NURSES' KNOWLEDGE OF SUDDEN UNEXPECTED POSTNATAL COLLAPSE (SUPC) AND SAFE NEWBORN POSITIONING

BY

CAMILLA ADDISON

Submitted in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

Committee Chair: Dr. Susan Ludington

Frances Payne Bolton School of Nursing

CASE WESTERN RESERVE UNIVERSITY

May, 2019

Abstract

Background/Significance: Sudden unexpected postnatal collapse (SUPC) of healthy newborns in the first two days of life is increasing and some newborns are dying during skin-to-skin contact (SSC) and breastfeeding because of unsafe positioning. A literature review suggested that a need existed for professional nursing education about safe positioning of newborns to reduce risk of SUPC.

Problem: Little was known about nurses' knowledge about SUPC and Safe Newborn Positioning because only three studies could be found regarding nurses' knowledge of SUPC and Safe Newborn Positioning.

Purpose: The purposes of the descriptive evaluative study were to determine clinical obstetric nurses' knowledge about SUPC and about Safe Newborn Positioning to prevent SUPC.

Method: A descriptive evaluative study was conducted with 36 complete data sets from 50 clinical obstetric nurses. Knowledge of SUPC and of Safe Newborn Positioning was determined using the SUPC and Safe Positioning Assessment Tool (SSPAT), a 20-item questionnaire. Knowledge scores were reported as mean, standard deviation, and percentage of correct answers.

Results: Nurses answered only 66.0% of SUPC questions correctly and only 72.0% of Safe Newborn Positioning questions correctly. Difference between SUPC and Safe Newborn Positioning scores was statistically significant. Masters prepared

and Inpatient OB certified nurses scored 60.0% correct answers on SUPC and 72.4% correct answers on Safe Newborn Positioning.

Conclusion: Nurses had less than optimal knowledge of SUPC and Safe Newborn Positioning and knew the most about Safe Newborn Positioning. A need for continuing education about SUPC and Safe Newborn Positioning exists.

Keywords: SUPC, safe newborn positioning, nurses' knowledge

DEDICATION

This scholarly project is dedicated to all the clinical obstetric nurses who work tirelessly every day to safely care for mothers and their newborns.

ACKNOWLEDGEMENTS

I would like to express my gratitude and appreciation to my advisor Dr. Susan Ludington. Thank you for your endless support and continuous encouragement throughout my scholarly project and for allowing me to grow as a DNP student. Your expertise on SUPC is amazing and I am thankful for your guidance in completing this study. I would also like to thank my committee members, Dr. Donna Dowling and Dr. Marguerite DiMarco for offering me comments and suggestions to improve my study and letting my defense be an enjoyable and stress-free moment. My gratitude also goes to Dr. Kevin Masick, my statistician, who was patient, flexible, encouraging and understanding of the numerous questions I asked regarding data collected from my study.

A special thanks to my family. I am so grateful to my husband Michael, children, mother and aunt for all the sacrifices they made for me to successfully complete my DNP degree. What a blessing you all are! To my extended family, friends and colleagues, your prayers and well wishes sustained me on this journey and I am so grateful to have you all in my life.

TABLE OF CONTENTS

Contents

Chapter One

Introduction

Rooming-in, skin-to-skin contact (SSC), maternal bonding, and breastfeeding are all common practices in the newborn period. Skin-to-skin contact and rooming-in are supported by evidence showing that implementing SSC and rooming-in increase exclusive breastfeeding, offer a safer and healthier transition for the newborn, and improve maternal/newborn bonding (Feldman-Winter & Goldsmith, 2016). Yet, an increase in reports of sudden unexpected postnatal collapse (SUPC) of healthy newborns suggest that improper holding during SSC, breastfeeding, and rooming-in, is associated with SUPC incidence. Furthermore, recent reports have also highlighted the need for continuous monitoring of all newborns by hospital personnel during the first two hours after birth and throughout the mother's delivery hospitalization (Bass, Gartley, Lyczkowski, & Kleinman, 2018; Becher, Bhushan, & Lyon, 2012; Davanzo et al., 2015; Feldman-Winter & Goldsmith, 2016; Goldsmith, 2013; Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan, 2014; Pejovic & Herlenius, 2013).

Background

Healthy full-term newborns are dying while being held in SSC and/or breastfeeding because of unsafe positioning (Bass et al., 2018). A phenomenon known as SUPC accounts for some of the sudden and unexpected newborn deaths and has contributed to the increase in this catastrophic event (Lambert, Parks, & Shapiro-Mendoza, 2018). As of January 1, 2019, the Joint Commission for Accreditation of Healthcare Organizations (TJC) has mandated reporting of all newborn complications

occurring during birth hospitalization in newborns without any pre-existing conditions (TJC, 2018). Complications, such as suffocation, asphyxiating events (Gnigler, Ralser, Karall, Reiter, & Kiechl-Kohlendorfer, 2013), apparent life threatening events (ALTEs) and brief resolved unexplained events (BRUEs), have been identified by TJC as complications to be reported; any one of these conditions is a synonym for SUPC (Arane, Claudius & Goldman, 2017; Feldman-Winter & Goldsmith, 2016; Piumelli et al., 2017).

New York State as well as many other states have high rates of sudden unexpected infant death because of SUPC (Lambert et al., 2018). Global rates of SUPC have been reported as ranging from 2.6 to 133 cases per 100,000 live births (Feldman-Winter & Goldsmith, 2016). Sudden unexpected postnatal collapse happens when a spontaneously breathing newborn unexpectedly becomes apneic and needs cardiopulmonary resuscitation. The most commonly used definition of SUPC, is a newborn who had a 5-minute Apgar score of eight or more out of a total of ten, who then experiences cardiorespiratory collapse from five minutes post-birth through the first seven days post-birth during SSC and/or breastfeeding (Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013). Bass et al. (2018) reported the definition of SUPC as a newborn with an Apgar score of seven or more at ten minutes who collapses suddenly. Due to a variability in the Apgar score criterion that is part of the definition and variability in the timing of the SUPC's occurrence, a uniform definition of SUPC has not yet been determined (Ludington-Hoe, Morrison-Wilford, DiMarco, & Lotas, 2018). Thus, the incidence of SUPC varies widely because of

different definitions, varying inclusion and exclusion criteria of newborns who experience SUPC, and the lack of standardized reporting (Davanzo et al., 2015). In a series of cases described by Pejovic & Herlenius (2013), one-third of SUPC events occurred in the first two hours of life, one-third between two and twenty-four hours post-birth, and the final third between one and seven days post-birth. Risk factors for SUPC (e.g., maternal fatigue, primiparity, distractions, maternal obesity and newborn side-lying beside mother) have been identified (Garofalo et al., 2018; Ludington-Hoe & Morgan, 2014; Rodriguez, Hageman & Pellerite, 2018). Sudden unexpected postnatal collapse can occur when the newborn is held in SSC, breastfeeding (Gnigler et al., 2013; Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013), or when swaddled and being held by anyone (Becher et al., 2012). Because of the possibility of newborn deaths and morbidity, recommendations have been made for continuous bedside monitoring of the newborn by professional personnel throughout hospitalization (Feldman-Winter & Goldsmith, 2016). In conjunction with continuous bedside monitoring, further recommendations have been made for professional personnel to educate parents who are with or holding a newborn, particularly during the first week of the newborn's life, on how to safely position newborns to prevent SUPC (Feldman-Winter & Goldsmith, 2016; Ludington-Hoe & Morgan, 2014).

Problem and Purpose

A need for professional nursing education about safe newborn positioning, especially during holding, exists, similar to other emerging nursing care practices (Goswami et al., 2018). For example, 200 nurses needed education in New York

University (NYU) Langone Health to reduce the incidence of SUPC (Imossi, Barber, Fava & Gauthier, 2018) as did professional staff in Christiana Healthcare System in Delaware that reported a decrease in SUPCs from five to zero (Pearlman, Igboechi & Paul, 2017). Another testimony to the need for education is a recent report of a task force in the University Health System in Illinois that organized an educational program to teach staff how to educate parents about proper, distraction-free positioning of their newborns to prevent SUPC (Garofalo et al., 2018). Validation of a need for specific education about SUPC and safe positioning is a pre-requisite to conducting continuing education courses about SUPC and safe newborn positioning. One way to validate the need was to assess nurses' knowledge about SUPC and safe newborn positioning during maternal holding. Assessing United States (U.S.) nurses' knowledge about SUPCs and safe newborn positioning was the purpose of the study. Another way to assess nurse's knowledge would be to observe nurses modeling safe positioning in their care of newborns by measuring congruence between the practice and the essential components of safe positioning identified on the safe positioning checklist (Ludington-Hoe & Morgan, 2014), but this method was not possible to test due to time constraints. Thus, assessment of nurses' knowledge using knowledge questions was conducted to meet the purpose of the study. Once U. S. nurses' knowledge of SUPC and safe newborn positioning has been determined by asking nurses pertinent questions about SUPC and safe newborn positioning, nurses may be more likely to teach mothers how to position their newborns safely during SSC and breastfeeding. A checklist developed by the United States Institute for Kangaroo Care

(USIKC) (2012) was designed to improve safe positioning of the newborn. The checklist has been recommended for use by the American College of Obstetricians and Gynecologists (ACOG) in the College's guidelines supporting breastfeeding (ACOG Committee Opinion, 2018). A checklist is an example of a simple, but thorough, way of documenting findings (Mohan & Caldwell, 2013). The goal of my descriptive evaluative study was to determine U. S. clinical obstetric nurses' knowledge about SUPC and safe newborn positioning.

Research Questions

The research questions were as follows:

RQ1. What was the level of clinical obstetric nurses' knowledge about SUPC as determined by scores on the SUPC and Safe Positioning Assessment Tool (SSPAT)?

RQ2. What was the level of clinical obstetric nurses' knowledge about Safe Newborn Positioning as determined by scores on the SSPAT?

Long Term Objective

The long-term objective of the study was to provide evidence to guide creation and development of nursing education about SUPC risk reduction strategies and a procedure to insure safe newborn positioning during maternal holding for SSC and breastfeeding. The results of the descriptive evaluative study will be disseminated to other perinatal institutions to determine the level of knowledge about SUPC and safe newborn positioning among each institution's personnel to justify development

of continuing education content for all perinatal nurses as one strategy to minimize SUPC occurrence in healthy newborns.

Conceptual Framework

The key concepts of the study were SUPC, safe newborn positioning, and knowledge of nurses. Clinical obstetric nurses' knowledge of SUPC and safe newborn positioning will save newborn lives (Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan, 2014; Pejovic & Herlenius, 2013). The key concepts have been theoretically and operationally defined and influencing factors on each concept and relationships between the concepts have been explained. The conceptual model of the study concludes the conceptual framework section and the significance of the study and assumptions conclude the first chapter.

SUPC. Sudden unexpected postnatal collapse within the first days of life is receiving increased attention (Arane et al., 2017; Bartick & Feldman-Winter, 2018; Bass, et al., 2018, Carlin & Moon, 2018; Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013). The majority of definitions describe SUPC as the sudden unexpected postnatal collapse of a healthy term (≥ 37 weeks gestational weeks) or near-term infant (>35 weeks gestational age) within the first days or up to 28 days of life (Becher et al., 2012; Feldman-Winter & Goldsmith, 2016; Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013). In some reports, SUPC is also called an apparent life threatening event (ALTE) (Arane et al., 2017; Feldman-Winter & Goldsmith, 2016; Piumelli, et al., 2017), sudden unexpected death in infancy (SUDI) (Bass et al., 2018, Lambert et al., 2018), sudden unexpected infant death (SUID) (Fleming, Blair

& Pease 2015; Herlenius & Kuhn, 2013), or a brief resolved unexplained event (BRUE) occurring within the first postnatal week. More recently, the use of BRUE has been increasing (Tieder et al., 2016). A BRUE is an incident occurring in an infant younger than one year when an observer reports a sudden, brief, and resolved episode of one or more of several symptoms including cyanosis or pallor, change in tone, irregular breathing, or altered level of responsiveness (Tieder et al., 2016). Because of the variability and invalidity of the Apgar score (a method to quickly summarize the health of a newborn) in an infant in SSC (Ludington-Hoe et al., 2018), the APGAR score should not be a part of the description and a more uniform definition of SUPC should be developed (Ludington-Hoe et al., 2018). Reports of SUPC in newborns less than five minutes old have also appeared (Ludington-Hoe et al., 2018; Zaleta, Miller & Kumar, 2016). The operational definition of SUPC that was used in the study was a healthy term newborn who experienced cardiorespiratory collapse in the first seven days post-birth during SSC, breastfeeding, holding or lying alone in his/her own crib. Commonly identified influences on SUPC are: being a primiparous mother, a newborn in an unsafe position, co-bedding, inadequate observation of a newborn in the first hours after birth, maternal fatigue, maternal sedation (Ludington-Hoe & Morgan, 2014), and maternal distraction from smart phone use (Garofalo et al., 2018; Rodriguez et al., 2018).

Safe newborn positioning. Patient **safety** has been defined by the Institute of Medicine (2004) as the prevention of harm to patients. **Newborn** was defined as an infant from the time of birth through the first 28 days post-birth (Mosby's Medical

Dictionary, 2009). In my study, a newborn referred to an infant from birth to 28 days of life. **Positioning** is defined as the placement of all parts of the newborn's body (Colson, 2014). The newborn's body position is usually reported in relation to the body being horizontal or upright tilted (Colson, 2014). In my study, positioning specifically referred to head, neck, trunk and upper extremity placement and upward tilt of the newborn's torso wherever the newborn was. Influential factors on safe newborn positioning (i.e., placement of newborn and his/her body parts so that undesirable outcomes were less likely to occur) is an awareness of safe newborn positioning technique (Evereklian & Posmontier, 2017; Naugler & DiCarlo, 2018), novelty of the new treatment of safe positioning (Naugler & DiCarlo, 2018), understanding the relationship between physiology of safe and unsafe positioning and occurrence of SUPC (Evereklian & Posmontier, 2017), nurses' belief that safe positioning is time consuming (Naugler & DiCarlo, 2018), or nurses' perceptions that safe positioning is an interruption to their routine workload (Naugler & DiCarlo, 2018; Penn, 2015).

The United States Institute for Kangaroo Care is the copyright owner of the first published safe positioning checklist (USIKC, 2014). The checklist is a simple and efficient method to document observation and simplify required procedures (Shapiro, Fernando, & Urman, 2014). Checklists improve patient safety and potentially decrease risk (Shapiro et al., 2014). Barriers to using a checklist are: no incentive to use a checklist, no mandate from a local or federal regulatory agency, belief to be too time consuming, and lack of training. Reasons that encourage

providers to use checklists are a clear mandate and evidence-based research (Shapiro et al., 2014). The safe positioning checklist used in my study was based on evidence relating newborn position to breathing abilities (Ludington-Hoe et al., 2018). The definition of safe newborn positioning in my study was placement of the newborn so that each element of the safe positioning checklist was reflected in a question on the SSPAT.

Knowledge of nurses. Knowledge of nurses is the means by which the whole purpose of caring for patients is achieved, and nursing knowledge classifies nursing as a profession (Hall, 2005). Historically, Conrad (1947) described nursing knowledge as knowing what the patient knows before the nurse asked. Katz (1969) defined nursing knowledge as "knowledge of the heart". These definitions represented nursing at a time when nurses were mainly doctors' "handmaidens" and their work was limited by the nature of the health service provided (Hall, 2005). Today, clinical skills and theoretical knowledge from both humanities and the sciences are needed to better care for patients (Hall, 2005). Clinical decisions are based on evidence rather than on opinion or belief (Hall, 2005). Throughout the literature search, three studies were found that were related to nurses' knowledge about SUPC (Imossi et al., 2018; Ludington-Hoe et al., 2018; Pearlman et al., 2017). Nursing knowledge in my study was defined as the percent of correctly answered questions on the SSPAT. Level of education, experience, attitudes and beliefs, and attendance at continuing education events all influence knowledge. Nurses can increase their knowledge and skill competency through certification courses (Kukla &

Ludington-Hoe, 2017; Ni, Hua, Shao, Wallen, Xu, Li., 2013) and other forms of formal continuing education. Continuing education improves knowledge and skills acquisition while building confidence in nurses (Almutairi & Ludington-Hoe, 2016; Ni et al., 2013).

Conceptual Model of the Study

The relationship between the concepts of the study can be explained as follows: Sudden unexpected postnatal collapse is a catastrophic event that can be prevented or minimized by safely positioning newborns. Safely positioning newborns depends on nursing knowledge of SUPC and safe newborn positioning. Knowledge is dependent upon the nurse's awareness of SUPC and the nurse's experience with SUPC and safe newborn positioning. These relationships are portrayed in the following conceptual model.

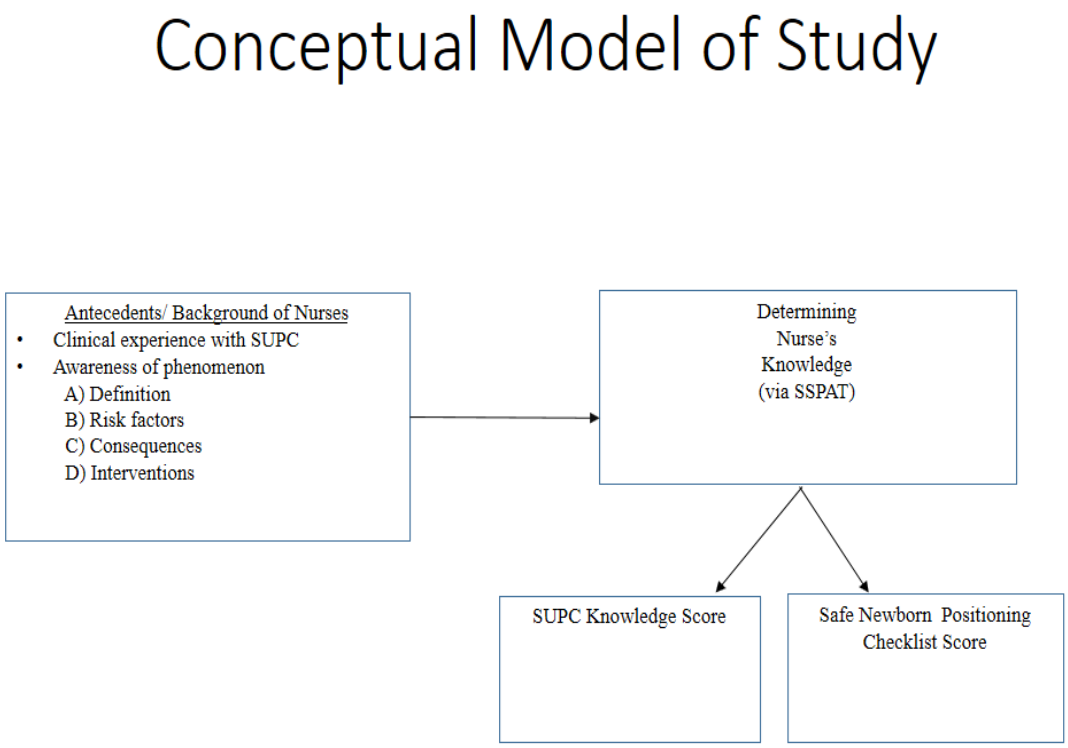

Figure 1. Conceptual Model of Study

Theory Guiding the Study

The theory guiding the study was the Triple Risk Hypothesis Theory (TRHT). The Triple Risk Hypothesis Theory is used to understand and guide investigations about SIDS (Guntheroth & Spiers, 2002); the TRHT is similarly applicable to studies regarding SUPC (Monnelly & Becher, 2018). The TRHT explains that three factors, when combined, can result in neonatal death (Garofalo et al., 2018; Guntheroth & Spiers, 2002). The three factors are:

1. Intrinsic vulnerability, which means problems existing before birth, such as transient hypoxemia, structural abnormality, metabolic condition, or congenital infection (Monnelly & Becher, 2018). In particular, a structural

abnormality of the Kolliker-Fuse Nucleus (KFN) in the newborn's brain stem has been associated with death in 11 out of 12 newborns who experienced SUPC (Lavezzi, Paradiso, Pusiol, Piscioli, 2019; Lavezzi, Piscioli, & Pusiol, 2017)

2. Developmental vulnerability, which means conditions that cannot be modified, such as alteration in development, hypotonia, hypothermia, and low Apgar scores (Monnelly & Becher, 2018), and
3. Extrinsic vulnerability, which refers to conditions that can be modified such as improper positioning during SSC and breastfeeding, co-bedding, maternal pain medication use, maternal distraction from cell phone use, and lack of awareness of SUPC (Garofalo et al., 2018; Monnelly & Becher, 2018).

All healthy newborns are at risk for SUPC (Davanzo et al., 2015; Ferrarello & Carmichael, 2016; Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan, 2014; Pejovic & Herlenius, 2013). The extrinsic risk factors of the TRHT specifically apply to studies of SUPC in that one extrinsic risk factor is knowledge about SUPC. Thus, the study revealed what the clinical obstetric nurses knew about SUPC and safe newborn positioning to prevent SUPC occurrence, constituting one of the extrinsic risk factors related to SUPC.

Significance to Nursing

The study of clinical obstetric nurses' knowledge about SUPC and safe newborn positioning was important because safe newborn positioning to prevent SUPC can reduce newborn deaths or chances of disability (Feldman-Winter &

Goldsmith, 2016). The results will lead to teaching mothers how to safely position newborns during holding so that life-threatening harm to newborns is avoided, particularly when health professionals are not present. Most of the risk factors for SUPC are modifiable; modifications could ultimately reduce the risk of SUPC (Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan, 2014; Pejovic & Herlenius, 2013). The current review of literature, especially considering the recent increase in studies about sudden unexpected infant deaths with SUPC that have appeared in 2018 (Bass et al., 2018; Lambert et al., 2018), establishes that the U.S. has a high neonatal mortality rate (Carlin & Moon, 2018). The American Academy of Pediatrics (AAP) (2016) and United Nations International Children's Emergency Fund (UNICEF) (n.d.) have expressed concern about reducing neonatal mortality, especially mortality due to SUPC (Feldman-Winter & Goldsmith, 2016). Though no official initiative or task force for SUPC and safe newborn positioning has been mentioned in the available literature, the time is appropriate for policies to be developed (i.e. TJC 2019 mandate), implemented, tested, and disseminated for the protection of all newborns from collapse and death and, ultimately, to lower the U.S.'s neonatal mortality rate.

Assumptions

In nursing research, an assumption refers to a basic principle that is believed to be true without proof or verification (Polit & Hungler, 1999). The assumptions of the study were:

1. Knowledge about SUPC is inherent to maternal/newborn nursing practice,

2. Knowledge about safe newborn positioning is also inherent to maternal/newborn nursing practice,
3. Clinical obstetrical nurses understood the questions in the SSPAT and answered as truthfully and as fully as possible,
4. Clinical obstetrical nurses did not deliberately distort their answers nor thwart the purposes of the study, and
5. Clinical obstetrical nurses followed instructions to independently answer the questions.

Chapter Two

Literature Review

Literature Review Search

The research problem was that a dearth of evidence existed about nurses' knowledge of SUPCs and safe newborn positioning. Only three previous studies (Imossi et al., 2018; Ludington-Hoe et al., 2018; Pearlman et al., 2017), have assessed obstetrical nurses' knowledge about SUPC and safe newborn positioning during holding. To obtain additional evidence, a systematic review was conducted on the relevant literature on SUPC knowledge and safe newborn positioning (see Appendix A). The review of literature covered a six-year period from 2013 to 2018 and addressed only articles written in English and in peer-reviewed journals. The focus was on research about SUPC and nurse's knowledge about SUPC and safe newborn positioning. Electronic databases utilized were PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Scopus. One hundred articles were retrieved from the literature search. Upon review of the full-text articles, the articles that met the inclusion criteria consisted of: a) 3 descriptive case studies about SUPC (Ferrarello & Carmichael, 2016; Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013); b) an expert opinion on a surveillance protocol to prevent SUPC while promoting breastfeeding (Davanzo et al., 2015); c) a commentary on a mother's posture having a protective role to play during SSC (Colson, 2014); d) a clinical report on safe sleep and SSC in the neonatal period for healthy term newborns (Feldman-Winter & Goldsmith, 2016); e) a manuscript relating the definition, risk

factors, development of a tool to assess infant risk for SUPC and the contents of a Safe Positioning Checklist (Ludington-Hoe & Morgan, 2014); f) national and state reports on trends in the incidence of sudden and unexpected infant death in newborns (Bass et al., 2018; Lambert et al., 2018); g) review of a national policy about health professionals' surveillance of SUPC (New Zealand Health Department, 2012); h) a U.S. clinical guideline for using the Safe Positioning Checklist (Ludington-Hoe & Morgan, 2014; USIKC, 2012) for postpartum care in the U.S. (ACOG Committee Opinion, 2018); i) child health update and recommendation to replace ALTE with BRUE in infants younger than one year (Arane et al., 2017; Tieder et al, 2016) and j) a review of BRUE, ALTE, and SUPC guidelines (Piumelli et al., 2017). The concepts of the study were nurses' knowledge, SUPC, and safe newborn positioning. The literature review proceeds to discuss each concept.

Factors Influencing Nurses' Knowledge

Factors influencing nurses' knowledge include level of education, attitudes and beliefs, and experience. Level of education is a strong influence on each nurse's knowledge, as are attitudes and beliefs, experience, and attendance at continuing education courses (Audet, Bourgault, & Rochefort, 2017; Cicolini et al., 2013; McHugh & Lake, 2010; Ni et al., 2013). The literature review discusses each.

Level of education. In 2011, the Institute of Medicine recommended that by 2020, 80% of RNs should be educated at the baccalaureate degree level or higher. Evidence indicates that the 80% baccalaureate degree threshold is associated with shorter hospital stays and reduced risk of hospital readmissions (Audet et al., 2017;

Cho, Park, Choi, Lee & Kim, 2018). Registered Nurses (RNs) with baccalaureate degree education have fewer medication errors and higher positive patient outcomes (Kutney-Lee, Sloane, & Aiken, 2013). Nurses and midwives with master's degrees showed greater knowledge than nurses with bachelor's degrees (Heydari et al., 2014). As part of nurse's baccalaureate education preparation, a key part of nursing practice is the responsibility of continuous assessment and monitoring of a patient's condition, the ability to identify changes that can indicate clinical deterioration, and initiating interventions that can save patient lives (Blegen, Goode, Park, Vaughn, & Spetz 2013; Kutney-Lee et al., 2013). A higher proportion of RNs in the hospital with baccalaureate degrees, who have more knowledge and better communication skills, is essential to efficient adverse event prevention and detection (Audet et al., 2017). Thus, level of education does influence nurse's knowledge.

Attitudes and beliefs. In regards to attitudes and beliefs, Barsman, Dowling, Damato, & Czeck (2015), found that attitudes, beliefs, and practices were not consistent with nurse's knowledge of SIDS risk reduction recommendations. Only 50% of the nurses who responded to a questionnaire on SIDS risk-reduction agreed that SIDS risk-reduction recommendations made a difference in preventing SIDS. Only 20% of responding nurses strongly agreed that parents would model nurses' SIDS prevention behaviors once the parents were discharged home. Barsman et al. (2015) reported that an ongoing need for education of nurses to support the findings in their study was important in SIDS risk-reduction recommendations. In another study conducted in a teaching hospital in Raichur, India, attitudes of medical and

nursing students regarding hand hygiene were assessed using a self-structured questionnaire. The results of the questionnaire indicated that the majority of students had poor attitudes with regard to hand hygiene (Nair, Hanumantappa, Hiremath, Siraj, & Raghunath, 2014). Nursing students had better attitudes (52.1%) than medical students (12.9%) (Nair et al., 2014). A study of Iranian nurses and midwives' attitudes toward evidence-based practice reported moderately positive attitudes of nurses and midwives towards evidence-based practice to enhance quality of care (Heydari et al., 2014). Knowledge, skills, and attitudes and beliefs all operate within each medical professional and affect nursing knowledge (Cicolini et al., 2013).

Experience. In Takase's study of the relationship between length of clinical experience and level of nurses' competence, Takase, (2012) found that the first 10 years of clinical experience provided nurses with profuse learning opportunities that increased the nurse's knowledge. During the first 10 years of practice, nurses were exposed to both successful and unsuccessful clinical experiences from which new knowledge was acquired along with skills and attitudes necessary for their work in the nursing profession. Nurses learned from both their own experiences and those of colleagues permitting swift absorption of newly acquired skills and knowledge from their experience (Takase, 2012). In a study that used the patient care unit as a level of analysis, researchers found that a high proportion of nurses with greater than five years of experience were associated with fewer medication errors and lower patient fall rates (McHugh & Lake, 2010). Thus, greater than five years' experience enabled nurses to have sufficient knowledge to reduce the number of falls. In another study

by Clarke, Rockett, Sloane, & Aiken (2002), nurses with a lower level of experience were associated with more near-miss needle stick incidents. Without background knowledge and experience, nurses were at risk for using poor judgment and lacked the required tools to make sound clinical decisions (Benner, 1984).

Attendance at continuing education. Through formal and informal continuing education, nurses are equipped to provide high quality nursing care, acquire new competencies in areas in which they do not have familiarity, and expand their knowledge and competencies (Takase, 2012). Continuing education (CE) is necessary and critical for nurses to keep abreast of the rapid changes in patient care due to advancements in knowledge and technology (Ni et al., 2013). Continuing education improves knowledge and skills acquisition (Almutairi & Ludington-Hoe, 2016). Most countries mandate CE participation for their nurses. Each nurse must obtain a specific number of credits within a set period of time in order to maintain their working credentials (Ni et al., 2013). A major motivating reason that nurses participate in CE is a desire to gain knowledge of the newest nursing evidence and procedures (Ni et al., 2013). Nurses consider CE opportunities as very important in the maintenance and development of their clinical practice and expertise (Ni et al., 2013). The most frequently identified values of continuing education in a certification course were enhanced feelings of personal accomplishment, enhanced professional commitment, personal satisfaction, and attainment of a practice standard (Kukla & Ludington-Hoe, 2017). A study conducted by Almutairi & Ludington-Hoe (2016) led the authors to conclude that nurses' knowledge and skills confidence of skin-to-skin

contact improved following a certification continuing education course. As a result, attendance at continuing education programs enhances the nurse's professional knowledge.

Measurement of Nurse's Knowledge

Nurses' knowledge has been measured using various tools by different authors. Examples of tools that have been used are: a) a previously validated 10-item questionnaire that assessed nurses' knowledge of guidelines for preventing Central Venous Catheter related infections (Cicolini et al., 2013); b) neonatal nurses' beliefs, knowledge, and practices in relation to SIDS risk- reduction recommendations using the SIDS Risk-Reduction Questionnaire (Barsman et al., 2015); c) an EBP questionnaire measuring EBP knowledge, skills, and attitudes (Heydari et al., 2014); d) a questionnaire that was reviewed by an expert panel of nursing school faculty members and hospital faculty with a minimum of five years of teaching experience in CE that assessed nurses participation in and, perceptions and expectations of CE, as well as factors that motivated or hindered the nurses' participation in CE practice; e) a safe monitoring bundle to decrease SUPC events (Hageman, McMullen, & Jawdeh, [in press]) and f) a tool promoting newborn safety using the Respiratory, Activity, Perfusion, Position, and Tone (RAPPT) assessment (Ludington-Hoe et al., 2018). In my study, nursing knowledge was measured as the number and percent of correctly answered questions on the SSPAT.

Previous Studies of Nurses' Knowledge

Nursing practice and knowledge has influenced the nursing profession since the time of Florence Nightingale (Gortner, 2000). The quality of care and the availability of qualified caregivers has greatly evolved from the 19th century through the 21st century. The development of formal programs of nursing education was viewed as a pathway to improve nursing practice (Gortner, 2000). A sustained focus on the development of academic nursing curricula began 40 years ago in university schools of nursing where nurse scientist graduate training was concurrent with other disciplines like medicine (Gortner, 2000). Nursing science came into maturity in the last decade as a result of the following: a) grant programs in nursing research were given, particularly topics related to vulnerable populations; b) schools of nursing began to recruit faculty with doctoral degrees with excellent research preparation and program interests that fit with concentrations of research within the school; c) educational programs in many universities maintained enough stability that faculty time and effort could be directed toward research; d) research support increased as grant success was forthcoming from both public and private agencies and e) nurse scientists became deans in schools of nursing and reinforced and supported the need for greater research in their academic settings. Nursing research and knowledge has become essential in defining and confronting 21st century health challenges (Gortner, 2000). In a study evaluating nurses' knowledge and adherence to the screening for critical congenital heart disease by using pulse oximetry in newborns, Ryan, Mikula, Germana, Silva & Derouin (2014), found a significant

improvement in knowledge test scores and documentation of the protocol in the medical charts immediately after completing an education module.

More recently, Imossi et al. (2018) assessed the SUPC knowledge of obstetric nurses at NYU Langone Health and found that 75% of responding nurses were aware of SUPC and 92% of the same nurses requested more practice with neonatal resuscitation skills and drills. Ludington-Hoe et al. (2018) concluded that nurse's knowledge scores increased significantly after education on RAPPT to determine risk of SUPC.

SUPC

Influencing Factors of SUPC

Factors influencing SUPC are: a) primiparous mothers with a lack of knowledge of proper newborn positioning during holding (Becher et al., 2012; Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan, 2014; Pejovic & Herlenius, 2013); b) newborn found in prone position while being held in SSC or for breastfeeding (Becher et al., 2012; Colson, 2014; Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan, 2014; Pejovic & Herlenius, 2013); c) a mother co-bedding with newborn, mother in episiotomy position in which she is lying flat rather than inclined and, parents left alone with the newborn during first hours after birth (Becher et al., 2012; Colson, 2014; Gnigler et al., 2013; Herlenius & Kuhn, 2013; Monnelly & Becher, 2018; Pejovic & Herlenius, 2013); d) mother and newborn left without adequate surveillance by clinical staff during first breastfeeding attempt (Becher et al., 2012; Gnigler et al., 2013; Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan,

2014; Monnelly & Becher, 2018; Pejovic & Herlenius, 2013); e) use of cell phones while newborn is in SSC (Garofalo et al., 2018; Goldsmith, 2013; Ludington-Hoe & Morgan, 2014; Pejovic & Helenius, 2013; Rodriguez, Hageman & Pellerite, 2018); f) maternal fatigue from childbirth and drowsiness from taking narcotic medications (Garofalo et al., 2018; Ludington-Hoe & Morgan, 2014) and g) excessive maternal weight (weight greater than 25kg/m²) (Ludington-Hoe & Morgan, 2014). Though the risk factors for SUPC have been discussed by the authors noted above, Rodriguez et al. (2018) presented the risk factors in columns relating to infant, mother, and environmental sources for easier understanding.

Measurement of SUPC

Sudden unexpected postnatal collapse is characterized by neonatal apnea, limpness, pallor, bradycardia, cyanosis, collapse, and cardiorespiratory arrest (Becher et al., 2012; Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013). The time-frame for measuring the occurrence of SUPC differs by authors. Some scholars consider only events occurring within twelve hours of birth as an SUPC (Becher et al., 2012), while others include events occurring at less than twenty-four hours of life, less than three days of life, or during the entire first week of life (Feldman-Winter & Goldsmith, 2016; Pejovic & Herlenius, 2013; Piumelli et al., 2017) as SUPCs. Nevertheless, all authors and scholars agree that the period of greatest risk to the newborn is the first two hours after birth (Becher et al., 2012; Garofalo et al., 2018; Herlenius & Kuhn, 2013; Ludington- Hoe et al., 2018). Uniformly SUPC has been measured by reporting the prevalence of occurrence in any given time period.

Previous Studies of SUPC

Historically, sudden unexpected deaths of healthy newborns have been recognized since ancient times but the focus of medical attention was not determined until the second half of the 20th century (Fleming et al., 2015). A dramatic fall in infant mortality rates in the 20th century in England and Wales from 95/1000 live births in 2012 revealed that more attention was given to those deaths where there was no explanation (Fleming et al., 2015). Several studies in the seventies and eighties showed an increase in the number of healthy newborn deaths and epidemiological studies in Europe and New Zealand showed an association with the practice of putting newborns down to sleep in a prone position (DeJonge, Engelberts, Koomen-Liefting et al., 1989; Fleming, Gilbert, Azaz et al., 1990). Among previous studies of SUPC, the majority have been clinical reports that identified risk factors (Bass et al., 2018; Herlenius & Pejovic, 2013). Risk factors were confirmed by a large prospective survey of SUPC occurrence throughout the United Kingdom (Becher et al., 2012). More recently, studies have begun to emerge reviewing what nurses know and how to properly intervene in regards to SUPC. As cited above, Imossi et al. (2018) found most nurses in NYU Langone Health knew about SUPC. Studies by Ludington-Hoe et al. (2018) and Pearlman et al. (2017) have recently reported pilot results of a bundle of interventions (i.e., use of the RAPPT assessment tool, pulse oximetry, nurse education and parent education about safe positioning of the newborn) that reduced SUPCs and in Pearlman et al.'s report, the number of SUPCs declined from five to zero as soon as the safety bundle was implemented. Most

recently, a quality improvement collaborative project has been proposed that will incorporate a similar bundle in multiple sites to decrease SUPC events (Garofalo, Pellerite, Goodstein, Paul & Hageman, 2019; Hageman et al., in press). Lastly, a comprehensive educational program for the prevention of SUPC was implemented in an Illinois based University Health System (Garofalo et al., 2018). The focus of the educational program was to educate the staff and parents about SUPC, frequently monitor the newborns in the immediate post-birth period, and document the infant assessments during the post-birth period in the electronic medical record (Garofalo, et al., 2018). Garofalo et al. (2019) also developed a learning module as part of the educational program about SUPC. Garofalo and associates (2019) focused on teaching parents that newborns should be "pink and positioned" properly whenever the newborn was in SSC. The learning module stresses "pink and positioned" to summarize the two concepts that the newborn needs to be positioned safely for good breathing (airway is unobstructed and you can see the newborn's chest rise with each breath) which results in pink color (newborn's skin, lips, and tongue should not be blue or dusky). In addition, a video of a nurse educating a new mother about "pink and positioned," no use of a cell phone to cause a distraction while holding the newborn, and placing the newborn in the bassinet when sleepy or calling for assistance when tired, has been developed and is available for streaming on https://vimeo.com/217089447/025fdb7811. The video is called "SUPC_2" (Rodriguez, Pellerite, Hughes, Wild, & Hageman, 2018). According to Garofalo and associates' (2018) completed and proposed (Garofalo et al. 2019) multidisciplinary

quality improvement project and SUPC preventative strategy, clinicians should assess that the newborn is "pink and positioned" every 15 minutes in the first hour post-birth, that the first breastfeeding attempt is observed by a nurse, and teaching is reinforced with parents and documented in the electronic medical record (Garofalo et al., 2018; 2019).

Safe Newborn Positioning

Influencing Factors of Safe Newborn Positioning

Factors influencing safe newborn positioning are: a) correct placement of the newborn so that his/her body parts are properly aligned to support adequate respiration (Garofalo et al., 2018; Ludington-Hoe & Morgan, 2014; Naugler & DiCarlo, 2018), b) novelty of the components of the safe positioning checklist and applying the components into daily practice (Ludington-Hoe & Morgan, 2014; Naugler & DiCarlo, 2018), c) lack of observation of the mother/newborn dyad during the first few hours after birth (Becher et al., 2013; Feldman-Winter & Goldsmith, 2016; Herlenius & Kuhn, 2013; Ludington-Hoe & Morgan, 2014), d) lack of education and skills among clinicians to support the mother/newborn dyad while in SSC (Davanzo et al., 2015; Ludington-Hoe & Morgan, 2014) and e) lack of understanding of the risks associated with unsafe positioning (Colson, 2014; Davanzo et al., 2015, Feldman-Winter & Goldsmith, 2016; Ludington-Hoe & Morgan, 2014). Colson's article (2014) was especially informative as the article conveys that the mother's posture plays an important role in newborn safe breastfeeding and SSC. Colson concluded that if the maternal body is sloped

upward so that the newborn's body is slightly tilted upward, the upward tilted posture protects newborn breathing and decreases the occurrence of an SUPC.

Measurement of Safe Newborn Positioning

The only objective measure of safe newborn positioning that could be found in the literature was the Safe Positioning Checklist developed by the USIKC (2012) that was developed by and reported in Ludington-Hoe and Morgan's 2014 manuscript. The Safe Positioning Checklist has also been reported to be in clinical use (Howe, Pacheco, & Sapp, 2017). Garofalo et al. (2018) have proposed having nurses measure safe positioning by looking at the newborn to determine if the newborn is "pink and positioned" with head turned to one side and mouth and nose of the newborn uncovered and visible. Safe newborn positioning was measured using the SSPAT in the study reported here. The number of correctly answered questions indicated the level of knowledge possessed by the clinical obstetrical nurse about safe newborn positioning.

Previous Studies of Safe Newborn Positioning

Previous studies (Becher et al., 2012; Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013) indicate that newborns who have experienced SUPC have been discovered prone on their mother's breast or chest, swaddled and supine in their mother's arms, swaddled and held supine by father or grandmother, lying beside a parent or on the parent's bed, and in various other places and positions (Bass et al., 2018; Colson, 2014; Ludington-Hoe & Morgan, 2014). Because SUPC occurs when the newborn is prone, a review of the literature about prone positioning has been

presented here. Monnelly & Becher (2018) explained that the newborn in a prone position is recognized as a risk factor in sudden unexplained death in infancy (SUDI) although the mechanism is not clear. Monnelly & Becher (2018) suggested that airway obstruction may lead to suffocation by blocking or flattening the newborn's nares or by posterior displacement of the tongue, and that the maternal position may hinder attempts of the newborn to relieve the obstruction. Lavezzi et al. (2019) found that 11 of 12 (91.6%) of newborns who died of SUPC during SSC had abnormal development of the Kolliker-Fuse Nucleus (KFN) in their brainstems. The KFN is essential for regulation of breathing. In relation to SSC and breastfeeding, the status of the KFN is very important because when a newborn experiences hypoxia when prone in SSC or when prone for breastfeeding, breathing regulation and compensation will not occur and a dysfunctional KFN unavoidably leads to death (Lavezzi et al. 2017). Monitoring the position of the newborn so that hypoxia does not occur is a key intervention to reducing SUPC occurrence; but monitoring for safe positioning will not be accomplished if nurses do not know about safe newborn positioning.

Previous studies about safe newborn positioning also include studies cited in relation to sudden infant death syndrome (SIDS). Beckwith (1973) noted the importance of the relationship between sudden unexpected infant death (SUID) and sleep. Beckwith postulated that SUIDs resulted from upper airway obstruction due to poor positioning of neck and face when prone in bed or due to prone positioning (Beckwith, 1973). During the last decade, an increase in the identification of deaths

by asphyxia has occurred (Mitchell & Krous, 2014). Increased risk of SIDS in the late 1980's and early 1990's led to the "Back-to-Sleep" campaign which resulted in a dramatic decline in SIDS mortality as infants were placed supine for sleep rather than prone (Mitchell & Krous, 2014). The advice "not to bed share with baby" and to educate clinicians about safe sleep positions was emphasized in the literature (Bombard et al., 2018; Feldman-Winter & Goldsmith, 2016; Garofalo et al., 2018; Mitchell & Krous, 2014). Obviously safe positioning for sleep is not the only factor that should be emphasized: safe positioning at all times and in any posture should be accentuated. A safe positioning checklist always enables health professionals to provide safe newborn positioning.

As health professionals have become aware of safe newborn positioning to prevent SUPCs, a study of teaching 20 nurses about safe newborn positioning and how to complete the RAPPT assessment (Ludington-Hoe & Morgan, 2014) for SSC and for breastfeeding, and what and when to teach parents about safe newborn positioning has been conducted (Howe et al., 2017). A detailed teaching program with simulated practice sessions with a baby doll, labor and delivery, newborn, and postpartum nurses' knowledge improved significantly about safe newborn positioning, when to teach mothers about safe newborn positioning, how often to do the RAPPT assessment, and what to chart. Additionally, mothers were asked questions before and after the nurses' educational program; before the educational program, the majority of mothers answered the question, "what were you told about your baby?" with "put him on my chest and cover with blanket". After the

educational program, about 58% of mothers responded to the same question with the answer "the checklist and verbal instructions" on safe newborn positioning (Howe et al., 2017). As Garofalo et al.'s (2018) completed quality improvement project continues to be described in more detail, additional reports of postpartum nurses' knowledge about safe newborn positioning should become available.

Implications for Nursing

The literature revealed that knowledge of SUPC and safe newborn positioning during holding is beneficial and needed and should be recommended (Becher et al., 2013; Davanzo et al., 2015; Garofalo et al., 2018, 2019; Ludington-Hoe & Morgan, 2014; Piumelli et al., 2017). Greater attention and continuous supervision/surveillance by health professionals, especially during the first two hours after birth, are crucial in saving the lives of healthy newborns (Feldman-Winter & Goldsmith, 2016; Garofalo et al., 2018; Piumelli et al., 2017). Clinical obstetric nurses should know about the risk factors associated with SUPC and safe newborn positioning to educate parents and caregivers to correctly hold the newborn to decrease the occurrence of SUPC (Garofalo et al., 2018, 2019; Howe et al., 2017; Ludington-Hoe & Morgan, 2014; Monnelly & Becher, 2018).

Gaps in the Literature

Sudden unexpected postnatal collapse is an evolving phenomenon. A paucity of research of nurse's knowledge about SUPC exists. All the authors in the literature review mentioned the definition of SUPC, SUPC's occurrence, risk factors, and recommendations. Although reported studies have been helpful in gaining

knowledge about SUPC, further research is needed that combines knowledge of SUPC with knowledge of safe newborn positioning into interventions that can be tested.

Chapter Three

Methods

Design

The study used a descriptive evaluative design because obstetrical nurses were asked to complete a questionnaire, which was scored in such a way that their level of knowledge about SUPC and Safe Newborn Positioning was known by totaling the number of correct answers on the SUPC and Safe Positioning Assessment Tool (SSPAT). Each correct answer equaled one point. The total number of correct answers yielded a total of 20 points, which was the highest number of correct answers the obstetrical nurses could achieve on the SSPAT. A descriptive evaluative study was chosen because such studies are most useful for describing phenomena or occurrences in which little information is known and/or for identifying new or arising phenomena (Dulock, 1993). The results of the descriptive evaluative studies are used as the foundation for further research. In descriptive evaluative studies, the current status of the phenomenon is what is being observed, described, or documented. Subjects were selected for descriptive evaluative designs because they possessed characteristics and information that were the focus of the study (Dulock, 1993). Characteristics and information about the nurses were identified in the subject criteria below. Case Western Reserve University approval was obtained. Return of the questionnaire designated consent to participate.

Sample/Setting

A minimum of 35 clinical obstetric nurses were recruited to obtain at least 30 complete data sets so that normality of data could be assumed. Because a 10% attrition rate was anticipated, up to 35 nurses needed to be recruited to obtain the 30 complete data sets. Convenience sampling method was used to recruit subjects by sending a questionnaire accessible on a Survey Monkey link to each nurse on a Perinatal Listserv. Clinical obstetric nurses were able to answer the questionnaire in any setting they preferred. Clinical obstetric nurses from various hospitals throughout the U.S. were the subjects of the study. Subjects were self-selected members of a Perinatal Listserv. The Perinatal Listserv was composed of 605 nurses from among the 22,000 members of Association of Women's Health Obstetric and Neonatal Nurses (AWHONN). AWHONN related that a response rate of 5% could be expected. Clinical obstetric nurses from AWHONN were chosen because of the Principal Investigator's membership in AWHONN. Permission was obtained from AWHONN to use the Perinatal Listserv to send the questionnaire via Survey Monkey.

Subject inclusion criteria. The inclusion criteria were clinical obstetric nurses who were English speaking, worked full-time or part-time, were permanently assigned to an obstetric unit, and had worked for at least six months as a clinical obstetric nurse. Obstetric units included Antepartum, Labor and Delivery, Mother/Baby or Postpartum units within an in-patient hospital.

Subject exclusion criteria. Exclusion criteria were nurses who had floated onto the obstetrical unit on a temporary assignment or who were on orientation as a newly hired obstetric nurse.

Variables in the Study

The variables of focus were the level of knowledge about SUPC and the level of knowledge about safe newborn positioning during holding.

Operational definitions. The operational definition of clinical obstetric nurses' knowledge about SUPC was the number of correctly answered questions about SUPC on the SUPC and Safe Positioning Assessment Tool (SSPAT) (see Appendix B). The operational definition of knowledge of safe newborn positioning was the number of correctly identified answers on the ten questions related to Safe Newborn Positioning. Knowledge about Safe Newborn Positioning included questions related to the following safe newborn positioning:

1. Newborn's head is in sniffing position
2. Newborn's head is turned to the side
3. Newborn's face is visible
4. Newborn's mouth is uncovered
5. Newborn's nose is uncovered
6. Newborn's hands are at newborn's shoulder level even if swaddled
7. Newborn's neck is not extended nor flexed
8. Newborn's trunk and neck are straight
9. Mother/person holding newborn is awake

10. Mother/person holding newborn is inclined

Instruments

Variable name	**Measurement/tool used**	**Administered Via**
Knowledge of SUPC	SSPAT	AWHONN Perinatal Listserv
Knowledge of safe positioning	SSPAT	AWHONN Perinatal Listserv

The instrument used to determine the level of knowledge was the investigator-created SSPAT (see Appendix B). The SUPC and Safe Newborn Positioning portions of the tool were ten items each consisting of multiple choice, fill-in, and true or false questions. Sixteen questions regarding demographic characteristics of subjects began the tool. The questions about SUPC were derived from the literature (Becher et al., 2012; Herlenius & Kuhn, 2013; Pejovic & Herlenius, 2013); questions about safe positioning were developed from the Skin-to-Skin Contact Checklist developed by USIKC (2012), reported in Ludington-Hoe and Morgan's 2014 manuscript, and endorsed for use by ACOG (ACOG Committee Opinion, 2018). Each correctly answered question was scored as one point. The total score of 20 points was the number of points obtained from the SUPC (10 points) plus the total number of points obtained from the Safe Newborn Positioning questions (10 points). The higher the number of points on the SSPAT, the greater the knowledge. Content validity of the SSPAT was established by a judge panel of three experts and internal consistency (Cronbach's alpha reliability) was established using the data from the study.

Pilot Work

No pilot work was conducted**.**

Procedure

After getting IRB approval from Case Western Reserve University (CWRU), clinical obstetric nurses were informed of the study via email notification through the AWHONN Perinatal Listserv, which contained 605 nurses who were all members of AWHONN. A Survey Monkey link with the questionnaire embedded was emailed to the clinical obstetric nurses from the AWHONN Perinatal Nurses email listserv. Prior to being given access to the SSPAT, there were questions related to inclusion and exclusion criteria and if the criteria were not met, advancement to the SSPAT did not occur; if all the criteria were met, nurses were allowed to advance to the SSPAT questionnaire. Inclusion and exclusion criteria questions were followed by questions about demographic characteristics of each subject (n = 36) so a complete description of the respondents was possible. Response rates from Survey Monkey were tracked daily and once the survey period was completed, data from Survey Monkey were analyzed. Data were collected over a four-week period.

Recruitment

Recruitment was accomplished by the researcher emailing all the clinical obstetrical nurses on the AWHONN Perinatal Nurses email listserv after permission had been obtained. Because not all solicited nurses returned the questionnaire, a 7% response rate was obtained.

Data Management

The alpha level of significance was $p \leq 0.05$ for the t-test of difference between knowledge scores. Data were entered into SPSS version 24.

Analysis of demographic data. Demographic data that were discrete/categorical in nature were: a) Are you a registered nurse (RN)?; b) Do you speak and understand English?; c) Have you been working as an RN on an obstetric unit for six months or longer?; d) Are you permanently assigned to an obstetrical unit (AP, L&D, Mother/Baby or Postpartum)?; e) Have you obtained any formal or informal education about SUPC or safe newborn positioning?; f) What is your highest level of nursing education?; g) Do you have certification in In-Patient Obstetrics or Kangaroo Care?; h) What kind of setting do you work in? i) Where is your institution located, urban or rural?; j) Do you have a child /children of your own? Categorical data were analyzed using absolute number, percent, and proportion statistics.

Demographic data that were continuous in nature were: a) How many years have you practiced as an obstetrical nurse?; b) How many deliveries does your institution have in a year?; c) How many unexpected newborn complications like asphyxia, suffocation, and SUPC have you experienced in your practice as an obstetric nurse in the last five years? and d) How many SUPCs have you experienced in your practice as an obstetrical nurse? Continuous data were analyzed using measures of central tendency (i.e., mean, median, and mode), dispersion (i.e., standard deviation and range), proportion (i.e., percent), and skew and kurtosis as measures of normality of distribution of the data.

Analysis of research questions. Level of knowledge about SUPC and about Safe Newborn Positioning were separately analyzed from the total knowledge score. In RQ1, (level of knowledge about SUPC) the number of correct answers on the SUPC portion of the SSPAT questionnaire were analyzed. In RQ2, (level of knowledge about safe newborn positioning) the number of correct answers on the Safe Newborn Positioning questions of the SSPAT questionnaire were analyzed. The total knowledge score was the number of correct answers on the SUPC plus the Safe Newborn Positioning portions of the SSPAT. The number of correctly answered questions yielded interval level data. Interval data were descriptively analyzed using measures of central tendency (i.e., mean, median, mode) and dispersion (i.e., standard deviation) and percent. Normal distribution was determined by checking mean = median = mode and by kurtosis and skew statistics. Missing data constituted removal of the questionnaire from data analysis. Three questionnaires were not included due to missing data.

Timeline

The study required four months to conduct.

Month 1: Expedited IRB approval from CWRU was obtained.

Month 2: Questionnaire was emailed to all AWHONN Perinatal Listserv nurses with a Survey Monkey link.

Month 3: Data entry, cleaning, analyses, interpretation, and first draft of the results and discussion chapters were conducted.

Month 4: Final results and discussion were written and dissemination of results to scholarly project committee occurred.

Protection of Human Subjects

The CWRU Collaborative Institutional Training Initiative (CITI Program) and Health Insurance Portability Accountability Act (HIPAA) research training were completed. Institutional Review Board (IRB) approval from CWRU was secured. All clinical obstetric nurses answering the questionnaire were aware that the questionnaire was part of the research study, participation in answering the questionnaire was voluntary, and they had the right not to complete the questionnaire. Submission of the answered questionnaire implied informed consent. The data from the questionnaire, recipients, and respondents were coded so that respondent identity and performance were not identified, thereby insuring subject anonymity and confidentiality. No risk of harm was associated with the questionnaire. Only the principal investigator, advisor and statistician had access to the raw data.

Dissemination of Findings

The study results are planned to be published in a specialty journal such as the Journal of Obstetric, Gynecologic, & Neonatal Nursing (JOGNN) or Neonatal Network, Advances in Neonatal Care and MCH: The Journal of Maternal Child Nursing. The study will be presented at specialty and research symposiums, and results will be shared with perinatal nurses during conferences such as AWHONN, the Academy of Neonatal Nursing (ANN), and National Association of Neonatal Nurses (NANN). Data may also be shared with interested Chief Nursing Officers and Risk

Management Officers of any obstetrical unit in order that policies can be developed to educate nurses, physicians, and new mothers about SUPC and safe newborn positioning. Thus, professional staff will be enabled to continuously monitor the mother/newborn dyad for safe positioning throughout hospitalization and especially during SSC and breastfeeding.

Chapter Four

Results

Characteristics of the subjects

There were a total of 50 clinical obstetric nurses who responded to the survey. Two of the clinical obstetric nurses were excluded due to being employed as a nurse practitioner or certified nurse midwife, nine were excluded due to not being permanently assigned to an obstetric unit, and three clinical obstetric nurses that met inclusion criteria were omitted due to incomplete SSPAT data. The final sample size was based on 36 clinical obstetric nurses. Of the 36 clinical obstetric nurses included in the analysis, 77.8% (n = 28) had formal education about SUPC or safe newborn positioning and 97.2% (n = 35) had informal education about SUPC. There were 69.4% (n = 25) who had In-Patient Obstetrics (OB) Certification and only 28% (n = 1) had Kangaroo Care Certification. The majority (69.4%; n = 25) of nurses held a Master of Science in Nursing (MSN) degree. Clinical obstetric nurses had an average of 21.5 (SD = 11.6) years of experience with a range of 2.5-42 years. There were 66.6% (n = 24) of clinical obstetric nurses who worked in a community hospital, 30.6% (n =11) worked in an academic medical center, and 83.3% (n = 30) worked in an urban setting. The top three annual deliveries for their hospitals were as follows: 58.3% (n = 21) had between 1001-5000 births per year, 16.7% (n = 5) had >5000 births per year and 11.1% (n = 4) had 501-1000 births per year. Demographic characteristics are reported in Table 1. A close review of Table 1 indicated two interesting demographic results. The first was that 25 (69.4%) of the

respondents held a MSN degree and 25 (69.4%) were In-Patient OB certified. The second interesting demographic result was that on average, within the previous five years, the mean number of unexpected newborn complications experienced by respondents was 0.98 (SD = 2.04) (Table 2). Because the SD of 2.04 was two times larger than the mean, reporting the percentage of the number of complications has been done to facilitate understanding (Table 3). Table 3 clearly showed that the majority of respondents experienced no newborn complications but one experienced ten, thereby creating the low mean and high SD for number of unexpected newborn complications experienced by respondents.

Table 1

Demographics of all Respondents

Variable		n	%
Formal education about SUPC or safe newborn positioning			
	Yes	28	77.8
	No	8	22.2
Informal education about SUPC or safe newborn positioning			
	Yes	35	97.2
	No	1	2.8
Highest Nursing Education			
	Diploma in Nursing	1	2.8
	Associate Degree in Nursing	0	0.0
	Bachelor of Science in Nursing	7	19.4
	Master of Science in Nursing	25	69.4
	Post Master's Certificate in Nursing	0	0.0
	DNP in Nursing	2	5.6
	PhD in Nursing	0	0.0
	MS	1	2.8
In-Patient Obstetrics Certification			
	Yes	25	69.4
	No	11	30.6

Kangaroo Care Certification			
	Yes	1	2.8
	No	35	97.2
Work Setting			
	Academic Medical Center	11	30.6
	Community Hospital	24	66.6
	Birthing Center	1	2.8
Institution Location			
	Rural Setting	6	16.7
	Urban Setting	30	83.3
Institution Annual Deliveries			
	200 or fewer	2	5.6
	201-500	3	8.3
	501-1000	4	11.1
	1001-5000	21	58.3
	>5000	6	16.7
Do you have children			
	Yes	31	86.1
	No	5	13.9

Table 2

Means, Standard Deviations, and Range of Continuous Demographic Variables

	M	SD	Minimum	Maximum
Years of experience as a nurse	21.5	11.6	2.5	42
How many unexpected newborn complications have you experienced in the last 5 years?	0.98	2.04	0	10

Table 3

Percentage of the 36 Respondents Experiencing a Specific Number of Unexpected Newborn Complications Within the Previous Five Years

# of complications	# of respondents	Percentage
0	21	58.3
1	3	8.3
2	5	13.8
2-3	1	2.8
5	1	2.8
10	1	2.8
Cannot remember	1	2.8
Unsure	1	2.8
No responses	2	5.6

Outcome Results

The first research question assessed the level of clinical obstetric nurses' knowledge about SUPC as determined by scores on the SSPAT. The SUPC portion of the SSPAT consisted of 10 questions and was scored out of 100% based on the correct answers. The average knowledge score for the SUPC questions was 6.6 correct answers (SD = 1.5, percent of correct answers = 66.0%). Out of the 36 clinical obstetric nurses, 12 (33.3%) scored above average. The mean SUPC knowledge score for respondents with MSN degrees was 6.0 (SD = 1.6); the mean SUPC knowledge score for respondents who were In-Patient OB certified was 5.9 (SD = 1.5).

The second research question assessed the level of nurses' knowledge about Safe Newborn Positioning on the SSPAT. The SSPAT contained 10 questions on Safe Newborn Positioning and was scored based on the number of correct answers. The average knowledge score of correct Safe Newborn Positioning was 7.2 (SD =1.4;

percent of correct answers = 72.0%). Of the 36 clinical obstetric nurses, 15 (41.7%) scored above average. See Table 4 for individual scores on the SSPAT. The mean Safe Newborn Positioning Knowledge score for respondents with a MSN degree was 7.2 (SD =1.4); the mean Safe Newborn Positioning knowledge score for respondents who were In-Patient OB certified was 7.0 (SD = 1.4).

Table 4:

Number of Correct Answers on the SUPC and Safe Newborn Positioning Questions by Respondent and by Group with Group Means, Standard Deviations and Range of Scores

	SUPC		Safe Newborn Positioning	
	Score	%	Score	%
Respondent 1	8	80	9	90
Respondent 2	8	80	9	90
Respondent 3	8	80	7	70
Respondent 4	8	80	9	90
Respondent 5	8	80	9	90
Respondent 6	8	80	9	90
Respondent 7	8	80	9	90
Respondent 8	8	80	8	80
Respondent 9	6	60	8	80
Respondent 10	6	60	8	80
Respondent 11	6	60	6	60
Respondent 12	6	60	5	50
Respondent 13	8	80	6	60
Respondent 14	3	30	7	70
Respondent 15	5	50	8	80
Respondent 16	6	60	6	60
Respondent 17	5	50	4	40
Respondent 18	8	80	10	100
Respondent 19	7	70	6	60
Respondent 20	6	60	6	60

Respondent 21	9	90	7	70
Respondent 22	6	60	4	40
Respondent 23	4	40	8	80
Respondent 24	6	60	6	60
Respondent 25	6	60	6	60
Respondent 26	3	30	7	70
Respondent 27	6	60	7	70
Respondent 28	4	40	7	70
Respondent 29	6	60	9	90
Respondent 30	6	60	7	70
Respondent 31	8	80	7	70
Respondent 32	5	50	8	80
Respondent 33	4	40	6	60
Respondent 34	7	70	7	70
Respondent 35	6	60	7	70
Respondent 36	8	80	8	80

Group Total SUPC Mean/SD = 6.1 / 1.50 and SUPC Range = 3 - 9

Safe Newborn Positioning Mean/SD = 7.2 / 1.44 and Range = 4 – 10

The data were analyzed to determine normality of distribution for both the SUPC and Safe Newborn Positioning scores. The skew and kurtosis for SUPC and safe newborn position were calculated. The skew for SUPC was -0.15 and kurtosis was -0.47. The skew for Safe Newborn Positioning was -0.29 and kurtosis was -0.17. For distributions to be considered normal, skew should be close to zero and kurtosis should not be above three; thus, the data distributed normally, permitting a t-test to determine difference between SUPC and Safe Newborn Positioning mean scores. Due to the dichotomous nature of several of the questions in each subscale of the SSPAT, a Cronbach's alpha could not be run. Testing SSPAT reliability by test-retest method was not possible, nor was criterion referenced reliability possible, thus, no reliability computations were conducted for the SSPAT.

Difference between SUPC and Safe Newborn Positioning Scores

An additional analysis was conducted to compare SUPC and Safe Newborn Positioning scores to determine if nurses had more knowledge of one or the other. The t-test was conducted and revealed that the difference in mean scores was statistically significant ($t = 3.7$, $p < 0.001$). The average percent of correct showed that nurses had more knowledge on Safe Newborn Positioning than SUPC.

Chapter Five

Discussion

Overview of the study

A descriptive evaluative study of 36 U.S. clinical obstetric nurses revealed that clinical obstetric nurses' knowledge about SUPC and Safe Newborn Positioning needs to be improved. Thirty-six clinical obstetric nurses answered the SSPAT questionnaire through the AWHONN Perinatal Listserv. Among the 36 respondents, 25 were MSN degree prepared and 25 had In-Patient OB Certification. Twenty-five of 36 clinical obstetric nurses being MSN prepared is a high percentage (69.4%) of MSN nurses practicing on the units and most likely reflects nurses who were clinical managers, nurse managers, nursing directors, or educators rather than being bedside nurses. The 36 clinical obstetric nurses had a low level of SUPC knowledge and a moderate level of Safe Newborn Positioning knowledge. The 36 clinical obstetric nurses had a statistically significant higher number of correct answers on Safe Newborn Positioning (72.0%) than on SUPC (66.0%). The results are dissimilar to Imossi et al.'s (2018) results that showed 75% of nurses were aware of SUPCs, but no safety practices such as safe newborn positioning were being implemented, leaving the reader to surmise that nurses' knowledge of safe newborn positioning was less than their SUPC knowledge. Other studies have reported that nurses needed knowledge about SUPC which led to providing education (Garofalo et al., 2018; Howe et al., 2017; Rodriguez et al., 2018; Pearlman et al., 2017), but the extent of nurses' knowledge about SUPC was not quantified nor reported and the same applies

to nurses' knowledge of safe newborn positioning. The fact that respondents knew more about Safe Newborn Positioning than about SUPC suggested that wide awareness of safe sleep positions to prevent SIDS exists. Interestingly, the respondents who had their MSN degree and those who had their certification in In-Patient Obstetrics scored the same as the whole group of nurses. These results are contradictory to Deng et al's. (2018) finding that level of education was positively correlated with higher knowledge scores. Similarly, certification has been shown to be a factor contributing to higher knowledge scores, too (Almutairi & Ludington-Hoe, 2016; Kukla & Ludington-Hoe, 2017) and higher scores in certification did not appear in the data. Continuing education and clinical training are needed for all clinical obstetric nurses to remain current with SUPC and safe newborn positioning evidence, understand outcomes of SUPC and poor newborn positioning, and practice surveillance and interventions to ensure the health of all newborns.

Explanation of results

One explanation for nurses knowing more about Safe Newborn Positioning than SUPC may be that nurses have always been responsible for ensuring the well-being of the newborn (Ferrarello & Carmichael, 2016) and a basic requirement of well-being is being able to breathe. Nurses are aware that various positions can influence breathing (i.e., being semi-inclined instead of flat facilitates breathing), and most know that positioning during sleep influences occurrence of SIDS (Feldman-Winter et al., 2016), so applying that awareness to the questions about Safe Newborn Positioning may have contributed to higher knowledge scores in that area. Another

possibility is that SUPC is still a relatively new diagnosis and may not be known to nurses as has been suggested by others (Bass et al., 2016; Garofalo et al., 2018; Goldsmith, 2013; Tieder et al., 2016) nor is SUPC a diagnosis assigned to nurses to make (Goldsmith, 2013), contributing to limited exposure to SUPC as a term and a condition. Sudden unexpected postnatal collapse is a diagnosis that is not synonymous with asphyxia, suffocation, and strangulation (Tieder et al., 2016), which are the current acceptable diagnoses that nurses have to use to report healthy newborns experiencing physiologic collapse (TJC, 2018). Thus, knowledge about Safe Newborn Positioning could be higher than knowledge about SUPC. The results that a majority of nurses knew something about SUPC and Safe Newborn Positioning indicates that the formal and informal education that the majority of nurses had about SUPC and safe newborn positioning as well as articles on the topic that have appeared in nursing journals (Ferrarello & Carmichael, 2016; Garofalo et al., 2018; Ludington-Hoe & Morgan, 2014; and related literature (Davanzo et al., 2015; Garofalo et al., 2018; Rodriguez et al., 2018), as well as presentations (Pearlman et al., 2017) are reaching nurses and enhancing their knowledge of SUPC and safe newborn positioning. However, the fact that nurses' knowledge is less than optimal about SUPC and safe newborn positioning may be due in part to limited experience and practice of safe newborn positioning on obstetric units in the U.S.

Future studies

Based on the results that not all clinical obstetric nurses scored very well on the SSPAT, future research should focus on factors that relate to knowledge

acquisition and ways to enhance knowledge acquisition. In relation to factors related to knowledge acquisition, one future research question could be: To what degree do level of education and years of clinical obstetric nursing experience contribute to increased clinical knowledge of SUPC and safe newborn positioning? The result that the percent of correct answers was not high as one might like because even one SUPC is one too many (Garofalo et al., 2019), studies are needed to determine specifically what formal and informal education the nurses had previously had and how to strengthen acquisition and retention of knowledge through these resources. Perhaps the video (Rodriguez et al., 2018) and learning modules (Garofalo et al., 2018; Howe et al., 2017) that have already been developed might produce higher levels of knowledge. Higher levels of knowledge are encouraged because nurses' knowledge level exerts an influence on practice and it is the actual practice of monitoring, intervening, and sustaining safe positioning that will reduce frequency of SUPC. Thus, nurses' knowledge needs to be supported.

Further studies with additional questions about emerging knowledge about SUPC are needed. For example, one question could be about the role safe positioning has as a preventive SUPC strategy because one will never know which newborn has a dysfunctional KFN and cannot respond to hypoxia threats. The unavoidable consequence of a dysfunctional KFN in a newborn who experiences positional hypoxia is death (Lavezzi et al., 2019). Another example is the need for a question about using specific assessments tools and oxygen saturation measures to monitor risk of SUPC (Pearlman et al., 2017). And of course, replication with a larger sample

size and with a more representative sample of clinical obstetric nurses across the U.S. should be conducted to justify the need to develop and execute educational programs about SUPC and safe newborn positioning.

Implications

Based on the results, a need to educate nurses about SUPC and Safe Newborn Positioning exists and is beginning to be met. For example, at the AWHONN convention in June 2019, there is a presentation on Sudden Unexpected Infant Death (SUID) and SUPC (Klassa & Larry-Osman, 2019). In reviewing the individual survey results for SUPC, there were 24 (66.7%) nurses who scored at or below 60%, and for Safe Newborn Positioning 11 (30.6%) nurses who scored at or below 60%, which indicates that continuing education and clinical training are needed for nursing staff to better understand and practice surveillance for SUPC and Safe Newborn Positioning. The results of lower scores on SUPC are consistent with Deng et al.'s (2018) findings that knowledge about Kangaroo Care (skin-to-skin contact) in general was low among neonatal nurses in a national survey of Chinese nurses.

Conclusion

The majority of clinical obstetric nurses know about SUPC and Safe Newborn Positioning during skin-to-skin contact and breastfeeding, but their level of knowledge is less than optimal. More opportunities need to exist for nurses to participate in formal education programs on the topics of SUPC and Safe Newborn Positioning for use in their own practice and for instructing mothers with their newborns in the postpartum period. Replication of this study with a larger sample

size and better representation of all practicing clinical obstetric nurses is recommended to determine the breadth of need for education about SUPCs and Safe Newborn Positioning.

References

Almutairi, W.M., Ludington-Hoe, S.M. (2016). Kangaroo care education effects on nurses' knowledge and skills confidence. *Journal of Continuing Education in Nursing, 47*(11), 518-524.

American Academy of Pediatrics (2016). Safe sleep and skin-to-skin care in the neonatal period for healthy term newborns. *Pediatrics, 138*(3): e2 0161889. Available at www.aappublications.org/news.

American College of Obstetricians and Gynecologists (2018, October). *ACOG committee opinion.* Breastfeeding expert work group committee on obstetric practice. Optimizing support for breastfeeding as part of obstetric practice*, 132* (4), e187 – e196. Available at www.ACOG.org.

Arane, K., Claudius, I., Goldman, R.D. (2017). Brief resolved unexplained event. New diagnosis in infants. *Canadian Family Physician, 63*(1), 39-41.

Audet, L., Bourgault, P., Rochefort, C.M. (2017). Associations between nurse education and experience and the risk of mortality and adverse events in acute care hospitals: A systematic review of observational studies. *International Journal of Nursing Studies, 80*, 128-146. Doi: 10.1016/j.ijnurstu.2018.01.007

Barsman, S.G., Dowling, D.A., Damato, E.G., Czeck, P. (2015). Neonatal nurse's beliefs, knowledge, and practices in relation to sudden infant death syndrome risk-reduction recommendations. *National Association of Neonatal Nurses, 15*(3), 209-219.

Bartick, M., Feldman-Winter, L., (2018). Skin-to-skin care cannot be blamed for increase in suffocation deaths. *The Journal of Pediatrics, 200(10), 296-* 297.

Bass, J.L., Gartley, T., Lyczkowski, D.A., Kleinman, R. (2018). Trends in the incidence of sudden unexpected infant death in the newborn: 1995-2014. *The Journal of Pediatrics, 196,* 104-108. Doi: 10.1016/j.jpeds.2017.12.045

Becher, J.C., Bhushan, S.S., Lyon, A.J. (2012). Unexpected collapse in apparently healthy newborns. A prospective national study of a missing cohort of neonatal deaths and near-death events. *Archives of Disease in Childhood, Fetal and Neonatal Edition, 97* (1), F30-F34. Doi: 10.1136/adc.2010.208736

Beckwith, J.B. (1973). The sudden infant death syndrome. *Curr Probl. Pediatr.* 3: 1-36.

Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice*. Menlo Park, CA: Addison-Wesley.

Blegen, M.A., Goode, C.J., Park, S.H., Vaughn, T., Spetz, J. (2013). Baccalaureate education in nursing and patient outcomes. *The Journal of Nursing Administration, 43*(2), 89-94. Doi: 10.1097/NNA.

Bombard, J.M., Kortsmit, K., Warner, L., Shapiro-Mendoza, C.K., Cox, S., Kroelinger, C.D. …Barfield, W.D. (2018). Vital Signs: Trends and disparities in infant sleep practices- United States. *Morbidity and Mortality Weekly Report, 67*(1), 39-46.

Carlin, R, Moon, R.Y., (2018). Learning from national and state trends in sudden unexpected infant death. *Pediatrics, 141*(3): e20174083

Cho, E., Park, J., Choi, M., Lee, H.S., Kim, E.Y. (2018). Associations of nurse staffing and education with the length of stay of surgical patients. *Journal of Nursing Scholarship, 50*(2): 210-218. Doi: 10.1111/jnu.12366. Epub 2017 Dec 21

Cicolini, G., Simonetti, V., Comparcini, D., Labeau, S., Blot, S., Pelusi, G., DiGiovanni, R. (2013). Nurses' knowledge of evidence-based guidelines on the prevention of peripheral venous catheter-related infections: A multicenter survey. *Journal of Clinical Nursing, 23*, 2578-2588. Doi: 10.1111/jocn.12474.

Clarke, S.P. Rockett, J.L., Sloane, D.M., Aiken, L.H. (2002). Organizational climate, staffing, and safety equipment as predictors of needlestick injuries and near-misses in hospital nurses. *American Journal of Infection Control, 30*, 207-216.

Colson, S. (2014). Does the mother's posture have a protective role to play during skin-to-skin contact? Research observation and theories. *Clinical Lactation, 5*(2), 41-50. Doi: https://doi.org/10.1891/2158-0782.5.2.41

Conrad, M.E. (1947). What is expert nursing care? *The American Journal of Nursing, 47*(3), 162-164.

Davanzo, R., DeCunto, A., Paviotti, G., Travan, L., Inglese, S., Brovedani, P., …Demarini, S. (2015). Making the first days of life safer: Preventing sudden unexpected postnatal collapse while promoting breastfeeding. *Journal of Human Lactation, 31*(1), 47-52.

DeJonge, G.A., Engelberts, A.C., Koomen-Liefting, A.J.M., P.J. (1989). Cot death and prone sleeping in the Netherlands. *British Medical Journal*, *298*: 722.

Deng, Qingqi, Zhang, Yao, Li, Qiufang, Wang, Hua, Xu, Xinfen (2018). Factors that have an impact on knowledge, attitude and practice related to kangaroo care: National survey study among neonatal nurses. *Journal of Clinical Nursing, 27,* 4100-4111. Doi: 10.1111/jocn.14556.

Dulock, H.L. (1993). Research design: Descriptive research. *Journal of Pediatric Oncology Nursing, 10*(4), 154-157.

Evereklian, M., Posmontier, B. (2017). The impact of Kangaroo Care on premature infant weight gain. *Journal of Pediatric Nursing, 34*, e10-e16.

Feldman-Winter, L. & Goldsmith, JP. (2016). AAP committee on fetus and newborn, AAP , task force on sudden infant death syndrome. Safe sleep and skin-to-skin care in the neonatal period for healthy term newborns. *Pediatrics*, *138*(3): e20161889.

Ferrarello, D., & Carmichael, T. (2016). Sudden Unexpected Postnatal Collapse of the Newborn. *Nursing for Women's Health, 20*(3), 269-275. doi: 10.1016/j.nwh.2016.03.005

Fleming, P.J., Blair, P.S., Pease, A., (2015). Sudden unexpected death in fancy: aetiology, pathophysiology, epidemiology and prevention in 2015. *Arch Dis Child, 100*, 984-988. Doi 10.1136/archdischild-2014-306424

Fleming, P.J., Gilbert, R.E., Azaz, Y, Berry, P.J., Rudd, P.T., Stewart, A., Hall, E. (1990). The interaction between bedding and sleeping position in sudden infant death syndrome: A population-based case-control study. *British Medical Journal, 301*, 85-89.

Garofalo, N.A, Newkirk, E.A., Noto, J.L., Filler, L.E., Smith, M.M., Hageman, J.R. (2018). An innovative educational program for the prevention of sudden unexpected postnatal collapse (SUPC) of newborns. *Neonatology Today, 13*(11), 3-15.

Garofalo, N.A., Pellerite, M., Goodstein, M., Paul, D.A., Hageman, J.R., (2019). Sudden unexpected postnatal collapse (SUPC): One newborn death is one too many: Current concepts. *Neonatology Today, 14*(2), 55-58.

Gnigler, M., Ralser, E., Karall, D., Reiter, G., Kiechl-Kohlendorfer, U. (2013). Early sudden unexpected death in infancy (ESUDI)- three case reports and review of literature. *Acta Paediatrica, 102,* e233-e238.

Goldsmith, J.P. (2013). Hospitals should balance skin-to-skin contact with safe sleep policies. *AAP News. 34*(11), 22. Retrieved June 17, 2018 from http://www.aappublications.org/content/34/11/22.

Gortner, S.R. (2000). Knowledge development in nursing: Our historical roots and future opportunities. *Nursing Outlook 48*(2), 60-67.

Goswami, I., Buchwalter, J., Howlett, A., Thomas, S., Lind, J.,Oliver, N., Mohammed, K., (2018-Aug). Introduction of continuous video EEG monitoring into 2 different NICU models by training neonatal nurses. *Advances in Neonatal Care, 18*(4), 250-259.

Guntheroth, W.G., Spiers, P.S., (2002). The triple risk hypotheses in sudden infant death syndrome. *Pediatrics, 110*(5), 1-6.

Hageman, J.R., McMullen, S., Jawdeh, E.A. (in press). Sudden unexpected postnatal collapse (SUPC) in hospitals: An emotional clinical entity.

Hall, A., (2005). Defining nursing knowledge. *Nursing Times, 101*(48), 34-37.

Herlenius, E., Kuhn, P. (2013). Sudden unexpected postnatal collapse of newborn infants: A review of cases, definitions, risks and preventive measures. *Translational Stroke Research* (4), 236 - 247. Doi: 10.1007/s12975-013-0255-4

Heydari, A., Mazlom, S.R., Ranjbar, H., Surlock-Evans, L. (2014). A study of Iranian nurses' and midwives' knowledge, attitudes, and implementation of evidence-based practice: The time for change has arrived. *Worldviews on Evidence-Based Nursing 11*(5), 325-331.

Howe, R.A., Pacheco, A., Sapp, K. (2017). Safe positioning during skin-to-skin and breastfeeding. Texas Children's Hospital Kaleidoscope Magazine. Retrieved from https://www.texaschildrens.org/sites/default/files/uploads/documents/health_professionals/kaleidoscope/Day%201%20Safe%20Positioning.pdf

Imossi, A., Barber, A., Fava, M., Gauthier, A. (2018). Nurse-driven prevention of and preparedness for sudden, unexpected postnatal collapse through an in situ simulation program. *Journal of Obstetric Gynecologic & Neonatal Nursing, 47*, S8-S42.

Institute of Medicine (2004). *Patient Safety: Achieving a new standard for care.* Washington, DC: National Academy Press.

Institute of Medicine. (2011). *The future of nursing: Leading Change, advancing health*, Washington, DC: The National Academy Press.

Katz, F. (1969). Nurses. In Etzioni, A. (Ed.). *The Semi-professions and their organization.* New York: The Free Press.

Klassa, P., Larry-Osman, C. (2019, June). *Keeping babies safe: Sudden unexpected infant death and sudden unexplained postnatal collapse*. Presented at the AWHONN Convention, Atlanta, GA.

Kukla, A., Ludington-Hoe, S.M., (2017). Value of specialty certification as a kangaroo caregiver. *The Journal of Perinatal Education, 26*(4), 185-194. Doi: 10.1891/1058-1243.26.4.185

Kutney-Lee, A, Sloane, D. M., Aiken, L.H. (2013). An increase in the number of nurses with baccalaureate degrees is linked to lower rates of post-surgery mortality. *Health Affairs 32*(3), 579-586. Doi: 10.1377/htthaff.2012.0504.

Lambert, A.B.E., Parks, S.E., Shapiro-Mendoza, C.K. (2018). National and state trends in sudden unexpected infant death: 1990-2015. *Pediatrics, 141*(3), e20173519

Lavezzi, A.M., Piscioli, F., Pusiol, T. (2017). Sudden unexpected collapse at 20 hours from birth during skin-to-skin care related to brainstem developmental alterations - a case report. *Folia Neuropathologica,* 55(3), 235-241.

Lavezzi, A.M, Paradiso, B., Pusiol, T., Piscioli, F. (2019). Neuropathology of sudden unexpected postnatal collapse. *Early Human Development*, *130*(121*)*.

Ludington- Hoe, S.M., Morgan, K. (2014). Infant assessment and reduction of sudden unexpected postnatal collapse risk during skin-to-skin contact. *Newborn and Infant Nursing Reviews, 14*(1), 28-33. Doi: 10.1053/j.nainr.2013.12.009.

Ludington-Hoe, S.M., Morrison-Wilford, B.L., DiMarco, M., Lotas, M. (2018). Promoting newborn safety using the RAPPT assessment and considering apgar criteria: A quality improvement project. *Neonatal Network, 36*(2), 85-95. Doi: 10.1891/0730-0832.37.2.85

McHugh. M.D., Lake, E.T. (2010). Understanding clinical expertise: Nurse education, experience, and the hospital context. *Res Nurs Health, 33*(4), 276-287. Doi: 10.1002/nur.20388.

Mitchell, E.A., Krous, H.F. (2015). Sudden unexpected death in infancy: A historical perspective. *Journal of Paediatrics and Child Health, 51*, 108-112.

Mohan, N., Caldwell, G., (2013). A considerative checklist to ensure safe daily patient review. *Clin Teach, 10,* 209-213.

Monnelly, V., Becher, J.C. (2018). Sudden unexpected postnatal collapse. *Early Human Development, 126,* 28-31. Doi: 10.1016/j.earlhumdev.2018.09.001.

Mosby's Medical Dictionary, 8th edition (2009). Retrieved from https://medical-dictionary.thefreedictionary.com/newborn

Nair, S.S., Hanumantappa, R., Hiremath, S.G., Siraj, M.A., Raghunath, P. (2014). Knowledge, attitude, and practice of hand hygiene among medical and nursing students at a tertiary health care centre in Raichur, India. *ISRN Preventive Medicine,* Article ID 608927, 4 pages. Doi: 10.1155/2014/608927.

Naugler, M.R., DiCarlo, K., (2018). Barriers to and interventions that increase nurses' and parents' compliance with safe sleep recommendations for preterm infants. *Nursing for Women's Health, 22*(1), 24-38.

New Zealand Ministry of Health (2012). *Observation of mother and baby in the immediate postnatal period: consensus statements guiding practice.* Retrieved from http://www.health.gov..nz/pubiction/observation-mother-and-baby-immediate-postnatal period-consensus-atatements-guiding-practice.

Ni, C., Hua, Y., Shao, P., Wallen, G.R., Xu, S., Li, L. (2013). Continuing education among Chinese nurses: A general hospital-based study. *Nurse Education Today. 34,* 592-597.

Pearlman S.A., Igboechi, E., Paul, D.A. (2017). A bundled intervention including pulse oximetry prevents sudden unexpected postnatal collapse (SUPC). Vermont Oxford Network.

Pejovic, N.J., & Herlenius E., (2013). Unexpected collapse of healthy newborn infants: Risk factors, supervision and hypothermia treatment. *Acta Paediatr, 102*(7), 680-688. Doi: 10.1111/apa.12244.

Penn, S. (2015). Overcoming the barriers to using kangaroo care in neonatal settings. *Nursing Children and Young People, 27*(5), 22-27. Doi: 10.7748/ncyp.27.5.22.e596.

Polit D. F., Hungler, B.P. (1999). *Nursing Research. Principles and methods.* Philadelphia, PA: Lippincott Williams & Wilkins.

Piumelli, R., Davanzo, R., Nassi, N., Salvatore, S., Arzilli, C., Peruzzi, M., Agosti, M., Palmieri, A., Paglietti, M.G., Nosetti, L., Pomo, R., DeLuca, F., Rimini, A., De Masi, S., Costabel, S., Cavarretta, V., Cremante, A., Cardinale, F., Cutrera, R., (2017). Apparent Life-Threatening Events (ALTE): Italian guidelines. *Italian Journal of Pediatrics, 43*(111), DOI 10.1186/s13052-017-0429-x.

Rodriguez, N.A., Hageman, J.R., Pellerite, M., (2018). Maternal distraction from smartphone use: A potential risk factor for sudden unexpected postnatal collapse of newborn. *The Journal of Pediatrics, 200,* 298-299.

Rodriguez, N., Pellerite, M., Hughes, P., Wild, B., Joseph, M., Hageman, J.R., (2018). An acute event in a newborn. Video Corner. *NeoReviews, 18*(12), e717-e720.

Ryan, D.J., Mikula, E.B., Germana, S., Silva, S.G., Derouin, A. (2014). Screening for critical congenital heart disease in newborns using pulse oximetry. *Advances in Neonatal Care 14*(2), 119-128. Doi: 10.1097/ANC.0000000000000047

Shapiro, F.E., Fernando, R.J., Urman, R.D. (2014). Barriers to the implementation of checklists in the office-based procedural setting. *American Society for Healthcare Risk Management, 33*(4), 35-43. Doi: 10.1002/jhrm.21141.

Takase, M. (2012). The relationship between the levels of nurses' competence and the length of their clinical experience: A tentative model for nursing competence development. *The Journal of Clinical Nursing, 22,* 1400-1410.

The Joint Commission on Accreditation of Healthcare Organizations (2018-July 31). Specifications manual for Joint Commission National Quality Measures (v2018B). Retrieved from https://www.jointcommission.org/the_joint_commission_announces_new_performance_measure_on_unexpected_complications_in_term_newborns/

Tieder, J.S., Bonkowsky, J.L., Etzel, R.A., Franklin, W.H, Gremse, D.A., Herman, B.,…Smith, M.B.H. (2016). Brief resolved unexplained events (formerly apparent life-threatening events) and evaluation of lower-risk infants: Executive summary. *Pediatrics, 137*(5), e20160591.

United Nations International Children's Emergency Fund (UNICEF), (n.d.). *Neonatal mortality rates.* Retrieved from https://www.unicef.org

United States Institute for Kangaroo Care: Safe positioning for kangaroo care (poster or card) (2012). Cleveland, OH. Also available in Ludington-Hoe & Morgan, 2014 publication.

Wigfield, R.E., Fleming, P.J., Berry, P.J., Rudd, P.T. (1992). Can the fall in Avon's sudden infant death rate be explained by the observed sleeping position changes? *British Medical Journal, 304*, 282-283.

Zaleta, S., Miller, S., Kumar, P. (2016). Unexplained neonatal cardiorespiratory collapse at five minutes of age. *Case reports in Pediatrics.* Article ID 7206572, 3 pages. Retrieved from http://dx.doi.org/10.1155/2016/7206572

Appendix A

Matrix of Review of Literature

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Arane , K., Claudius, I., Goldman R.D. (2017)	Reviews the recommendation for changing ALTE to BRUE in all infants under one year and indicate that new clinical practice guideline will decrease unnecessary and costly medical interventions & improve patient outcomes	Child health update	N/A	N/A	Yes Low –risk infants who have experienced BRUE should not be admitted to the hospital and overtesting is discourage

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Bass, J.L., Gartley, T., Lyczkowski, D.A., Kleinman, R. (2018)	To evaluate the epidemiology of sudden unexpected infant death (SUID) over a 20 year period in the U.S., to assess the frequency of SUPC in the early days of life, and to determine if SUID rates in the neonatal period have changed	Data from the U.S. Centers for Disease Control and Prevention linked birth/infant death records for 1995-2014. Data were analyzed for the first hour, day, week and month of life	U.S. National Vital Statistics System category of SUID combined conditions included in ICD-9 & ICD 10 codes and made a comparison of neonatal & post neonatal data related to SUID including accidental suffocation	Death records for 1995-2014 reveal that although SUID rates in the post neonatal period have declined following the 1992 American Academy of Pediatrics sleep position policy change, newborn SUIDs have failed to decrease, and the percentage of SUIDs attributed to unsafe sleep conditions has significantly increased	Ongoing research on SUID prevention is needed

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Becher, J.C., Bhushan, S.S., Lyon, A.J. (2012)	A prospective study of 13 months of unexpected infant deaths	Cases were referred through the British Paediatric Surveillance Unit over a 13-month period	Data was collected on infants>/ 37weeks gestation, had an Apgar score of >/ 8 at 5 minutes, collapsed within 12 hours in hospital requiring PPV and either died or received ongoing intensive care.	53% (25/45) of deaths occurred from airway obstruction during bonding(??), breastfeeding or prone position with a majority of mothers being primiparous. Some deaths occurred in arms and in cots.	Yes Kangaroo care and breastfeeding should be continued with better vigilance. Parents should assess airway, breathing, and color of infant.
Colson, S (2014)	Commentary to develop a postural argument to increase understanding of the potential role played by the maternal body slope to reduce the risk of idiopathic SUPC	N/A	N/A	N/A	Yes Educating about maternal body slope that promotes a neonatal body tilt will protect breathing in the infant

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Davanzo, R. et al. (2015)	Protocol was developed to promote safe mother and infant bonding and to establish successful breastfeeding without increasing the risk of SUPC	N/A	Delivery room and postnatal ward of the Institute for Maternal Child Health of Trieste in Italy	N/A	Yes Guidelines for SUPC incidence reduction should be developed worldwide. The RAPP tool provide guidance on repeated assessment of the infant
Feldman-Winter, L, & Goldsmith, JP, (2016)	To assist birthing centers and delivery hospitals caring for healthy newborns in creating appropriate skin-to-skin contact (SSC) and safe sleep policies	Case reports	Birthing centers and hospitals	Recommend ations made to standardize methods of providing SSC and continuous monitoring of the mother-infant dyad while rooming-in during their hospital stay	Yes Close monitoring of the infant by experienced staff is necessary to prevent SIDS & ALTE.

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Ferrarello, C., Carmichael, T (2016)	Case study on SUPC and measures to decrease its risk	N/A	N/A	N/A	Yes A nurse's frequent observation and assessment of the infant during breastfeeding and SSC is needed to decrease SUPC event

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Gnigler, M., Ralser, E., Karall, D., Reiter, G., Kiechl-Kohlendorfer, U. (2013)	To find additional data for the identification of risk factors and develop prevention strategies.	A retrospective analysis on three cases of unexplained death of babies born after uncomplicated pregnancies and deliveries of their mothers	Three cases of unexplained death of babies in which a collapse was unknown and led to death. Babies were born in Tyrol, Austria between 2006 and 2011.	A consistent definition is needed if more is to be learned about newborn sudden death. Unattended early SSC and primiparity combined with a lack of expertise in breastfeeding are key risk factors.	Yes Close monitoring in the delivery room and improved parental instruction can be life saving.
Goldsmith, J.P. (2013)	Hospitals should balance skin-to-skin contact with safe sleep policies	N/A	N/A	N/A	Yes Hospitals should balance SSC with safe sleep policies

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Herlenius, E., Kuhn, P. (2013)	To review available published reports concerning sudden unexpected postnatal collapse (SUPC) of apparently healthy infants within the first days of postnatal life, establish a structured presentation and delineate recommendations for preventive measures	All published reports of SUPC were retrospectively analyzed and three not previously published SUPC at Karolinska University Hospital were detailed to exemplify the varying presentations and outcomes of SUPC.	Scopus, Web of Science, and Medline databases were searched to retrieve and analyze published SUPC cases and reports concerning early SUDI, early neonatal sudden unexpected death, SUEND, and early ALTE occurring during the first postnatal days in presumably healthy term and near term newborns.	When a defined time for SUPC event is described, approximately one third of reported events occur during the first 2 hours and between 1 to 7 days after birth. Adequate education of caregivers and appropriate surveillance during the first days of newborns should enable us to save hundreds of lives.	Yes Maintain continuous but restrained monitoring of the infant during the first hours & days of life

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Ludington-Hoe, S. (2014)	To share with maternity nursing staff how to conduct an easy newborn assessment that helps the nurse identify immediate newborn physiologic condition and to share nursing interventions designed to minimize the risk of the newly emerging complication called sudden unexpected postnatal collapse (SUPC)	N/A	N/A	Adequate education of health personnel and families in relation to accurate newborn physiologic assessment and safe positioning, along with appropriate surveillance during the first days of newborn life , especially in high-risk families, will save hundreds of lives	Yes Nurses need to be educated on strategies (e.g. use of RAPP tool) to identify infants at risk for SUPC.
New Zealand Ministry of Health (2012)	A consensus policy statement to prevent SUPC	N/A	Postnatal period	N/A	Yes All practitioners supporting mothers and babies in the immediate postnatal period will use this consensus policy to guide their practice.

Source Citation	Purpose/Aim	Methods	Sample and Setting	Results	Relevance to study & Nursing Implication
Piumelli, R., Davanzo, R., Nassi, N., Salvatore, S., Arzilli, C., Peruzzi, M…Cutrera, R. (2017)	A review of BRUE, ALTE, and SUPC	Updated guideline	N/A	N/A	Yes Multidisciplinary document on the clinical management of ALTE.
Tieder, J.S., Bonkowsky, J.L., Etzel, R.A., Franklin, W.H, Gremse, D.A., Herman, B. … Smith, M.B.H. (2016)	Recommends the replacement of the term "apparent life-threatening event" (ALTE) with a new term "brief resolved unexplained event" (BRUE). A guideline that provides an approach to evaluation & management that is based on the risk that the infant will have a repeat event or has a serious underlying disorder.	N/A	N/A	N/A	Yes Helps clinicians determine the presence of a serious underlying cause of an event & alerts clinicians to the most significant features of a clinical history & physical.
United States Institute for Kangaroo Care, (2012)	Checklist for safe newborn positioning	N/A	N/A	N/A	Yes Checklist that teaches safe positioning of the newborn during holding

Appendix B

This survey should take approximately 10 minutes or less to complete. Your responses are completely confidential and will never be individually identified. Your participation is greatly appreciated.

Demographic Data

1. Are you a registered nurse (RN) in the United States?
   A. Yes
   B. No
2. Do you speak and understand English?
   A. Yes
   B. No
3. Are you currently employed as a Nurse Practitioner or Certified Nurse Midwife?
   A. Yes
   B. No
4. Are you permanently assigned to an obstetric unit (Antepartum, Labor & Delivery, Mother/Baby or Postpartum)?
   A. Yes
   B. No
5. Have you been working as an RN on an obstetric unit for six months or longer?
   A. Yes
   B. No
6. How many years have you practiced as an obstetric nurse?

7. Have you obtained any formal education (e.g., continuing education, conference, webinar, e-learning module, etc.) about SUPC or safe newborn positioning?
   A. Yes
   B. No
8. Have you had any informal education (e.g., reading an article, talking with colleagues about an SUPC occurrence at work, reading a bulletin board notice, etc.) about SUPC or safe newborn positioning?
   A. Yes
   B. No
9. What is your highest level of nursing education?
   A. Diploma in Nursing
   B. Associate Degree (A.A.S., A.S.N., A.D.N.) in nursing
   C. Bachelor of Science (B.S.) in nursing
   D. Master of Science (M.S.) in nursing
   E. Post Master's Certificate in Nursing
   F. DNP in Nursing
   G. PhD in Nursing
   H. Other
10. Do you have certification in In-Patient Obstetrics?
    A. Yes
    B. No
11. Do you have certification in Kangaroo Care?
    A. Yes
    B. No

12. What kind of setting do you work in?
    A. Academic Medical Center (teaching hospital)
    B. Community Hospital
    C. Birthing center
    D. Other
13. Where is your institution located?
    A. Rural setting
    B. Urban (city, town, conurbation, or suburb) setting
14. How many deliveries does your institution have in a year?
    A. I don't know
    B. 200 or fewer deliveries/year
    C. 201-500 deliveries/year
    D. 501-1000 deliveries/year
    E. 1001 – 5000 deliveries/year
    F. > 5000 deliveries/year
15. How many unexpected newborn complications like asphyxia, suffocation, and SUPC have you experienced in your practice as an obstetric nurse in the last five years?
16. Do you have a child or children of your own?
    A. Yes
    B. No

SUPC & Safe Positioning Assessment Tool (SSPAT)

1. What do the initials SUPC stand for?
   A) Sudden Unexpected Parental Control
   B) Sudden Unplanned Prenatal Counsel
   C) Sudden Unexpected Postnatal Collapse
   D) Sudden Unplanned Postpartum Care
2. The frequency of SUPC ranges from:
   A) 1.5 – 3/100,000 live births
   B) 2.6 – 133/100,000 live births
   C) 3.5-500/100,000 live births
3. Since 1985, the frequency of SUPC has:
   A) Remained the same
   B) Increased because breastfeeding has increased
   C) Decreased because skin-to-skin contact has increased
4. SUPC can occur in:
   A) Healthy term newborns
   B) Premature newborns
   C) Newborns with identified risk factors
   D) All newborns
5. The criteria for a diagnosis of SUPC are:
   A) Healthy newborn greater than 37 weeks gestation with 5 minute Apgar of 8 or more suffering cardiorespiratory collapse
   B) Healthy newborn greater than 38 weeks gestation with 1 minute APGAR of 7 or more suffering cardiorespiratory collapse
   C) Healthy newborn greater than 37 weeks gestation with 1 minute APGAR of 8 or more suffering cardiorespiratory collapse

6. The **majority** of SUPC surviving newborns have shown:
   A) No neurological abnormality
   B) Neurological abnormality
   C) Death
7. The period of greatest risk for SUPC in a healthy newborn is:
   A) First breastfeeding attempt
   B) First two hours after birth
   C) Within 24 hours after birth
   D) During the postpartum period
8. Two-thirds of fatal SUPC cases are due to positional asphyxia.
   A) True
   B) False
9. Fifty percent (50%) of newborns with SUPC die.
   A) True
   B) False
10. The **major** risk factor for SUPC is:
   A) Mother falls asleep holding newborn
   B) Mother is multiparous
   C) Mother and newborn are intermittently observed
   D) Mother is obese or severely obese
11. All newborns should be placed _____ for skin-to-skin contact
   A) Prone on chest in sniffing position
   B) Side-lying on chest
   C) Supine on chest
   D) Prone on chest in sniffing position with nose and mouth uncovered

12. What is the best position of the mother to provide skin-to-skin contact?
    A) Mother is sitting up-right (fully inclined)
    B) Mother is semi-reclined
    C) Mother is flat in bed and supine (fully reclined)
    D) Mother is flat in bed with legs up (lithotomy)
    E) Mother is lying sideways next to newborn
13. During any holding of the newborn, the newborn's face may become embedded in the holder's body or clothes.
    A) True
    B) False
14. During SSC and any holding, the newborn should be pink in the position.
    A) True
    B) False
15. The best position for the newborn's head and neck is:
    A) Head down, neck turned to side
    B) Head turned to side, neck flexed
    C) Head turned to side and neck in sniffing position
    D) Head up looking at caregiver, neck extended
16. The newborn's shoulder should be at an angle towards the mother's face
    A) True
    B) False
17. The newborn's legs should be _____ during SSC.
    A) Straight
    B) Flexed, abducted
    C) Swaddled tightly

18. Newborns and mothers should be checked for safe positioning:
    A) Every 15 minutes for the first two hours post-birth
    B) Every 30 minutes for the first two hours post-birth
    C) Continuously throughout the first two hours post birth
19. The **best** intervention to minimize the risk of SUPC is:
    A) Educate mothers and holders of the newborn immediately after delivery about safe positioning
    B) Notify mothers and holders that cell phones increase risk of SUPC
    C) Monitoring newborn's position and condition
    D) Move newborn to crib when mother wants to or falls asleep
20. Which of the following is **NOT** a manifestation of SUPC:
    A) Newborn's skin is no longer pink
    B) Newborn's respirations are shallow or absent
    C) Newborn sneezes multiple times during holding
    D) Newborn's mouth and nose are occluded

Appendix C

Safe Positioning for Skin-to-Skin Contact

Check List

- ❑ Face can be seen
- ❑ Head is in "sniffing" position
- ❑ Nose and mouth are not covered
- ❑ Head is turned to one side
- ❑ Neck is straight, not bent
- ❑ Shoulders are flat against mom
- ❑ Chest-to-chest with mom
- ❑ Legs are flexed
- ❑ A little upright, not flat, on bed/chair
- ❑ Cover the back with blankets
- ❑ Both are watched when sleeping or
- ❑ Baby is being monitored

If no one can watch you and your baby after feedings and when sleep is likely, put your baby on his or her back on the baby's own firm bed.