to make breastfeeding easier and enhance bonding, however bed-sharing research does not support bed-sharing as a protective strategy to SIDS (National Institutes of Health [NIH], 2016). Rates of ASSB have risen slowly over the last decade and as previously discussed infants who share an unsafe sleeping environment with an adult are at an increased risk of death by injury especially for infants younger than four months (Ruys, de Jonge, Brand, Engelberts & Semmerkrot, 2007). Multiple studies have shown that parents often share sleep surfaces with their infant. In 2008, Ateah and Hamelin found that 72.4% of the 293 mothers surveyed reported bed sharing regularly or on an occasional basis with their three-month-old infants. Reasons mothers report sharing a bed with their infant include mother-infant bonding, breastfeeding, frequent infant night awakenings, parental stress, improved sleep for mother, culture and tradition (Colson et al., 2013; Horsley et al., 2007; McKenna et al, 1997; Möllborg, Wennergren, Norvenius, & Alm, 2011; Salm Ward & Ngui, 2015). Additional studies indicate that bed-sharing is common practice. The National Infant Sleep Position Study showed that bed sharing practices have increased to 13.5% in 2010 from 6.5% in 1993 (Coloson et al., 2013). Mothers often share a sleep surface with their infant despite initially intending never to share a surface and despite the known dangers. Krouse et al. (2012) found that at the time of initial enrollment prior to infant’s birth, none of the mothers intended on sharing a sleep surface with their infant. Yet, follow up interviews revealed that 47% of the mothers shared a bed with their infant at one month, and 17% at three months (2012). Ateah and Hamelin (2008) found that 88% of mothers who bed-share with their infants agreed that it is not without risk.

The AAP and ABM both recognize epidemiological studies that have identified specific circumstances, when present, significantly increase the risk of infant death when a caregiver and infant share a sleep surface. Unsafe sleeping practices that increase an infant's risk of death include: (a) bed-sharing with an infant younger than three months regardless of whether parents are smokers or not, and (b) bed-sharing with a current smoker or if the mother smoked during pregnancy (Blair et al., 1999; Blair et al., 2009; Carpenter et al., 2004; Tappin et al., 2005). Furthermore, research has shown infant exposure to alcohol and illicit drugs both prenatally and after birth increase his or her risk of infant mortality including SIDS (AAP, 2011b, p. e1353). Also of importance are the risks associated with bed-sharing with someone who is not the parent or bed-sharing with multiple persons and/or bed-sharing on a soft surface (Blair et al., 1999; Tappin et al., 2005). Common surfaces that can be particularly dangerous to infants include waterbeds, old mattresses, sofas, couches, chairs, and surfaces with soft pillows and/or heavy blankets (Hauk et al., 2003, Blair et al. 2009).

On the other hand, the ABM and AAP recommendations for exclusive breastfeeding do align with each other. Exclusive breastfeeding and breastmilk feeding through age six months is encouraged with breastfeeding continuing through the introduction of complementary feeds as long as mother and child desire (AAP, 2011b). The literature documents many benefits for breastfeeding with the most notable being its association with a 45% reduction of SIDS (University at Albany, 2015). While any amount of breastfeeding or breastmilk feeding is protective, protection seems to increase with exclusivity (Hauck, Thompson, Tanabe, Moon, & Vennemann, 2011). Unfortunately, the United States falls short of the current breastfeeding recommendations. While the percentage of mothers who begin breastfeeding is high at 77%, only 49% are still breastfeeding at six months and 27% at 12 months (CDC, 2013)

The identified nursing problem is the significant difference in sleeping practice recommendations from two professional bodies. The AAP strongly recommends against bed-sharing of a caregiver and infant despite breastfeeding status while the ABM uses co-sleeping as an intervention to increase breastfeeding duration and exclusivity. Evidence suggests exclusive breastfeeding through six months reduces an infant's risk of SIDS nevertheless breastfeeding rates remain low and SIDS rates are unchanged. The difference in sleeping practice recommendations sends inconsistent messages to caregivers as well as registered nurses. Interestingly, co-sleeping habits of caregivers and infants is common and often underreported (Lahr, Rosenberg, & Lapidus, 2007). Lahr, Rosenberg and Lapidus used Oregon's Pregnancy Risk Assessment Monitoring System to survey 1,756 women on maternal-infant bed-sharing practices. When asked "How often does your baby sleep in the same bed with you?", 20.5% reported always bed-sharing, 14.7% almost always, 41.4% sometimes and only 23.4% reported never sharing a bed with their infant (Lahr, Rosenberg, & Lapidus, 2007). To date no standard nursing practice guideline exists to support the current safe sleep research or efforts of the safe sleeping campaigns. Without standard nursing practice guidelines to direct health education, families will receive varying instruction as to how to protect their infants from SIDS and SUID.

Registered nurses have a unique position to impact caregiver's decisions regarding sleep practice. According to National Institutes of Health (2015), when a family observes a registered nurse demonstrating safe sleep recommendations in the hospital that family is more likely to follow the recommended safe sleep practices at home. This systematic review examined literature for registered nurses' knowledge, attitudes and use of recommendations regarding safe infant sleep practices. The author focused on answering the following questions.

- What do registered nurses know about SIDS/SUID and infant sleep recommendations?

- What are registered nurses' beliefs or attitudes towards current infant sleep recommendations?
- What is the evidence regarding registered nurses use of safe sleep recommendations within their practice?
- How do registered nurses fill in the gaps between two recommendations and what criteria do they use to do so?

There are three ways the systematic review can be used to inform nursing practice. First, the information synthesized from the literature can guide policy makers to develop and improve current standard nursing practice standards and guidelines. Second, nurse educators can use the information gathered to find ways to integrate best practice recommendations for infant sleep into nursing curriculum as well as specialty areas of practice. Third, the systematic review of literature could be used to inform public health to revise current public education campaigns surrounding safe sleep practice.

Background

Efforts to decrease infant mortality began in the late 1960s with the recognition of the term sudden infant death syndrome in the healthcare literature (NIH, 2015). Soon after, Congress passed the Sudden Infant Death Syndrome Act in 1974. The congressional act recognized the significant impact of SIDS as a public health issue and directed research efforts towards improving infant outcomes. By the late 1980's epidemiologic reports from Europe and Australia urged medical societies to issue recommendations for putting infants to sleep in a non-prone position (AAP, 2011b). In response to these reports the United States' American Academy of Pediatrics Task Force recommended in 1992 that all infants be placed to sleep in a supine or side position to reduce the risks of SIDS (AAP, 2011a). By 1996, research showed even side-

sleeping positions were unstable and increased infants risk of SIDS so supine only sleeping was advised. Revision of infant sleep recommendations come every five years with the most recent published in 2011.

Public health directed agencies such as the CDC and the Maternal and Child Health Bureau have developed public education campaigns aimed at reducing SIDS and other sleep-related infant deaths. The most notable public health initiative was education that encouraged placing infants on their back to sleep (CDC, 1999). As a result, rates of SIDS dropped 52% over a ten-year period between 1994 and 2004 (University at Albany, 2015; CDC, 1999).

Despite the success, SIDS rates have plateaued since 2005 (AAP, 2011b). Unknown causes of infant deaths remained unchanged between 1990 and 2013 while rates of ASSB increased starting in 1998 to its highest in 2014 of 27.3 deaths per 100,000 live births (CDC, 2016). Research on national trends of SUID reports offer evidence that “the decrease in SIDS since 1999 may not be a true decline but may be explained by a shift in diagnosis such that cases once reported as SIDS are now reported as ASSB or unknown/unspecified” (Shapiro-Mendoza, Tomashek, Anderson, & Wingo, 2006, p. 768). Senter, Sackoff, Landi and Boyd (2011) reported the 1970’s infant deaths largely classified as SIDS are now classified as injury related from either asphyxia, strangulation or entrapment. Improvements in death scene investigations have informed statistical reporting and thus guiding public health education. With the increase in ASSB rates, education to protect infants from death shifted from reducing SIDS alone to promoting a safe sleep environment (AAP, 2011b).

According to the CDC (2015), the cause of death in many cases cannot be determined. It is believed most infants die from suffocation, strangulation or entrapment while sleeping in an unsafe environment. Researchers cannot be sure about how often SUID is a result of accidental

suffocation for multiple reasons including that cases are unwitnessed, autopsy tests are not able to differentiate between SIDS or suffocation, and the lack of uniformity in death investigations of infants (CDC, 2015; NIH, 2015). Varying interpretations and classifications of SUID create a barrier in understanding how sleep related factors impact infant mortality (Senter, Sackoff, Landi, & Boyd, 2006, p. 242). In 1996 the CDC released the Sudden Unexplained Infant Death Investigation Reporting Form. The form aimed to improve classification of sleep-related infant deaths by standardizing data collection (CDC, 2014). According to Shapiro-Mendoza, Tomashek, Anderson and Wingo (2006), the form may have led to improved data collection, death scene investigation, and understanding of unsafe sleep environments as evidenced by a steady increase in ASSB rates. By 2006, medical examiners, death scene investigators, and coroners offered trainings and guidelines through the CDC's Sudden Unexpected Infant Death Initiative of 2004. More recently, the CDC adopted a state-level surveillance system called the SUID Case Registry. The registry allows states to use standard definitions to categorize SUID and monitor the incidence of SUID in infant death investigations (CDC, 2014). The hope is that data collection in the case registry will convey demographic and environmental risk factors that will eventually guide new interventions and potentially save lives (CDC, 2014).

The successful campaign led by the AAP Task Force had an immediate effect on SIDS rates. In 2011, the AAP expanded the previous 2005 recommendations to include additional "safe sleep" guidance. However, long term-unchanged rates of SUID following a seemingly successful public health effort to reduce infant death rate requires a different, more effective health response.

Registered nurses provide care and education to mother-infant pairs prenatally through adolescence. Nursing care starts early during preconception physicals, prenatal appointments,

prenatal home visiting services, and even extends beyond labor and delivery and postpartum care to postpartum and pediatric clinic appointments. Each time a registered nurse encounters a family along the spectrum of care, a valuable opportunity presents itself to provide education that could save an infant's life. Lifesaving education is not limited to safe sleeping practices but can include breastfeeding support and promotion, poison control, injury prevention as well as disease prevention measures. Childhood injury prevention education is important because injury is the number one cause of death among children (CDC, 2012). Car crashes, suffocation, drowning, poisoning, fires and falls are the some of the most common injuries in childhood. Among infants, the leading cause of unintentional injury related to mortality between one and 12 months is SUIDS, with the highest number of deaths occurring between two and four months of age (CDC, 2012). Registered nurses who are responsible for providing SUID risk reduction education are typically responsible for promoting breastfeeding practices. Often times registered nurses hold additional certifications that reflect a certain body of research and knowledge to educate families. Registered Nurses holding lactation education certifications may be accessing information from the ABM to assist families while a pediatric nurse endorses AAP guidelines. Inconsistent recommendations from two professional associations cause a nursing dilemma, which may be influencing family's decisions in adopting safer sleep practices.

Definitions

Definitions of the terms related to infant death make navigating the literature confusing and complicates the research process. The sudden and unexpected death of an infant less than one year is termed sudden unexpected infant death or SUID (CDC, 2015). The NIH (2015) defines the following additional death diagnoses:

- Sudden Infant Death Syndrome (SIDS) is one type of SUID defined as the sudden death of an infant younger than one year of age that cannot be explained even after a full investigation that includes a complete autopsy, examination of the death scene, and review of the clinical history.
- Undetermined cause is used when evidence is not clear or not enough information is available (the CDC [2015] uses the term “unknown” in a case where a thorough investigation was conducted and a cause could not be determined).
- Accidental suffocation and strangulation in bed (ASSB) is one type of SUID and a cause-of-death code for vital statistics reporting purposes. The code is used to identify infant death caused by a mechanism that leads to accidental suffocation in a sleeping environment.
 - Overlay-when another person shares the sleep surface with the infant and lays on or rolls on top of or against the infant while sleeping, blocking the infant’s airway.
 - Strangulation-When something wraps around the infant’s head and neck blocking the airway.
 - Suffocation-when no air reaches an infant’s lungs, usually caused by a block in the airway.
 - Entrapment- when an infant is trapped between two objects, such as a mattress and wall, and cannot breathe.

Terms for infant sleep location are often used interchangeably. The ABM (2008) does not define co-sleeping but rather describes it as “the diverse ways in which infants sleep in close social and/or physical contact with a caregiver (usually the mother)” (p. 38). The AAP defines sleeping arrangements as follows (2011b):

- Co-sleeping is a general term used when a parent and infant sleep in close proximity so as to be able to see, hear, and/or touch each other (p. e1350). The term includes sharing a sleep surface such as a bed, sofa or couch as well as separate surfaces but in the same room.
- Bed-sharing is a specific type of co-sleeping in that the infant is sleeping on the same surface with another person (p.e1350). The term describes parents who share a sleep surface whether it be the floor, adult bed, chair or sofa.
- Room-sharing is the term for separate sleep locations in close proximity where a caregiver can hear, see and or touch the infant.

SIDS and SUID are used interchangeably. Currently, the CDC uses SUID to define the unexpected death of an infant before an investigation is completed to determine a cause. The current public education campaign “Safe to Sleep” as well as the literature found to inform the systematic review uses the term SIDS. For that reason, the term SIDS will be used in the remainder of the paper. Room-sharing and bed-sharing will be used in this paper as they define the specific type of co-sleeping that occurs between a parent and infant. Research shows that the benefits of breastmilk are comparable whether an infant receives milk from the breast, human milk from the mother, or donor milk through a bottle (AAP, 2011b). Breastfeeding and breastmilk feeding are also used interchangeably; however, the term breastfeeding will be used for the remainder of the paper.

CHAPTER 2. METHODOLOGY

PRISMA Framework

Registered nurses face many decisions throughout their nursing practice. Decisions surrounding patient care are complex, fast paced, and may even be filled with uncertainty. The nursing process provides a scientific method to ensure the quality of care delivered is holistic and patient-centered (American Nurses Association, 2015). Together, registered nurses and patients plan mutually determined goals to decide the best care possible (Hopp & Rittenmeyer, 2012). Registered nurses are responsible for combining research evidence, professional nursing expertise and patient preferences when choosing interventions to meet the determined goals (Hopp & Rittenmeyer, 2012). Although professional knowledge gained through years of practice is important, decisions about patient care should be based on research evidence (Brown, 2012). Research evidence decreases uncertainty in healthcare decisions by providing research-based recommendations from soundly produced clinical practice guidelines (Melnik & Fineout-Overholt, 2005). When nursing practice is evidence-based, patients receive safe and effective nursing care that promotes the best possible outcomes. Melnyk and Fineout-Overholt (2015) describe evidence-based practice as “an approach that enables clinicians to provide the highest quality of care in meeting the multifaceted needs of patients and families” (p. 3).

Healthcare is a rapidly evolving system. Clinicians, along with registered nurses, need access to reliable research. Limited access to current best practices leads to outdated care that can be detrimental to patient outcomes and safety. The use of evidence-based practice versus standard care has shown to improve patient outcomes by 28% (Hopp & Rittenmeyer, 2012, p.5). Unfortunately, only about half of all patients in the United States receive recommended care (Hopp & Rittenmeyer, 2012, p.5). Reported barriers to delivering evidence-based practice in

nursing include: demanding patient loads, large volume of journal articles related to clinical practices, lack of time and resources to appraise evidence, demands from patients for a certain type of treatment and pressure from peers to continue practices steeped in tradition (Hopp & Rittenmeyer, 2012; Melnyk & Fineout-Overholt, 2005). Given both the large number of journal publications and limited time registered nurses have to critically review articles related to their practice, systematic reviews can save a great deal of time by highlighting research evidence about a single topic. Systematic reviews are considered the ‘gold standard’ of research synthesis because it collects and reviews findings from multiple original research studies using rigorous methodology to reduce bias and improve reliability and accuracy of conclusions (McCrae, Blackstock, & Pursell, 2014). Brown (2012) states systematic reviews are useful forms of research evidence where “the cumulative findings are formulated as new knowledge claims, which are unifications of the separate findings of the original studies” (p. 20). One characteristic particularly useful in informing practice is the way the synthesis of multiple studies sheds light on trends that are not always evident when reviewing individual pieces of literature (Brown, 2012). Identifying and summarizing the best evidence surrounding a research question may also identify gaps in the current literature. Results or conclusions of the findings can be translated into evidence-based practice recommendations by expert panels (Brown, 2012).

The explosion of knowledge in healthcare today can be exhaustive to review. Registered nurses must appraise research to ensure the work is reliable and trustworthy enough to inform nursing practice (McCrae, Blackstock, & Pursell, 2014). Poor reporting of research evidence diminishes the value of the findings for clinicians, and policy makers as well as other users such as curriculum or clinical practice guideline developers (Liberati, et al., 2009). In 1999 the QUOROM (Quality of Reporting of Meta-analysis) Statement was published with the purpose of

aiding authors of systematic reviews in reporting transparent research. Since the development of QUOROM, the knowledge surrounding the development of systematic reviews grew but the quality of reporting remained less than ideal (Liberati, et al., 2009, p.w-66). In 2005 the QUOROM statement was updated to include the knowledge gained related to the conduct and reporting of systematic reviews as well as the advancing conceptual understanding of assessing the risk of bias. The name was changed to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) Statement. PRISMA includes a 27-item checklist that focuses on the importance of transparency and completeness when reporting findings. A four-phase flow diagram assists the author to develop a search strategy that uncovers significant literature related to the research question. Renjith, George and D'Souza (2015) identifies PRISMA as a means to outline explicit and exhaustive reporting methods used in the systematic review of literature. The statement presents a systematic rigorous methodology that encourages authors to critically appraise whether each study is vital to guarantee the analysis is conducted in a way that minimizes bias. Bias is defined as anything that distorts the study findings (Melnik & Fineout-Overholt, 2005, p. 81).

Registered nurses are increasingly called to publish research that will inform nursing practice. Nursing journals must publish work that is conducted with scientific rigor so as to ensure the research evidence relating to the safety and efficacy of the studied interventions are reported accurately (McCrae, Blackstock, & Pursell, 2014). It must be noted that the PRISMA Statement is distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited (Liberati et al, 2009). Since 2009, several updates to the PRISMA statement have been developed to facilitate reporting of different types or aspects of systematic

reviews however, none are applicable to this review. The PRISMA statement was used to guide the systematic review of literature.

Review Protocol

In accord with the need identified by Renjith, George, and D'Souza (2015); Magarey (2001); McCrae, Blackstock, and Pursell (2015); and Wood (2003) the author performed a systematic review of literature designed to critically analyze registered nurses' knowledge, attitude and practice of infant sleep position recommendations. The following is a brief description of the systematic literature review process.

Databases

The search process started on November 11, 2015 and was limited to online databases. Journal articles related to the search terms were accessed from the following databases:

- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
- PubMed
- Medline
- Academic Search Premier

Search Terms

Registered nurses' knowledge and attitudes about infant sleep position recommendations as well as how the recommendations are used in practice guided the search. The search terms were chosen using the population, intervention, control, and outcome format known as PICOS (Hopp & Rittenmeyer, 2012; Melnyk & Fineout-Overholt, 2005). Terms to differentiate desired population included: "registered nurse", "nurse", and "nursing". A population term was combined with one of the following outcome terms "knowledge", "attitude", "practice". In order

to limit the scope of the search to journal articles related to current infant sleep guidelines, common terms associated to the recommendations are listed in the Appendix.

Inclusion Criteria

The initial search process identified potential articles to be included in the literature review. Population, intervention, control, outcome and study types yielded the most relevant terms related to the aims of the systematic review. All types of studies were considered including descriptive study designs, qualitative and quantitative research. The population under study was registered nurses. Registered nurses work in different specialties including but not limited to hospitals, clinics, public health agencies as well as in schools of nursing and in higher education. Any study where registered nurses cared for infants including the mother-infant dyad, or mother alone was included. Melnyk and Fineout-Overholt (2005) state that “interest area” can replace interventions when the research question is not intervention focused. Studies that examined registered nurses’ knowledge, attitudes and/or practice regarding infant sleep positions were included. Examples of interventions found in the literature were pre and post testing of nurses’ knowledge following education, observation of nursing practice, and surveys of attitudes surrounding infant sleep positions. In this case, the control or “comparison of interest” was infant sleep recommendations.

Additional inclusion criteria included the year the studies were completed and the country in which the research took place. Initial safe sleep recommendations were released in 1994; expanded recommendations were published last in 2011. The Academy of Breastfeeding Medicine revised the co-sleeping recommendation in 2008. Research from the last 10 years yielded search results that included current recommendations for infant sleep. Older studies were considered as long as they provided research relevant to current nursing practice. Research

studies from other countries were included if the studies presented situations likely to occur in the United States.

Exclusion Criteria

Articles published that did not recognize the initial AAP (1996) recommendations of endorsing supine only sleep for infants were not included. Other studies that addressed parent's knowledge, opinions and attitudes surrounding SIDS prevention guidelines, research evaluating SIDS risk factors and bed sharing risk factors as well as evaluations of parent or caregiver choice to bed-share with their infant were excluded. While studies from other countries were included, co-sleeping in other industrialized nations and third world countries present a different set of concepts that, in some cases cannot be equally compared to the United States. Mothers and fathers in developing nations may co-sleep with their infants for reasons related to cost effectiveness or survival and safety. One example is African mothers in regions with a high malaria risk (ABM, 2008). Often the mothers and infants must share a mosquito net to protect themselves from malaria, which means sharing a sleep surface. Literature from other countries that did not represent a similar situation to the United States were excluded.

PRISMA Flow Diagram

As stated previously, the systematic review of literature follows the PRISMA Statement as recommended by Liberati et al. (2009). The framework ensures an accurate and reliable summary of the evidence. Liberati et al. presents a diagram that depicts the search process and shows the number of identified records as well as the number of included and excluded articles following each screening stage.

To begin, the search terms outlined in the Appendix produced articles that were screened initially by title alone and yielded 249 records. Online databases were the only search method so

no duplicate articles were identified from other sources. At the screening stage, abstracts were scanned for eligibility criteria determined above. Through the screening process, conference proceedings and non-primary research articles were discarded. The screening process yielded 65 articles that were read in full keeping not only inclusion and exclusion criteria in mind but also sources of bias. Papers that addressed all healthcare persons without defining statistics for nurse caregivers alone limited the number of articles eligible for the systematic review. Articles concentrating research efforts on childcare settings, parent’s knowledge, attitudes and choice of infant sleeping, epidemiology of SIDS were excluded. Inter-library loan was unable to produce two full text articles from foreign countries. A total of 18 articles were included in the systematic literature review.

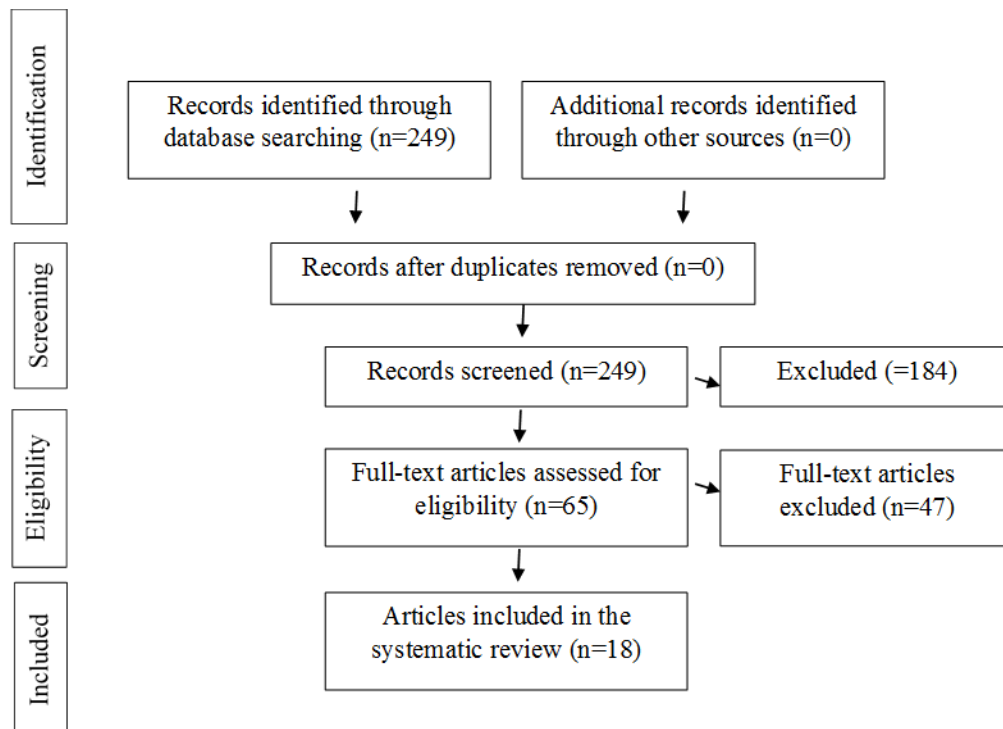


Figure 1. PRISMA flow diagram of information through the different phases of a systematic review (Liberati et al., 2009).

CHAPTER 3. RESULTS

Overview of Selected Studies

Table 1 summarizes the studies included in the systematic review of literature. The table contains information regarding the authors of the research, year published, research design and identifies the nursing setting in which the study was completed. Included in the table is the concepts of nursing knowledge, attitudes and practice examined in the research along with a summary of results found.

Table 1

Summary of Studies Included in the Systematic Review of Literature

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Aris, Stevens, LeMura, Lipke, McMullen, Côté-Arsenault, & Consenstein	2006	Quantitative	Neonatal Intensive Care Unit (NICU)	The purpose of the study was to explore and describe newborn intensive care unit nurses' self-reported knowledge and practices regarding infant sleep position. The author also explored what nurses teach parents.	When asked about full-term infants' sleep positioning, 40% said supine. Reflux was cited as the primary reason to place a full-term infant prone for sleep. Only 52% of nurses advised parents to place their infant exclusively supine after NICU discharge, while 38% reported telling parents that supine or side is an acceptable sleep position and 9% of nurses instructed parents to use side position exclusively. It was found that nurses working in hospitals with sleep or unit policies were more likely to advise parents to place infants to sleep on back.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Barsman, Dowling, Damato, & Czeck	2015	Qualitative Descriptive	NICU and Transitional Care Unit (TCU)	The study examined nurses' beliefs regarding SIDS prevention along with the knowledge of 2011 SIDS risk-reduction recommendations. Application of guidelines on "clinically stable" infants was examined. The study also compared the differences between the units.	As for beliefs surrounding SIDS recommendations, 53% of the nurses strongly agreed they make a difference in SIDS prevention, while 50% strongly believed in following a unit policy regardless of their views about the efficacy of SIDS prevention. Only 20% of the nurses felt strongly that parents would mimic the prevention strategies of the hospital. A majority of nurses were able to correctly identify risk-reduction recommendations. Nurses report using side lying position for clinically stable infants and use risk of aspiration, improved respiratory status and infant comfort as rationale for using a non-supine sleeping position. 40% of NICU nurses reported having received education on SIDS risk-reduction compared to 52% of TCU nurses. A majority of nurses in NICU report using extra objects in crib to position infant while TCU nurses report using practices supportive of safe sleep.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Bartlow, Cartwright, & Shefferly	2016	Observation Quantitative Descriptive	Well-baby, Post-partum units in two hospitals	Knowledge and attitudes were measured using a questionnaire. Nursing practice was evaluated using an observational method.	Nurses reported being aware of AAP guidelines, 95% of the nurses correctly identified supine sleeping and the recommended position. Results of the observations showed 34% of the infants did not meet position guidelines and 59% of crib environments did not meet the environment guidelines. Overall 69% of the observations did not meet the guidelines for both positioning and environment. When assessing attitude, 26% indicated that they did not believe or were unsure that sleep position was associated with SIDS. As for reason to use non-supine positioning, 25% of nurses stated that in their clinical experience the infant would be at an increase aspiration risk when supine. Nurses also cited poor sleep and decrease in infant comfort with supine sleep positioning. Blankets, towels, gloves, onsies and diapers were found in cribs. One infant was propped on his side with blankets.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Bullock, Mickey, Green, & Heine	2004	Qualitative Descriptive	Maternal child nurses in hospital setting	Examines knowledge, attitude and practice in positioning healthy infants for sleep in the hospital. The study also examined nurse discharge education to parents of infants.	Of the 528 returned surveys, 96% of nurses reported being aware of the AAP recommendations for infant sleep, although 52% thought that the side lying position was also an acceptable sleep position. 82% of the nurses reported educating parents that both back and side positions were acceptable. None of the nurses placed infants prone for sleeping though nurses reported using side sleeping position. When asked if sleep positions was a risk factor in SIDS, only 49% answered yes. Half of the nurses felt supine position would increase risk of aspiration and decrease comfort. 25% of the nurses surveyed were unsure if their hospital had a policy. Those hospitals that did have a policy, 80% of the policies included lateral sleeping as an acceptable sleep position.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Efe, İnal, Balyılmaz, Çetin, Turan, Altun, Çalışır, & Arikan	2012	Descriptive	NICU, Pediatric Intensive Care (PICU), Pediatric Units, Newborn nursery in Turkey	The goal of the study was to assess nurses' knowledge regarding risk factors for SIDS, sleep positions, and sleep environments of infants.	Nurses were aware of SIDS but lacked knowledge about which sleeping position is preferable to prevent SIDS. Nurses recommended side-lying position as an acceptable position for infant sleep. Regarding bed-sharing, 88% of nurses said the mother should not share the same bed as an infant.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Gelfer, Cameron, Masters, & Kennedy	2013	Observation Quantitative Descriptive	NICU	The study examined nurse attitudes towards implementing safe sleep practices and monitored nurse practice before and after a safe sleep education intervention. The study also examined parents' adherence to recommendations following discharge.	Although nurses believed AAP recommendations should be implemented, persistent attitudinal barriers were present in focus group discussions. Nurses were aware of AAP recommendations but continued to use side positioning, particularly after feedings. Following Back to Sleep education, cribs audits revealed increase in supine positioning, use of a firm sleep surface and removal of soft objects in cribs. Following discharge, a significant increase in parent compliance with safe sleep recommendations was noted, from 23% before implementation phase to 82% after the implementation phase.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Grazel, Gibbons Phalen, & Polomano	2010	Observation Qualitative	NICU	The study investigated nurse knowledge of 2005 safe sleep recommendations as well as the nurses' clinical application of "Back to Sleep" for discharge of infants. Discharge education provided to parents by a nurse was also assessed.	Regarding nurse knowledge, 85% of the nurses were able to identify recommended strategies correctly, but 26.5% of the nurses stated supine or side sleeping was acceptable. 27% of nurses identified use of home monitors as a SIDS risk reduction strategy. When nurses were asked why they positioned infants other than supine for sleep the most common responses were: fear of aspiration, infant comfort and infant safety. Observations of nurses applying the SIDS prevention strategies indicated that almost half of the nurses used positioning objects in cribs and more than half the nurses placed blankets over the head of the crib. Nurses offered verbal SIDS education 73% of the time, while less than half of the nurses addresses secondary SIDS risk prevention strategies.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Hein & Pettit	2001	Qualitative	Obstetric unit of hospital	Study attempts to understand why nurses use side lying instead of supine for infant sleep positioning.	The most frequent fear cited by nurses was aspiration.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Horstman & Rens-Leenaarts	2002	Qualitative	Child Health Center-Home nursing services in rural Netherlands	Nurses were interviewed regarding their views on cot death prevention and the responsibilities that were involved. The researchers also asked about their experience with infant sleep guidelines specifically, about risks of prone sleeping, blankets in crib and smoking. The nurses were also asked to discuss any dilemmas or distress they experienced.	Nurses believed that communication on the risk of cot death should be managed with prudence, tact, respect and care as to not make parents afraid and anxious. The study found that while the nurses were committed to the guidelines they felt it was the primary responsibility of the parents to care for the infant and sometimes felt caught in between scientifically based guidelines and parents making decisions. When nurses are trapped between their professional duty and the need to support parents, nurses expressed some ambivalence with the standards. The nurses reported having no doubt about the relationship between cot death and prone positioning but experienced difficulty with the change.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
McMullen, Fioravanti, Brown, & Carey	2016	Qualitative Observation	Hospital Pediatrics NICU Mother-baby Unit	The questionnaire assessed knowledge, attitudes and opinions before and after an education intervention. Observation of clinical practice at base line and following the education intervention.	Results of the questionnaire show an improvement in agreement with AAP 2011 SIDS risk reduction recommendations from pretest to posttest. Pretest results show only 63% of nurses agree with the AAP recommendations, increasing to only 84% following the posttest. Observations 1 week following educational intervention showed continued unsafe infant sleep positioning. A safe sleep week of activities was implemented. Following the safe sleep week, compliance improved.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Peeke, Hershberger, Kuehn, & Levett	1999	Qualitative Descriptive	NICU, PICU, Pediatric and maternity units.	The study examined nurses' acceptance and practice of the AAP recommendations for sleep positions. Infant sleep surface was also studied.	Almost all nurses who were surveyed (97%) were aware of the AAP sleep recommendations; yet, 32% of the nurses disagreed with the AAP. For those nurses that did not agree with AAP recommendations, they cited "experience" and "potential adverse consequences of the supine position" as reasons. 55% of infants observed on two units were found sleeping in a side-lying position, while only 29% were found supine. Only 63% of infants were found on firm flat sleep surfaces without additional objects.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Price, Hillman, Gardner, Schenk, & Warren	2008	Qualitative	Newborn nursery	Pretests were completed prior to training intervention to assess knowledge, beliefs and practice of safe sleep. Posttests were administered to assess how it influenced knowledge, beliefs and practices.	Prior to training only 68% of nurses placed infants supine. Almost all nurses felt that nurses would influence parents' practice at home. Almost half of the nurses endorsed side sleeping as safe infant care practice while 2% endorsed bed sharing. Thirty-six percent of nurses agreed or were unsure that there was an increase in aspiration with supine positioning.
Rowe, Sisterhen, Mallard, Borecky, Schmid, Rettiganti, & Luo	2016	Qualitative Observation	Multiple units at Children's hospital	Knowledge was assessed before and after a quality improvement project to implement safe sleeping practices for all hospitalized infants less than 1 year old.	Among nursing staff, there was a statistically significant improvement in knowledge from pre and post testing of AAP safe sleep guidelines. Prior to quality improvement measures, barriers to implementing safe sleep practices included inconsistent information, lack of awareness and willingness to follow along with parents wishing to sleep with their infant.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Stastny, Ichinose, Thayer, Olson, & Keens	2004	Qualitative	Newborn nursery	The study investigated infant sleeping position and examined the nurses' motivations, recommendations, and knowledge regarding infant placement. The study also looked at how nurses influence mothers in their positioning choices.	Seventy-two percent of nurses correctly identified supine sleeping as the position associated with the lowest risk of SIDS. More than half of the nursery staff (64%) reported placing infants most often on their sides in the last month, while 63% of the nurses also reported advising mothers to place infants on their "side" or "side or back". Nurses report fear of aspiration in supine position as their reason for placing infants in a side lying position.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Voos, Terreros, Larimore, Leick-Rude, & Park	2015	Observation	NICU	The goal of the study was to understand the effects of a safe sleep education intervention on nursing practice. Observations of sleep environment were conducted for data collection.	Prior to the education, intervention baseline observations showed only 21% of infants in a safe sleep environment. The three most common unsafe sleeping environments include: head of the bed elevated, infant not positioned supine and toys in bed with the infant.
Welby	2004	Qualitative	NICU	The study aimed to establish the perceptions of nurse practice in relation to the education of families on SIDS.	When it comes to providing SIDS education, nurses believed that raising the issue would create more anxiety for parents. The nurses felt that some of the developmental and supportive care provided in the unit such as positioning rolls, extra care to keep infant warm and apnea monitors would prevent parents from adopting safe sleep practices at home. Nurses expressed the belief that they were the most appropriate professional group to educate parents on the matter of SIDS.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Young & Schluter	2002	Qualitative	Birthing and postnatal units and special care nursery in Queensland.	The research aims to investigate nursing staff knowledge, attitudes and practices relating to risk factors for SIDS.	Results prior to an educational intervention revealed that 92% of the nursing staff were aware that a supine position reduces the risk of SIDS. Despite this knowledge, only 42% of nurses indicated that infants should be placed on their back to sleep when they have mild reflux. Significantly, more young nurses correctly identified safe sleep messages than their older counterparts, as did nurses with no children. Of the 60 staff nurses studied, 35 of the respondents had additional professional qualifications including midwives and neonatal and child health.

Table 1. *Summary of Studies Included in the Systematic Review of Literature (continued)*

Authors	Year	Research Design	Nursing practice studied	Areas assessed: Knowledge, Attitudes, Practice	Summary of Results
Young and O'Rourke	2003	Qualitative	Birthing and postnatal units and special care nursery in Queensland.	The research aimed to investigate nursing staff knowledge, attitudes and practices relating to risk factors for SIDS.	While a majority of participants agreed healthy newborns should be placed supine for sleep, 36% responded supine or side lying was acceptable for infant sleep. Only 50% agreed with supine sleeping for infants with reflux and 20% disagreed with the supine recommendation for reflux indicating that aspiration risk was increased by placing infants supine. Most nurses agreed that nurses had an important role in reducing the risk of SIDS. Despite knowledge that supine sleeping reduces risk of SIDS, nurses continued to provide education stating side-lying position was acceptable for a healthy infant to sleep. Only 13% of nurses were educated on information regarding room-sharing benefits and risks of bed-sharing.

A majority of the articles were published within the last ten years and addressed the most recent 2005 and 2011 AAP Safe Sleep recommendations. While there were eight articles that addressed AAP recommendations prior to 2005, they presented valuable information and similar findings as more recently published articles. All articles were published after the AAP (1996)

expanded risk reduction measures. In addition, every study acknowledged the recommendations that infants shall be placed solely on their backs, alone, and on a firm flat sleep surface without extra bedding. Each article recognized the initial 1997 SIDS Global Strategy Task Force position statement addressing the role of health care professionals in modeling safe sleeping practices for parents prior to discharging the infant and family from the hospital setting (Hunt, 1997). The following section is a summary of selected articles.

Synthesis of Selected Studies

The articles included in this systematic literature review addressed at least one of the concepts of nurses' knowledge, attitude or practice surrounding safe sleep recommendations. Articles were constructed using multiple research methods including qualitative, quantitative, observational and descriptive. A majority of the articles utilized questionnaires to assess nurse knowledge and attitudes. Observations were most often used to gather information on nursing practice and adherence to safe sleeping practices. Two articles conducted focus groups while one article used semi-structured interviews to gather data. Seven of the eighteen articles addressed data before and after an education intervention.

All but one article was conducted in the hospital setting. Horstman and Rens-Leenaarts (2002) examined the public health aspect of SIDS risk reduction education by evaluating nurse home visitors' experiences. Five of the articles took place outside of the United States; Australia, Turkey, Netherlands and the United Kingdom were represented. The NICU was well represented with nine articles providing data on nurses' knowledge, attitude and practice of safe sleep recommendations. In general, the NICU presents an unusual challenge as many preterm infants are permitted to be positioned in a non-supine manner for multiple reasons such as to improve respiratory status. Broad recommendations by the AAP encourage placing preterm

infants supine as soon as possible. If a preterm infant's clinical status has stabilized, the AAP recommends placing the infant supine as early as 32 weeks gestation to accustom the infant and parents to a supine sleep position before discharge (AAP, 2011b). Only clinically stable infants were included in the NICU studies research design.

Unfortunately, no articles were found specifically addressing nurse's knowledge, attitudes or practice surrounding bed-sharing. Seven articles evaluated aspects of the AAP room-sharing vs bed-sharing recommendations. No articles addressed the ABM co-sleeping recommendations.

The process of analysis for determining recurring themes included reading each article in its entirety while highlighting and using key words in the margins noting commonalities. After reading the articles through once, the key themes identified in the margins were jotted on a rudimentary concept map. The articles were reread and more extensive notes were taken using the concept map. After careful synthesis of all eighteen articles, it is clear that a knowledge gap exists between nurses' awareness of safe sleep recommendations and the ability to apply the recommendations in the health care setting. Not only is this gap identified in attitudes towards the efficacy of the recommendations, it is observed in the clinical settings where nurses are working with infants. Four themes emerged that summarized the articles findings: knowledge deficits of infant sleep recommendations, conflicting attitudes towards infant sleep recommendations, inconsistent nursing practice, and the importance of policy in nursing practice.

Knowledge Deficits of Infant Sleep Recommendations

Eleven of the 18 articles measured nurses' knowledge of current recommendations for infant sleep, while three of the articles only asked nurses if they were aware of the guidelines. Merriam-Webster defines knowledge two ways: (a) an understanding, or skill that you can get

from experience or education, and (b) an awareness of something (2000). Although it seems quite simple to measure awareness, the implications of not being aware are significant to nursing practice. Nurses working with infants will unavoidably have to place an infant to sleep. As discussed previously, laying an infant supine is the single greatest way to reduce the risk of SIDS. Three articles showed that an awareness of the recommendations did not mean nurses had the correct information or understanding. Eight of the articles documented nurses' knowledge of SIDS risk reduction guidelines using a questionnaire. All eight of the articles noted a knowledge deficit of safe sleep guidelines among nursing staff caring for infants. In fact, four of the articles addressed a knowledge deficit specifically related to the expanded sleeping recommendations, including room-sharing vs bed-sharing recommendation.

Peeke, Hershberger, Kuehn, and Levett's (1999) survey of 103 maternal child health nurses revealed that almost all (97%) of the nursing staff were aware of the AAP recommendations on infant sleep positions. In 2004, a study of 528 maternal child nurses from 58 Missouri hospitals showed similar results; 96% of the nurses reported an awareness of the guidelines (Bullock, Mickey, Green, & Heine). Bartlow, Cartwright and Shefferly's (2016) study reported the entire well-baby postpartum nursing staff working in two Washington, DC hospitals indicated an awareness of the current infant sleep position guidelines. Despite an awareness, nurses lack knowledge when it comes to understanding current guidelines. Bullock, Mickey, Green and Heine's (2004) findings demonstrated that the seemingly high rate awareness did not correlate with the correct knowledge. More than half of the surveyed nurses preferred side lying for infant sleep positions (Bullock et al., 2004).

Nurse participants were responsible for caring for infants in all 18 articles. Systematic review of the literature provides evidence that nurses do not clearly grasp the rationale for the

supine only sleep position recommendation. A study completed in 2004 examined how 96 newborn nursery staff placed infants to sleep (Stastny, Ichinose, Thayer, Olson, & Keens). The authors discovered only 72% of the nurses correctly identified supine placement as the sleep position with the lowest SIDS risk (Stastny et al., 2004). Another study also evaluated nurses' ability to correctly identify recommended infant sleep positions. Prior to a "Back to Sleep" educational intervention, 515 nurses were surveyed of which 43% endorsed side-lying and 2% recommended prone as a safe sleep position (Price, Hillman, Gardner, Schenk, & Warren, 2008). The same study found that while 85% of the nurses recommend infant sleep in a crib, 2% endorsed bed-sharing and 8% approved of infants sleeping in a reclined position such as a car seat or swing (2008). Moreover, Grazel, Gibbons Phalen, and Polomano (2010) surveyed 430 NICU nurses' knowledge of recommended sleep position and learned that 26.5% believed that "supine or side" position for sleep was a SIDS risk reduction strategy. The studies included in the systematic review of literature did not define the optimal percentage of nurses that should be knowledgeable of the SIDS risk reduction guidelines. However, McMullen, Fioravanti, Brown and Carey's (2016) research is the only study that declared a standard for measurement. The authors reported that nothing less than 100% compliance was acceptable when it came to issues of safety and infant sleep (McMullen, Fioravanti, Brown, & Carey, 2016). They go on to state "individuals may not understand or agree with the rationale, but full compliance remains the expectation" (2016, p. 47).

As discussed earlier, medical professionals do not have a full understanding of the causes of SIDS but epidemiologic research has confirmed the importance of supine sleeping. Additionally, the literature recognizes that while supine sleep is crucial, expanded risk-reduction strategies must not be overlooked. To illustrate the significance of secondary recommendations

Young and O'Rourke (2003) summarized the research about SIDS and smoke exposure by stating "evidence suggests smoking is causally related to SIDS and an estimated population attributable risk of 61% implies that the number of deaths from SIDS could be reduced by almost two-thirds if parents did not smoke" (p. 12). Four articles identified knowledge deficits surrounding the expanded guidelines including two articles addressing bed-sharing. With prone sleeping rates low, smoke exposure has become a greater risk factor for SIDS (Young and O'Rourke, 2003). Furthermore, epidemiologic research has recognized the risk of unintentional suffocation, entrapment and asphyxiation of infants in unsafe sleeping environments. Unfortunately, a study completed in 2010 showed only 26% of NICU nurses selected supine and or side positioning as a risk reduction strategy (Grazel, Gibbons Phalen, & Polomano). The same study reported that 5%-17.5% of the nurses rarely or never discussed additional risk reduction strategies including education on the importance of a separate sleep area for infant, reducing infant secondhand smoke exposure or appropriate infant bedding (Grazel et al., 2010). In 2003, a study of maternity nurses in Queensland showed that less than 1/3 of the nurses educated parents using a consistent risk reduction message or shared recommendations regarding issues of bed-sharing, room-sharing, smoking and breastfeeding (Young & O'Rourke). Another study conducted in 2006 examined 252 NICU nurses' discharge education and found that none of the nurses mentioned protecting infants from exposure to second hand smoke, overheating or bed-sharing (Aris et al.). Interestingly, two articles discussed NICU nurses failing to recognize that the use of home monitors is not considered a risk reduction recommendation (Grazel et al., 2010; Barsman, Dowling, Damato, & Czeck, 2015).

Young and O'Rourke (2003) found that nursing degree or additional special qualifications did not positively impact nursing knowledge, attitude or practice relating to SIDS.

Aris et al. (2006) also found that a higher nursing degree did not necessarily influence nurse practice. Associates (63%) and masters (57%) prepared nurses were more likely to recommend a supine only sleep position at discharge than bachelors prepared (30%) or diploma (33%) nurses (Aris et al., 2006). Aris et al. (2006) and Bullock et al. (2004) found that years of nursing experience influenced both attitude and practice. When nurses were asked about interest in continuing education on safe sleep recommendations, 41% were uncertain or disinterested (Aris et al., 2006). Nurses with less than five years experience were more interested in continued education compared with more experienced nurses (Aris et al, 2006). Bullock et al. (2004) found that nurses with more experience were less likely to believe SIDS was associated with sleep position and were less likely to use supine only position because they felt that infants did not sleep as well. Conversely, their younger counterparts were more likely to encourage parents to use supine-only for sleeping (Bullock et al., 2004).

Three articles analyzed how nurses obtain information on safe sleep recommendations. In 1999, Peeke et al. found that maternal child health nurses used mass media, professional literature and colleagues as their primary sources of information. Price, Hillman, Gardner, Schenk and Warren (2008) identified the AAP (47%), professional journals (26%) and professionals known to the respondents (24%) as the most cited sources for information regarding SIDS risk reduction. Television media appeared to play a significant role in knowledge acquisition for nurses in Welby's (2004) research but they also cited journal articles, media reports, texts books and books related to childcare as useful sources of information.

Conflicting Attitudes Towards Infant Sleep Recommendations

Attitudinal barriers were cited in 15 of the articles. When synthesizing the collected works, attitude was defined as any beliefs, views or opinions about any of the SIDS risk

reduction strategies. A study conducted in 2002 captured the difficulty of nurses accepting brand new supine sleep recommendations, when just decades earlier the exact opposite position of prone sleeping was endorsed (Horstman & Rens-Leenaarts). Ambivalence towards the recommendations was demonstrated in one nurse's statement "In the beginning I found that difficult. First we had promoted prone sleeping, and now we should say that was wrong" (Horstman & Rens-Leenaarts, 2002, p. 9). Another nurse stated "Look how it goes when they do not sleep on their back. I mean from one day to another something cannot be completely good or bad. You should remain attentively watching the child" (Horstman & Rens-Leenaarts, 2002, p. 145). Nurses overwhelmingly cited risk of aspiration with supine sleeping as the biggest barrier to the following SIDS risk reduction recommendations. Fear of aspiration was addressed in 12 of the 15 articles. Moreover, nurses mentioned reservations with supine sleeping position and the possible negative consequences on infant comfort and development.

From this research, it is evident that nurses do not believe supine sleeping remains the safest position for all infants including those infants that appear to have gastroesophageal reflux (GER). The AAP's clinical report "Gastroesophageal Reflux: Management for the Pediatrician" considers GER "a normal physiologic process that occurs several times a day in healthy infants, children and adults" (Lightdale & Gremse, 2013, p. e1685). Little is known about GER in infants, but it is understood that regurgitation and spitting up is the most common symptom reported (AAP, 2013). Hein and Pettit's (2001) research aimed to understand why nurses chose side lying positions in the hospital despite recommendations for supine only sleeping. They learned the number one reason for positioning infants in a non-supine sleep position is the fear of aspiration (Hein & Pettit, 2001). Grazel et al. (2010) found that nurses chose non-supine

positioning for discharge ready preterm infants because they feared aspiration (29%), believed it affected infant comfort (28%), and compromised infant safety (20%).

The belief that infants are at risk while supine is contradictory to the current research that supports the safety and importance of supine sleeping. Yet, nurses continued to use the concern as a reason to use non-spine sleep positions for infants. Regardless of the AAP's (2011b) statement of evidence that (a) the side lying sleep position is unstable and increases SIDS risk and (b) supine sleep position for infants with reflux does not increase risk of aspiration or SID, nurses' fear of aspiration was particularly high following feedings (Gelfer, Cameron, Masters, & Kennedy, 2013). A Turkish study completed in 2012 found that 82% of nurses thought infants should be placed on their side after a feeding (Efe et al., 2012). Stastny, Ichinose, Thayer, Olson and Keens (2004) discovered 68.4% of the studied nurses reported laying infants on their sides most often in the preceding month, citing a fear of aspiration as motivation for choosing a non-supine sleeping position. A study of Queensland nurses reported that despite 92% of nurses acknowledging that supine sleeping reduced the risk of SIDS, 42% indicated infants with reflux should be placed in a side lying position (Young & Schluter, 2002). Furthermore, 1/3 of the 515 nursery staff working in Missouri hospitals reported being unsure or agreed with the statement "infants are at an increased risk of aspiration while supine" (Price et al., 2008). In fact, 45% of the nursery nurses testified that, in their clinical experience, placing an infant supine did increase the infants risk of aspiration (Price et al., 2008). Bullock et al. (2004) found similar results of nurses asserting clinical experience as a factor to disregard current sleep recommendations. Just about half of the maternal child nurses surveyed believed that supine sleeping increased aspiration (Bullock et al., 2004). In addition, when the same 528 nurses were asked if they had

encountered a healthy newborn in distress because it was placed in the supine, prone and side lying position, 48% claimed they had encountered a distressed infant in supine position (2004).

Besides the fear of aspiration, nurses used non-supine positioning for infant sleep because in their opinion supine negatively affected infant comfort and infant development. Bartlow et al. (2016) revealed that 25% of the nurses surveyed stated that “in their clinical experience, the supine position will increase risk of aspiration, cause the infant not to sleep well, and decrease comfort of the infant” (pg. 11). Grazel et al. (2010) found that nurses identified infant comfort (29%), fear of aspiration (25%) and infant safety (23%) as explanations for placing infants in prone or side-lying position for sleep. Three additional studies recognized that nurses omitted adherence to safe sleep practice and chose to follow their perception of infant comfort when they decided on infant sleep position. In a 2004 study of maternal child health nurses, 15% felt that supine sleeping would decrease infant’s comfort while 21% believed that it would cause infants to sleep poorly (Bullock et al.). Ten percent of newborn intensive care nurses in Barsman, Dowling, Damato and Czeck’s (2015) study chose side lying positioning for discharge ready infants to promote comfort while sleeping. Another study of NICU nurses cited “inconsolability” as a reason to place infant prone for sleep (Aris et al., 2006). A less common concern identified in the literature were nurses’ concerns with current supine sleep recommendations causing changes in head shape (Barsman et al., 2015; Gelfer et al., 2013; Horstman & Rens-Leenaarts, 2002).

As for research that addressed bed-sharing, three articles reported nurses encountering barriers related to parents wishing to sleep in the same bed as their infants. McMullen et al. (2016) indicated participants faced an ethical dilemma when parents insisted on bed-sharing with their infants despite nurses providing education on the risks. Nurses were concerned with

potential liability if an infant was harmed because of a parent's choice to bed-share. Hospital administration stepped in with a legal consultation and agreed that once a family received education on the risk of bed-sharing it was the parents' decision to bed-share and the nurse would document the education and decision within the chart (McMullen et al., 2016). Horstman and Rens-Leenaarts' (2002) study of home visiting nurses in the Netherlands describe the unique relationship between public health nurses and the families they serve. The study attempted to understand how nurses provided safe sleep education with respect to individual family capabilities and needs. The researchers documented that while the nurses were committed to risk reduction standards, they felt the responsibility of caring for the baby fell on the parents (Horstman & Rens-Leenaarts, 2002). A nurse who felt torn between scientifically based recommendations and the parents' beliefs or desires stated "The final responsibility is with the parents; this counts for cot death too" (Horstman & Rens-Leenaarts, 2002, p 143).

Price et al. (2008) reported that almost all of the nurse participants (92%) believed that their practice would influence how parents care for their infants. Conversely, Barsman et al. (2015) found that only 20% of the nurses felt that parents would mimic what was modeled in the hospital. Welby (2004) found that nurses felt they were the most appropriate educators when it came to risk-reduction education. Young and O'Rourke (2003) also found that nurse participants agreed they had an important role in reducing SIDS risk. Although nurses' feel they may influence parents' decisions, two articles documented that nurses felt they must talk about SIDS recommendations gently with parents. Welby (2004) identified a "protective nature of nursing staff towards parents" which resulted in nursing staff not educating parents about the risks of SIDS (p. 87). Nurses believed that bringing up such a sensitive subject while their infant was hospitalized would cause more anxiety for parents. Similarly, Horstman and Rens-Leenaarts

(2002) found that nurses felt SIDS education must be “managed with prudence, tact, respect and care” so as not to scare parents (p. 142). One nurse reflected on the idea in the following statement “Now we confront everybody with the possibility of cot death, and I realize the disadvantages. But on the other hand, you want to work preventively. It has two sides, some people become insecure, others don’t” (Horstman & Rens-Leenaarts, 2002, p. 143).

As discussed earlier, Peek et al. (1999) found that a majority of nurses were aware of AAP infant sleep recommendations, of concern though was the 32% of the nurses who disagreed with the recommendations. In fact, five articles evaluated nurses’ disagreement with the sleep position recommendations. Nurses cited “experience” and “potential adverse consequences” as reasons for disagreement but did not elaborate (Peeke et al., 1999). Bullock et al. (2004) found that despite broad awareness of the SIDS guidelines among nurses, only half of the nurses agreed infant sleep positions were associated with SIDS, while 41% were unsure and 10% did not agree. Price et al. (2008) discovered that 75% of the nurses surveyed were uncertain or in disagreement with the link between side-lying sleep position and SIDS. More recently, Bartlow et al. (2016) reported an improvement in the percentage of nurses (75%) that believe infant sleep positions was associated with SIDS. Despite improvement, 25% of the nurses indicated that they did not believe or were unsure that supine position would reduce SIDS (Bartlow, Cartwright, & Shefferly, 2016). A volunteer questionnaire was included in a quality improvement project to promote AAP safe sleep recommendations for all infants during their hospital stay. Of the 659 nurses who participated, 203 of the 658 nurses, participated in a voluntary pretest questionnaire regarding nurse knowledge, attitudes and opinions while 196 nurses participated in post testing (McMullen et al., 2016). Before the mandatory education intervention, 64% of the nurses were in agreement with the AAP recommendations (2016). Results from the posttest showed an

increase in nurse agreement with recommendations to 84% (2016). While a statistically significant increase in the belief of the recommendations was reported, a large number of nurses still did not believe in the SIDS risk reduction strategies outlined by the AAP.

Inconsistent Practice of Infant Sleep Recommendations

Inconsistent use of current safe sleep recommendations in nursing practice was identified in 14 of the 18 articles. Infants positioned in a non-supine position, unsafe sleeping environments and inaccurate discharge education were the most common errors found in observational studies and self-reported nurse surveys. The studies suggested that nurses are not convinced with the evidence and rationale of safe sleep recommendations. Welby's (2004) research supported the findings that nursing knowledge of risk factors does not transfer to the clinical setting as the nurses reported nursing practice was guided mostly by tradition. Likewise, well-baby postpartum nurses correctly identified supine as safest for infant sleep and again, the knowledge did not transfer to the clinical setting (Bartlow et al., 2016). Observations of the nurses revealed only 30% of the infants audited fully met APP recommendations for both positioning and environment (2016).

The persistent use of non-supine positioning for infants was identified in seven articles. Grazel et al. (2010) found only 67% of the nurse's reported using only supine positioning for full term infants in the NICU. Cribs audited by Peeke et al. (1999) showed high rates of side-lying and prone positions at 55% and 16% respectively. Voos, Terreros, Larimore, Leick-Rude and Park's (2015) pre intervention observations of NICU infants showed 21% of infants in a non-supine sleep position. Random crib audits completed in another NICU revealed only 39% of the infants sleeping supine (Gelfer et al., 2013). Similarly, low rates of supine only positioning (40%) were found when NICU nurses were asked to identify the typical sleep position they

choose for full term infants (Aris et al., 2006). More recent observational research demonstrated sub-optimal (65%) use of supine position for full term infants (Bartlow et al., 2016). Price et al. (2008) showed that endorsement of safe sleep recommendations did not transfer to nursing clinical practice. Even though 72% of the nurses recognized the AAP guidelines, the use of supine position for sleep was applied only 68% of the time (Bartlow et al., 2016). Side-lying position was used in 29% of the observations (2016). Though the documented use of prone sleeping was infrequent (3%), more than 10 years of warnings against the position have passed, and nurses continued to use the position (Price et al., 2008). Of particular concern was the continued use of prone sleeping even after an educational intervention (McMullen et al., 2016). Prior to nursing education, 15% of the infants were found sleeping in a prone position. Even after 100% of the nurses completed the education intervention, 5% of the infants were still found prone (2016).

Infant death investigations indicate unsafe sleep environments play a significant role in SIDS. Common unsafe sleep environments found in the research were loose blankets, infants head of the bed elevated, soft sleep surfaces, and soft objects such as diapers, gloves, clothes, and toys in the crib. Observation of NICU cribs showed 21% of the infants in an unsafe sleeping environment (Voos, Terreros, Larimore, Leick-Rude, & Park, 2015). Previous research presented similar results where 28% of the observations had extra objects in crib with the infant including diapers found under infants heads (Peeke et al., 1999). More than half (59%) of the sleep environments in well-baby postpartum nurseries did not meet AAP recommendations (Bartlow et al., 2016). Surprisingly, one observation found an infant propped on his side with a rolled towel behind his back (2016). One-third of hospital nurses in a Turkish study said that a pillow should be used for infant sleep (Efe et al., 2012).

Patient education is a nursing intervention and part of nursing practice. Seven studies described inaccurate safe sleep education given to parents. Use of non-supine sleep position, specifically side-lying, as an acceptable sleep practice was the most common inaccuracy reported. Young and O'Rourke's (2003) study of Queensland nurses indicated that while SIDS education was a part of the daily care plan, only 78% of the nurses advised supine only sleeping. Bullock, Mickey, Green, and Heime's (2004) study of maternal child health nurses found that 82% of the participants told parents supine or side-lying positioning was acceptable. A study published that same year found 65% of nursery nurses advised mothers to place infants on their "side" or "side or back" (Stastny et al., 2004). Fifty-one percent of NICU nurses advised supine sleeping, 38% also provided guidance that side positioning was acceptable (Aris et al., 2006). The most recent research shows that nurses continued to advise both supine and side sleeping in discharge education (Bartlow et al., 2016).

Two studies addressed discharge education and bed-sharing. More than half of the NICU nurses (57%) in Grazel et al. (2010) study were educated on the importance of separate sleep areas while a more recent NICU study showed 80% of the nurses encouraged room-sharing without bed-sharing (Barsman et al., 2015)

Importance of Policy in Nursing Practice

As discussed earlier, nothing in the literature attempted to understand how nurses bridge the gap between two recommendations or what criteria they use to do so. However, the literature does show that nurses look to policies when it comes to decision making. Forty-one percent of NICU nurses in Stastny, Ichinose, Thayer, Olson, and Keens' (2004) research reported policy as a motivating factor to place infants in a supine position to sleep. Likewise, half of the NICU nurses studied reported strongly believing in following a policy regardless of their own

views about the efficacy of SIDS prevention (Barsman et al., 2015). The most recent research study completed in 2016 had particularly interesting results. When nurses were asked to rank factors that influence their practice, the top three answers were (a) policy, (b) research, and (c) clinical experience (Bartlow et al., 2016). Ironically, neither of the studied hospitals had a policy on safe sleep (2016). When Aris et al. (2006) controlled for nursing degree and experience they found that nurses were more likely to advise parents to place their infant on their back for sleep when they worked in a hospital with a policy on infant sleep position. Gelfer et al. (2013) found that policy implementation helped modify nurses' beliefs and behaviors towards the supine only sleeping recommendations.

Taking another look at Horstman and Rens-Leenaarts' (2002) research provided some evidence on how nurses bridge the gap between two recommendations. The goal of their study was to examine the ethical dilemmas public health nurses encounter when working with families. Interviews showed that public health nurses balance multiple aspects of preventive health education and the study described how dilemmas were evident in how nurses presented safe sleep education. Instead of merely reciting the scientific knowledge, the nurses tailored the education to each family with respect to individual strengths and abilities. For example one nurse stated "It is the way in which I formulate the message, and that might differ. To one person I am more direct than to others..." (Horstman & Rens-Leenaarts, 2002, p. 144). Researchers reported that nurses felt torn between professional duty and the obligations to support families when they encountered parents who were ambivalent towards the risk reduction standards (2002, p.147). In instances where nurses felt conflicted, researchers found the nurses would personally distance themselves from the standards (2002). When nurses reported feeling torn between scientific guidelines and parents the researchers also noted that nurses empathized with parents without

disregarding the organizations policy (2002). For example, one nurse stated “I am forbidden to advise it. I am not allowed to say to you that it is right, so I won’t” (2002, p. 147).

CHAPTER 4. DISCUSSION, RECOMMENDATIONS, AND CONCLUSION

Discussion

The intent of the systematic review of literature was to investigate nurses' knowledge, attitudes and practices of current safe sleep recommendations. It was discovered that nurses' lack of knowledge and mixed feelings towards recommendations influenced their ability to implement safe sleep recommendations within their clinical practice. Findings were certainly worrisome because (a) supine only positioning has been recommended for almost two decades and (b) infant safety and wellbeing is dependent on a caregiver's familiarity with safe sleep recommendations. Nurses' unfounded fears and misconceptions often controlled their thinking and practice of safe infant sleep. Before solutions can be proposed, we must first examine how knowledge deficits, attitudinal barriers, and education and policy effect nursing decisions.

Knowledge Deficits Effect Nursing Practice and Patient Outcomes

From the research, nurses who cared for infants lacked knowledge about SIDS prevention strategies. Observational studies demonstrated nursing practice was not consistent with AAP recommendations. Integration of both knowledge and practice is the foundation of evidence-based care. Patient outcomes could be negatively affected when nurses do not understand SIDS risk reduction guidelines and subsequently do not practice the recommendations correctly.

Nurses who care for infants, particularly in the NICU or PICU settings, provide lifesaving care. Use of non-supine sleeping positions along with other nonconforming interventions may be necessary for critical infants. Consequently, parents may become confused when the infant stabilizes and no longer needs the interventions. Interventions for stable infants must be consistent with the current SIDS risk reducing recommendations so that parents are modeled appropriate behavior before discharge. For example, infants in intensive care units are

closely observed using cardio-respiratory monitors. Welby (2004) found that the use of non-supine positions for stable infants while on the monitor sent inconsistent messages to parents. The monitors can cause a false sense of security and prevent the use of recommended positioning. Gelfer et al. (2012) emphasized the importance of supine only positioning for stable infants throughout the entire hospital stay and stated “Although these hospitalized infants were not at risk because they were being continuously monitored, pre-discharge sleep practices that conflict with the AAP recommendations for SIDS prevention are likely to be continued after discharge when the infants are no longer being monitored” (p. e2).

Nursing “traditions” as accepted truths in nursing practice is a growing concern for many nursing units (Polit & Beck, 2014). When nurses make decisions based on unit customs or unit culture rather than sound research evidence, interventions may be less effective and unsafe. One example of a nursing “tradition” is covering the head of bassinets with blankets to shield the infant from the harsh lighting often found in hospital units. Nurses may feel the practice decreases the stimulation and light thus increasing sleeping comfort when it is likely causing a breathing hazard for an infant. The researchers found an increase in parent compliance with safe sleep practices following discharge when parents observed consistent demonstrations of safe sleep practices by nurses before discharge from the hospital (Gelfer et al., 2012). The authors findings show that nursing knowledge and practice of safe sleep recommendations shaped parents’ behaviors at home. If a family sees blankets over an infant’s head they may feel that the practice of covering an infant’s head with a blanket is necessary at home as well. Interestingly, covering infant’s heads is all too commonly found in public places where mothers and fathers do not want their infant to wake while sleeping in a car seat so they cover the infant head possibly preventing infant from breathing fresh air. Nurses must be conscious of nursing tradition so that

they demonstrate proper safe sleep recommendations for parents every single time they place a baby down to sleep.

Multiple studies showed nurses provided inconsistent safe sleep messages in their discharge education and that clinical practice was influenced by tradition and fear (Barsman et al., 2015; Bullock et al., 2004; Grazel et al., 2010). Despite knowledge deficits and poor practice, nurses believed they influenced parents' decisions to practice safe sleep recommendations. Unfortunately, nurses repeatedly endorsed non-supine positioning, unsafe sleep environments and omitted expanded safe sleep recommendations in patient discharge education. Parents rely on nurses to give them accurate information to keep their child safe. It is important for nurses to understand all SIDS reduction strategies. One recommendation alone, such as supine only sleeping, reduces the infants risk but education and support to correctly perform all recommendations such as assistance with smoking cessation, breastfeeding success and educating on the risks of a shared sleep surface, particularly a couch or chair could decrease SIDS rates drastically.

Attitudinal Barriers to Recommendations are Persistent

Placing an infant to sleep on his back is a simple and important risk reduction strategy against SIDS. Continued use of non-supine sleep positions is evidence that nurses do not understand the research and rationale behind the recommendations. Despite evidence that supine sleep protects infants from SIDS, unfounded fears and misconceptions are contributing to the reluctance of integrating SIDS risk reduction strategies in nursing care (Grazel et al., 2010). Studies included in the systematic review date back to 1999, just three years prior to supine only sleep recommendations. Two decades later ambivalence towards safe sleep recommendations continues. The thought that infants are at increased risk of aspiration while sleeping supine has

remained consistent since the introduction of safe sleep recommendations. Persistent attitudinal barriers like fear and perception of infant comfort contribute greatly to the use of non-supine infant sleep positioning.

Nurses must understand the rationale for supine positioning and endorse the correct information so parents may continue to practice safe sleep recommendations at home. The AAP reports that parents also fear choking or aspiration with supine positioning and “often misconstrue coughing or gagging, which is evidence of a normal protective gag reflex, for choking or aspiration” (2011b, p. 31347). Nurses are in an influential position to encourage parents to make safe choices for their infants’ sleep however they must first understand the rationale for supine only positioning. As described earlier, reflux is considered normal in infants, often causing small spit ups. It is important for nurses to understand that this does not increase an infant’s risk of aspiration or SIDS. Infant participants in a 2007 research study showed that 96% of the observed 3,240 normal infants did not have episodes of spitting up in the first 24 hours after birth (Tablizo et al., 2007). The research goes on to state that of the 3.7% of infants that did spit up during supine sleep, none required significant interventions (Tablizo et al., 2007, p. 508). Research by Tablizo was consistent with Byard and Beal (2000) who did not find significant gastric aspiration in infants who were lying supine. Furthermore, the AAP endorses the North American Society for Pediatric Gastroenterology and Nutrition’s statement that indicated:

prone positioning is acceptable if the infant is observed and awake, particularly in the postprandial period, but prone positioning during sleep can only be considered in infants with certain upper airway disorders in which the risk of death from GERD may outweigh the risk of SIDS. (Vandenplas et al., 2009, p. 15).

The AAP (2011b) provides some definition of certain upper airway disorders “specifically, infants with upper airway disorders in whom airway protective mechanisms are impaired, which may include infants with anatomic abnormalities, such as type 3 or 4 laryngeal clefts, who have not undergone antireflux surgery” (p. e1347).

Regardless of the research and clinical practice guidelines, nurses in two studies reported they found an infant in distress in a supine position (Bullock et al., 2004 & Price et al., 2008). The AAP description of normal gag reflexes in infants may be misinterpreted as a need for intervention explaining why the nurses may have responded to what they believed was an infant in distress (2011b). It is also important for nurses to understand that elevating the head of the bed does not improve GER symptoms but instead puts the infant at risk for sliding into positions that can compromise breathing (AAP, 2011b). In fact, supine sleeping may be protective for infants who spit up while laying down. Infants can clear secretions when laying on their back by swallowing them into the esophagus. Since the esophagus is located anterior to the trachea, gastric contents would have to work against gravity to be aspirated into the lungs (Grazel et al., 2010).

Another common attitudinal barrier in using supine only sleep positioning is the belief that infants are uncomfortable or stating the infant wakes frequently while sleeping supine (Aris et al., 2006; Bullock et al., 2004; Grazel et al., 2010). Research has shown that infants who sleep on their stomachs are less reactive to noise, have fewer movements, have higher arousal thresholds, and longer periods of deep sleep (Grazel et al., 2010, p.339). The AAP states that lighter sleep is precisely why supine sleeping is protective to the infant:

“An infant who wakes frequently is normal and should not be perceived as a poor

sleeper . . . The ability to arouse from sleep is an important protective physiologic response to stressors during sleep, and the infant's ability to sleep for sustained periods might not be physiologically advantageous" (AAP, 2011b, e1348).

Education and Policy Influence Nursing Decisions

The AAP policy statement on "SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment" is evidence-based and considered the "gold standard" for nurse endorsement within their practice (2011a). The ABM has also written their guideline on co-sleeping and breastfeeding using the best evidence available (2008). Research studies did not specifically address how nurses fill the gaps between the two recommendations. Based on the systematic review of research there is significant evidence that education and policy are important aspects of influencing practice decisions and filling in obvious practice gaps.

Education was a particularly valuable part of decision making when knowledge deficits and attitudinal barriers were present. Studies that included an educational intervention found an improvement in practice compliance as well as knowledge and attitudes towards safe sleep recommendations (Gelfer et al, 2013; McMullen et al., 2016; Price et al., 2008; Rowe et al, 2016; Young & O'Rourke, 2003; Voos et al, 2015). While education interventions were shown to be effective, the research found differences in both nursing degree held and years of experience when it came to knowledge, attitudes, and practice of safe sleep recommendations. Knowledge and attitudinal differences, as well as nursing degree and years of nursing experience could all be related to varying curriculum content and/or declining effects of previous public education campaigns. More experienced nurses may have placed their own children to sleep prone or side-lying with no ill effects, see the practice as safe, and continue to use it. Whereas novice nurses

grew up in a time where they were placed on their backs to sleep by their own parents, may remember the public education campaign or have small children of their own and were educated on safe sleep recommendations. While individual life circumstances play a role in the inconsistent use of safe sleep practices, unit policies encouraged regular use of current SIDS recommendations despite differences in education and experience (Aris et al., 2006; McMullen, 2016; Stastny et al., 2004).

Implications

Safe sleep recommendations were published more than 20 years ago. Even the most recently published articles included in the systematic review indicate that nurses are not utilizing the research available to inform their clinical practice. Nurses have a professional duty to provide care based on the most current research evidence. As discussed previously, nursing care that is built on research evidence both positively impacts the quality of care delivered and improves patient outcomes. Despite evidence that integration of research in nursing practice has positive effects on patient care and despite the vast availability of high quality research, a gap remains between research available and the use of the research in practice (Côté, Gagnon, Houme, Abdeljelil & Gagnon, 2012; Hopp & Rittenmeyer, 2012).

The term research utilization is an older concept, yet the idea is still considered an important aspect of evidence-based practice (Aita, Richer & Héon, 2007). Research utilization attempts to understand how nurses use research in clinical practice while evidence-based practice involves a larger skill set that includes making clinical decisions based on the best possible evidence available (Melnyk & Fineout-Overholt, 2005; Polit & Beck, 2014). Evidence-based practice takes into consideration multiple research studies, clinical expertise, patient values, and existing resources while the research utilization goal is to translate empirical evidence into real

world applications (Polit & Beck, 2014). The process of synthesizing, disseminating, and using research-generated knowledge to make an impact on or change existing nursing practice explains research utilization (UC Davis, 2016). Polit and Beck (2014) state “Research utilization begins with the emergence of new knowledge. Research is conducted and, over time, evidence on a topic accumulates. In turn, the evidence works its way into use-to varying degrees and at different rates” (p. 21). Current safe sleep recommendations base specific actions on research that has been gathered over the last 20 years. Regardless of clinical expertise and patient preferences, both important components in evidence-based research, the science is clear that nurses must adopt supine only sleep recommendations in practice.

Results from this systematic review highlight the need for nurses to understand and accept safe sleep recommendations. A behavior change in nursing practice is necessary in order to influence infant mortality statistics related to SIDS. Nurses are called to practice evidence-based care, however, “simply ‘pushing’ guidelines to healthcare providers does not guarantee that the providers will change their behavior and adopt a new behavior. . . the cognitive system also plays a predominant role in the nurses’ assimilation of knowledge that can motivate adopting a new practice” (Aita, Richer & Héon, 2007, p. 15). Changing practice is a complex process influenced by many factors. Barriers to moving research into practice include both nurse-related characteristics and organizational barriers as well as the nature of the evidence at hand (Polit & Beck, 2014). While education is an important initiator of change, incorporating behavioral and environmental components can facilitate behavior change (Kuhns, 2007). Estabrooks, Floyd, Scott-Findlay, O’Leary and Gushta (2003) found that beyond education, attitudes and beliefs were important factors influencing nurse’s use of research in practice. Attitude towards research and the motivation to engage in evidence-based practice continue to be

significant barriers. Research studies have found that the more positive the attitude, the more likely the nurse will use research in practice (Polit & Beck, 2014).

Nurse educators must understand the attitudinal context in which behaviors are likely to change. Beliefs, attitudinal factors, and subjective norms must be considered when designing interventions or education programs that intend to change behavior (Richards & Digger, 2008). The Theory of Planned Behavior (TPB) is a useful framework in predicting behaviors and understanding what influences behavior change (Richards & Digger, 2008). Powerful social, psychological and environmental conditioning that influence behavior change are acknowledged in the TPB framework (Kuhns, 2007). The TPB, an extension of Azjen's Theory of Reasoned Action, was developed to explain variables which are at the root of personal behavioral modifications (Côté et al. 2012). While healthcare professionals typically use the TPB to develop health promotion activities, Côté et al. (2012) reported that TPB is also useful to understand healthcare professionals' behavior and intentions.

According to the TPB, intentions are the most important predictor of behavior and intentions are formed by (a) attitudes towards a behavior; (b) subjective norms; and (c) perceived control over a behavior (Kuhns, 2007). The key concepts from the TPB together with the results from the systematic review of literature show that multidimensional, interactive interventions are necessary to positively influence intention and change behavior of nurses. Nursing education, a far-reaching public education campaign, and the development of policies are key interventions to influence attitudes, change social norms and increase nurses' confidence to promote safe sleep recommendations. Figure 2 illustrates how the proposed interventions influence nurses' intentions and thus change desired behavior to carry out the safe sleep recommendations in their own clinical practice.

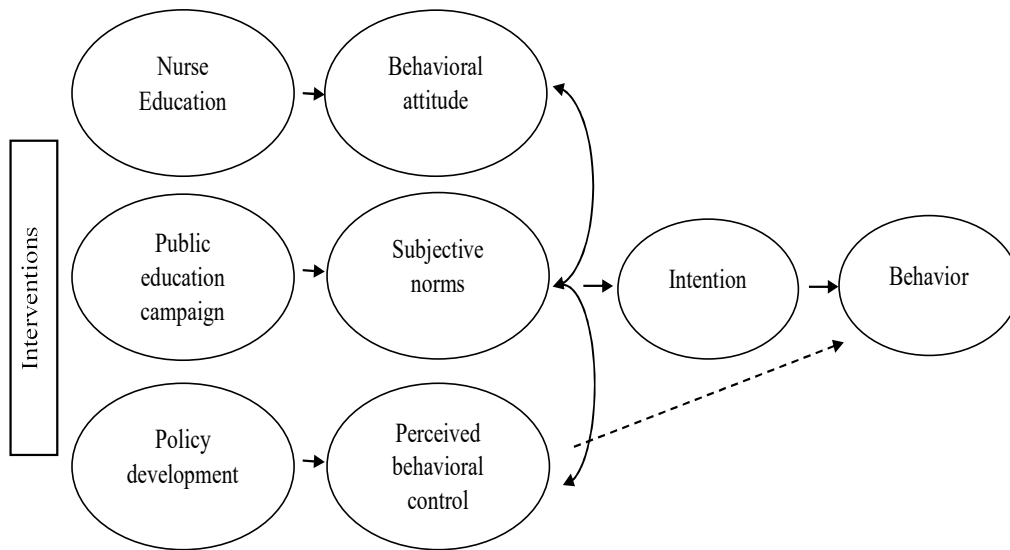


Figure 2. Theoretical Framework for nursing intervention development; adapted from Azjen's Theory of Planned Behavior (Côté, Gagnon, Houme, Abdeljelil, & Gagnon, 2012).

Nurse Education

Behavior attitude refers to an individual's positive or negative expectations and evaluations towards a behavior (Kuhns, 2007). The concept of behavior attitudes reflects a combination of feelings, beliefs, intentions and perceptions about how someone thinks or feels about the consequences of performing the behavior. Individual nurse characteristics that may be barriers to moving research into practice include (a) not feeling capable of evaluating research, (b) feeling isolated from knowledgeable colleagues with whom they could discuss the research, (c) unaware of the research, and (d) resistant to change (Hopp & Rittenmeyer, 2012; Polit & Beck, 2014). If the desire is to change nurse intention or behavior, nurses must believe that following safe sleep recommendations will result in a positive outcome, but first, the nurse must be given the opportunity to explore the research.

Persistent negative attitudes towards safe sleep recommendations was a common theme identified in the systematic review of literature. The recurring belief that an infant could be

harmful or would be uncomfortable in a supine sleeping position prevented the routine use of safe sleep recommendations in practice. A curriculum based exclusively on nurse compliance to the safe sleep recommendations disregards the reason for non-compliance. In order to change behavior, a curriculum built on the research that supports the rationale provides evidence to influence nurses' attitudes. Aita, Richer and Héon (2007) found that creating opportunities for professionals to discuss and interpret research findings within their local context could help overcome barriers to the use of the research in the clinical practice. One example of such opportunity is an in-house journal club. The journal club could be held monthly to discuss any relevant nursing care topic using research evidence. Each month a nurse can present the findings of the research and together as a group decide how the research may be applied to the nursing setting. Workshops or discussion groups were also identified as preferred methods to discuss evidence-based practice guidelines (Aita, Richer & Héon, 2007). Group settings that encourage open communication should include key professionals, such as a nurse leader, nurse educator, nurse practitioner and/or physician, who are able to discuss practical implications of the research in specialty practice settings. Mandatory education, in-services, observations, focus groups, and computer-based training were also found to be effective interventions (Gelfer et al., 2013; Grazil et al., 2010; McMullen et al., 2016; Young & Schluter, 2002; Young & O'Rourke, 2003).

The systematic review found that degree or additional certificates held and years of experience played a role in nurse attitude towards safe sleep recommendations. An assumption could be made that not all college or specialty certifications includes safe sleep recommendations in the curriculum. De Natale and Malloy (2012) recommended the use of position statements in curriculum development as an important foundational guideline for teaching evidence-based practice in nursing. Position statements are developed by various professional organizations

using research evidence. The goal of position statements are to outline standards of practice surrounding a certain topic. Integrating the use of position statements within curriculums design can encourage nurses to explore nursing and medical (i.e. AAP) organizations' values related to a specific practice specialty. Promoting activities that include the use of position statements also demonstrates the role of professional nursing organizations in advancing nursing practice. Even when a curriculum does not specifically address safe infant sleeping, nurse educators are modeling the importance of gathering research evidence to support safe and effective nursing practice.

Public Education Campaign

Nursing education is an important component to transforming nurses' attitudes. As the TPB explains, changing attitudes and beliefs alone does not change intentions or behavior. Subjective norms are the social pressures placed upon a person to perform or not perform a behavior (Kuhns, 2007). Family, friends, co-workers, trusted professionals and even the media influence behaviors. In deciding whether to perform a certain behavior, both one's own beliefs and the opinions of others are important factors in intention to perform a behavior. "Thus, people often behave as they believe others expect them to behave" (Kuhns, 2007, p. 319) and in order to change intention or behavior, nurses must see others around them believe in the safe sleep recommendations.

More than a decade of increasing ASSB mortality rates is evidence that the once successful Safe to Sleep public education campaign may not be reaching the intended audience. An updated, far-reaching public education campaign is needed to change society's views on safe sleep recommendations. Parents are no longer the only target of safe sleep messages. Grandparents, childcare providers, social workers, nurses, primary care providers, churches and

other spiritual or community centers must be given the same message targeted to their specific role in caring for the family or infant. It was found that nurses were influenced by both parents and tradition carried on by other nurses when it came to following safe sleep guidelines (Bullock et al., 2004; McMullen et al, 2016; Peeke et al., 1999; Rowe et al., 2016; Welby, 2004). Likewise, nurses were found to influence parents in the use of safe sleep recommendations (Barsman et al, 2015; Gelfer et al, 2013; Stastny et al, 2004). By using a public education campaign, an additional supportive network surrounding the infant will be educated on the importance of using safe sleep recommendations.

The TPB demonstrates the effect of social influences on intentions and behavior. Social influences include the effects of the media and sale of commercial products. When television commercials, television series, and movies show infants in cribs with bumpers, sleeping prone, sleeping with loose blankets and sleeping in semi-seated positions such as infant swings, the message is contradictory to the AAP recommendations. Besides home monitors, mesh mattresses and the continued sale of crib bumpers, the baby product industry is flooding the market with products that claim to keep infants safe. One example of such deceptive advertising is the marketing of semi-reclined rockers or chairs for infant sleep. The baby product industry has capitalized on nurses' and parents' common and unfounded fear of aspiration by inventing baby gear that lead parents to believe their infant is safer in a semi-reclined position. The semi-reclined rockers do not follow AAP recommendations of a firm, flat, sleep surface and may actually put infants at risk for positional asphyxia, a type of ASSB. Efforts to go after false advertising that place infants at risk must be included in the public education campaign. For example, the states of Maryland and Illinois have effectively banned the sale of crib bumpers. Research studies have found that knowledge and practice by both nurses and parents were

affected by media and commercial sales (Barsman et al, 2015; Grazel et al, 2010; Horstman & Rens-Leenaarts, 2002; Peeke et al., 1999)

Policy Development

Nurses as individuals are responsible for using the best available evidence in their clinical practice however, organizations, leaders and systems of care can greatly affect how nurses use the evidence (Hopp & Rittenmeyer, 2012, Polit & Beck, 2014). Individuals will find it difficult to integrate research into practice when too many organizational barriers are present. Perceived behavioral control is the extent to which an individual believes he or she can perform or control the behavior. In general, the more favorable the attitude and subjective norm, the greater the perceived control and the stronger the intention is to execute a behavior (Kuhns, 2007).

Individuals with high-perceived behavioral control hold stronger intentions and are more likely to carry out desired behaviors despite barriers and challenges. Organizations can create a positive environment making it easier for nurses to move research into practice (Hopp & Rittenmeyer, 2012). In order for nurses to follow safe sleep recommendations in practice, they must feel capable and confident to carry out the behavior within their specialty.

Organizational policies outline expectations of nursing care and provide nurses with the tools to implement safe sleep recommendations. Policy can also include additional components such as standard order sets, nursing assessment of sleep environment, parent safe sleep contracts or acknowledgement, and yearly reviews monitoring compliance. When an infant is born, admission orders that include order sets supporting recommended supine sleep position and safe sleeping environments throughout the hospital stay may encourage all nurses to follow recommendations despite attitude or social norms. Another organizational policy supportive to carrying out safe sleep recommendations is designing electronic health records to include nursing

assessment components that evaluate infant sleep position and sleep environment. Childcare providers and public health units have included safe sleep contracts in their service agreement to acknowledge the safe sleep recommendations by signing a declaration. The idea could also be used in the hospital. On admission parents are given safe sleep education and asked to acknowledge their understanding and the efforts to keep infants safe while sleeping by signing the contract. Safe sleep contracts provide parents with the rationale to follow safe sleep recommendations and encourage nurses to model safe sleep practice throughout the infants' hospital stay. Yearly reviews and audits can be an effective tool to empower nurses to continue to follow safe sleep recommendations. The research found that policies were an effective tool to encourage nurses to follow safe sleep recommendations (Aris et al., 2006; Gelfer et al., 2013; McMullen et al., 2016; Rowe et al., 2016; Stastny et al., 2004).

Recommendations

Infant sleep and safety are common concerns for both parents and healthcare professionals. Nurses have a responsibility to parents to support the use of safe sleep recommendations. Strategies used to encourage the use of safe sleep practices must address multiple challenges. Specifically, the strategies must allow nurses to explore both the research and individual attitudes and opinions towards the recommendations, continue to challenge the social norms of infant sleep as well as engage organizations to incorporate recommendations to support nurses in their practice.

One strategy that must be carefully evaluated is how nurses can use the research to explore their attitudes and feelings towards the recommendations. Persistent negative or uncertain attitudes towards the research can be explored through open forums. Nurses can be encouraged to discuss concerns related to the recommendations while moderators lead the

meetings and introduce the research that provides rationale to adopt the use of the recommendations. In addition to open forums evaluating nurse attitudes and beliefs, nurse educators must evaluate education approaches and its effects on nurses' perception of the recommendations. One educational approach that may prove valuable is the inclusion of basic respiratory system anatomy, including mouth and esophagus. Allowing nurses to study the structures protective to aspiration may improve their belief in safe sleep recommendations.

Strategies that support individual nurses in adopting recommendations is only one solution. Nurses can be the leaders in social and organizational change by participating in public education and policy development that supports consistent information and accurate modeling. For example, it would be beneficial for a public health nurse to evaluate the effectiveness of safe sleep recommendations displayed near infant baby products in stores that sell such products as cribs and infant swings. Displaying safe sleep recommendations near baby products allows parents continued exposure to accurate information. Organizations can also commit to modeling accurate and consistent information by ensuring all advertisements and educational brochures commit to demonstrating safe infant sleep practices. Each organization can recruit key stakeholders such as pediatricians, nurses, marketing and parent volunteers that meet to evaluate all advertising and education content for safe infant sleep practices. The following examples, while brief, provide a starting point for nurses to engage in activities that support current safe sleep recommendations.

Future Research

Research surrounding nurses' knowledge, attitude and beliefs is abundant. The systematic review of literature confirms a gap exists between the scientific evidence of safe sleep recommendations and how nurses use the guidelines within nursing practice. Nurses remain

ambivalent towards the efficacy of safe sleep recommendations while their use in nursing practice is suboptimal. Additional research should include analyzing the benefits of a nursing organization policy statement supporting safe sleep efforts, research evaluating strategies to reduce injury and harms associated with bed-sharing, evaluating the role of nurses in sharing risk reduction messages with bed-sharing families, as well as evaluating strategies that support safe sleep practices while preserving the breastfeeding relationship.

Professional nursing organizations are an invaluable source of support for nurses who desire to practice nursing using the best available evidence. As discussed earlier, specialty nursing position statements inform nursing practice. Matthew-Maich, Ploeg, Dobbins and Jack's (2013) study focused on understanding how to move evidence-based care in to practice and indicated that choosing relevant and credible guidelines from a trusted professional nursing organization was key to a successful implementation process. Currently, no professional nursing organization has a written policy or position statement supporting the AAP safe sleep recommendations. Research is necessary to consider the effects of a joint or supporting position or policy statement from a nursing organization regarding safe infant sleep practices.

While research shows that bed-sharing is common practice among mothers, nurses should continue to provide education on the current AAP guidelines and encourage parents to follow the guidelines to protect their infant. Nurses must also consider safe sleeping practices for their patients and clinical practice in real life settings. Bed-sharing is a controversial subject, despite opposition from the medical community and public health officials, parents are increasingly choosing night time parenting strategies such as bed-sharing especially for breastfeeding mothers (University of Notre Dame, 2016). Researchers must investigate nurses' role in sharing risk-reduction strategies for parents who chose to bed-share following safe sleep recommendations.

Strategies to reduce injury and harms associated with bed-sharing is an important topic to investigate because evidence shows parents may share a sleep surface with their infant even when it is unplanned.

A one-size fits all education campaign will unlikely prevent bed-sharing. Culver (2009) interviewed 24 mothers on bed-sharing choices and found that “motives for mothers to bed-share with their babies are interrelated and change over time. Within the complex context, mothers make either intentional or unintentional decisions to bed-share in order to meet the needs of their babies and themselves” (p 423). Furthermore, researchers must investigate mothers in their decision making process to bed-share with infants. Findings from such research can assist nurses in designing unique interventions that increase the likelihood of mothers and families following current safe sleep recommendations. Breastfeeding has been shown to be protective against SIDS, so above all, interventions must be evaluated as to how it protects a breastfeeding relationship.

Closing Remarks

Unchanged rates of sleep related infant deaths over the past decade calls for a deeper understanding of how to move awareness to action. The current systematic review of literature demonstrated how nurses’ knowledge and attitudes effect clinical practice. Nurses’ knowledge deficits surrounding safe sleep recommendations and persistent attitudinal barriers towards the efficacy of the recommendations continue to place infants at risk. Nurses’ are in a unique position to move the needle simply by modeling and supporting the AAP safe sleep recommendations. Yet, perceived barriers exist and prevent nurses from using the recommendations in their clinical practice. This paper proposes removing actual and perceived barriers to using the recommendations by developing interventions that target nurse attitudes and

beliefs. By targeting attitudes and beliefs, nurse educators can increase nurses' readiness to change behavior and nursing practice. Focusing interventions on supporting behavior change empowers nurses to promote safe sleep recommendations in their clinical practice.

Recommended interventions include nurse education focused on rationale and position statements, a broader public education campaign and organizational policies supporting safe sleep practices. Finally, researchers and nurses must consider a parent's decision or preference of infant sleep location as part of evidence-based practice when studying or educating on SIDS risk-reduction strategies.

REFERENCES

- Academy of Breastfeeding Medicine Protocol Committee. (2008). ABM Clinical Protocol #6: Guideline on Co-Sleeping and Breastfeeding. *Breastfeeding Medicine*, 3(1), 38-43. doi: 10.1089/bfm.2007.9979
- American Academy of Pediatrics, Task Force on Infant Positioning and SIDS. (1996). Positioning and SIDS. *Pediatrics*, 98(6), 1216-1218. Retrieved from <http://pediatrics.aappublications.org/content/pediatrics/98/6/1216.full.pdf>
- American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011a). Policy Statement: SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*, 128(5), 1030-1039. doi: 10.1542/peds2011-2284
- American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011b). Technical Report SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*, 128(5), e1341-1367. doi: 10.1542/peds2011-2285
- American Nurses Association. (March 12, 2015). *The nursing process*. Retrieved from <http://www.nursingworld.org/EspeciallyforYou/StudentNurses/TheNursingProcess.aspx>
- Aris, C., Stevens, T. P., LeMura, C., Lipke, B., McMullen, S., Côté-Arsenault, D., & Consenstein, L. (2006). NICU nurses' knowledge and discharge teaching related to infant sleep position and risk of SIDS. *Advances in Neonatal Care*, 6(5), 281-294. doi: 10.1016/j.adnc.2006.06.009

- Aita, M., Richer, M.C., & Héon, M. (2007). Illuminating the process of knowledge transfer in nursing. *Worldviews on Evidenced-Based Nursing*, 4(3), 146-155.
doi: 10.1111/j.1741-6787.2007.00087.x
- Ateah, C. A., Hamelin, K. J. (2008). Maternal bedsharing practices, experiences and awareness of the risks. *JOGNN*, 37(3), 274-281. doi: 10.1111/.1552-6909.2008.00242.x
- Barsman, S., Dowling, D. A., Damato, E. G., & Czeck, P. (2015). Neonatal nurses' beliefs, knowledge, and practices in relation to sudden infant death syndrome risk-reduction recommendations. *Advances in Neonatal Care*, 15(3), 209-219.
doi: 10.1097/ANC.000000000000160
- Bartlow, K. L., Cartwright, S. B., & Shefferly, E. K. (2016). Nurses' knowledge and adherence to sudden infant death syndrome prevention guidelines. *Pediatric Nursing*, 42(1), 7-13.
Retrieved from <http://web.a.ebscohost.com.ezproxy.lib.ndsu.nodak.edu/ehost/pdfviewer/pdfviewer?sid=5f9c823f-a50a-4de9-9996-0da9261d9dab%40sessionmgr4001&vid=3&hid=4114>
- Blair, P. S., Fleming, P. J., Smith, I. J., Platt, M. J., Young, J., Nadin, P.,... CESDI SUDI Research Group. (1999) Babies sleeping with parents: case-control study of factors influencing the risk of the sudden infant death syndrome. *BMJ*, 319, 1457-1462.
doi: <http://dx.doi.org.ezproxy.lib.ndsu.nodak.edu/10.1136/bmj.319.7223.1457>
- Blair, P. S., Sidebotham, P., Evason-Coombe, C., Edmonds, M., Heckstall-Smith, E. M., & Fleming, P. (2009). *BMJ*, 339. doi: <http://dx.doi.org/10.1136/bmj.b3666>
- Brown, S.J. (2012). *Evidenced-based nursing* (2nd ed.). Sundbury, MA: Jones & Bartlett Learning.

- Bullock, L. F., Mickey, K., Green, J., & Heine, A. (2004). Are nurses acting as role models for the prevention of SIDS. *The American Journal of Maternal/Child Nursing*, 29(3), 172-177. Retrieved from http://ovidsp.tx.ovid.com.ezproxy.lib.ndsu.nodak.edu/sp-3.19.0a/ovidweb.cgi?&S=NFAEFPGAOPDDAPCANCINKNDLBDFOMAA00&Link+Set=S.sh.22.23.27.31|8|sl_10
- Byard, R. W., & Beal, S. M. (2000). Gastric aspiration and sleeping position in infancy and early childhood. *Journal of Paediatrics and Child Health*, 36(4), 403-405.
doi: 10.1046/j.1440-1754.2000.00503.x
- Carpenter, R. G., Irgens, L. M., Blair, P. S., England, P. D., Fleming, P., Huber, J., ... Schreuder, P. (2004). Sudden unexplained infant death in 20 regions in Europe: case control study. *The Lancet*, 363(9404), 186-191. Retrieved from <http://web.b.ebscohost.com.ezproxy.lib.ndsu.nodak.edu/ehost/pdfviewer/pdfviewer?sid=65bf1657-f8ce-4dd7-a380-7440aac5ca0c%40sessionmgr120&vid=9&hid=110>
- Center for Disease Control and Prevention, Division of Nutrition, Physical Activity, and Obesity. (2013). *Breastfeeding report cards United States, 2013*. Retrieved December 17, 2015 from <http://www.cdc.gov/breastfeeding/data/reportcard.htm>
- Center for Disease Control and Prevention. (1999). Achievements in public health, 1990-1999: Healthier mothers and babies. *Morbidity Mortality Weekly Report*, 43(38). 849-858. Retrieved March, 19, 2016 from <http://www.cdc.gov/mmwr//preview/mmwrhtml/mm4838a2.htm>
- Center for Disease Control and Prevention. (November 22, 2015). *Sudden unexpected infant death and sudden infant death syndrome*. Retrieved from <http://www.cdc.gov/sids/index.htm>

- Center for Disease Control and Prevention. (February 8, 2016). *Sudden unexpected infant death and sudden infant death syndrome: Data and statistics*. Retrieved from <http://www.cdc.gov/sids/data.htm>
- Center for Disease Control and Prevention. (December 2, 2014). *Sudden unexpected infant death and sudden infant death syndrome: SUID initiative*. Retrieved from <http://www.cdc.gov/sids/suidabout.htm>
- Center for Disease Control and Prevention. (2012). Vital signs: Unintentional injury deaths Among persons aged 0-19 years-United States, 2000-20009. *Morbidity Mortality Weekly Report*, 61(15), 270-276. Retrieved November 11, 2015 from <http://www.cdc.gov/mmwr/pdf/wk/mm6115.pdf>
- Colson, E. R., Willinger, M., Rybin, D., Heeren, T., Smith, L. A., Lister, G., Corwin, M. J. (2013). Trends and factors associated with infant bed sharing, 1993-2010: The national Infant sleep position study. *JAMA Pediatrics*, 176(11), 1032-1037. doi:10.1001/jamapediatrics.2013.2560.
- Côté, F., Gagnon, J., Houme, P. K., Abdeljelil, A. B., & Gagnon, M. (2012). Using the Theory of Planned Behavior to Predict nurses' intention to integrate research evidence into clinical decision-making. *Journal of Advances Nursing*, 68(10), 2289-2298. doi: 10.1111/j..1365-2648.2011.05922.x
- Culver, E. D. (2009). Exploring bed-sharing mothers' motives and decision-making for getting through the night intact: A grounded theory. *Journal of Midwifery & Women's Health*, 54(5), 423. doi: 10.1016/j.jmwh.2009.06.010

- De Natale, M. L., & Malloy, S. E. (2012). The use of position statements in teaching best practices in nursing. *Nursing Education Perspectives*, 33(6), 378-30.
- Efe, E., İnal, S., Balyılmaz, H., Çetin, H., Turan, T., Altun, E., . . . Arıkan, D. (2012). Nurses' and paediatricians' knowledge about infant sleeping positions and the risk of sudden infant death syndrome in Turkey. *Health Med*, 6(1), 140-147. Retrieved from Interlibrary Loan Office
- Estabrooks, C. A., Floyd, J. A., Scott-Findlay, S., O'Leary, K. A., & Gushta, M. (2003). Individual determinants of research utilization: a systematic review. *Journal of Advanced Nursing*, 45(3), 506-520. doi: 10.1046/j.1365-2648.2003.02748.x
- Gelfer, P., Cameron, R., Masters, K., & Kennedy, K. (2013). Integrating "Back to Sleep" recommendations into neonatal ICU practice. *Pediatrics*, 131(4), e1-e7.
doi: www.pediatrics.org/cgi/doi/10.1542/peds.2012-1857
- Grazel, R., Gibbons Phalen, A., & Polomano, R. C. (2010). Implementation of the American Academy of Pediatrics recommendations to reduce sudden infant death syndrome risk in neonatal intensive care units. *Advances in Neonatal Care*, 10(6), 332-342.
doi: 10.1097/ANC.0b013e3181f36ea0
- Hauk, F., Herman, S. M., Donavan, M., Iyasu, S., Moore, C. M., Donoghue, E., . . . Willinger, M. (2003). Sleep environment and the risk of sudden infant death syndrome in an Urban population: The Chicago infant mortality study. *Pediatrics*, 111(5), 376-382.
Retrieved from <http://web.b.ebscohost.com.ezproxy.lib.ndsu.nodak.edu/ehost/pdfviewer/pdfviewer?sid=65bf1657-f8ce-4dd7-a380-7440aac5ca0c%40sessionmgr120&vid=12&hid=110>

- Hauk, F. R., Thompson, J., Tanabe, K. O., Moon, R. Y., & Vennemann, M. (2011).
Breastfeeding and reduced risk of sudden infant death syndrome: a meta-analysis.
Pediatrics, *128*(1), 103-110.
doi: <http://dx.doi.org.ezproxy.lib.ndsu.nodak.edu/10.1542/peds.2010-3000>
- Hein, H. A., & Pettit, S. F. (2001). Back to Sleep: Good advice for parents but not for hospitals.
Pediatrics, *107*(3), 537-539. Retrieved from <http://web.b.ebscohost.com.ezproxy.lib.ndsu.nodak.edu/ehost/pdfviewer/pdfviewer?sid=65bf1657-f8ce-4dd7-a380-7440aac5ca0c%40sessionmgr120&vid=15&hid=110>
- Hopp, L., & Rittenmeyer, L. (2012) *Introduction to evidence-based practice: A practical guide for nursing*. Philadelphia, PA: F.A. Davis Company.
- Horsley, T., Clifford, T., Barrowman, N., Bennett, S., Yazdi, F., Sampson, M., Moher, D., . . .
Côté, A. (2007). Benefits and harms associated with the practice of bed sharing.
Archives of Pediatric and Adolescent Medicine, *161*(3), 237-245.
doi: 10.1001/archpedi.161.3.237.
- Horstman, K., & Rens-Leenaarts, E. (2002). Beyond the boundary between science and values:
Re-evaluating the moral dimension of the nurses' role in cot death prevention. *Nursing Ethics*, *9*(2), 137-154. doi: 10.1191/0969733002ne494oa
- Hunt, C. E. (1997). Expanded "back to sleep" recommendations: hospital-based safe sleeping practice, *Journal of Sudden Infant Death Syndrome Infant Mortality*, *2*, 223-224.
- Krouse, A., Craig, J., Watson, U., Matthews, Z., Kolski, G., Isola, K. (2012). Bed-sharing Influences, attitudes, and practices: Implications for promoting safe infant sleep. *Journal of Child Healthcare*, *16*(3), 274-283. doi: 10.1177/1367493511432300

- Kuhns, M. (2007). Theories from the behavioral sciences. In McEwen, M., & Wills, E. M. (Eds.), *Theoretical basis for nursing* (300-327). Philadelphia: Lippincott Williams & Wilkins.
- Lahr, M., Rosenberg, K., & Lapidus, J. (2007). Maternal-Infant Bedsharing: Risk Factors for Bedsharing in a population-based Survey of New Mothers and Implications for SIDS Risk Reduction. *Maternal Child Health, 11*, 277-286. doi: 10.1007/s10995-006-0166-z
- Liberati, A., Altman, D., Tetzlaff, J., Mulrow, C., Gotzsche, P., Ioannidis, J.,...Moher, D. (2009). The PRISMA Statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *Annals of Internal Medicine, 151*(4), Retrieved from <http://annals.org/article.aspx?articleid=744664&resultClick=3>
- Lightdale, J. R., & Gremse, D. A. (2013). Gastroesophageal reflux: Management guidance for the pediatrician. *Pediatrics, 131*(5), e1684-e1695. doi: 10.1542/peds.2013-0421
- Magarey, J. M. (2001). Elements of a systematic review. *International Journal of Nursing Practice, 7*, 376-382.
- Matthew-Maich, N., Ploeg, J. Dobbins, M., Jack, S. (2013). Supporting the uptake of nursing guidelines: what you really need to know to move nursing guidelines into practice. *Worldviews of Evidence-Based Nursing, 10*(2), 104-115. doi: <http://dx.doi.org.ezproxy.lib.ndsu.nodak.edu/10.1111/j.1741-6787.2012.00259.x>
- McCrae, N., Blackstock, M., & Pursell, E. (2015). Eligibility criteria in systematic reviews: A Methodological review. *International Journal of Nursing Studies, 52*, 1269-1276. doi: <http://dx.doi.org.ezproxy.lib.ndsu.nodak.edu/10.1016/j.ijnurstu.2015.02.002>

- McKenna, J. J., Mosko, S. S., & Richard, C. A. (1997). Bedsharing Promotes Breastfeeding. *Pediatrics, 100*(2), 214-219.
- McMullen, S. L., Fioravanti, I. D., Brown, K., & Carey, M. G. (2016). Safe sleep for hospitalized infants. *The American Journal of Maternal/Child Nursing, 41*(1), 43-50. doi: 10.1097/NMC.0000000000000205.
- Melnyk, B. M., & Fineout-Overholt, E. (2005). *Evidence-based practice in nursing & healthcare: A guide to best practice*. Philadelphia, PA: Lippincott Williams & Wilkins
- Merriam-Webster's collegiate dictionary (11th ed.) (2000). Springfield, MA: Merriam-Webster Incorporated.
- Möllborg, P., Wennergren, G., Norvenius, S.G., & Alm, B. (2011). Bed-sharing among six-month-olds infants in western Sweden. *Acta Paediatrica, 100*, 226-230. doi:10.1111/j.1651-2227.2010.02008.x
- Mosko, S., Richard, C., & Mckenna, J. (1997a). Maternal sleep and arousals during bedsharing with infants. *Sleep, 201*(2), 142-150. Retrieved from <http://cosleeping.nd.edu/articles-and-presentations/articles-and-essays/>
- Mosko, S. Richard, C., & McKenna, J (1997b). Infant arousals during mother-infant bedsharing: Implications for infant sleep and SIDS research. *Pediatrics, 100*(2), 841-849. Retrieved from <http://cosleeping.nd.edu/articles-and-presentations/articles-and-essays/>

National Institutes of Health (NIH), Eunice Kennedy Shriver National Institute of Child Health and Human Development. (February 3, 2016) *Continuing Education (CE) Activity on Risk Reduction for Sudden Infant Death Syndrome (SIDS) and Other Sleep-Related Causes of Infant Death: Curriculum for Nurses*. Retrieved from https://www.nichd.nih.gov/cbt/sids/nursececourse/Course_Content.aspx?link_id=22&content_id=4

National Institutes of Health (NIH), Eunice Kennedy Shriver National Institute of Child Health and Human Development. (2015) *Safe to Sleep Public Education Campaign*. Retrieved from <https://www.nichd.nih.gov/sts/Pages/default.aspx>

Peek, K., Hershberger, M., Kuehn, D., & Levett, J. (1999). Infant sleep position: Nursing Practice and knowledge. *The American Journal of Maternal/Child Nursing*, 24(6), 301-304. Retrieved from http://ovidsp.tx.ovid.com.ezproxy.lib.ndsu.nodak.edu/sp-3.19.0a/ovidweb.cgi?&S=KDLKFPEHKKDDKOMDNCIKDDDCIPBDAA00&Link+Set=S.sh.22.23.27.31|8|sl_10

Polit, D. F., & Beck, C. T. (2014). *Essentials of nursing research: Appraising evidence for Nursing practice* (8th ed.). Philadelphia: Lippincott Williams & Wilkins.

Price, S. K., Hillman, L., Gardner, P., Schenk, K., & Warren, C. (2008). Changing hospital Newborn practice: Results from a statewide “Back to Sleep” nurses training program. *Maternal Child Health Journal*, 12, 363-371. doi: 10.1007/s10995-007-0243-y

Renjith, V., George, A., & D’Souza, P. (2015). Undertaking Systematic Reviews of Nursing. *International Journal of Nursing Education*, 7(4), 104-109. doi: 10.5958/0974-9357.2015.00202.0

- Richards, E., Digger, K. (2008). Compliance, motivation, and health behaviors of the learner. In Bastable, S. B. (Eds.), *Nurse as educator* (199-228). Sudbury, MA: Jones and Bartlett Publishers.
- Rowe, A. D., Sisterhen, L. L., Mallard, E., Borecky, B., Schmid, B., Rettiganti, M., & Luo, C. (2016). Integrating safe sleep practices into a pediatric hospital: Outcomes of a quality improvement project. *Journal of Pediatric Nursing, 31*, e141-e147.
doi: <http://dx.doi.org.ezproxy.lib.ndsu.nodak.edu/10.1016/j.pedn.2015.10.015>
- Ruys, J. H., de Jonge, G. A., Brand, R., Englebets, A. C., Semmerkot, B. A. (2007). Bed-sharing in the first four months of life: a risk factor for sudden infant death. *Acta Paediatrica, 96*, 1399-1403. doi: 10.1111/j.1651-2227.2007.00413.x
- Salm Ward, T. C., Ngui, E. M. (2015). Factors associated with bed-sharing for African American and White mothers in Wisconsin. *Maternal Child Health Journal, 19*, 720-732.
doi: 10.1007/s10995-014-1545-5
- Senter, L., Sackoff, J., Landi, K., & Boyd, L. (2011). Studying sudden and unexpected infant deaths in a time of changing death and investigation practices: Evaluating sleep-related risk factors for infant death in New York City. *Maternal Child Health Journal, 15*, 242-248. doi: 10.1007/s10995-010-0577-8
- Shapiro-Mendoza, C. K., Tomashek, K. M., Anderson, R. N., & Wingo, J. (2006). Recent national trends in sudden, unexpected infant deaths: More evidence supporting a change in classification or reporting. *American Journal of Epidemiology, 163*(3), 762-769.
doi:10.1093/aje/kwj117

- Stastny, P. F., Ichinose, T. Y., Thayer, S. D., Olson, R. J., & Keens, T. G. (2004). Infant sleep Positioning by nursery staff and mothers in newborn hospital nurseries. *Nursing Research, 53*(2), 122-129. Retrieved from http://ovidsp.tx.ovid.com.ezproxy.lib.ndsu.nodak.edu/sp-3.19.0a/ovidweb.cgi?&S=IDNIFPFGPDDDKO KGNCIKPFGCPLLHAA00&Link+Set=S.sh.22.23.26.29|8|sl_10
- Tablizo, M.A., Jacinto, P., Parsley, D., Chen, M.L., Ramanathan, R., Keens, T.G. (2007). Supine Position does not cause clinical aspiration in neonates in hospital newborn nurseries. *Archives of Pediatrics and Adolescent Medicine, 161*(5), 507-510. Retrieved from <http://archpedi.jamanetwork.com/article.aspx?articleid=570313>
- Tappin, D., Ecob, R., Brooke, H. (2005). Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: A case-control study. *The Journal of Pediatrics, 147*(1), 32-37. doi: 10.1016/j.jpeds.2005.01.035
- UC Davis Medical Center. (2016, May 15). *Research Utilization*. Retrieved from <http://www.ucdmc.ucdavis.edu/nurse/practicemodel/research.html>
- University at Albany, The School of Public Health. (Producer). (2015). *Public Health Live: Can We Prevent Infant Sleep-Related Deaths? What You Need to Know* [Broadcast]. Available from http://www.albany.edu/sph/cphce/phl_1115.shtml
- University of Notre Dame, College of Arts and Letters. (2016, May 20). *Mother-Baby Behavioral Sleep Laboratory*. Retrieved from <http://cosleeping.nd.edu/>

- Vandenplas, Y., Rudolph, C.D., Lorenzo, C.D., Hassall, E., Liptak, G., Mazur, L., . . . Wenzl, T.G. (2009). Pediatric gastroesophageal reflux clinical practice guidelines: Joint recommendations of the North America Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). *Pediatric Gastroenterology and Nutrition*, 49(4), 498-457. Retrieved from <http://www.naspghan.org/files/documents/pdfs/position-papers/FINAL%20-%20JPGN%20GERD%20guideline.pdf>
- Voos, K. C., Terreros, A., Larimore, P., Leick-Rude, M. K., & Park, N. (2015) Implementing safe sleep practices in a neonatal intensive care unit. *The Journal of Maternal-Fetal & Neonatal Medicine*, 28(14), 1637-1640. doi: 10.3109/14767058.2014.964679
- Welby, J. (2004). Nurses' perceptions of cot death education for parents and carers of babies with an increased risk. *Journal of Neonatal Nursing*, 10(3), 85-88. Retrieved from Interlibrary Loan Office.
- Wood, M. J. (2003). Systematic literature reviews. *Clinical Nursing Research*, 12(1), 3-7. doi: 10.1177/1054773802238736
- Young, J., & Schluter, P. J. (2002). SIDS: What do nurses and midwives know about reducing the Risk? *Neonatal, Paediatric and Child Health Nursing*, 5(2), 18-25. Retrieved from https://www.researchgate.net/publication/27480569_SIDS_What_do_Nurses_and_Midwives_Know_about_Reducing_the_risk

Young, J., & O'Rourke, P. (2003). Improving attitudes and practice relating to sudden infant death syndrome and the reduce the risk messages: The effectiveness of an educational Intervention in a group of nurses and midwives. *Neonatal, Paediatric and Child Health Nursing*, 6(2), 4-14. Retrieved from Interlibrary Loan Office.

APPENDIX. SEARCH TERMS

1. “registered nurse” and “knowledge”
2. “registered nurse” and “attitudes”
3. “registered nurse” and “practice”
4. “nurse” and “knowledge”
5. “nurse” and “attitude”
6. “nurse” and “practice”
7. “nursing” and “knowledge”
8. “nursing” and “attitude”
9. “nursing” and “practice”
10. Sudden infant death syndrome
11. SIDS
12. Sudden unexplained infant death
13. SUID
14. Infant sleep
15. Infant sleep position
16. Back to sleep
17. Safe to sleep
18. Cot death crib death
19. 1-9 and “Sudden infant death syndrome”
20. 1-9 and “Sudden infant death”
21. 1-9 and “SIDS”
22. 1-9 and “Sudden unexplained infant death”

23. 1-9 and “SUID”
24. 1-9 and “sleep”
25. 1-9 and “infant sleep”
26. 1-9 and “sleep position”
27. 1-9 and “supine sleep”
28. 1-9 and “back sleep”
29. 1-9 and “prone sleep”
30. 1-9 and “back to sleep”
31. 1-9 and “safe to sleep”
32. 1-9 and “sleep practice”
33. 1-9 and “cot death”
34. 1-9 and “crib death”