

A DNP PROJECT

Promoting Safe Sleep Education For At Risk Mothers

A Project Presented to the Faculty of Keigwin School of Nursing

Jacksonville University

In partial fulfillment of the requirements

For the Degree of Doctor of Nursing Practice

by

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Date: April 21, 2022

Dedication

I am dedicating this DNP project to my dad, Carl R. Moore Jr. 08/18/1949 – 04/14/2020. He was one of my biggest cheerleaders and he always provided me with unwavering support and encouragement through this long journey. I only wish he could have been here to see me complete it.

Acknowledgements

First and foremost, I would like to thank my family for their unconditional love, support, patience, and understanding. I am grateful to my loving and supportive parents for always believing in me, even when I didn't believe in myself. I only wish my dad could have been here to see me finish. I know he is smiling down on me from heaven, beaming with pride. To my mom, my rock, she has picked me up countless times when I wanted to give up. Thank you for loving me through the tears, the long hours, and more importantly taking care of my girls when I couldn't. To my daughters, Kyleigh and Finley, I hope that I have shown you hard work pays off. I hope that through this journey with me you have learned to never give up, no matter what life throws your way. I love you girls to the moon, stars, and back. This project would not have been possible without my project chair, Dr. Christopher. I appreciate you supporting me through this long yet amazing journey. I hope you realize how much I appreciate your encouragement, patience, and support. I would also like to express my gratitude to the Magnolia Clinic for their guidance, support, and dedication to serving our community of at-risk mothers.

ABSTRACT

Sudden infant death syndrome (SIDS) is an unexplained scary phenomenon that has plagued parents for years until research determined there was a link between the infants sleeping position and sudden death. Local community leaders in health and advocacy review fetal and infant deaths on an annual basis to identify ways that infant mortality may be prevented. Barriers related to social determinants of health and lack of knowledge specific to safe sleep were identified root causes. Evidence-based recommendations for safe sleep set forth by the American Academy of Pediatrics have demonstrated effectiveness in reducing mortality. The purpose of the quality improvement project was to educate expecting mothers on the risk of SIDS. The project also evaluated barriers that exist and adherence to safe sleep guidelines. At risk mothers were provided with a self-reported pre-knowledge assessment survey to assess baseline safe sleep knowledge, including barriers that might prevent them from adhering to the recommendations. Weekly virtual educational meetings were held during a four-week period. The post-intervention knowledge assessment results demonstrated that mother had safe sleeping spaces for their infants; however, they did not always place their babies in these spaces for naps or bedtime. The implementation of the “safe sleep education” had a 100 % adherence rate per the post-surveys. All of the mother’s showed interest and willingness to follow the safe sleep guidelines. COVID limited face to face educational sessions which may have impacted participant engagement in all of the project interventions.

Keywords: *sudden infant death syndrome, safe sleep, SIDS, sudden unexplained infant death, barriers to safe sleep*

TABLE OF CONTENTS

List of Tables	9
List of Figures	10
PROBLEM DESCRIPTION.....	11
Nature & Significance of General Problem	11
Nature & Significance of Specific Local Problem	12
Problem Statement	13
Purpose Statement	14
AVAILABLE KNOWLEDGE	14
Overview of Search.....	14
Review Of Literature	1Error! Bookmark not defined.
Imapct of SIDS	1Error! Bookmark not defined.
Risk Factors	16
Breastfeeding and Safe Sleep.....	17
Safe Sleep Environment.....	19
Smoking Cessation.....	21
Barriers to Safe Sleep.....	23
Racial Disparities	25
Socioeconomic Status	27
Summary of Evidence.....	27
Syntesis of Evidence - Overall Strength and Quality	29
Recommendations for Change in Practice.....	30
Fit, Feasibility, and Appropriateness	31

Advanced Nursing Practice.....	32
Nursing Education	32
Nursing Leadership.....	33
Health Policy.....	34
RATIONALE: CONCEPTUAL AND IMPROVEMENT SCIENCE	35
Conceptual Framework Health Promotion Model.....	35
Quality Improvement Model: PDSA	36
SPECIFIC AIMS	39
Specific Aim 1 - Outcome: SUIDS.....	40
Specific Aim 2 - Process: Intervention Fidelity.....	40
Specific Aim 3 - Process: Patient Knowledge of Safe Sleep	41
Specific Aim 4 - Process: Barrier Reduction	41
Specific Aim 5 - Process: Adherence to Safe Sleep Practices.....	41
CONTEXT	41
Project Setting	41
Population and Plan for Recruitment	42
Analysis of Strengths and Opportunities	43
Impact on Clinic Workflow and Electronic Health Record.....	43
Support for Project.....	44
INTERVENTION DESCRIPTION	44
Description.....	44
Project Design Process.....	45

Project Timeline.....	46
Part One: Planning	46
Part Two: Implementation	47
Part Three: Evaluation	47
STUDY OF INTERVENTION AND MEASURES.....	47
Expert Validation of the Safe Sleep Education Pre- and Post- Assessment Tool.....	49
Data Collection	49
Pre- and Post- Safe Sleep Education Assessment.....	49
Process Measure Tracking	50
Valuation Measures	50
ANALYSIS.....	ERROR! BOOKMARK NOT DEFINED.1
Descriptive Statistics.....	Error! Bookmark not defined.1
Inferential Statistics	Error! Bookmark not defined.4
Qualitative Data Analysis	Error! Bookmark not defined.5
ETHICAL CONSIDERATIONS.....	5ERROR! BOOKMARK NOT DEFINED.
RESULTS	ERROR! BOOKMARK NOT DEFINED.7
Demographic Descriptive Statistics	Error! Bookmark not defined.7
Specific Aim Analysis	Error! Bookmark not defined.9
Specific Aim 1 - Outcome: SUIDS.....	Error! Bookmark not defined.9
Specific Aim 2 - Process: Intervention Fidelity.....	Error! Bookmark not defined.9
Specific Aims 2, 3, and 5	60
Specific Aim 4 - Process: Barrier Reduction.....	68

SUMMARY	68
INTERPRETATION.....	69
LIMITATIONS.....	70
CONCLUSIONS.....	70
Significance and Usefulness	70
Sustainability.....	71
Dissemination of Findings	71
LESSONS LEARNED.....	72
REFERENCES	73
APPENDIX A: POWER POINT PRESENTATION	78
APPENDIX B: PDSA CYCLE	83
APPENDIX C: CITI TRAINING CERTIFICATE	84
APPENDIX D: SAFE SLEEP PRE SURVEY ASSESSMENT TOOL.....	8ERROR!
	BOOKMARK NOT DEFINED.
APPENDIX E: SAFE SLEEP EDUCATION POST ASSESSMENT TOOL	93
APPENDIX F: EDUCATIONAL HANDOUTS PROVIDED	101
APPENDIX G: TOPICS FOR WEEKLY DISCUSSIONS	102
APPENDIX H: EXPERT PANEL VALIDATION RUBRIC FOR THE SAFE SLEEP EDUCATION ASSESSMENT TOOL (PRE AND POST)	103

LIST OF TABLES

Table 1: Demographic or Descriptive Variables	51
Table 2: Inferential Statistics and Variables	54
Table 3: Demographic Variables	58
Table 4: Summary Statistics Table for Interval and Ratio Variables	58
Table 5: Summary Statistics Table for Safe Sleep Practices Score	61
Table 6: Summary Statistics Table for What Safe Sleep Options Are in the Home	61
Table 7: Summary Statistics Table for Where Will Your Baby Sleep at Night	62
Table 8: Summary Statistics Table for Where Has Your Baby Been Sleeping for Naptime.....	62
Table 9: Summary Statistics Table for Stuffed Animals, Toys, Pillows, Quilts, Wedges, Positioners, Other Loose Bedding Or Bumper in the Baby's Sleeping Space	63
Table 10: Summary Statistics Table for Baby Ever Shared a Sleep Surface with a Sibling Parent or Pet	63
Table 11: Summary Statistics Table for Smoking Near Baby	64
Table 12: Summary Statistics Table for Pacifier Use	64
Table 13: Summary Statistics Table for Interval and Ratio Variables	66
Table 14: Summary Statistics Table for Pre- and Post-Safe Sleep Practices Scores.....	68

LIST OF FIGURES

Figure 1: Ranked values of the Pre- and Post-Safe Sleep Practices Scores.....	67
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Promoting Safe Sleep Education For At Risk Mothers

Approximately 3,500 infants die each year from sleep related deaths in the United States, which includes ill-defined deaths, sudden infant death syndrome (SIDS), and accidental strangulation and suffocation in bed. African American infants are two to three times more likely to succumb to SIDS than that of white non-Hispanic infants (*Center for Disease Control and Prevention, 2018; Safe to Sleep, 2019*). SIDS is the third leading cause of infant mortality. There was an initial decline in the amount of sleep related deaths in the 1990s when the “back to sleep” campaign was started, however, numbers have not decreased and have in fact are increasing over the last decade (*Center for Disease Control and Prevention, 2018*). There are many nonmodifiable and modifiable risk factors for deaths related to sleep and SIDS, which are immensely similar (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention, 2018*).

Problem Description

Nature & Significance of General Problem

SIDS is a subcategory of sudden unexpected infant death (SUID) and may also be referred to sudden unexpected death in infancy (SUDI). According to the American Academy of Pediatrics (2016), these terms are used to define any unexpected or sudden death that happens during the infancy period. In cases that have been reviewed after a sudden death, SUID might be related to trauma such as unintentional/accidental cases such as suffocation, infection, entrapment, metabolic diseases, asphyxia, ingestions, and arrhythmia-associated cardiac channelopathies. SIDS, which is under the umbrella of SUID, relates to a source of death of an infant (age birth to one year), has no explanation after a very in-depth investigation, including a post-mortem analysis, an investigation of the scene and review of the infant’s medical history.

There is however a distinction among SUID and SIDS, specifically the ones that occur while the infant is sleeping and is not actively being observed. Unintentional suffocation cannot be concluded with an autopsy alone therefore this must rely on a full investigation of the death (Brown et al., 2017).

Nature & Significance of Specific Local Problem

According to the Department of Health, in Duval County Florida there were 13,180 live births in 2017. For 2017 it was estimated that there would be 88 infant deaths, the actual number of infant deaths was 106. The expected infant mortality rate for 2017 was 6.68 while the actual rate was 8.04, resulting in a higher-than-expected death rate (Florida Department of Health, n.d.). In Duval County infants under the age of one-year statistics include 35 White, 64 African American, 6 other, and 1 unknown. For Hispanic origin there were 2 Mexicans, 7 Puerto Ricans, 1 Cuban, and 1 other/unknown (Florida Department of Health, n.d.).

Per the Florida Department of Health (2018), one in five, approximately 22% of mothers report not putting their infants on their back to sleep, which is endorsed by the safe sleep campaign. Two in five, approximately 39% of mothers acknowledge that they use soft bedding, which goes against recommendations when placing babies to sleep (Center for Disease Control and Prevention, 2018).

After the initial campaign introduction of “back to sleep” started in 1994 the rate of deaths dropped by 50%. In 2010 the U.S. SIDS rates had dropped to about 2,000 per year in comparison to 4,700 in 1993. While these rates have dropped, ill-defined causes and accidental suffocation deaths have risen (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention*, 2018).

According to The Northeast Florida Healthy Start Coalition (NEFHSC) (2019), in 2017 more than 250 infants were still births or died prior to their first birthday in Northeast Florida. Of those deaths, 28 were reviewed by the Northeast Florida Healthy Start Coalition's Fetal and Infant Mortality Review. The community leaders in health and advocacy review the fatalities and explore ways that infant mortality can be prevented. It is imperative to review the vast social determinants of health and life issues that are present in the lives of families locally. In 2019 the NEFHSC received grant funding to support the full review of all 143 infant deaths occurring in 2018. The review revealed that despite safe sleep educational campaigns (focused on infants sleeping alone on their back, in a bassinet, crib, or pack-n-play), parents continued at an astonishing 70% to bedshare and position their babies in unsafe positions (not on their back), or unsafe places (e.g., chair, couch, adult bed, or with unsafe bedding and stuffed animals) (Safe to Sleep, 2019). Because of these numbers, the specific problem addressed by this quality improvement project is the need for additional parent education, needs assessments to understand barriers and facilitators of safe sleep, and follow-up during the post-partum period to reinforce safe sleep practices.

Problem Statement

Sudden infant death syndrome (SUIDS) rates continue to rise nationally, specifically in Duval County Florida. Despite the evidenced-based research, community outreach programs, use of social media, and education, the rates of infant mortality are still on the rise (Brown et al., 2017). These deaths are completely preventable, and the United States rates are higher than most other developed nations (American Academy of Pediatrics, 2016).

Purpose Statement

The purpose of this project was to educate expecting mothers on the risk of SIDS. The project also evaluated what barriers may exist for these families and why they do not follow the safe sleep guidelines. According to the Florida Department of Health 2019, Duval County Florida, there is a higher number of infant deaths than what is expected each year. For example, the average expected number of infant deaths in Florida each year is 5. In Duval County, the number of actual deaths each year related to SUIDS is 8 (Florida Department of Health, n.d.). The practice site opened a facility in the Arlington area of Duval County in January 2019. Partnering with the practice site may help educate at risk families and expecting mothers to reduce the incidence of SIDS in this community by providing consistent education on safe sleep practices and encouraging mothers to breastfeed their infant for a minimum of six months.

Available Knowledge

The PICOT question for the search of available knowledge is as follows: (P) For pregnant women in their second or third trimester, (I) does the use of an evidence-based safe sleep program as compared to (C) standard prenatal education reduce the (O) risk of infant mortality related to sleep during the newborn period? The use of a well-defined PICOT question as a guide will assist in finding high quality evidence (Melnyk & Fineout-Overholt, 2015). For the DNP project, the population of interest are women who are at risk in Duval County and infants < 1 year of age receiving prenatal care at a community clinic in the urban core of Jacksonville.

Overview of Search

After the clinical problem was identified, the next step was to review and critically appraise the literature that is significant to the clinical problem at hand. Throughout this research many electronic databases were used to gather information and materials. Those databases and

websites include Google Scholar, ProQuest, Cumulative Index to Nursing and Allied Health Literature (CINAHL), ScienceDirect (Elsevier), direct websites such as the Center for Disease Control (CDC), Florida Department of Health, Healthy Start, and the American Academy of Pediatrics (AAP). The keywords included: *infant mortality, safe sleep, breastfeeding and safe sleep, smoking and infant death, barriers to safe sleep, infant death, sudden infant death syndrome, SIDS, evidence based safe sleep.*

The decision was made to not apply any year restrictions based on the original publications that came about with the Safe Sleep Campaign guidelines, as those were written in the 1990s. Phase one search limiters were used, which included systematic review, peer-reviewed, English language, full text articles, and journal entries, allowing for robust evidence. The majority of studies selected for use in this integrative review were systematic reviews. The main topics and overarching themes to be reviewed had already been established. The main topics included the etiology of SIDS, risk factors of SIDS, racial disparities, breast feeding, safe sleeping guidelines, and prevention of SIDS. After abstract review, 31 were appraised and synthesized to derive evidence-based recommendations for a safe sleep quality improvement project intervention.

Review of Literature

Impact of SIDS

The purpose of this literature review was to evaluate the literature regarding safe sleep practices and education for expecting mothers and compliance with these recommended guidelines. The objectives of the review are to evaluate if safe sleep education prior to a mother delivering her infant would increase compliance with the recommended safe sleeping habits. The research of literature will also look for common barriers that may exist with following these

guidelines. It will also assist in providing appropriate education for mothers of any population, but specifically at-risk mothers.

Risk Factors

The etiology of SIDS remains unidentified. There are no definitive autopsy findings however there are common findings of pulmonary congestion, petechial hemorrhages, pulmonary edema, and tissue markers of asphyxia which have been noted in approximately half of the SIDS cases. Epidemiological risk factors are often the focus of SIDS deaths. These risks are often referred to as the chances that an outcome will happen given the presence of certain factors or sets of factors (American Academy of Pediatrics, 2016). Unfortunately, there are no preexisting conditions or individual risk factors that are believed to result in SIDS (Center for Disease Control and Prevention, 2018).

SIDS is thought to be a multifactorial disorder in which genetic and environmental factors interact (Sauber-Schatz et al., 2015). Throughout the 1980s prone sleep was documented as one of the leading risk factors for SIDS. This knowledge is what led to the 1990s back to sleep campaign, which over the years has had an effective impact on reducing the rate of SIDS. While this helped reduce crib deaths, there have been increasing rates of strangulation and accidental suffocation. More recent data suggests that SIDS is multifactorial (Brown et al., 2017). While the exact cause of SIDS is still unknown, there are strong links to maternal characteristics, lifestyle, and behaviors that have a role in the occurrence. There are higher incidences in mothers who have lower education, income, are younger, African American, bedsharing and especially mothers who smoke cigarettes. Additionally, inadequate prenatal care, cultural beliefs, and maternal grandmother advice are included in potential risk factors (Hwang & Corwin, 2017). While the exact cause of SIDS is still unknown, there are strong links to

maternal characteristics, lifestyle, and behaviors that have a role in the occurrence. There are higher incidences in mothers who have lower education, income, are younger, African American, bedsharing and especially mothers who smoke cigarettes. Additionally, inadequate prenatal care, cultural beliefs, and maternal grandmother advice are included in potential risk factors (Hwang & Corwin, 2017).

Breastfeeding and Safe Sleep

Breastfeeding has many emotional and physical benefits for both the infant as well as the mother. Breastfeeding has also been speculated to have protective qualities for infants to prevent morbidity and mortality by lowering the risk for hospitalization within the first year of life, through the development of chronic health conditions, and as well as SUID by at least 50% (American Academy of Pediatrics, 2016; Leruth, Goodman, Bragg, & Gray, 2017). There have been physiologic sleep studies which have shown that infants who are breastfed have a lower arousal threshold compared to infants who are strictly formula fed (Hauck et al., 2011).

Breastfeeding improves overall health outcomes, obesity, and can reduce healthcare costs across one's lifespan. The decision to breast feed is made based on social and cognitive factors, which includes attitudes in relation to potential embarrassment, time commitment, self-efficacy, and social support. Often these decisions are made early in a pregnancy (Center for Disease Control and Prevention, 2018; Risica & McCausland, 2017). Breast milk provides the nutrients to an infant based on age and feeding habits. Breast milk is easier to digest and scientifically known to provide optimal immunological, nutritional, and emotional nurturing for the growth and development of infants and children (American Academy of Pediatrics, 2016; *Safe Sleep*, 2019; *Safe to Sleep*, 2019)

In the United States, by choosing to breast feed, which is the healthy choice for your baby, it leads to saving millions of dollars for the health system as well as decreased sick visits to the pediatrician and subsequent hospitalizations (American Academy of Pediatrics, 2016; Leruth et al., 2017). The American Academy of Pediatrics, U.S. Department of Health and Human Services, American College of Obstetricians and Gynecologists, and the U.S. Centers for Disease Control and Prevention all recommend exclusive breastfeeding for the first six months of life and continuing breastfeeding through the first year and beyond (Northeast Florida Healthy Start Coalition, 2019).

There seems to be a rise in the exclusivity of breastfeeding among African American women and women of color, yet these mothers are still co-sleeping with their infants, which puts infants at risk for SIDS (Salm Ward, Kanu, & Anderson, 2018). There continues to be disparities among African American women and women with lower income when it comes to understanding the benefits of breast feeding. In the U.S. 83% of White women breastfed in 2012 whereas only 66% of African American women did. Mothers with lower education and income levels were not as likely to breastfeed (Leruth et al., 2017). Mothers are encouraged to nurse their infant in a rocking chair to help prevent falling asleep while nursing (American Academy of Pediatrics, 2016).

According to Hauck et al. (2011), a meta-analysis was performed on 18 case control studies where breastfeeding was provided to infants. This study revealed that any amount of breastfeeding for any duration is protective against SIDS. It is more beneficial if the infant is exclusively breastfed. Breastfeeding itself is protective, but there are other protective factors that are shown to be beneficial such as socioeconomic status and absence of smoking or smoke exposure. The meta-analysis also shows that exclusive breastfeeding for at least 4-6 months is

best, but the highest benefit is breastfeeding up to one year of age. These recommendations are also in line with the American Academy of Pediatrics. Breastfed infants tend to be more easily arousable from sleep at the age of 2-3 months more so than formula fed infants. The peak age when SIDS occurs is between 2-4 months. Breastfeeding also grants immunologic advantages by delivering cytokines and immunoglobulins that protect infants during the time when they are most vulnerable to SIDS. This is generally when the infants maternal acquired levels of immunoglobulin G level are decreasing, and their own production is starting. Interestingly, during this meta-analysis it was noted that infants who died often had minor illnesses just days prior to death. The infections potentially induce proinflammatory cytokines which can lead to respiratory distress, fever, hypoglycemia, shock, and cardiac dysfunction. The caveat to breastfeeding is that the infant must not bed-share with the mother/parents. Breast feeding mothers need to have a location such as a chair or rocker to breast feed. This will allow them not to be so comfortable that they accidentally fall asleep. Placing the infant back to sleep in their own crib is imperative for safe sleep.

Safe Sleep Environment

When teaching parents about safe sleep, the provider must be very detailed. The infant must sleep in their own area next to where the parents sleep. A hard-flat surface such as a mattress that is in a safety approved crib with a sheet that is fitted is recommended (American Academy of Pediatrics, 2016; Center for Disease Control and Prevention, 2018). The device in which an infant sleep should meet the safety standard set forth by the Consumer Product Safety Commission, which consist of spacing less than 2 3/8 inches for slats. Cribs should have all hardware and parents need to check for recalls before using (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention*, 2018; *Safe to Sleep*, 2019). An infant should

never sleep in a grown person's bed, chair alone, or couch by themselves or with anyone. There should be no smoking near or around the infant. The crib should not have any pillows, blankets, crib bumpers, or sheepskins in it. All toys, objects that are soft, and bedding that is loose should be removed from sleep area of the infant. Nothing should ever cover the infants face or head. The infant must sleep in appropriate clothing such as a onesie or footed sleeper. No loose blankets or over bundling should be done when the infant is placed in the bed for sleep. The infant should always be laid down on their back to sleep for naps and at bedtime (American Academy of Pediatrics, 2016; Center for Disease Control and Prevention, 2018; Safe to Sleep, 2019).

There are also additional suggestions to help decrease the risk of SIDS which consist of giving the infant a pacifier during naps and bedtime. The infant should not get too hot during naps or bedtime. Breastfeeding is also strongly encouraged to help reduce the risk of SIDS. The infant should be allowed tummy time while awake when someone is supervising. Parents need to follow the recommendations and guidance from the health care provider on vaccines and regular health checkups as well (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention*, 2018; *Safe to Sleep*, 2019)

Data was analyzed from the Chicago Infant Mortality Study to explore risk factors for SIDS. An interview was conducted with the primary caregiver in the home two weeks after the infant died. The questions consisted of sleep habits, stressors, and ease of access to health care. The use of pacifiers reduced the risk of SIDS by approximately 70%. The decrease was more prevalent when the mothers were over 20 years of age, nonsmokers, married, breastfed, and had sufficient prenatal care. There was some protection against SIDS when the infant was in unsafe sleeping positions according to this study (Moon et al., 2012). An infant should be laid down on

their back for every sleep. Side sleeping, and stomach sleeping are not safe. While laying supine (wholly on their backs), infants are not at an increase for choking, reflux, or aspiration, as their anatomy has mechanisms which prevent aspiration (American Academy of Pediatrics, 2016).

Death scene investigations (DSIs) are needed to fully understand and identify what risk factors were involved in SIDS. When an infant passes away due to occult trauma, suffocation, or hypothermia, it may be undeterminable postmortem. If an infant is overwrapped or even over clothed and becomes hyperthermic, this can be an increased risk factor for SIDS. If the infant is sweating secondary to overheating, this limits the air flow through the material and might result in suffocation due to compression against the infants' mouth and nose. DSIs are also helpful to determine if the infant was co-sleeping, what position they were in, what type of surface the infant was on, if there was anything in the crib with the infant, if the mother was intoxicated either by illegal drugs or alcohol, and if the mother smoked prior to laying the infant down (Bennett et al., 2019).

Smoking Cessation

Smoking one cigarette a day while being pregnant can double the chances of an unexpected death for an infant. The CDC states the risk of death increases by .07 for every extra cigarette smoked, including up to 20 a day which is consistent of one pack of cigarettes. If a mother smokes one pack per day, the infant's risk of unexpected sudden death has tripled compared to non-smokers (*Center for Disease Control and Prevention, 2018*). In a mother that is a heavy smoker, cutting back has been found to be somewhat favorable. Women who reduced their cigarette consumption by their third trimester saw a 12% decrease in sudden death risk, and if they were able to quit entirely by the third trimester led to a 23% reduction risk (*Safe to Sleep, 2019*).

Not only are there risks for SUID with maternal smoking, but children are also at risk for higher rates of colic, asthma, and childhood obesity. Secondhand smoke is also equally dangerous to the unborn fetus, thus escalating the risk of low birth weight up to 20% (American Academy of Pediatrics, 2016; Center for Disease Control and Prevention, 2018). Although there have been significant decreases in smoking rates in the U.S., a self-reporting statistic shows that approximately 338,000 women still smoke during pregnancy (American Academy of Pediatrics, 2016).

According to Zhang and Wang (2013), a meta-analysis was performed to examine the accumulated connection between the risk of SIDS with pre and postnatal maternal smoking. Several definitions for maternal smoking were evaluated which included postnatal maternal smoking, prenatal maternal smoking, heavy cigarette smoking greater than 10 per day, and co-sleeping with mothers who smoked. There was a 95% confidence interval between maternal smoking and increased risk for SIDS. This meta-analysis showed that both prenatal and postnatal smoking correlated with a significant increased risk of SIDS. Based on stratified analyses despite prenatal or postnatal smoking, heavy cigarette smoking drastically increased the risk of SIDS and considerably raised the risk of SIDS and was associated with co-sleeping. Prenatal smoking has been linked to causing morphological placental changes which may lead to chronic fetal hypoxic stress and abnormal brain and lung development. Nicotine is a robust stimulant of cholinergic neurons, and it has been suggested to act upon nicotinic acetylcholine receptors peripherally and or centrally. When infants are exposed to cigarette smoke it can trigger intrinsic responses in the infant's vulnerable neurotransmitter system. Maternal smoking is the largest contributor to cotinine levels in infants.

Sawnani et al. (2004) conducted a study to measure respiratory and arousal patterns during sleep among infants. There were two groups, one of nonsmoking mothers and the other had a history of maternal smoking of at least 10 cigarettes each day. The study was performed during the hours of 8pm and 6am. There were 16 infants in the maternal smoking group, which ranged from 10 to 40 cigarettes smoked per day. Exposure prenatally to cigarette smoke had a significant increase in their apnea index. This was even higher in infants who were premature. These infants have an increase in respiratory events including obstructive apnea. When looking at the total arousal index, preterm infants had a significant decrease in arousal during these apneic events. A protective mechanism in hypoxic and apneic episodes is arousal, which is suspected to play a key role in SIDS. It is still unknown as to the exact mechanism in arousal patterns and alterations in respiratory function in smoking mothers (Sawnani et al., 2004)

Barriers to Safe Sleep

A study by Varghese et al. (2015) included a sample of 121 participants consisting of parents, grandparents, adult caregivers of newborns. A self-administered questionnaire was given to these caregivers. Approximately 22% of caregivers disagree with safe sleep practices or place a child on their back for sleeping. With regards to using a pacifier for sleeping and decreasing the risk of SIDS, 53.4% disapproved of using a pacifier for sleep time. Those that did not agree felt it interfered with breastfeeding. Additionally, 60% of participants disagreed with the suggestion to not swaddle infants during sleep time (Herman, Adkins, & Moon, 2015). Breastfeeding was the most defined reason why mothers continued to co-sleep despite being educated on safe sleeping (Salm Ward, 2015).

Some parents and caregivers' attitudes about safe sleep are usually unaddressed, however more education needs to be given to male caregivers. They demonstrate some comprehension on

safe sleep practices; however, fathers are not practicing this fully. Often, they nap with the infants in unsafe settings, and co-sleep at night (Hirsch, Mullins, Miller, & Aitken, 2017). Another question that is asked, is do the requirements for safe sleep place barriers on certain groups? Families feel vulnerable when they must ask for help or require an intervention for safe sleep. This may make some people feel uneasy when asking for help from state officials for fear of “getting into trouble”. There are resources for free cribs to low-income communities, however, the question remains if parents will use these for safe sleeping surfaces. There are cultural differences and women of color co-sleep with their infants more often than white women do (Whiteside-Mansell et al., 2017).

Another reason mother’s chose to co-sleep was that it was considered comforting for the infant and mother. Mother’s also felt as if the infant slept better, and they received more hours of solid sleep. Co-sleeping was also thought to create a better bonding connection between the infant and mother (Salm Ward, 2015). There are also environmental reasons for co-sleeping which include protection, no crib, and for warmth. Parents who reported no crib cited financial reasons, another child was using it, or there was no space for a crib. Mothers also reported that they co-slept in response to crying. They felt they needed solid rest to care for their infants. Traditions and cultural reasons were also given as reasons why mothers co-slept with their infants (Hwang & Corwin, 2017; Salm Ward, 2015).

There are many families who have intergenerational relationships, and it is crucial to understand the influence a grandmother or other older female relative can have on sleep related practices. Aitken et al. (2016) conducted a prospective survey based on self-reported behaviors on safe sleep. The infants were 6 months or younger and care was provided by grandmothers. Failure to follow safe sleep guidelines were reported to be associated with well-known myths

like infants choking when laying in the supine position. There is also a perceived notion of discomfort when in the supine position. White grandmothers more often adhered to the guidelines while non-white grandmothers did not. Adherence did not differ by income or education in this study.

Racial Disparities

In Duval County Florida, the center of the region, has a persistently high infant mortality rate with 8 deaths per 1,000 live births. African American infants are dying at two times the rate of Caucasian infants. Black mothers are almost 2 ½ times more likely to experience the death of an infant than a white mother does. This has been a consistent number over the past five years. SUID accounted for 20% of infant deaths in this region (Northeast Florida Healthy Start Coalition, 2019). In an article by Herman et al. (2015), reasons for sleep decisions were based on the care givers perceptions of the infants emotional and physical comfort. They also believed the environment was effective, convenient, and safe while also meeting their own needs for rest.

Some parents believe that the infant is more comfortable on their stomach and with blankets in the parent's bed for sleep (Gaydos et al., 2015; Herman et al., 2015). In the African American and American Indian cultures, these parents felt that the infants were safer in their parents' beds. These mothers felt as though the motherly instinct knows where the infant is in the bed, and she will awaken before anything bad happens. Some of these mothers voiced concerns over the safety of cribs and that the infants could not be accurately monitored while in them (Herman et al., 2015).

African American mothers are more likely to bedshare, they place infants prone because of the perceived safety and comfort. African American mothers have voiced concerns of safety when infants are on their backs. They think that if the infant vomits during sleep on their back,

they will choke. Often this advice comes from the grandmother (Gaydos et al., 2015).

Approximately a third of African American infants will be sleeping in the prone position by 2-4 months, which has been noted to be the highest period of time for SIDS deaths. Some mothers claimed that breastfeeding was a reason they allowed their infants to bed share. Mothers also took comfort in knowing that their babies were right next to them. Many of the mothers were aware of the guidelines but misunderstood the reasoning behind them (Zundo et al., 2017).

According to Gaydos et.al (2014), focus groups were created in Albany, GA. In seven of those groups the participants were only African American. Providers and mothers were recruited to participate. In this study the average age of the mother was 22.5 years, and the average age of the infant was less than nine weeks. Of this sample less than half had any education beyond high school. In these groups it was found that many of the mothers were aware of SIDS and understood the recommendations for safe sleeping. Shockingly, all but three mothers in this study reported placing their babies on their stomachs to sleep. According to the providers that participated in this study, they agreed that the mothers were aware of the safe sleep guidelines and risks, but mostly did not comply due to cultural reasons. The mothers had three reasons for not complying which included safety in an event of choking, convenience, and the infant's quality of sleep. During these focus groups the mothers also admitted that they valued the advice of family members, specifically their own mother, as opposed to the advice of the clinician. When the clinicians were asked if they actively counseled their patients, the answer was no because they were ultimately going to do what they want anyway. Throughout this focus group it was determined that clinicians need to provide a more detailed explanation and rationale for the safe sleep recommendations.

In another study by Brown Speights et al., (2017), data was obtained on state level infant mortality reports (IMR) for US linked live birth infant death files from 1999 to 2013. Linear regression was conducted for each state. The outcome variable was then log-transformed value of rolling 3-year average IMR. This was estimated two ways, one was calculating the time point when the Black and White rolling average IMR slopes would overlap with 95% CI and the other was by calculating the time point when the black to white ratio would be equal to 1. There was substantial state level variation for black IMR in Arizona, Iowa, and Massachusetts as they were the top three ranked states that improved reducing the rates of SIDS. This study quantified the magnitude of racial disparities of the 64,876 infants that died between 1999 and 2013 in 35 states there were more black deaths than whites.

Socioeconomic Status

Socioeconomic status can include a variety of factors including occupation, education, income, social position, and social circumstances. A link between SIDS and socioeconomic status has been noted throughout the literature. The socioeconomic status of a family does not cause SIDS, but there is related to mortality through variables such as smoking, over swaddling the infant, low birth weight, and prone sleeping (Spencer & Logan, 2004). Maternal education combined with household income are associated with infants being placed prone. Mothers with less education, especially less than a high school education were twice as likely to place an infant on their stomach. Mothers with less education believe that their baby is more comfortable on their stomach, and they also sleep better (Zundo et al., 2017).

Summary of Evidence

There are decades of knowledge about safe sleep in the U.S. However, in the last 15 years the numbers of SUID's remain the leading cause of infant mortality (American Academy

of Pediatrics, 2016; Bennett et al., 2019; Brown Speights et al., 2017; *Center for Disease Control and Prevention*, 2018). The major identifying factors are attributed to unsafe sleeping environments and practices. Unfortunately, despite all the warnings and education, only a third of all infants and less than half of black infants are put back to sleep (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention*, 2018; Gaydos et al., 2015; Hwang & Corwin, 2017) In fact, most of the infants who died were noted to be co-sleeping with an adult in a shared space which includes a couch, chair, or bed (Aitken et al., 2016; American Academy of Pediatrics, 2016; Bennett et al., 2019; Brown et al., 2017; Brown Speights et al., 2017; *Center for Disease Control and Prevention*, 2018; *Safe Sleep*, 2019). There is not enough evidence that promote the use of products which claim to decrease the risk or prevent SIDS. These items are in bed sleepers, wedges, swaddles, and wraps (American Academy of Pediatrics, 2016). (American Academy of Pediatrics, 2016; Bennett et al., 2019; Brown Speights et al., 2017; *Center for Disease Control and Prevention*, 2018). The major identifying factors are attributed to unsafe sleeping environments and practices.

Sharing a bed with an infant even if exclusively breast feeding is discouraged. SIDS risk are greater when an infant shares a bed younger than the age of four months; bed sharing with a parent who is a currently smoking or if the mother smoked while pregnant; bed sharing with an adult who is not easily arousable due to sleepiness or use of medications that have sedating effects, or substances; co-sleeping with any adult who is not a parent or normal caregiver; co-sleeping on surfaces that are soft such as waterbeds, arm chairs, old mattresses, couches, and sofas; bed sharing with pillows, blankets or any soft bedding (American Academy of Pediatrics, 2016; Brown et al., 2017; *Center for Disease Control and Prevention*, 2018; Hirsch et al., 2017; *Safe Sleep*, 2019; Salm Ward & Balfour, 2016). In the National Infant Sleep Position study,

more infants were put to bed with bedding in their sleeping area, mostly by young mothers, with lower education levels, and they were non-white in ethnicity (Hwang & Corwin, 2017).

Anticipatory guidance is the goal to help prevent sleep related deaths. This education should be given to the caregivers prior to delivery, setting a goal of delivering a consistent message prenatally, during pregnancy, and postnatally (Brown et al., 2017). Providers need to speak to women at each OBGYN visit about the practice of safe sleep. Once a woman is pregnant, she should be educated at every prenatal visit about the practice of safe sleep for infants (American Academy of Pediatrics, 2016; Hwang & Corwin, 2017). Providers need to speak to women at each OBGYN visit about the practice of safe sleep. (American Academy of Pediatrics, 2016; Hwang & Corwin, 2017)

Synthesis of Evidence – Overall Strength and Quality

A total of 31 sources were included in the evidence appraisal, with the levels of evidence ranging from I to V using the John Hopkins Nursing EBP: Level of Evidence (Dang & Dearholt, 2018). Evidence reviewed included:

- two Level Is (Risica & McCausland, 2017; Sawnani et al., 2004)
- zero Level IIs
- 23 Level IIIs (Aitken et al., 2016; Bennett et al., 2019; Gaydos et al., 2015; Hauck et al., 2011; Herman et al., 2015; Hirsch et al., 2017; Hwang & Corwin, 2017; Khan et al., 2018; Leruth et al., 2017; Melnyk & Fineout-Overholt, 2015; Moon et al., 2016; Moon et al., 2017; Moon et al., 2012; Salm Ward, 2015; Salm Ward & Balfour, 2016; Salm Ward et al., 2018; Sauber-Schatz et al., 2015; Spencer & Logan, 2004; Varghese et al., 2015; Whiteside-Mansell et al., 2017; Zhang & Wang, 2013; Zundo et al., 2017)

- two Level IVs (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention*, 2018)
- four Level Vs (Brown et al., 2017; Brown Speights et al., 2017; *Safe Sleep*, 2019; *Safe to Sleep*, 2019)

There were two Level I studies appraised (systematic and/or meta-analyses). Both received a high-quality rating for sufficient strong design, sufficient sample size, consistent and generalizable results, with recommendations for practice gleaned from scientific evidence. Of the 23 Level III studies, 20 received high quality ratings and three received good quality as the review had lower sample sizes. All the Level IV and V studies were of good quality, demonstrating reasonably consistent results, sufficient sample size and definitive conclusions.

Recommendations for Change in Practice

Based on the appraisal and synthesis of available knowledge there was strong evidence that supports not adhering to the safe sleep guidelines can have a profoundly negative impact on infant's survival (American Academy of Pediatrics, 2016; Bennett et al., 2019; Brown et al., 2017; *Center for Disease Control and Prevention*, 2018; Khan et al., 2018). Creating and collecting demographic form at the start of this Doctor of Nursing Program (DNP) project was vital to collect data that can lead to future projects in this area. Based on the appraisal and synthesis of available knowledge, there was strong and compelling evidence to support the recommendation of back to sleep for all infants from birth to six months of age (Gaydos et al., 2015; Moon et al., 2017; *Safe Sleep*, 2019; Salm Ward & Balfour, 2016; Sauber-Schatz et al., 2015; Varghese et al., 2015; Zundo et al., 2017). These simple, yet effective sleep practices and tools provide much needed patient education for mothers and provide a family-centered approach to healthcare delivery. Therefore, use of these evidence-based practices, such as placing the

baby on their back for sleep, nothing in the crib/bassinette, encouraging breastfeeding, smoking cessation, offering a pacifier, and not bed sharing with their infant.

Fit, Feasibility, and Appropriateness of Recommendations for Translation into Practice

As noted by the American Academy of Pediatrics 2016, it was important to educate families in the urban area of Jacksonville, FL about safe sleep practices. Discussing safe sleep, following evidenced-based recommendations, adhering to the guidelines set up by the American Academy of Pediatrics and Safe to Sleep to help prevent the incidence of sudden infant death syndrome. Discussing and assessing barriers as to why these at-risk mothers are not adhering to safe sleep guidelines is essential when implementing evidenced-based education in this setting. Some of the barriers noted by the AAP (2016) are lack of education, lack of resources, and cultural barriers. The AAP (2016) recommends educating all families on the importance of safe sleep, this means anytime a provider encounters an expectant mother, safe sleep should be discussed.

The above recommendations were appropriate for this community as this urban area of Jacksonville, FL has one of the higher incidents of SUIDS in Duval County. Providing evidence-based education to the at-risk mothers and discussing barriers which may prevent them from adhering to the guidelines is imperative to reduce the SUIDS rates. The education was provided either at the Magnolia Clinic or via Zoom, depending on the current COVID-19 guidelines. The DNP student had flexibility which allowed for zoom meetings to assist the staff by educating the mothers with the recommendations and guidelines set forth by the AAP (2016) and Safe to Sleep (2019) on how to prevent SUIDS. The organizational culture and desire to incorporate the AAP (2016) and Safe to Sleep (2019) recommendations into practice are a good fit and supports the translation of evidence of education tools into practice to optimize adherence to safe sleep.

Thus, the DNP project recommendations for evidence-based education in this urban area were feasible and appropriate.

Advanced Nursing Practice

Advanced nursing practice can educate and ensure that parents are being taught about safe sleep from the very first prenatal visit. Caregivers should be advised to place infants on their back for every sleep. Removing any extra toys, soft bedding, pillows, and bumper pads must not be in the baby's sleep area. Bed sharing should not be done for any reason, and infant needs their own sleep space. Healthcare professionals should be asking on every visit how the baby is placed to sleep, where they sleep, and what challenges are preventing them from following the recommendations and trying to find solutions (Center for Disease Control and Prevention, 2018).

Nursing Education

It is imperative that nurses continue to educate not only mothers but the fathers of infants about the risks of sleep-related deaths. Staff in newborn nurseries should begin educating the parents immediately and throughout the hospital stay. If an infant is born prematurely and admitted to the NICU, SIDS risk reduction education and recommendations should begin when the infant is stable medically and during their entire hospital stay. Premature infants who spend time in the neonatal intensive care unit fare at a higher risk for SUID. Each staff member including physicians, nurses, practitioners, certified nursing assistants, or other health care provider should provide education on safe sleep for the infant. This education should continue with every visit up to one year of age. All hospitals should make sure that the policies are congruent with evidence based safe sleep guidelines. Additionally, all state regulated agencies that provide any type of childcare should have promote teaching on safe sleep and execute such

practices (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention*, 2018).

Using the media to expose the public about safe sleep is a great platform. Movies, magazines, television, newspapers, and web sites are useful outlets for education. Store displays, and manufacturer advertisements are good at influencing attitudes and beliefs. Public education should continue for infants which include people who provide childcare, parents, foster parents, grandparents, and babysitters. This education must consist of approaches for behavior changing modalities and overcoming barriers. The safe sleep campaign must have emphasis on African and American Indian as well as Alaskan Native populations. They are at greater risk of SIDS and other sleep related deaths (American Academy of Pediatrics, 2016). Nurses should also continue to use the safe sleep campaign to include strategies to encourage breast feeding while simultaneously decreasing bed sharing and educating mothers to stop smoking and tobacco exposure. Educating mothers should began before they become pregnant. (American Academy of Pediatrics, 2016). Nurses should also continue to use the safe sleep campaign to include strategies to encourage breast feeding while simultaneously decreasing bed sharing and educating mothers to stop smoking and tobacco exposure. Educating mothers should began before they become pregnant.

Nursing Leadership

As nursing leadership, it is vital to educated staff on the significance of safe sleep. Leadership must also encourage staff members to constantly teach families, caregivers, and facilities the recommendations of safe sleep, especially in the NICUs. These units should follow and execute SIDS risk reduction when the infant is medically stable and well before the anticipatory discharge date (American Academy of Pediatrics, 2016). Newborn nursery staff

should begin educating families at birth and through discharge. This includes nurses, doctors, and ancillary health care providers must go through mandatory education on safe sleep practices. The leadership teams must impress upon staff the significance of screening for barriers to safe sleep. Staff must also continually educate families and caregivers at every appointment about safe sleep (Sauber-Schatz, Sapperfield, & Shapiro-Mendoza, 2015).

Health Policy

It seems that local and state health departments are refining safe sleep practices in hospital settings and childcare settings by educating and training providers. The use of educating women through Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and other programs that help assist mothers and infants to deliver culturally appropriate messages regarding safe sleep for babies. They continue to monitor and evaluate safe sleep campaigns and programs (Center for Disease Control and Prevention, 2018). Policies in hospitals should be written as such that follow the most current evidence-based information on safe sleep. They should also follow the latest endorsement of the American Academy of Pediatrics for safe sleep (Safe to sleep, n.d.). It is necessary for all hospitals to remain vigilant and follow the updated safe sleep recommendations. State regulatory agencies must mandate childcare providers receive education on and implement safe sleep practices via written policies (American Academy of Pediatrics, 2016).

Rationale

Conceptual Framework Health Promotion Model

According to Nola Pender (2011), nursing theories utilize many different conceptual frameworks which are often used as a guide for nursing practice and care. These theories are crucial to nursing as they provide guidance and direction for research. The Health Promotion

model also known as HPM was created because Pender was certain that her patients' quality of life could be immensely enhanced by preventing problems before they happened which subsequently would save health care costs by promoting healthier lifestyles. The main purpose of the model is to help nurses in understanding the elements of health behaviors as a foundation for behavioral counseling to ensure and endorse healthy lifestyles. Three classifications from the HPM model are individual characteristics and prior experiences related to personal behavior and factors such as physiological, biological, and sociocultural. The second is behavior specific cognitions and affect such as perceived barriers to action, perceived benefits of action, activity related affect, perceived self-efficacy, situational influences, and personal influences from peers, family, and providers. Thirdly are immediate behavioral contingencies such as commitment to a plan of action and responding to immediate demands and preferences. Understanding and using the HBM will help new parents change their behaviors and lifestyle for creating a safe sleep environment for their infants.

When using the HBM it suggests that a person's health associated behavior depends on their insight of four areas. Those areas are the gravity of potential illness, an individual's predisposition to that illness, advantages of taking pre-emptive action, and what barriers may exist. Applying this to new parents and teaching them about safe sleep, assessing what barriers they may have for safe sleep, and educating them starting at conception will hopefully reduce sleep related deaths. There are six major concepts in HBM which include: perceived costs, perceived severity, perceived susceptibility, perceived benefits, motivation, and enabling or modifying factors. Additionally, HBM is based on theoretical propositions. People obligate in taking part in behaviors in which they are anticipating personal valued beliefs. What obstacles that can constrain commitment to change. Competence to change a certain behavior and increase

the potential obligation to action and performance of the behavior. Families, friends, and health care providers are resources of influence that can decrease or increase commitment to health. People can change affect, thoughts, personal influences, and situational influences to produce incentives for health promoting behaviors (Nursing theory, 2016).

Using evidence-based practice to evoke change using the HBM would be placing the infant on their back for sleep, which is the desired outcome. Other outcomes include placing the infant in their own bed with no blankets, pillows, toys; no bedsharing; using a pacifier when sleeping; refrain from cigarette smoking; and always providing supervised tummy time. Understanding behaviors, developing, and testing interventions, and promoting health are all benefits to using HBM. This model also allows healthcare professionals to create plans of action for not only SIDS education, but many other issues and or problems in the clinical setting.

Quality Improvement Model: PDSA

The DNP project followed one of the many quality improvement models, Plan-Do-Study-Act, which supports the idea of applying the knowledge learned at the clinic on safe sleep and preventing infant mortality. The Plan-Do-Study-Act (PDSA) method is a way change is tested after implementation. There are specific steps that guide the thinking process into a step-by-step process, evaluating the outcome, correcting/improving it, and then re-testing (Langley et al., 2009). The Plan-Do-Study-Act example is listed in Appendix B. (Langley et al., 2009).

The plan is a concise statement of what is going to be tested. During the plan phase, the implementation and improvement goals were prepared. The project had a speedy cycle with the implementation process lasting approximately three months. Before the implementation of the project, a meeting with the stakeholders was held. This coordinated group sessions with the DNP student. After approval from the Jacksonville University IRB, implementation of the intervention

was established. The DNP student was part of the group sessions with the clinic and mothers during their last trimester. The student assessed the knowledge of the expectant mothers and what they knew about SIDS. The mothers were provided with educational information on safe sleep practices. The expectant mothers were given the opportunity to sign the informed consent or verbally opt out of the project. The expectant mothers were apprised of the importance of the study to reduce the rate of SIDS in the community and help promote safe sleeping practices for these at-risk mothers and infants.

The DNP student informed the expecting mothers of the projects plan. After the consents were signed, the DNP student met with the expecting mothers via Microsoft Teams Meetings and assessed their knowledge base of safe sleep. Education was then given during the Microsoft Team meetings on safe sleep practices and how to prevent SIDS during these meetings. The mothers then had a follow up meeting at least 2 weeks postpartum to assess and answer a survey regarding how and where their infant was sleeping. This questionnaire (pre-and post-safe sleep education assessment tool) evaluated the mother's knowledge and practices of sleeping habits of their newborns. Safe sleep information was made available to them from the CDC and Healthy Start. The Microsoft Team meetings discussed these handouts.

A measurement or outcome is determined of what should be achieved and steps are created. Doing is setting the plan in motion after the plan is set. During the Do phase, the plan was carried out. During this phase, the DNP student met with the leaders at the Magnolia clinic, stakeholders, and other relevant personal. The clinic employees received the information that was passed out to the expectant mothers on safe sleep. The DNP student proceeded with the implementation plan. The DNP student coordinated educational sessions with the group sessions for the expectant mothers during their third trimester. These mothers then had a follow up

meeting two weeks post-partum to evaluate the sleeping habits of their newborn. The DNP student took this information and used the data collection tool to capture information.

The Study phase gathers the data that was analyzed and determine if the education was successful, and the mothers practiced safe sleep guidelines after they delivered. Information was transferred from the collection tool and verified as accurate. The Statistical Package for Social Sciences (SPSS) is what was used to assist the DNP student in answering the research question and performing data analysis. The test that was used on this quality improvement project question and objectives is the dependent samples *t*-test. This test was best suited to compare pre-knowledge and post-knowledge of expectant mothers who obtained an intervention. The education provided and responses pre- and post-education in response to the intervention and how it influenced safe sleep (the dependent variable) two weeks post-partum. The sample was compared to the pre knowledge assessment and determine if there was a significant difference between the quality improvement project on adhering to safe sleep guidelines. The data analysis plan was analyzed by using descriptive statistics, providing a variation of percent, frequency, mode, range, median, standard deviation and mean.

During the Act phase, the quality improvement project was evaluated to decide if changes need to be made in further education classes on safe sleep. The DNP project results were examined to determine the project's sustainability and assess if the education provided produced change. This also ascertained if change should be considered, further evaluated, if more implementation is necessary, or if the project should be restructured and/or repeated. The information that was collected was presented to the organization so that it can be used to increase at risk mother's education. The results of this study have the potential to provide lifesaving implications for these infants. Additionally, the Act determines if the implementation was

successful or not. If it was not successful what can be done in the next cycle differently. If it did work, is it set to be put into practice (Agency for Healthcare Research and Quality, 2015).

Specific Aims

The primary aim of this DNP quality improvement project was to prevent and reduce the risk of infant mortality, specifically during the first two weeks of life, for patients receiving care at a community clinic located in the urban core of Jacksonville (**Specific Aim 1**). The process that was used to achieve this primary aim was the implementation of an evidence-based and theoretically informed safe sleep program (**Specific Aim 2**). At risk families were educated using evidence-based approaches derived from the key stakeholder's prevention materials, and best practices as outlined by the American Academy of Pediatrics and Safe to Sleep organization on how to practice safe sleep. The above-named literature was essential and well supported in preventing SIDS. Further, the evidence-based safe sleep practice is recommended for all infants' birth to a year (American Academy of Pediatrics, 2016; *Center for Disease Control and Prevention*, 2018; *Safe Sleep*, 2019; *Safe to Sleep*, 2019).

Educating mothers on risk factors and the best safe sleep practices for infants is the key to reducing SUIDS rates (American Academy of Pediatrics, 2016). Thus, **Specific Aim 3** focused on improved knowledge of safe sleep practices by pregnant women who participated in the project. The mothers were given a pre-survey to assess the infants planned sleep space as well as the mother's knowledge about safe sleep. A post education survey was completed during the 2-week post-partum follow up to assess where and how the infant is being placed for sleeping. This was vital to help increase awareness for this preventable death.

Specific Aim 4 focused on barrier reduction through the safe sleep prevention education and program, such as cultural barriers, smoking, not breastfeeding, and lack of a safe sleep space

for the infant. Finally, **Specific Aim 5** sought to achieve improved adherence to safe sleep practices taught during the evidence-based education program.

Specific Aim 1 – Outcome: SUIDS

- Prevent infant mortality related to SUIDS during the first two weeks of life, for patients receiving care at a community clinic located in the urban core of Jacksonville as measured by the number of reported deaths of newborns for project participants.
 - Target goal is zero SUIDS for the project group.

Specific Aim 2 – Process: Intervention Fidelity

- Achieve 90% of participants completing the evidence-based and theoretically informed safe sleep program.
 - Reduce the number of mothers who do not adhere to the safe sleep protocols by providing evidence-based education as compared to a post survey at their two-week post-partum follow up
 - Meet weekly with the mothers to explore any barriers that participants may have in adhering to safe sleep practices and reinforce safe sleep recommendations and safe sleeping positions (Appendix G)
 - Describe types and characteristics of barriers mothers may have to adhering to the safe sleep guidelines (Appendix G)

Specific Aim 3 – Process: Patient Knowledge of Safe Sleep Practices

- Significant improvement of program participant knowledge of safe sleep practices from the baseline safe sleep pre-survey assessment tool as compared to the safe sleep education post assessment tool.

Specific Aim 4 – Process: Barrier Reduction

- Reduce perceptions of barriers to safe sleep practices from pre to post project using the safe sleep pre and post education assessment tool.

Specific Aim 5 – Adherence to Safe Sleep Practices

- Achieve a mean score of 95% adherence to safe sleep practices taught during the evidence-based education program as measured by the pre- and post-intervention by using the safe sleep pre-and post-safe sleep education assessment tool.

Context**Project Setting**

The purpose of this project was to educate expecting families on the risk of SIDS. In addition to evaluating what barriers existed for these families and why they do not follow the safe sleep guidelines. According to the Florida Department of Health 2019, Duval County Florida, there is a higher number of infant deaths than what is expected each year. The project was conducted at the Magnolia Project clinics. The Magnolia Project aims to improve the health and well-being of childbearing women and is federally funded through the Healthy Start Initiative. This project aligned with their strategic goal of reducing infant mortality rates for their clinic population.

The west Magnolia Project Clinic location has been operational for several years and is located in the downtown metropolitan area. The east clinic location opened in the Arlington area of Duval County in January 2019. Partnering with the Magnolia Project and clinics will help educate at risk families and expecting mothers of the safe sleep practices and guidelines set forth by the American Academy of Pediatrics (AAP) by providing education and evidence-based knowledge on safe sleep practices for a minimum of 12 weeks.

Population and Plan for Recruitment

The identified population that was asked to participate in this project were women who were in their third trimester who received prenatal and postnatal services at the Magnolia Clinic locations. The participants were an at-risk population as assessed by the Healthy Start Prenatal and Postnatal Risk Screening tools and corresponding social determinants of health. The participants were in a group setting and learned about post-partum care via a virtual meeting platform (Microsoft Teams) due to COVID-19 policies at the clinic. The participants were invited to participate in a 30-minute educational lecture on safe sleep practices for their newborn babies and were asked to complete a pre-and post-safe sleep education assessment tool. Appendix G includes a list of topics that were discussed during the weekly meetings.

Inclusion Criteria for the Project

1. Already a patient at the practice site
2. Women in their third trimester
3. Receiving education and resources from the clinic
4. Any age (of childbearing years, but at least 18)
5. At risk population
6. Women who are able to participate in a lecture
7. Women who are able to perform teach back methods

Exclusion Criteria for the Project

1. Women who are not in their third trimester
2. Women who cannot complete the surveys
3. Must be age 18 or older

Analysis of Strengths and Opportunities

Analysis of strengths and opportunities that may influence success of the change in the healthcare setting. One of the clinic's strengths was the staff's willingness to educate these at-risk mothers about SIDS prevention and safe sleep. One challenge for the clinic was trying to change the culture of thinking for these mothers. The issue may be remedied if the staff mention safe sleep with every encounter they have with the mothers. Another weakness might be that the mothers get annoyed or frustrated with hearing the same information each time they have contact with the clinic. This can be remedied by just gently reminding the mothers that this is recommended by the American Academy of Pediatrics, and that there are many studies that show how preventable SIDS deaths are.

Impact on Clinic Workflow and Electronic Health Record

This project had minimal impact on the clinic's workflow. It only required the staff's assistance with recruitment of participants. There is no EMR system so there is no new build or any changes that would be made to a medical record system. This project was managed completely by the DNP student. Therefore, the project did not have any impact on the clinic's daily workflow.

Support for Project

The information given to the participants is provided by the Magnolia clinic and it is also easily obtained on the internet from Safe Sleep.org, which is at no cost to the mothers. This project was strongly supported by the Magnolia Project's director, Ms. Marsha Davis as well as other staff at the clinic. The content experts for the validation of the pre and post surveys are JU faculty. Dr. Lindsay Wolf and Dr. Amber Santos both felt that this was a meaningful project that was needed for these at-risk mothers. The DNP student used JU Qualtrics, which is a survey program for the pre and post surveys at no cost to the clinic or student (See Appendixes D& E).

There were no supplies needed. The DNP student created an educational power point presentation which is included as Appendix A. There were educational handouts which were provided by the clinic which are given out to the expectant mothers in Appendix F. There were no costs incurred during this project. There are also programs available to assist mothers who do not have a safe sleeping space for their infant which are at no cost to them.

Intervention

Description

The American Academy of Pediatrics has strongly recommended following safe sleep guidelines. The DNP student educated the at-risk mothers about the importance of safe sleep and the prevention of SIDS/SUIDS. The interventions were inexpensive compared to saving at least one baby's life. The information consists of safe sleeping practices for infants, where infants should sleep, what should be in the crib with them, and encouraging mothers not to co-sleep (*Center for Disease Control and Prevention, 2018*). The DNP Student presented a PowerPoint slide presentation that was created for this project (see Appendix A), along with the documents that were provided to the mothers from the Magnolia clinic (see Appendix F). The DNP student provided the mothers with a pre- and post-Safe Sleep Education Assessment Tool. The pre safe sleep education assessment tool assessed the mother's knowledge about safe sleep prior to the DNP student's weekly education sessions with them. Each week topics were discussed as outlined in Appendix G. These topics were tracked and notated in an Excel spreadsheet. At the conclusion of the 12-week period, the DNP student gathered all available information to statistically verify if this low-cost educational program has had an impact on the reduction of SIDS/SUIDS. (*Center for Disease Control and Prevention, 2018*). The DNP Student also presented a PowerPoint slide presentation that was created for this project see Appendix A.

Project Design Process

1. DNP student received a list of identified expecting mothers from the practice site
2. DNP student met with the expecting mothers via Microsoft Teams (or at the clinic), obtained consent, and then reviewed the pre-knowledge assessment.
3. DNP student administered the pre-knowledge assessment questionnaire obtaining baseline knowledge of the expectant mother.
4. DNP student provided a packet of safe sleep education and post knowledge questionnaire. The participant completed the questionnaire at the two week follow up.
5. DNP student provided 15-30 minutes of safe sleep education (CDC and Healthy Start)
6. DNP student contacted the mother to complete a post knowledge questionnaire at two weeks post-partum.
7. DNP student addressed concerns about safe sleep with mothers.
8. Data was analyzed. The pre-knowledge and post-knowledge results were obtained.
9. The surveys were compared and measured.

The strength of this approach allowed for the evaluation of the intervention at a clinic of at-risk mothers. The implementation of the intervention, which is safe sleep education pre- and post-knowledge questionnaires was performed by the same DNP student.

Project Timeline

The project began August 15th, 2020

Part One Planning (August 2020- May 2021)

- Met with important stakeholders in the organizations to verbally discuss intentions
- Reviewed papers from EBP I and II in preparation of project and compiling existing literature and identify gaps

- Completed and updated literature review and select framework to integrate
- Selected which educational materials to provide
- Developed project proposal to include project design, implementation, instruments, financial assessments
- Developed measurement tool/data collection spreadsheet, implementation process diagram, conceptual framework diagram
- IRB.net process
- Consulted Dr. Christopher regarding data analysis plan
- Wrote the proposed plan to provide to the organization/stakeholders
- Submitted DNP proposal to Dr. Christopher, faculty chair for review
- Once DNP project proposal was approved, secured JU IRB approval
- Once IRB approval was obtained, project implementation began

Part Two: Implementation (July 2021 to November 2021)

- Prepared a PowerPoint presentation for Magnolia Clinic staff and present to them prior to expectant mothers
- Performed the pre knowledge assessment
- Educated the third trimester expectant mothers
- Prepared folders for mothers with the safe sleep education handouts and resources
- Performed the post knowledge assessment

Part Three: Evaluation (November 2021 to December 2021)

- Evaluated findings and write them up
- The pre/post knowledge results from the questionnaire were evaluated
- Dr. Christopher provided analytical findings for statistical interpretation of data

- Prepared a PowerPoint presentation for the DNP final defense including the project data and findings for the organization's stakeholders
- Completed DNP portfolio
- Disseminated project finding to the Pediatric Journal
- Submitted DNP final project to the Jacksonville University Swisher Library Repository and the Sigma e-repository

Study of Intervention and Measures

To determine safe sleep knowledge and practices, a pre- and post-Safe Sleep Assessment Tool was completed by each participant (see Appendix D& E). The pre-assessment tool was a thirteen-question survey that asked the expecting mother where her infant will sleep, what will be in the crib when the infant sleeps, if anyone smokes in the home, will the baby be offered a pacifier, will the baby be breastfeed, and if the baby will share a sleeping space with anyone else. These surveys were sent out to three pediatric expert validators. Two, Dr. Lindsay Wolf and Dr. Amber Santos, reviewed and approved with explicit recommendations for enhancements. The pre-education assessment tool helped educators better measure the expecting mothers plans for sleeping arrangements for their newborn and alert them to any possible further educational needs. The post education assessment tool which is 20 questions and was a useful tool for the providers as it helps them see what information the mothers retained from the education provided during this project.

In **Specific Aim 1**, preventing infant mortality related to SUIDS during the first two weeks of life, for patients receiving care at a community clinic located in the urban core of Jacksonville the number of reported deaths of newborns for project participants were measured and tracked. The target goal is zero SUIDS. In **Specific Aim 2**, the goal is to achieve 90% of

participants completing the evidence-based and theoretically informed safe sleep program. This can be achieved by reducing the number of mothers who do not adhere to the safe sleep protocols by providing evidence-based education as compared to a post survey at their two-week post-partum follow up. Weekly meetings were held with the mothers to explore any barriers that participants may have in adhering to safe sleep practices and reinforce safe sleep recommendations and safe sleeping positions (Appendix G). Description of the types and characteristics of barriers mothers may have to adhering to the safe sleep guidelines were also measured (Appendix G). **Specific Aim 3** was achieved with significant improvement of program participant knowledge of safe sleep practices from the baseline safe sleep pre-survey assessment tool as compared to the safe sleep education post assessment tool. **Specific Aim 4** sought to reduce perceptions of barriers to safe sleep practices from pre to post project using the safe sleep pre and post education assessment tool. **Specific Aim 5** was achieved by participants scoring 95% adherence to safe sleep practices taught during the evidence-based education program as measured by the pre- and post-intervention by using the safe sleep pre-and post-safe sleep education assessment tool.

Expert Validation of the Safe Sleep Education Pre- and Post-Assessment Tools

Due to the lack of an available instrument to measure pre- and post-safe sleep education, tools were developed for this project. Prior to utilization of the assessment tools, each was reviewed and validated by two content experts using the Expert Panel Validation Rubric (see Appendix I). The rubric provides a method for content experts of a specified field to evaluate a designed instrument for face validity, construct validity, and content validity (Simon & White, 2016). Feedback included allow for other as an option to several questions as well as fill in the blanks. Another suggestion was to change “back to sleep” to placing your baby on their back for

sleep at night and naps. Simplifying room sharing vs bed sharing to does your baby sleep in your room but not in your bed. And lastly changing has your baby had the recommended vaccines to has your baby had the Hepatitis B vaccine (no score below meets expectations; comments). Modifications to the pre and post assessment tools were made to improve these aspects as suggested by the expert reviewers.

Data Collection

Pre- and Post-Safe Sleep Education Assessment

The pre- and post- education assessment tools were sent to the participant's email via a Qualtrics survey link. Qualtrics is a secure platform for data collection. If the participants could not access the survey link through a computer or cell phone, a paper copy was provided to them either at an upcoming prenatal visit or by their Healthy Start Case Manager if enrolled in that program. The pre-safe sleep education assessment tool was completed prior to the before the education session, whereas the post-safe sleep education assessment tool was completed approximately two weeks post-partum.

Process Measure Tracking

Appendix G contains topics for the weekly discussion during the group meetings. The DNP student discussed and reviewed weekly safe sleep practices; discussed and tracked any barriers that the mothers were having in regards to safe sleep; discussed and tracked the infant will have/or had a safe sleeping space; discussed smoking cessation; tracked if anyone is smoking; discussed the benefits of breast-feeding; tracked if any of the mothers are breast-feeding; discussed any cultural and or generational barriers; answered questions that emerged; provided resources that the Magnolia clinic has access to; tracked the number of participants

each session; and if safe sleep recommendations need to be reinforced. The DNP student collected this feedback from these questions and tracked using an excel spreadsheet weekly.

Valuation Measures

There are some associated costs that are paid for by the clinic which is a Zoom account and that costs approximately \$1200 per year. Qualtrics Core XM standard license is \$360 per year for surveys that do not exceed 30 questions per survey; however, as a student at Jacksonville University, there was no cost to the DNP student or clinic. The handouts can be printed from the internet and may include costs of \$200 per year for paper and ink. There was not any additional for the DNP student. The time the DNP student spent on the project is approximately five hours a week. There was very little cost to do this project, as the DNP student used resources that were already available and have no additional cost, therefore the economic impact was not significant.

Analysis Plan

Descriptive Statistics

All statistical analysis was conducted using both descriptive and inferential statistics using Intellectus (see Tables 1- 2). A demographic data collection sheet was used to collect the relevant background characteristics of the at-risk population. Nominal and ordinal level variables were interpreted using frequencies, mode, and percentages, and will include a) age, b) marital status, c) para, d) race, e) how many people live in your home, f) annual income, g) highest level of education, and h) geographic zip code (See Table 1). For the ratio variable, age, the following descriptive statistics were calculated: sum, frequency, mean, median, mode, standard deviation, variance, minimum, maximum, range, interquartile range, standard error of the mean, skewness, and kurtosis (see Table 1). The descriptive statistics examined demographic

data. This data was used exclusively to describe the population studied, and aggregated summary statistics were calculated. Any further analysis was conducted at the discretion of the DNP lead.

Table 1

Demographic or Descriptive Variables

Demographic Variable	Level of Measurement	Categories	Descriptive Statistical Procedures
Age	Ratio	16-45	Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E. Mean</i>), Skewness, and Kurtosis
Marital Status	Nominal	Single Married Divorced Widowed	Mode, percentage, and frequency
How many times have you been pregnant? (Gravida)	Interval		Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E. Mean</i>), Skewness, and Kurtosis
How many live births have you had? (Para)	Interval/Ratio		Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E. Mean</i>), Skewness, and Kurtosis
Race	Nominal	White Black Middle Eastern	Mode, percentage, and frequency

How many people live in your home?	Interval	North African Asian American Indigenous, Latinx Bi- or Multiracial	Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E. Mean</i>), Skewness, and Kurtosis
Annual Income	Ordinal	\$0 \$1-\$4,999 \$5,000 - \$14,999 \$15,000 - \$24,999 \$25,000 - \$39,999 \$40,000 - \$49,999 \$50,000 - \$74,999 \$75,000 - \$99,999 ≥\$100,000	Mode, percentage, and frequency
Highest Educational Level	Ordinal	< 9 th grade 9 th – 12 th grade (No Diploma) High school graduate, GED, or Alternative Some college or Associate Degree Bachelor Degree Graduate or Professional Degree	Mode, percentage, and frequency
Zip Code	Interval	Zip code	Mode, percentage, and frequency
Number of SUIDS (Specific Aim 1)	Ratio		Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E. Mean</i>), Skewness, and Kurtosis
Number of participants who	Ratio		Sum, Frequency, Mean, Median, Mode, Standard

complete the
EBP Safe Sleep
Program
(Specific Aim 2)

Number of Ratio
Weekly Sessions
(Specific Aim 2)

Number of Ratio
Participants who
attend each
Weekly Session
Held **(Specific
Aim 2)**

Number of Ratio
participants who
adhere to the
Safe Sleep
Protocols
**(Specific Aims 2
& 5)**

deviation, Variance,
Minimum, Maximum,
Range, Interquartile Range,
Standard Error of the Mean
(or *S.E. Mean*), Skewness,
and Kurtosis

Sum, Frequency, Mean,
Median, Mode, Standard
deviation, Variance,
Minimum, Maximum,
Range, Interquartile Range,
Standard Error of the Mean
(or *S.E. Mean*), Skewness,
and Kurtosis

Sum, Frequency, Mean,
Median, Mode, Standard
deviation, Variance,
Minimum, Maximum,
Range, Interquartile Range,
Standard Error of the Mean
(or *S.E. Mean*), Skewness,
and Kurtosis

Sum, Frequency, Mean,
Median, Mode, Standard
deviation, Variance,
Minimum, Maximum,
Range, Interquartile Range,
Standard Error of the Mean
(or *S.E. Mean*), Skewness,
and Kurtosis

Inferential Statistics

To evaluate the overall the inferential variables noted in Table 2, paired t-tests was utilized to determine if there is a statistically significant difference between pre- and post-patient knowledge of safe sleep practices, barriers to safe sleep practices, and adherence to safe sleep practices Scores for the percent correct pre and post were calculated to compare using a paired *t*-test.

Table 2*Inferential Statistics and Variables*

Study Variable (Dependent Variable)	Level of Measurement	Descriptive Statistical Procedures	Inferential Statistical Procedures
Participant Knowledge of Safe Sleep Practices (Specific Aim 3)	Interval	Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E.</i> <i>Mean</i>), Skewness, and Kurtosis	Paired t-test or Wilcoxon
Barriers to Safe Sleep Practices (Specific Aim 4)	Interval	Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E.</i> <i>Mean</i>), Skewness, and Kurtosis	Paired t-test or Wilcoxon
Adherence to Safe Sleep Practices (Specific Aim 5)	Interval	Sum, Frequency, Mean, Median, Mode, Standard deviation, Variance, Minimum, Maximum, Range, Interquartile Range, Standard Error of the Mean (or <i>S.E.</i> <i>Mean</i>), Skewness, and Kurtosis	Paired t-test or Wilcoxon

Qualitative Data Analysis

To evaluate Specific Aims 2 and 4, qualitative analysis was used. For the Specific Aim 2 intervention fidelity and Specific Aim 4 barrier reduction, participants were asked to describe types and characteristics of barriers they may have had adhering to the safe sleep guidelines via an open-ended item on the pre- and post-safe sleep education assessment tools. Participants were asked to explore any barriers during the weekly check-in sessions. Qualitative findings were explored and summarized using thematic analysis into categories, themes, and patterns in an aggregate fashion as to not identify individuals.

Ethical Considerations

The DNP project proposal was presented to the Jacksonville University Institutional Review Board (IRB) as a quality improvement project. The Magnolia Project and Northeast

Florida Healthy Start Coalition does not have an IRB and deferred review oversight to the JU IRB. A benefit risk ratio was also submitted at this time. Risk for this project was considered minimal risk as there are two potential risks to the project participants. Risks associated with online surveys can include a breach of privacy and confidentiality, which was minimized by following proper data management and security procedures. Benefits of this project include the potential for increased knowledge of safe sleep practices shown to reduce infant mortality risk. As a minimal risk QI project, the potential benefits to the project participants and society outweigh the risks of the educational intervention and assessment questionnaires.

The participants were expecting mothers at the practice site. For the first year the projected numbers of patients to be seen at this clinic are three hundred pregnant women, three hundred other women or children, and one hundred men. The sample size for a cohort of centering pregnancy prenatal women was expected to be between 10 to 15 participants. However, the actual number of participants were five women.

Ethically, the DNP student and faculty have completed the required CITI training (see Appendix C). The expecting mothers provided informed consent and received education in the third trimester following a pre-knowledge survey. At their two-week post-partum follow up, they received their second survey to assess the adherence to safe sleep guidelines.

No fully identifiable data was collected. The data was entered and stored in the secure database with a protected password and encrypted server via the project's JU OneDrive folder. The Health Insurance Portability and Accountability Act (HIPAA) privacy rule was strictly adhered to. HIPAA protects the participants privacy and health information, including data collected and electronic data. The data collected via the pre-and post-Safe Sleep Education Assessment tools are securely stored in Qualtrics. For analysis, the data was extracted via a

downloadable Excel file. This data was maintained according to the JU IRB standards and operating procedures. Any paper assessment tools were scanned and saved into the project's JU OneDrive folder. The paper assessment tools will then be shredded and destroyed.

The participants who volunteered to enroll into the project were provided with an explanation of the project and written consent. There was an opportunity to opt out of the project at the time of signing, or during the course of the project with no repercussions or changes to care from the clinic. The consent form explained the project's purpose, confidentiality, procedure, risk, withdrawal, risks, as well as the DNP student's and Chair's contact information. The DNP student was available for any concerns or questions that were raised. The informed consent (Appendix H) discussed the project's information, purpose, risks, and benefits. The consents were created using Adobe Suite that were emailed to the mothers and then returned to Mrs. Marsha Davis. The emails were kept secure. If the mother did not have access to internet or email, the case manager went by the expectant mother's home and have them sign a paper consent, which were securely kept at the clinic.

Results

The purpose of this DNP project was to implement an educational lecture, which included the cessation of smoking, encouraging breastfeeding, and practicing the safe sleep guidelines as set forth by the American Academy of Pediatrics (2016). As noted previously, only five mothers attended at least one meeting over the course of 12 weeks and completed the pre and post surveys. There were many weekly meetings that had zero attendees. The Magnolia Clinic attempted to reach out to the expectant mothers each week on the day prior to the meetings as a reminder to join. The demographic data showed that all women lived within the 32211-zip code.

Demographic Descriptive Statistics

All demographic variables were analyzed using descriptive statistics via Intellectus Statistics software (2019), SAS, or SPSS. Four participants completed both the pre and post pre- and post-Safe Sleep Assessment Tool surveys which evaluated patient knowledge of safe sleep practices, barriers to safe sleep practices, and adherence to safe sleep practices. One participant completed only the post-Safe Sleep Assessment Tool.

Three of the women were single and one was divorced. Three of the women indicated they were of Black race, and one indicated Latinx. Two of the women had graduated high school or GED/alternative program and two had between 9th and 12th grade education. One participant had an income ranging between \$1-\$4,999, two had incomes ranging from \$15,000-\$24,000, and one had an income between \$25,000-\$39,999. Frequencies and percentages are presented in Table 3.

Table 3

Demographic Variables

Variable	<i>n</i>	%
Marital Status		
Single	3	60.00
Divorced	1	20.00
Missing	1	20.00
Race		
Black	3	60.00
Latinx	1	20.00
Missing	1	20.00
Highest Educational Level		
9th-12th Grade (no diploma)	2	40.00
High School Graduate, GED, or Alternative	2	40.00
Missing	1	20.00
Annual Income		
\$1-\$4,999	1	20.00
\$15,000-\$24,999	2	40.00
\$25,000-\$39,999	1	20.00

Missing 1 20.00

Note. Due to rounding errors, percentages may not equal 100%.

The average age of the participants was 23.33 ($SD = 3.06$, $SE_M = 1.76$, Min = 20.00, Max = 26.00, Skewness = -0.38, Kurtosis = -1.50). The average number of pregnancies was 2.75 ($SD = 1.26$, $SE_M = 0.63$, Min = 1.00, Max = 4.00, Skewness = -0.65, Kurtosis = -0.90). On average the women reported three people living in their home ($SD = 2.06$, $SE_M = 1.03$, Min = 1.00, Max = 5.00, Skewness = -0.12, Kurtosis = -1.85). The summary statistics can be found in Table 4.

Table 4

Summary Statistics Table for Interval and Ratio Variables

Variable	M	SD	n	SE_M	Min	Max	Skewness	Kurtosis
Age in years	23.33	3.06	3	1.76	20.00	26.00	-0.38	-1.50
How many times pregnant	2.75	1.26	4	0.63	1.00	4.00	-0.65	-0.90
How many people live in home	3.25	2.06	4	1.03	1.00	5.00	-0.12	-1.85

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

Specific Aim Analysis

The primary aim of this DNP quality improvement project was to prevent and reduce the risk of infant mortality, specifically during the first two weeks of life, for patients receiving care at a community clinic located in the urban core of Jacksonville.

Specific Aim 1 – Outcome: SUIDS

Specific Aim 1 aimed to prevent infant mortality related to SUIDS during the first two weeks of life, for patients receiving care at the clinical site. The SUIDS outcome indicator was measured as the number of reported deaths of newborns for project participants. The target goal was zero SUIDS for the project group. The target was met. No SUIDS were reported by project participants during the project period.

Specific Aims 2 – Process: Intervention Fidelity

Specific Aim 2 had four process objectives aimed at evaluating intervention fidelity. For Objective 1, five participants completed all of the evidence-based and theoretically informed safe sleep program, which equates to 100% completion rate. The 90% target was therefore achieved.

Objective 3 focused on evaluating participation in the weekly meeting aimed at exploring and reducing any barriers that participants may have in adhering to safe sleep practices and to reinforce safe sleep recommendations and safe sleeping positions (Appendix G). All mothers participated in at least one session, and one participant attended two sessions. The objective of all mothers participating in all scheduled sessions was not met.

Objective 4 sought to describe types and characteristics of barriers mothers may have to adhering to the safe sleep guidelines (Appendix G) and to mitigate any barriers prior to delivery through education and community resources. Barriers identified prenatally included advice from other female family members (like grandmothers, aunts, sisters, and cousins), and not having a safe place for their baby to sleep. Another barrier mothers described was having their other babies sleep with them because they were fatigued. After delivery, advice from female family members continued to be a barrier, though mothers reported feeling educated in responding to the barrier. Other barriers included feeling so tired they resorted to sleeping with their baby or falling asleep while holding their baby.

Specific Aims 2, 3, and 5

Specific Aim 2, Objective 2 sought to reduce the number of mothers who did not adhere to the safe sleep protocols by providing evidence-based education as compared to a post survey at their two-week post-partum follow up as measured by the pre- and post-Safe Sleep Assessment Tool surveys. Specific Aim 3 evaluated whether significant improvement of program participant knowledge of safe sleep practices from the baseline safe sleep pre-survey assessment tool as compared to the safe sleep education post assessment tool. Specific Aim 5 aimed to achieve a mean score of 95% adherence to safe sleep practices taught during the

evidence-based education program as measured by the pre- and post-intervention by using the safe sleep pre-and post-safe sleep education assessment tool.

To evaluate Specific Aims Two, Three, and Five, a score was calculated for items that were included on both the pre and post surveys specific to safe sleep practices:

1. Safe sleep options in the home
2. Where the baby slept at night
3. Where the baby slept at naptime
4. Use of stuffed animals, toys, quilts, wedges, positioners, other loose bedding or bumper in the baby's sleeping space
5. Sharing baby's sleeping space with a sibling, parent, or pet
6. Mother smoking near baby or in the home
7. Other caregivers smoking near their baby or in the home
8. Breastfeeding
9. Use of a pacifier.

A correct answer was scored as a one and an incorrect answer (not indicative of safe sleep practices) received a score of zero for each of the nine items. Scores may range from zero to nine, with nine being the highest and indicative of adherence and knowledge of safe sleep practices. The observations for the pre safe sleep practices score had an average of 5.50 ($SD = 1.91$, $SE_M = 0.96$, $Min = 3.00$, $Max = 7.00$, $Skewness = -0.49$, $Kurtosis = -1.37$). The observations for post safe sleep practices score had an average of 7.60 ($SD = 1.14$, $SE_M = 0.51$, $Min = 6.00$, $Max = 9.00$, $Skewness = -0.27$, $Kurtosis = -1.04$). Scores improved from pre- to post-program, indicating that there was a reduction in nonadherence. Thus, Specific Aim 2, Objective 2 was met. The summary statistics can be found in Table 5.

Table 5

Summary Statistics Table for Safe Sleep Practices Score

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
PRE- Safe Sleep Practices Score	5.50	1.91	4	0.96	3.00	7.00	-0.49	-1.37
POST- Safe Sleep Practices Score	7.60	1.14	5	0.51	6.00	9.00	-0.27	-1.04

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

The observations for the pre-program item “What safe sleep options are in the home” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The observations for the post-program item “What safe sleep options are in the home” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The summary statistics can be found in Table 6.

Table 6

Summary Statistics Table for What Safe Sleep Options Are in The Home

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
PRE- What safe sleep options are in the home	1.00	0.00	3	0.00	1.00	1.00	-	-
POST- What safe sleep options are in the home	1.00	0.00	5	0.00	1.00	1.00	-	-

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

The observations for pre-program item “Where will your baby sleep at night” had an average of 0.50 ($SD = 0.58$, $SE_M = 0.29$, $Min = 0.00$, $Max = 1.00$, $Skewness = 0.00$, $Kurtosis = -2.00$). The observations for post-program item “Where has your baby been sleeping at night” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The summary statistics can be found in Table 7.

Table 7

Summary Statistics Table for Where Will Your Baby Sleep at Night

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
PRE- Where will your baby sleep at night	0.50	0.58	4	0.29	0.00	1.00	0.00	-2.00
POST- Where has your baby been sleeping at night	1.00	0.00	5	0.00	1.00	1.00	-	-

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

The observations for pre-program item “Where will your baby sleep for naptime” had an average of 0.75 ($SD = 0.50$, $SE_M = 0.25$, $Min = 0.00$, $Max = 1.00$, $Skewness = -1.15$, $Kurtosis = -0.67$). The observations for post-program item “Where has your baby been sleeping for naptime” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The summary statistics can be found in Table 8.

Table 8

Summary Statistics Table for Where Has Your Baby Been Sleeping for Naptime

Variable	M	SD	n	SE_M	Min	Max	Skewness	Kurtosis
PRE- Where will your baby sleep for naptime	0.75	0.50	4	0.25	0.00	1.00	-1.15	-0.67
POST- Where has your baby been sleeping for naptime	1.00	0.00	5	0.00	1.00	1.00	-	-

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

The observations for pre-program item “Will there be stuffed animals, toys, pillows, quilts, wedges, positioners, other loose bedding, or bumper in the baby s sleeping space” had an average of 0.25 ($SD = 0.50$, $SE_M = 0.25$, $Min = 0.00$, $Max = 1.00$, $Skewness = 1.15$, $Kurtosis = -0.67$). The observations for post-program item “Are there any stuffed animals, toys, pillows, quilts, wedges, positioners, other loose bedding, or bumper in the baby s sleeping space” had an average of 0.60 ($SD = 0.55$, $SE_M = 0.24$, $Min = 0.00$, $Max = 1.00$, $Skewness = -0.41$, $Kurtosis = -1.83$). The summary statistics can be found in Table 9.

Table 9

Summary Statistics Table for Stuffed Animals, Toys, Pillows, Quilts, Wedges, Positioners, Other Loose Bedding, Or Bumper in The Baby S Sleeping Space

Variable	M	SD	n	SE_M	Min	Max	Skewness	Kurtosis
PRE Q4 Will there be stuffed animals, toys, pillows, quilts, wedges, positioners, other loose bedding, or bumper in the baby s sleeping space	0.25	0.50	4	0.25	0.00	1.00	1.15	-0.67
POST Q4 Are there any stuffed animals, toys, pillows, quilts,	0.60	0.55	5	0.24	0.00	1.00	-0.41	-1.83

wedges, positioners, other loose bedding, or bumper in the baby's sleeping space

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

The observations for pre-program item “Will your baby ever share a sleeping space with a sibling parent or pet” had an average of 0.25 ($SD = 0.50$, $SE_M = 0.25$, $Min = 0.00$, $Max = 1.00$, $Skewness = 1.15$, $Kurtosis = -0.67$). The observations for post-program item “Has your baby ever share a sleeping space with a sibling parent or pet” had an average of 0.20 ($SD = 0.45$, $SE_M = 0.20$, $Min = 0.00$, $Max = 1.00$, $Skewness = 1.50$, $Kurtosis = 0.25$). The summary statistics can be found in Table 10.

Table 10

Summary Statistics Table for Baby Ever Shared a Sleep Surface with a Sibling Parent or Pet

Variable	M	SD	n	SE_M	Min	Max	Skewness	Kurtosis
PRE- Will your baby ever share a sleeping space with a sibling parent or pet	0.25	0.50	4	0.25	0.00	1.00	1.15	-0.67
POST- Has your baby ever shared a sleep surface with a sibling parent or pet	0.20	0.45	5	0.20	0.00	1.00	1.50	0.25

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

The observations for the pre-program item “Do you plan to smoke near your baby and in your home” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The observations for the post-program item “Are you smoking near your baby or in your home” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). When the skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013). The summary statistics can be found in Table 11.

Table 11

Summary Statistics Table for Smoking Near Baby

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
PRE- Do you plan to smoke near your baby and in your home	1.00	0.00	4	0.00	1.00	1.00	-	-
POST-Are you smoking near your baby or in your home	1.00	0.00	5	0.00	1.00	1.00	-	-

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

The observations for the pre-program item “Do you plan on using a pacifier” had an average of 0.75 ($SD = 0.50$, $SE_M = 0.25$, $Min = 0.00$, $Max = 1.00$, $Skewness = -1.15$, $Kurtosis = -0.67$). The observations for post-program item “Are you using a pacifier” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The summary statistics can be found in Table 12.

Table 12

Summary Statistics Table for Pacifier Use

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
PRE- Do you plan on using a pacifier	0.75	0.50	4	0.25	0.00	1.00	-1.15	-0.67
POST- Are you using a pacifier	1.00	0.00	5	0.00	1.00	1.00	-	-

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

There were eight additional post-program items used to evaluate adherence and knowledge of safe sleep practices. Summary statistics were calculated for each. Overall, the eight additional items support adherence to safe sleep practices. The observations for the post-program item “When you place your baby down for the night do you place them on their backs to sleep” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The observations for the post-program item “When you place your baby down for naps do you place them on their backs to sleep” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The observations for the post-program item “Are you using any positioners wedges or products that claim to reduce SUIDS” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, $Min = 1.00$, $Max = 1.00$, $Skewness = Undefined$, $Kurtosis = Undefined$). The observations for the post-program item “Does your baby sleep in your room but not in your bed” had an average of 1.00 ($SD = 0.00$, SE_M

= 0.00, Min = 1.00, Max = 1.00, Skewness = Undefined, Kurtosis = Undefined). The observations for the post-program item “Are you providing supervised tummy time” had an average of 0.80 ($SD = 0.45$, $SE_M = 0.20$, Min = 0.00, Max = 1.00, Skewness = -1.50, Kurtosis = 0.25). The observations for the post-program item “Are you swaddling or covering your baby up” had an average of 0.20 ($SD = 0.45$, $SE_M = 0.20$, Min = 0.00, Max = 1.00, Skewness = 1.50, Kurtosis = 0.25). The observations for the post-program item “Has your baby received the Hepatitis B vaccine” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, Min = 1.00, Max = 1.00, Skewness = Undefined, Kurtosis = Undefined). The observations for the post-program item “Is anyone else caring for your baby and if so are they placing them on their backs for sleep” had an average of 1.00 ($SD = 0.00$, $SE_M = 0.00$, Min = 1.00, Max = 1.00, Skewness = Undefined, Kurtosis = Undefined). The summary statistics can be found in Table 13.

Table 13

Summary Statistics Table for Interval and Ratio Variables

Variable	M	SD	n	SE_M	Min	Max	Skewness	Kurtosis
When you place your baby down for the night do you place them on their backs to sleep	1.00	0.00	5	0.00	1.00	1.00	-	-
When you place your baby down for naps do you place them on their backs to sleep	1.00	0.00	5	0.00	1.00	1.00	-	-
Are you using any positioners wedges or products that claim to reduce SUIDS	1.00	0.00	5	0.00	1.00	1.00	-	-
Does your baby sleep in your room but not in your bed	1.00	0.00	5	0.00	1.00	1.00	-	-
Are you providing supervised tummy time	0.80	0.45	5	0.20	0.00	1.00	-1.50	0.25
Are you swaddling or covering your baby up	0.20	0.45	5	0.20	0.00	1.00	1.50	0.25
Has your baby received the Hepatitis B vaccine	1.00	0.00	5	0.00	1.00	1.00	-	-
Is anyone else caring for your baby If so are they placing them on their backs for sleep	1.00	0.00	4	0.00	1.00	1.00	-	-

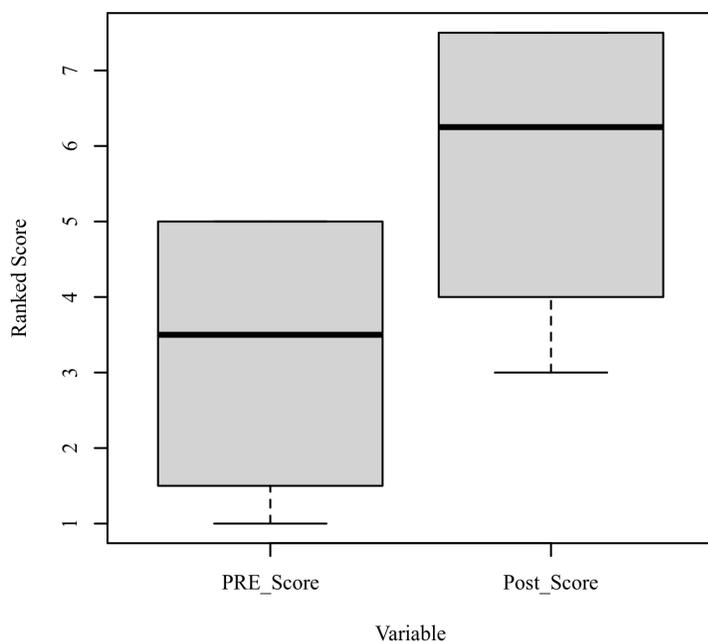
Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

A two-tailed Wilcoxon signed rank test was conducted to examine whether there was a significant difference between the participants' pre and post scores due to the small sample size.

The two-tailed Wilcoxon signed rank test is a non-parametric alternative to the paired samples t -test and does not share its distributional assumptions (Conover & Iman, 1981). The results of the two-tailed Wilcoxon signed rank test were not significant based on an alpha value of .05, $V = 1.50$, $z = -1.29$, $p = .197$. This indicates that the differences between the pre score ($Mdn = 6.00$) and the post score ($Mdn = 7.50$) are explainable by random variation. Figure 1 presents a boxplot of the ranked values of the pre and post scores.

Figure 1

Ranked values of the Pre- and Post-Safe Sleep Practices Scores



Specific Aim 3 aimed to measure whether there was significant improvement of program participant knowledge of safe sleep practices from the baseline safe to post program. The observations for pre-program score had an average of 5.50 ($Mdn=6.0$, $SD = 1.91$, $SEM = 0.96$, $Min = 3.00$, $Max = 7.00$, $Skewness = -0.49$, $Kurtosis = -1.37$). The observations for the post-program score had an average of 7.60 ($Mdn=7.5$, $SD = 1.14$, $SEM = 0.51$, $Min = 6.00$, $Max =$

9.00, Skewness = -0.27, Kurtosis = -1.04). Though scores increased from an average of 5.5 to 7.6, the results were not statistically significant indicating the objective was not met. However, the improvement in knowledge and use of safe sleep practices does have clinical significance.

The summary statistics can be found in Table 14.

Table 14

Summary Statistics Table for Pre- and Post-Safe Sleep Practices Scores

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
PRE-Program Score	5.50	1.91	4	0.96	3.00	7.00	-0.49	-1.37
Post-Program Score	7.60	1.14	5	0.51	6.00	9.00	-0.27	-1.04

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

Specific Aim 5 sought to achieve a mean score of 95% adherence to safe sleep practices taught during the evidence-based education program as measured by the pre- and post-intervention scores ranging from eight to nine indicating a 95% adherence level. Participant scores ranged from 6 to 9 post program with an average of 7.6 indicating that an 85% adherence level was achieved. Thus, Specific Aim 5 was not met, but does indicate improvement in knowledge and application of safe sleep practices from baseline.

Specific Aim 4 – Process: Barrier Reduction

Specific Aim 4 aimed to reduce perceptions of barriers to safe sleep practices from pre to post project using the safe sleep pre and post education assessment tool. Mothers reported similar barriers focused on the influence of the advice from other female family members both pre-and post-program. Thus, significant reductions in barriers were not statistically achieved for that element. However, none of the participants reported a barrier with having a safe sleeping space for their baby to sleep post program.

Summary

The participant enrollment in this QI project was negatively impacted due to lack of participation and COVID-19 restrictions. The goal of 10-15 participants was not achieved. The results demonstrated that mothers had safe sleeping spaces for their infants; however they did not always place their babies in these spaces for naps and / or bedtime. The implementation of the “safe sleep education” had a 100% adherence rate per the post-surveys. All of the mothers showed interest and willingness to follow the safe sleep guidelines.

Interpretation

It is unclear as to why there was a lack of participation. Whether it be the patient population, or the effects of COVID-19 related to lack of in person meetings, there were not many participants. The original design of this project was to be done at the clinic through weekly scheduled visits for centering pregnancy. However, due to the global COVID-19 pandemic, all in person meetings were changed to virtual meetings via Microsoft Teams. It was difficult to get the mothers to participate. The case worker attempted to recruit mothers who were assigned to the clinic and would even call them weekly the night prior to the meetings. The lack of participation could be related to social determinants of health due to lack of funds to afford minutes, access to WIFI, and access to a cellphone. For those that did attend, safe sleep education was provided weekly to mothers (Ahler-Schmidt, et.al 2021) .

One major barrier that was noted repeatedly was the cultural influences of the female matriarch, maternal grandmothers. In a study by Aitken et al. (2016), grandmothers were given surveys on safe sleep practices. The grandmothers who believed that babies would choke if they were put to sleep on their back were significantly less likely to follow recommendations set by the American Academy of Pediatrics. Additionally, grandmothers who believed that the babies

would sleep better and or were more comfortable on their stomachs also were less likely to follow the safe sleep guidelines. Based on the post knowledge survey scores for this DNP project it was noted that there was an improvement in adherence to safe sleep practices by 100%. There were no reported deaths during this time.

Limitations

The number of mothers who participated in the study was grossly underestimated at the beginning of the project. Due to COVID-19 restrictions, the meetings were virtual which may have led to lack of participation. Completing this project while dealing with a global pandemic proved to be very challenging. It was difficult to engage this population to participate, perhaps if an incentive was offered more participation would have been achieved.

A recent study during the COVID-19 pandemic showed that mothers with higher incomes were more likely to attend virtual safe sleep meetings versus mothers with lower socioeconomic status who were more likely to attend in person meetings. It was discussed that this was mainly due to the use of technology (Ahler-Schmidt, et.al 2021). The individuals' ability to use technology and the capacity to gain access and understand digital content is created by their cultural, social, and financial positions. This should be considered when creating education and health care, specifically in this community.

Conclusions

Significance and Usefulness

As noted before, SIDS is preventable and the third leading cause of infant deaths in the United States where approximately 3500 infants die annually from (AAP 2016). It is imperative that expectant mothers and family members understand the practice of safe sleep. Placing

infants on their backs, in a safe sleeping environment with nothing in the crib, can potentially save lives. Safe sleep education and practice should be discussed with not only at-risk mothers, but all expectant mothers during pregnancy. Implementing safe sleep education, is a wonderful way to achieve the goal of lowering infant deaths related to SIDS. Mothers play a significant role in the safety and wellbeing of their children.

Sustainability

This project had the potential to save infants lives simply by educating mothers on the practices of safe sleep. Educating mothers on the practices of safe sleep is recommended by the American Academy of Pediatrics using evidence-based practice (American Academy of Pediatrics, 2016). While the data at the conclusion of this project did not demonstrate improved safe sleep habits, it did bring about increased awareness. The education only took 10 to 15 minutes of the mother's time. It would be feasible for the case workers at the clinic to share this additional information with the expectant mothers.

In the future it would be beneficial to have the meetings in person. However, if the pandemic still restricts group class settings, then it would be important to provide the appropriate technology for these mothers. Perhaps discussing if they have access to Wi-Fi, if they have access to a cell phone, access to unlimited minutes or data prior to doing the education virtually. It is also important to know if they are comfortable navigating this type of technology.

Dissemination of Findings

The dissemination of the project outcomes was communicated with an oral presentation on the Jacksonville University campus. The presentation included the DNP project lead, project chair, faculty, staff, committee, project site providers, students, or community members who desired to attend. A written manuscript was submitted to an appropriate maternal/newborn

journal for publication. Before submitting the manuscript, a search was conducted to determine which journal was appropriate for the project findings and quality improvement methodology. The final DNP scholarly project paper was submitted to both the Sigma and JU Swisher Library repositories.

Lessons Learned

Trying to complete a quality improvement project during the middle of a global pandemic proved to be particularly challenging. The project initially set out to run over eight weeks, but the DNP lead extended it to 12 weeks in hopes to recruit additional mothers. Only five mothers completed the pre and post surveys. There were several lessons learned during this QI project. With only five mothers participating in this project, it would have been beneficial to have more mothers involved. Two of the mothers stated on their survey's that they were just so tired and sometimes fell asleep with the baby in the bed with them. We discussed the importance of placing the baby back in their safe sleeping environment, and how being so sleepy could potential be dangerous if they rolled over onto the baby. Hopefully, a project such as this can make the difference in at least one life, making it worth the effort. Incorporating comments into the post survey section allowed the mothers to explain why safe sleeping practices were not being followed without judgement.

It may be beneficial to apply for grant funding to provide phones or tablets to the mothers who participate ensuring they receive the appropriate safe sleep education. According to national data racial minorities specifically Latino and Black Americans lead the way in terms of using cellphones for accessing health information, social media sites, the internet, and managing or tracking with health apps. However, access to home broadband access and owning tablets leads

to making cell phones the only device for internet use for Black Americans compared to white Americans (Simon & White, 2016).

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Appendix A

Educational Power Point Presentation



GOAL

- The goal is to increase the awareness of SIDS in your community and the clinic by. We can do this by talking with others about the impact SIDS has on infants and what other ways we can reduce risks and modify behaviors.



OBJECTIVES



- Be able to define SIDS
- Understand the impact SIDS has on infants
- Discuss what other websites and resources you can obtain information about SIDS from
- Discuss how we can increase awareness in your community
- Feel comfortable placing your baby back to sleep

SIDS



- What is SIDS?
- Sudden Infant Death Syndrome is an unexpected death of an infant less than 1 year of age for which there is no exact cause of death.
- The most common age this occurs is 2-4 months

THE “BACK TO SLEEP” CAMPAIGN

- In the mid 1990s the Back To Sleep campaign became a public health initiative to help reduce the number of SIDS cases in the United States
- The goal of this campaign is to promote safe sleep by placing your baby on their “back to sleep” for infants less than 1 year of age



MYTH BUSTERS

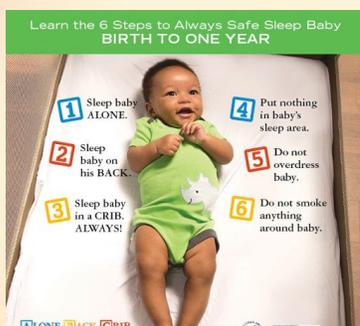
- SIDS is not caused by vaccines or immunization
- SIDS is not caught or contagious
- SIDS is not caused by child abuse or neglect
- If your baby spits up/vomits, they will not choke if they are laying on their back
- Your baby is not uncomfortable sleeping on their back

FACTS

- SIDS is the leading cause of death for infants age 1 month to 1 year
- Most deaths happen between 2-4 months of age
- SIDS is also known as crib death – but the crib is not to blame
- Infants who are placed on their stomach to sleep are more likely to die from SIDS than ones who are placed on their backs
- SIDS is sudden and occurs without warning
- We still do not know what causes SIDS



FACTS



- African American babies are **2 times** as likely to die from SIDS than white babies
- Approximately 3500 infants die from SIDS each year in the United States. Before the Back to Sleep campaign more than 5000 infants died each year
- Mothers who smoke increase the risk for SIDS
- Breast feeding is thought to have protective qualities against SIDS
- Bed-sharing/co-sleeping is associated with SIDS

REDUCING RISK FACTORS

- Always place your baby on their back to sleep even for naps
- Always supervise tummy time, do not leave your baby alone
- Always place your baby in a crib or bassinet with a firm surface
- Do not put toys, loose bedding, bumpers, blankets or other objects in the crib with your baby
- Do not allow any smoking around your baby
- Keep your baby's sleeping area close to you, but do not share a bed with your baby

REDUCING RISK FACTORS

- Offer your baby a pacifier. There have been studies that link pacifier use to reducing the risk of SIDS
- Do not over swaddle or overheat your baby, if you are comfortable, your baby is too!
- Make sure to get good prenatal care as well as post partum care
- Make sure your baby goes to their scheduled appointments and gets their immunizations!
- Breastfeed your baby
- Do not sleep in the same bed with your baby

SHARE YOUR KNOWLEDGE



- Tell your friends about safe sleep
- Tell your parents
- Tell your grandparents
- Make sure everyone you know, knows “back to sleep”
- We can all do our part to save the babies



What does a safe sleep environment look like?

Reduce the Risk of Sudden Infant Death Syndrome (SIDS) and Other Sleep-Related Causes of Infant Death



Use a firm sleep surface, such as a mattress in a safety-approved* crib, covered by a fitted sheet.

Do not use pillows, blankets, sheepskins, or crib bumpers anywhere in your baby's sleep area.

Keep soft objects, toys, and loose bedding out of your baby's sleep area.

Do not smoke or let anyone smoke around your baby.

Make sure nothing covers the baby's head.

Always place your baby on his or her back to sleep, for naps and at night.

Dress your baby in light sleep clothing, such as a one-piece sleeper, and do not use a blanket.

Baby should not sleep in an adult bed, on a couch, or on a chair alone, with you, or with anyone else.

*For more information on crib safety guidelines, contact the Consumer Product Safety Commission at 1-800-638-2722 or <https://www.cpsc.gov>.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
 Division of Field Operations
 Center for Disease Control and Prevention
 National Center for Child Health and Human Development

SAFE TO SLEEP

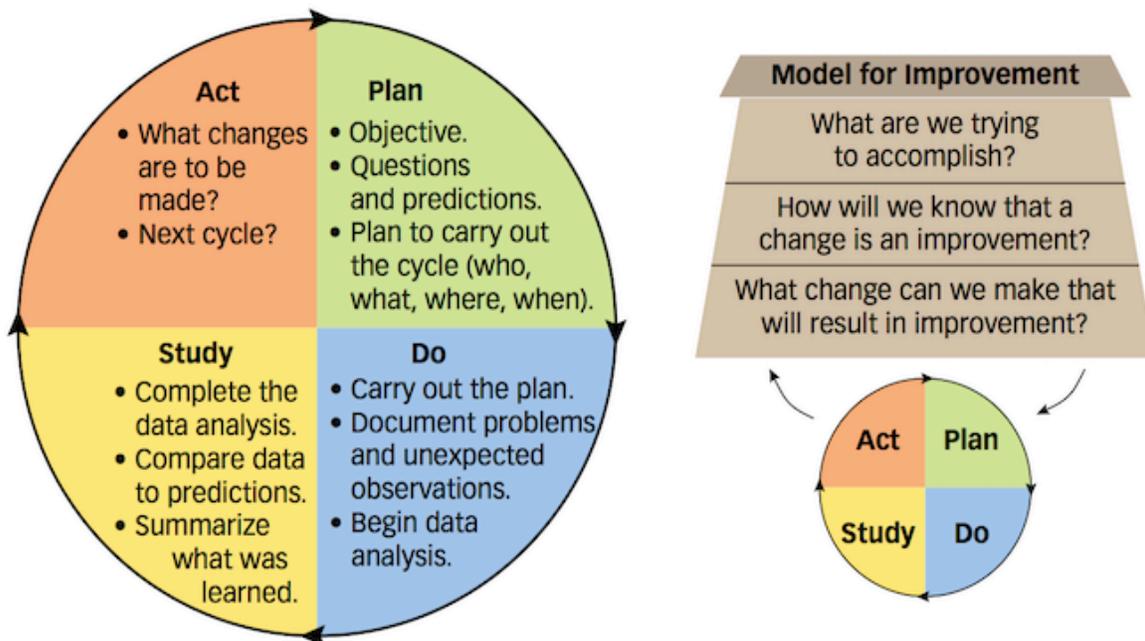
ADDITIONAL RESOURCES

- <https://safetosleep.nichd.nih.gov/>
- <https://www.cdc.gov/sids/Parents-Caregivers.htm>
- <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/healthy-child-care/Pages/Safe-Sleep.aspx>
- <https://www.healthychildren.org/English/ages-stages/baby/sleep/Pages/AParents-Guide-to-Safe-Sleep.aspx>
- <https://nefhealthystart.org/>

Appendix B

The Model for Improvement (Hunter, 2015)

PDSA cycle and Model for Improvement—1991, 1994 / FIGURE 8



Appendix C

Collaborative Institutional Training Initiative



Completion Date 18-Jan-2022
Expiration Date 17-Jan-2025

Redacted for privacy

This is to certify that:

Breanna James

Has completed the following CITI Program course:

Responsible Conduct of Research (RCR)
(Curriculum Group)
Research Administration/ORSP (RCR)
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Jacksonville University

Not valid for renewal of certification through CME.



Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wd4bccd4e-b458-4351-8a3a-1101c3450a7b-46696824

Appendix D

Safe Sleep Assessment Tool Pre-Survey

Start of Block: Pre-Survey

Q1 What safe sleep options are in the home?

- Crib (1)
 - Bassinet (2)
 - Pack and play (3)
 - Other please list _____ (4)
 - None of the above (5)
-

Q2 Where will your baby sleep at night?

- Crib (1)
 - Bassinet (2)
 - Pack and play (3)
 - Couch (4)
 - Recliner (5)
 - Swing (6)
 - Car seat (7)
 - Bouncy seat (8)
 - Floor (9)
 - With an adult/you (10)
 - Other (11)
-

Q3 Where will your baby sleep for naptime?

- Crib (1)
 - Bassinet (2)
 - Pack and Play (3)
 - Couch (4)
 - Recliner (5)
 - Swing (6)
 - Car seat (7)
 - Bouncy seat (8)
 - Floor (9)
 - With an adult/you (10)
 - Other (11)
-

Q4 Will there be stuffed animals, toys, pillows, quilts, wedges, positioners, other loose bedding or bumpers in the baby's sleeping space? Select all that apply

- Yes (1)
 - Maybe (2)
 - No (3)
-

Q5 Will your baby ever share a sleeping space with a sibling, parent, or pet?

- Yes (1)
- Maybe (2)
- No (3)
-

Q6 If you have other children did you share a bed with you?

- Yes (1)
- No (2)
-

Q7 Do you plan to smoke near your baby and in your home?

- Yes (1)
- No (2)
-

Q8 Do you plan to allow other caregivers to smoke near your baby or in your home?

- Yes (1)
- No (2)
-

Q9 Do you plan on breastfeeding?

- Yes (1)
- Maybe (2)
- No (3)

Q10 Do you plan on using a pacifier?

- Yes (1)
- Maybe (2)
- No (3)
-

Q11 Has anyone discussed safe sleep for your baby with you?

- Yes (1)
- No (2)
-

Q12 These are some common barriers (reasons why) mothers mention with placing babies on their back for sleep and prevention of SIDS. Select all that may apply to you

- Not having a safe sleeping place for your baby (like a crib, play pen, bassinette) (1)
- Advice from other female family members (like grandmothers, aunts, sisters, cousins) (2)
- Not breastfeeding (3)
- Smoking (4)
- Other family members in the home that will smoke and be near your baby (5)
-

Q13 What barriers do you feel may prevent you from practicing safe sleep for your baby that are not listed above?

Q14 What is your age?

Q15 Marital Status

- Single (1)
- Married (2)
- Divorced (3)
- Widowed (4)

Q16 How many times have you been pregnant?

Q17 How many live births have you had?

Q18 Race

- White (1)
 - Black (2)
 - Middle Eastern (3)
 - North African (4)
 - Asian American (5)
 - Indigenous (6)
 - Latinx (7)
 - Bi-or multiracial (8)
-

Q19 How many people live in your home?

Q20 Annual Income

- \$0 (1)
 - \$1-\$4,999 (2)
 - \$5,000-\$14,999 (3)
 - \$15,000-\$24,999 (4)
 - \$25,000-\$39,999 (5)
 - \$40,000-\$49,999 (6)
 - \$50,000-\$74,999 (7)
 - \$75,000-\$99,999 (8)
 - >\$100,000 (9)
-

Q21 Highest Educational Level

- Less than 9th grade (1)
 - 9th-12th Grade (no diploma) (2)
 - High School Graduate, GED, or Alternative (3)
 - Some College or Associates Degree (4)
 - Bachelor Degree (5)
 - Graduate or Professional Degree (6)
-

Q22 Zip Code

Appendix E

Safe Sleep Assessment Tool Post Survey

Start of Block: Post Assessment Tool

Q1 What safe sleep options are in the home?

- Crib (1)
 - Bassinet (2)
 - Pack and play (3)
 - None of the above (4)
 - Other please list _____ (5)
-

Q2 Where has your baby been sleeping at night?

- Crib (1)
 - Bassinet (2)
 - Pack and play (3)
 - Couch (4)
 - Recliner (5)
 - Swing (6)
 - Car seat (7)
 - Bouncy seat (8)
 - Floor (9)
 - With an adult/you (10)
 - Other please list (11)
-

Q3 Where has your baby been sleeping for naptime?

- Crib (1)
 - Bassinet (2)
 - Pack and play (3)
 - Couch (4)
 - Recliner (5)
 - Swing (6)
 - Car seat (7)
 - Bouncy seat (8)
 - Floor (9)
 - With an adult/you (10)
 - Other please list (11)
-

Q4 Are there any stuffed animals, toys, pillows, quilts, other loose bedding, or bumpers in the baby's sleep environment? Select all that apply

- Yes (1)
- Sometimes (2)
- No (3)
- Other please list (5)

Q5 Has your baby ever shared a sleep surface with a sibling, parent, or pet?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q6 When you place your baby down for the night do you place them on their backs to sleep?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q7 When you place your baby down for naps do you place them on their backs to sleep?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q8 Are you using any positioners, wedges, or products that claim to reduce SIDS/SUIDS?

- Yes (1)
- Sometimes (2)
- No (3)
- Other please list (4)
-

Q9 Does your baby sleep in your room, but not in your bed?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q10 Are you providing supervised tummy time?

- Yes (1)
- No (2)
-

Q11 Are you smoking near your baby or in your home?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q12 Does anyone else smoke who takes care of your baby smoke near the baby or in your home?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q13 If you answered yes to number 11 and/or 12, are you or the caregiver changing your clothes and washing your hands before holding the baby after smoking?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q14 Are you breastfeeding?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q15 Are you using a pacifier?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q16 Are you swaddling or covering your baby up?

- Yes (1)
- Sometimes (2)
- No (3)
-

Q17 Has your baby received the Hepatitis B vaccine?

- Yes (1)
- No (2)
-

Q18 Is anyone else caring for your baby? If so, are they placing them on their backs for sleep?

- Yes (1)
- Sometimes (2)
- No (3)
- Not sure (4)
-

Q19 These are some common barriers (reasons why) mothers mention not placing babies on their back for sleep. Select all that may apply to you

- Not having a safe sleeping place for your baby (like a crib, play pen, bassinette) (1)
 - Advice from other female family members (like grandmothers, aunts, sisters, cousins) (2)
 - Not breastfeeding (3)
 - Smoking (4)
 - Other family members in the home that will smoke and be near your baby (5)
-

Q20 What barriers do you feel may prevented you from practicing safe sleep for your baby that are not listed above?

End of Block: Post Assessment Tool

Appendix F

Car Seat & Crib SAFETY



Car Seat Safety Checklist

- Appropriately sized and safe car seat.
- Check all safety standards.
- Rated for your baby's weight.
- Correctly installed in the back seat.
- Harness straps are used correctly.

Crib Safety Checklist

- Crib meets safety standards.
- Free mattress that reaches crib sides.
- Only a crib sheet is used—no extra bedding.
- Baby is on his back dressed in comfortable clothing.

It's important that your baby come home in a safe car seat to a safe environment!

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Baby's 1st Year - 11 Handouts 21

Fact or Myth: Keep Your Baby Safe

It can be hard to remember and which to remember. Grandma means well but does not always update about baby cars. Keep the facts so your baby is safe and healthy—an expert who takes care of you. Look over the chart below that provides the answers to some old wives tales about taking care of babies.

<p>Babies get a flat head if they sleep on their back.</p> <p>Babies need food. They'll starve with just milk/formula. A little food won't hurt.</p> <p>Putting cereal in a baby's bottle will help her sleep.</p> <p>Babies should cry it out.</p> <p>Babies will be spoiled if held too much.</p>	<p>Babies should sleep on their backs to prevent SIDS. You can gently rotate/bend/hold to the side to prevent eye flattening.</p> <p>Breastmilk and formula have all the nutrition your infant needs. As your baby gets older you can introduce food as instructed by your health care provider. Introducing food too early can cause allergies.</p> <p>There is no proof to show that babies will sleep any longer with added cereal. Sleeping through the night is developmental. Some babies will achieve this in time.</p> <p>Babies should not be left to cry it out. They need to be soothed and cared for—not ignored.</p> <p>Babies cannot be spoiled. They need to be held and snuggled to help them feel secure.</p>
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Always check with your pediatrician if you have any questions or need help.

You know your baby best!

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Baby's 1st Year - 11 Handouts 75

Appendix G

Topics for weekly discussions

(The questions will likely be the same as the meetings will have different mothers attending each session)

- Every week discuss safe sleep practices (reviewing information should only take 10 minutes)
- Discuss and track any barriers that the mother's might be having to providing safe sleep
- Discuss and track if mothers have a crib, bassinette, or play pen for the baby to sleep in
- Discuss how smoking cessation helps reduce SIDS
- Track if mothers are smoking, and if so if they are cutting back
- Discuss how breastfeeding helps reduce SIDS
- Track if any mothers are breastfeeding
- Discuss any cultural/generational barriers
- Answer any questions mother's might have
- Track questions that mother's might have
- Provide any resources that Magnolia Clinic might have

Process Tracking:

For each session note the following:

1. Number of participants:
2. What questions mothers may have
3. If anyone is smoking
4. Reported barriers and how many
5. Safe Sleep Recommendations needing to be reinforced
6. Each topic will be tracked using an Excel spreadsheet weekly

Appendix H
Expert Panel Validation Rubric for the
Safe Sleep Education Assessment Tool (Pre and Post)

Criteria	Operational Definitions	Score				Questions NOT meeting standard (List question number) and need to be revised. <i>Please use the comments and suggestions section to recommend revisions.</i>
		1=Not Acceptable (major modifications needed)	2=Below Expectations (some modifications needed)	3=Meets Expectations (no modifications needed but could be improved with minor changes)	4=Exceeds Expectations (no modifications needed)	
		1	2	3	4	
Clarity	<ul style="list-style-type: none"> The questions are direct and specific. Only one question is asked at a time. The participants can understand what is being asked. There are no <i>double-barreled</i> questions (two questions in one). 					
Wordiness	<ul style="list-style-type: none"> Questions are concise. There are no unnecessary words 					
Negative Wording	<ul style="list-style-type: none"> Questions are asked using the affirmative (e.g., Instead of asking, “Which methods are not used?”, the researcher asks, “Which methods <i>are</i> used?”) 					
Overlapping Responses	<ul style="list-style-type: none"> No response covers more than one choice. All possibilities are considered. There are no ambiguous questions. 					

Balance	<ul style="list-style-type: none"> The questions are unbiased and do not lead the participants to a response. The questions are asked using a neutral tone. 					
Use of Jargon	<ul style="list-style-type: none"> The terms used are understandable by the target population. There are no clichés or hyperbole in the wording of the questions. 					
Appropriateness of Responses Listed	<ul style="list-style-type: none"> The choices listed allow participants to respond appropriately. The responses apply to all situations or offer a way for those to respond with unique situations. 					
Use of Technical Language	<ul style="list-style-type: none"> The use of technical language is minimal and appropriate. All acronyms are defined. 					
Application to Praxis	<ul style="list-style-type: none"> The questions asked relate to the daily practices or expertise of the potential participants. 					
Measure of Construct: Safe Sleep Practices	<ul style="list-style-type: none"> The survey adequately measures this construct “Safe Sleep Practices” 					

Types of Validity

VREP is designed to measure face validity, construct validity, and content validity. To establish criterion validity would require further research.

Face validity is concerned with how a measure or procedure appears. Does it seem like a reasonable way to gain the information the researchers are attempting to obtain? Does it seem well designed? Does it seem as though it will work reliably? Face validity is independent of established theories for support (Fink, 1995).

Construct validity seeks agreement between a theoretical concept and a specific measuring device or procedure. This requires operational definitions of all constructs being measured.

Content Validity is based on the extent to which a measurement reflects the specific intended domain of content (Carmines & Zeller, 1991, p.20). Experts in the field can determine if an instrument satisfies this requirement. Content validity requires the researcher to define the domains they are attempting to study. Construct and content validity should be demonstrated from a variety of perspectives.

Criterion related validity, also referred to as instrumental validity, is used to demonstrate the accuracy of a measure or procedure by comparing it with another measure or procedure which has been demonstrated to be valid. If after an extensive search of the literature, such an instrument is *not* found, then the instrument that meets the other measures of validity are used to provide criterion related validity for future instruments.

Operationalization is the process of defining a concept or construct that could have a variety of meanings to make the term measurable and distinguishable from similar concepts. Operationalizing enables the concept or construct to be expressed in terms of empirical observations. Operationalizing includes describing what is, and what is not, part of that concept or construct.

References

Carmines, E. G. & Zeller, R.A. (1991). *Reliability and validity assessment*. Newbury Park: Sage Publications.

Fink, A., ed. (1995). *How to measure survey reliability and validity v. 7*. Thousand Oaks, CA: Sage.

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