

INCREASING BREAST FEEDING SUPPORT AMONG NEONATAL NURSES

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Abstract

The importance of breastfeeding support remains a global phenomenon, as breastfeeding remains the algorithm of healthcare promotion throughout the life span. The purpose of this project reviews benefits of improving breastfeeding, and breast milk production, among lactating women and their infants by increasing knowledge, skills and positive breastfeeding attitudes among Neonatal Intensive Care Unit (NICU) nurses. The project health care facility has approximately 30% of its neonatal infants who receive breast milk within four weeks of life (Project Facility, 2017) compared to the Center for Disease Control (CDC) recommendation of 75% for early breastfeeding initiation (CDC, 2017). The project's quality improvement program provided a descriptive quantitative design in which questionnaires were distributed among neonatal nurses and breastfeeding mothers to query access and implement the CDC guidelines, Baby Friendly benchmarks, and Healthy People 2020 goals. The Breastfeeding Support Program was implemented as a 3 day breastfeeding support class, implementation of hands-on policy, and a quality improvement tool. The key findings of this project study demonstrated evidence that neonatal nurses were not given consistent interactive breastfeeding in-service. As such, neonatal nurses should be given a 'hands on' breastfeeding support class and policy review annually per CDC recommendations. In particular, mothers experienced a statistically significant greater breastfeeding proficiency post-intervention ($M = 7.43$, $SD = 0.53$) than pre-intervention ($M = 1.86$, $SD = 1.86$). By doing so, neonatal nurses had increased breastfeeding support to breastfeeding mothers and their infants at the project facility.

Key Words: hands on training, breastfeeding support, Neonatal nurses, breastfeeding mothers, breastfeeding outcome

Increasing Breastfeeding Support Among Neonatal Nurses

The aim of this project is to improve breastfeeding support, with recognition of Healthy People 2020 healthcare initiatives for new breastfeeding mothers and infants within the Neonatal Intensive Care Unit, by increasing conviction and confidence, among the project hospital neonatal nurses. According to the Center for Disease Control (2017), breastfeeding interventions and support strategies remain global healthcare initiatives to improve healthcare for new breastfeeding mothers and infants throughout the world. As such, the healthcare initiatives of Healthy People 2020 have a 10-year national health agenda that includes breastfeeding objectives to improve breastfeeding rates for mothers and their infants. The CDC breastfeeding framework is designed to meet Healthy People 2020 breastfeeding objectives which identify strategies to promote positive outcomes, and prevent disease among new breastfeeding mothers and infants (CDC, 2017). This framework includes objectives to improve outcome measures that remain specific to maternity care (AHRQ, 2017). Moreover, diverse global initiatives require assistance from the United Nations to improve breastfeeding outcomes in developing countries, which require systematic health care planning, and strategies with global stake holders, as well. The purpose of the project demonstrates the importance, as well as the benefits of breast feeding with new mothers and their infants, among the project hospital's neonatology nurses. The importance of breastfeeding includes mothers who deliver premature infants and produce milk that remains slightly different from term deliveries. However, research suggests breast milk produced by new mothers of premature infants provide special benefits for infants of prematurity (Islam, 2016). The immediate and long-term benefits of breastfeeding across a life span meets health care initiatives within the US and world-wide. According to Fitzgerald (2012), infants of prematurity who receive breast milk are 10 times less likely to acquire necrotizing enterococcus,

a gastro intestinal disease; compared to, infants who receive formula milk. Moreover, premature infants acquire their mother's immunological benefits, which protect them from childhood diseases such as: lower respiratory disease, reduction of acute otitis media, atopic dermatitis, acute lymphocytic leukemia, meningitis, cardiovascular disease and pneumonia (Fitzgerald, 2012). Willumsea (2013) and The World Health Organization (WHO) suggest breastfeeding support and education to be implemented in different modes of delivery, such as, health professional pre-service breastfeeding training, one on one breastfeeding assistance, and in-service training, to assist mothers in breastfeeding strategies (CDC, 2017). According to Ashley and Schub (2016) breastfeeding training should be routinely communicated with a written policy informing staff and pregnant women of the benefits in breastfeeding. The implementation of the breastfeeding support program would enhance the importance and benefits of improving breast feeding and breast milk production among lactating women utilizing support interventions, education, mentoring, professional collaboration, community support, as well as information technology.

Problem Description

The project health care facility has approximately 30% of its neonatal infants who receive breast milk within 4 weeks of life, and less than 30% of new mothers' who breast feed their infants (Project Hospital, 2017). According to the Centers for Disease Control (2017) the benchmark is 75% for the initiation of breastfeeding. The importance of breast feeding remains a global and a national concern. The Centers for Disease Control [CDC] (2016) reported that only 14 % of hospitals have a breastfeeding policy, and less than 4 % follow at least 9 of the 10 recommended Baby Friendly practices. In Georgia, as in several Southern states, the percentage

of births at “Baby-Friendly” hospitals that promote breastfeeding was zero, according to the 2011 CDC report (Miller, 2012). Although breastfeeding is one of the most effective preventative health measures for infants and mothers, half of U.S.-born babies are given formula within the first week of life, and by nine months of age, only 40 % of babies are still being breastfed (CDC, 2017). Jaafar, Ho, and Lee (2016) suggest that higher breastfeeding frequency or pumping, among new mothers during early puerperium contributes to optimal milk production. Therefore, breastfeeding for new mothers within the first 4 weeks of postpartum remains imperative for optimal breast milk production.

In September (2015), the project facility became the first public, academic Baby-Friendly Hospital in Georgia. Lactation services coordinates’ hospital-wide breastfeeding care for patients however, the project hospital’s breastfeeding rates were below 30% and breast milk consumption continues to be below the national average of 46.6% as reported by neonatal nurses and perinatal staff (CDC, 2017). According to the CDC (2017), breastfeeding support from health care professionals remains one of the most important elements that affect the new mothers’ ability to produce milk (CDC, 2017). Accordingly, one of the national goals of Healthy People 2020 breastfeeding initiatives calls for increasing breastfeeding initiation, duration, and proportion of mothers who breastfeed their babies to a benchmark of 75% which is one of the Baby Friendly Hospital initiatives in the early postpartum period. However, the project hospital’s breastfeeding rates are 30% and currently below the Healthy People 2020 target goals of 81.9% (CDC, 2017).

As breastfeeding is the cornerstone in fighting many infant and childhood diseases, one of the most essential elements towards improving health care among infants and mothers is readiness and availability of free breast milk (American Pediatrics, 2012). This natural resource

remains one of the most natural components in healing and is important to the well-being of infants and children, as well as mothers (American Pediatrics, 2012). Therefore, breastfeeding support and the use of consultants remains one of the most important factors for maintaining a healthy milk flow. As such, breastfeeding has become a national and global concern. Researchers have found breast feeding to be one of the most important interventions in reducing exposure to necrotizing enterocolitis, ear infections, respiratory tract infections, sudden infant death syndrome, and obesity (CDC, 2017). The use of formula milk compared to breast milk increases the risk of necrotizing enterocolitis 2.8 times (American Pediatrics, 2012). Therefore, breastfeeding education and support, especially to the staff, remains one of the most important factors to maintaining a healthy milk flow. Breastfeeding support has become a concern to the project facility. Breastfeeding support and education are currently provided annually for neonatal staff nurses. As knowledge is not the only component in meeting Baby Friendly Hospital Initiatives (BFHI), neonatal nurses are required to increase their breastfeeding knowledge and skills combined with positive attitudes; these components are necessary to provide a level of confidence, which not only enhances, but encourages new mothers to breastfeed (CDC, 2017).

Available Knowledge

Breastfeeding support enhances confidence and conviction among neonatal nurses, while increasing multifaceted breastfeeding initiatives among mothers and their infants in the NICU. A comprehensive and systematic literature review was conducted based on evidence to improve the efficacy of breastfeeding support from professional nurses, working with new mothers and infants in the Neonatal Intensive Care Unit. As such, the following data bases were used to collect and conduct an exhaustive systematic literature review as follows: Medline (PUBMED),

Elton B Stephens Company (EBSCO), The Cochrane Library, Cumulative Index to Nursing and Allied Health (CINAHL), and The Centers for Disease Control (CDC).

Key words searched included: breastfeeding support program, health care initiatives, evidence-based outcomes, policy, program, multifaceted interventions, neonatal nurses, knowledge, skills, and attitudes, gestational age, premature infants and education. A total of 44 articles were retrieved. Literature synthesis to support evidence-based practice consisted of 24 articles specific to increasing breastfeeding support among neonatal nurses. Literature search was conducted from years 2012 to 2017, which included a five-year limit.

Literature Synthesis to Support Evidence Based Practice

Nursing Advocacy. Throughout the United States, breastfeeding remains an imperative health care initiative. The importance of breastfeeding support for mothers and their infants is a key intervention to decrease childhood diseases and promote healthcare across the life span. As a result, neonatal nurses are key advocates during breast feeding support for mothers with infants in Neonatal Intensive Care Units. Accordingly, nurses are key professional contributors and they remain at the bedside as important breastfeeding advocators who improve breastfeeding outcomes, for mothers and infants (Davis, 2015). By providing breastfeeding support classes for neonatal nurses, this quality improvement strategy provides essential knowledge, skills, and positive attitudes that improve breastfeeding advocacy; therefore, neonatal nursing support improves quality of health care for both mother and infant. The CDC (2017) suggests the ten year national health agenda for Healthy People 2020 provides a framework for disease prevention and health promotion. The national agenda includes implementing new innovative healthcare strategies that increase breastfeeding rates and improves outcome measures that are

unique to maternal and infant care. A quasi- experimental randomized controlled study was completed by McFadden, Gavine, and Renfrow (2016), comparing extra support from health care professionals for breast feeding mothers with term infants. The authors conducted 100 trials involving more than 83,246 mother and infant dyads which consisted of 73 studies which contributed to 74,656 data reviews that included 58 individually-randomized trials and 15 cluster-randomized trials. The results of this study suggest when breastfeeding support is offered to new mothers, the duration and extent in exclusive breastfeeding is increased. The study also found that effective breastfeeding support is characterized by RNs and other health care professionals to include: scheduled trained professionals during ante partum, postnatal care, and face to face support from care givers.

A Call to Breastfeeding and Breast Milk Production. Healthy People 2020 breastfeeding agenda calls for international and local breastfeeding support to increase milk production. Accordingly, the American Academy of Pediatrics (2012) conducted research that provided evidence to the bedside practice which identifies that breast milk remains human specific. Breast milk provides unique antigens which makes human milk superior in fighting childhood disease. Extensive research was completed by the American Pediatric Association from 1997 to 2012 using epidemiologic methodologies that documents laboratory findings that benefits infants, children, mothers, families, and society. The advantages include health, nutrition, immunological, psychological, social, economic, and environmental benefits.

According to Haider, Chang, Gold, Olsen, and Bolton (2017) several national and international organizations such as: The American Academy of Pediatrics (AAP), The World Health Organization (WHO), and The American Dietetic Association, (ADA) recommend

breastfeeding mothers continue in exclusive breast feeding for their infants and children from birth through 6 months while providing supplemental feedings and breast-feeding, from a year and beyond. The World Health Organization (WHO; 2013) suggests that babies who breastfeed should continue from 6 months, and then combine with solid food for 2 years. However, only 77% of breastfeeding women in America initiate breast-feeding and continue to breastfeed beyond infants 6 months in age (CDC, 2017). Furthermore, women who are classified as maternal risk (preterm births, infections, caesarean section, and preeclampsia) were found to breastfeed their infants at 27% after birth (WHO, 2013). As such, public health departments have adopted breastfeeding programs within communities, which include peer support programs developed from The United States Loving Support Model (2010) which improved breastfeeding rates among urban and low- income Hispanic populations using peer support breastfeeding programs (WHO, 2013).

Breastfeeding Knowledge. Breastfeeding knowledge increases breastfeeding strategies and promotion. Balogun, O'Sullivan, and McFadden (2016) suggest that despite a wide documentation of risk related to not breastfeeding, new mothers' initiation rates remain low in many high and low income countries. Many women did not follow recommendations of the World Health Organization (WHO, 1992) to initiate breastfeeding within the first hour of birth. The authors conducted randomized controlled trials that evaluated the effectiveness of breastfeeding promotion activities that included twenty-eight trials involving 107,362 women in seven countries. The authors conducted studies that included breastfeeding support from health care professionals that led breastfeeding education and support verses standard care. The study showed there was evidence from five trials involving 564 women in total who demonstrated an improvement in breastfeeding initiation rates which was compared to standard cares support.

Vandewark (2014) explored the relationship between breastfeeding knowledge and attitudes of undergraduate nursing students at the beginning and end of their clinical education. The author conducted electronic surveys based on the Iowa Infant Feeding Attitude Scale and Breastfeeding Knowledge Questionnaire. The study suggested knowledge is not the only component of nurse preparedness, if nurses are to effectively assist mothers to breastfeed their infants. Nursing education and knowledge must be combined with positive attitudes towards breastfeeding, including a level of comfort while assisting mothers to breastfeed, in order to effectively advocate breastfeeding for their patients.

The effectiveness of breastfeeding support remains imperative to improve breastmilk production. Thussanasypap, Laprongwatana, and Kalampakorn (2016) completed a study which measured the effectiveness of breastfeeding knowledge, breastfeeding support, and breastfeeding self-efficacy utilizing two groups of nursing mothers, an intervention group and a comparison group. The results of the study showed a significant higher score from the interventional group which breastfed continuously for 6 months (69.23%) versus the comparison group (53.85%). Furthermore, the study suggested a bridged gap in breastfeeding support was given to the comparison group from the health system before being discharged home; this was to encourage breastfeeding after discharge.

Breastfeeding Support Program. Healthcare systems that provide care for mothers and infants remain accountable for effective breastfeeding policies and programs regarding professional training. Schub and Ashley (2016) suggested training all health care staff to implement a routinely communicated written breastfeeding policy, informing all pregnant women of the benefits of breastfeeding, showing mothers how to maintain flow when separated

from their infant, encouraging on-demand breastfeeding, practicing 24-hour rooming-in, and providing no artificial teats or pacifiers as some of the UNICEF prescribed steps currently implemented by hospitals, in its quest to become Baby-Friendly (UNICEF, n.d.). Breastfeeding peer program can also improve breast feeding outcomes. However, breastfeeding peer programs require professional support during hospitalization. Islam (2016) conducted a study set out to evaluate a breastfeeding support peer program, which indicated an effective method to improve breastfeeding rates in low income areas of the United States. The study analyzed quantitative data which indicated poor acceptance of breastfeeding support from a peer support program. The study used semi-structured interviews on a total of 11 women, in which 8 declined peer support groups and 3 embraced attending it. The results of the study showed further research is required to determine the effects of peer support groups due to the lack of participation to peer support group during hospitalization, antepartum, and postpartum periods. Therefore, mothers are often intimidated by a formula fed community, with a lack for support of breastfeeding initiatives (Islam, 2016). Furthermore, breastfeeding support can also become affected by elements within the nurses' professional environment. Hunter, Magill-Cuerden, and McCourt (2015) conducted a study to identify elements of a postpartum unit which impacted the introduction of breastfeeding support programs. The study used semi-structured interviews and practice observations to provide a qualitative evaluation. The interventions were aimed at improving breastfeeding. The study found breast feeding support was communicated poorly to mothers due to a lack of nursing staff and lack of nursing confidence which was related to nurses feeling overwhelmed, and unable to provide effective breastfeeding instructions to mothers.

Breast Milk Supply and Demand. According to the March of Dimes (2017), breast milk is the best food for your infant, even in the Neonatal Intensive Care Unit (NICU). Breast milk

provides antibodies to help infants fight infections, as well as nutrients high in fat and protein for growth and development. The NICU has nurses and lactation consultants with specialized training in breastfeeding, breast pump instructions, and breast milk production. Infants are able to breast feed at less than 37 weeks of gestation, and as early as 30 to 32 weeks gestational age. Bal Ogun et al, (2016) conducted a randomized control study involving 107,362 women, included three countries (Australia, United Kingdom, United States) and one lower income country, Nicaragua. The three studies investigated the effects of interventions used to increase breastfeeding at least one hour after giving birth; the study also examined international rates of breastfeeding initiation, in which the study suggests extreme variability within and between countries. Low- and middle-income countries generally have the highest rates with breastfeeding initiation; however, the challenge was to start breastfeeding within one hour after birth. The results showed significant progress in breastfeeding outcomes due to nurse and interdisciplinary support. A total of 564 women reported an increase in breastfeeding initiation due to staff support. Furthermore, Wetta and Jacobson (2014) conducted a qualitative study to evaluate grant funded breastfeeding initiative programs in health departments throughout Kansas. A total of 10,000 dollars in grant monies funded 19 breastfeeding intervention programs. A qualitative process evaluated the programs' progress in meeting their goals and objectives. The results of the study suggested an increase in overall health and well-ness of mothers and infants, fewer allergies, reduction in childhood obesity, and an increase in mother/infant bonding. Also noted was: 73% of mothers began breast feeding at birth, 42% of mothers breast fed after birth, and a total of 27% continued breastfeeding, until the infants reached 6 months of age. Moreover, Fitzgerald (2012) suggests premature neonates who received breast milk were found to be ten times less likely to develop or acquire enterocolitis (GI disease) compared to formula fed

premature infants. The author suggested premature infants, as well as newborns benefits include effects such as: higher developmental intelligent quotient (IQ) scores at 18 months, and at 7.5 to 8 years of age. Heon, Goulet, and Garofalo (2016) estimated the effects of breast milk expression education and a support intervention program by conducting a pilot study. Forty mothers of hospitalized preterm infants (less than 30 weeks gestation) participated in a randomized study involving experimental interventions and standard care for 6 weeks. The duration of breast milk expressions and volume of expressed milk were measured daily, in which samples of breast milk was collected 3 times daily, regarding frequency of breast milk expression. The study found that daily expression of breast milk promotes breast milk production in mothers with extremely preterm infants.

Increasing Breastfeeding Skills. Breastfeeding skills are imperative to improve breast milk consumptions for newborn and preterm infants. As such, Harding, Frank, and Botting (2015) conducted a study to evaluate the progress of nine infants who experience difficulty in establishing a consistent suck-swallow- breath coordination cycle. The study evaluates the progression of infants with neurodevelopmental disorders to consider core components necessary for a comprehensive feeding assessment for vulnerable infant feeding. Infants are evaluated with utilizing non- nutritional sucking to stimulate and evaluate an infants' sucking pattern. The results of this study suggested training and coaching parents about non-nutritional sucking (NNS) and establishing important communication during NNS to improve quality of life for infants and parents. Rocha, Silva, and Soeiro (2013) conducted a descriptive exploratory study with a qualitative approach to analyze the effects of nursing guidelines in the learning and practice of breastfeeding before infants were discharged home from the NICU. The study consisted of 15 nursing mothers and infants 34 to 36 weeks, in gestational ages who were

admitted to the NICU. The authors suggested health teams who provided the most guidance were nurses, due to their daily contact with the mothers and infants. The authors also suggested mothers who were interviewed during the study, preferred nursing guidelines; as they felt these guidelines were crucial for them to initiate breastfeeding. Moreover, Su, Tsa, and Tzu- Pin Su (2012) implemented a breastfeeding project study to increase the breastfeeding rate for premature infants in the Neonatal Intensive Care. Mothers who exclusively breastfed in the NICU was 23.3%, it was noted that 58.1% of mothers and families were given breastfeeding instructions before the project was implemented. The study was preceded with the breastfeeding project by: 1). implementing organizational lectures in breastfeeding education classes for mothers with infants in the NICU 2). drafted check lists and conducted phone interviews with postpartum mothers at home 3). Guidelines on breastfeeding premature infants were drafted 4). Encouraged family members to participate in breastfeeding classes and kangaroo care. Results of this study reported an improvement of 93.1% in breastfeeding instructions to mothers by the nursing staff, and breastfeeding rates for premature infants improved from 23.3 % to 67.5%. The authors suggest that results from this program can be applied to improve breastfeeding rates for mothers with premature infants.

Premature Infants and Breastfeeding. It is understood by many researchers that mothers with infants in the NICU are prevented from direct breastfeeding due to infant's prematurity; this fact is associated with emotional and psychological liability and is related to the infants' hospitalization in the NICU, and could be considered by mothers, as a possible failure to produce milk. Thus, breastfeeding support remains imperative among NICU nurses (Brod, Rocha, and Santos, 2016). NICU nurses must remain skilled in identifying infants' developmental ability to breastfeed. Hyqvist (2013) found evidence that suggests preterm infants are able to attain

exclusive breastfeeding at 32 weeks gestation. The study was conducted according to routine guidelines in a NICU at a university hospital in Sweden. The study suggests that preterm infants are unable to coordinate sucking, swallowing and breathing until 32 to 34 weeks and demonstrates ineffective and dysfunctional sucking until they reached a minimal of 32 weeks gestational age. A total of 71 infants were used in the sample, 57 out of 71 (80%) infants attained breastfeeding and 10 (14%) were discharged with partial breastfeeding. Mothers and infants must be encouraged to breastfeed one hour after birth during the infants first day of life (CDC, 2017). Nguyen, Whitters, and Hajeebhoy (2017) conducted a cross-sectional survey in Vietnam to examine the association of infant formula during the first 3 days after birth with subsequent formula feeding and early breastfeeding. The authors suggested infant formula feeding during the first 3 days after birth (50%) was associated with a higher prevalence of subsequent infant formula feeding, and early cessation of breastfeeding, which underscored the need to make early, exclusive breastfeeding a norm that is needed to create an environment that supports it.

Increasing Breastfeeding Attitudes. Positive and confident breastfeeding attitudes are imperative to maintaining a productive breastfeeding environment. Hunter, Magil-Cuerden, and McCourt (2015) reported findings from a qualitative evaluation of breastfeeding support interventions on a post-partum ward in the United Kingdom (UK). This study sought to identify elements which decreased breastfeeding support interventions by registered nurses and nurse midwives. The study suggested that RNs and nurse midwives lack confidence and support, to advocate mothers to breastfeed due to an extremely busy environment and lack of confidence in helping mothers to establish lactation. Furthermore, Rollins, Bhandari, and Hajeebhoy (2016) examined the effects of breastfeeding support interventions that were delivered by lactation consultants. The authors conducted a meta-analysis of interventions that provided antenatal and

postnatal support. The authors suggest breastfeeding will rapidly improve when relevant interventions are delivered adequately toward breastfeeding practices. The best breastfeeding outcomes are achieved when interventions are implemented through several channels. The authors further suggest breastfeeding support interventions by global industry, community resources, as well as worldwide market changes.

Breastfeeding Improves Healthcare Across the Life Span. Breastfeeding remains a cornerstone in healthcare that affects the life span. Bhutta, Das, and Jai (2013) suggest a stunting prevalence in under-nutrition, especially, in poor and underserved countries. The authors suggested a slow decrease in size which included a total of 165 million children in 2011 who experienced under-nutrition, which consisted of fetal growth restriction, stunting, wasting, and deficiencies in vitamins and zinc, along with suboptimum breastfeeding. The authors suggest under-nutrition underlies 3.1 million deaths in children, younger than 5 years of age annually world-wide. The authors modeled the effects of interventions in 34 countries that consisted of 90% of global stunted children. The interventions included affected women, adolescents, and women of reproductive age, pregnant women, newborn babies, infants, and children. The authors suggest replacement of iron-folate with multiple micronutrient supplements have shown to reduce small gestational age infants (SGA). Breastfeeding strategies in community and facility settings have shown promising benefits to enhance exclusive breastfeeding rates; however, evidence for long term benefits on nutritional developmental outcomes remain scarce.

The March of Dimes (2017) suggests mothers refer to nurses and lactation consultants who are able to demonstrate and educate mothers on breast pumping. Lactation consultants have specialized professional training to help all mothers to breastfeed, even mothers with infants that

have special breastfeeding problems. Breast milk remains unique with antibodies which protect infants from illness. Breast milk also contains nutrients that help infants with growth and development, meeting the infants' growth and development requirements, even for infants less than 37 weeks of gestation.

Rationale

An evidence-based model that integrates a systems approach assimilates a continuum in communication among lactation consultants, nurses, and mothers with infants, within Neonatology. The framework selected for this project is the Plan – Do –Study Act (PDSA) model. The framework of change consists of a four-cycle quality improvement model. The problem is identified through collaboration, in which the best solution is selected with a targeted outcome, evaluated, and established into a permanent change. The model is a guiding framework that identifies the importance of inter-professional collaborations among health team members, nurses, patients, family, and community. The Deming quality improvement framework uses language that remains similar to the nursing process (Stikes and Barber, 2013).

The foundation of nursing practice involves utilization of evidence; however, barriers may exist or the identified problem is the reason for the quality improvement process and agents of change are selected to implement quality improvement strategies. Therefore, relationship building among all interdisciplinary team members within the Neonatal Intensive Care Unit remains imperative. Neonatologists, nurse leaders, Lactation Consultants and neonatal nurses must maintain a continuum of communication, concerning identifiable barriers, related to breastfeeding support for new mothers with infants in the NICU. Lactation Consultants and neonatal nurses can build mentoring relationships which increase knowledge, skills, and positive

breastfeeding attitudes (confidence) that support new mothers and their infants, including premature infants to increase breastfeeding outcomes and breast milk production according to the CDC and Healthy People 2020 objectives with an identified goal of 75% for early breastfeeding initiation.

Advanced nursing roles for DNP leaders are often challenged as nurse managers, nurse consultants, clinical nurse specialists are often charged as change agents in quality improvement outcomes. As such, the sciences of complex adaptive systems provide important concepts and tools that are necessary for practice while responding to challenges within the 21st century. Therefore, DNP leaders are given the unique opportunity to respond during this time of health care reform. A conceptual frame work such as, the PLAN- DO- STUDY- ACT (PDSA) provides a continuum in quality performance similar to the nursing process; the elements consist of assessment, planning, implementation, and evaluation (Stikes and Barber, 2013). The PDSA consists of four continuous quality improvement cycles as follows: 1. Plan- The initial step begins by assessing and identifying the problem, defining the target outcome, developing the planned process for a desired change, as well as a method, to evaluate and/or monitor the change; 2. Do- involves implementing the collection of data and processing change when needed; 3. Study- involves completing data analysis, evaluating by reviewing results, and comparing the actual outcome, to the desired outcome; 4. Act- entails identifying the needed modifications and acting on what is learned. The results of the change are accepted or abandoned, in which case the cycle would start again (Stikes and Barber, 2013).

Shewart and Deming (1994) pioneered the Plan Do Study Act quality improvement tool into a science that improved health care management, throughout the healthcare industry. The

PDSA model for processing quality improvement helps to identify the gap in practice according to Healthy People 2020 and Baby Friendly Hospital Initiatives target range of 75% for breastfeeding. The project hospital's current early breastfeeding initiation rate is 30%, which is currently below the national average of 46.6% and Baby Friendly Hospital Initiatives goals of 75% in early breastfeeding initiation (CDC, 2017). The PDSA identifies planned interventions and goals which are set for an 8 week process to implement quality improvement strategies required for neonatal nurses to increase breastfeeding, for mothers with infants in the Neonatal Intensive Care Unit.

According to the CDC (2017) breastfeeding support from neonatal nurses remains a key strategy that affects new mothers' confidence in their ability to continue milk production for infants. Barriers were identified from the project hospital due to a lack of effective breastfeeding support from neonatal nurses for early breastfeeding initiation, as evidenced by decreased breast milk production, and breastfeeding scores within 30% which are less than Healthy People 2020 and Baby Friendly Hospital Initiatives' target range of 74 to 81.9%.

The Agency for Health Care Research and Quality (AHRQ) created Team STEPPS, an evidence-based teamwork system to improve communication and teamwork among health care professionals. Team STEPPS curriculum is a three phase process aimed at creating and sustaining a culture change with pre-training assessment for site readiness, focuses on training on site trainers of health care staff, implementation of change, and ongoing sustainment. The process correlates with the Plan- Do- Study- Act model / framework by assessment, planning, implementation, evaluation, and sustainment (Stikes & Barber, 2013).

The use of the PDSA model encourages collaboration, learning, reflection, and validation throughout the implementation of the project. Nurses in the NICU have the ability to encourage and introduce breastfeeding strategies to parents within the NICU. As such, neonatal nurses demonstrate knowledge, skills, and positive attitudes while providing transitional collaboration, support, and patient education to improve quality care initiatives, among new breastfeeding mothers. Consistent collaboration, using confidence and competence among interdisciplinary members remain key components towards innovative change that improve breastfeeding outcomes and goals according to Healthy People 2020, Baby Friendly Hospital Initiatives, and CDC guidelines. DNP leaders who initiate healthcare policies and programs remain agents of change (Denisco & Barker, 2013). Moreover, nursing management should educate employees and provide influential leadership toward implementing change. The art of influencing also requires mentorship which develops confidence, with a sense of empowerment (Kelly, 2013). This, in turn, encourages employees with a feeling of belonging, dedication, and commitment within the healthcare organization (Kelly, 2013).

Specific Aims

The purpose of this project was to review the importance, and benefits of improving breast feeding, and breast milk production, among lactating women and their infants. The project hospital currently has one International Board Certified Neonatal Lactation Consultant who is assigned to the unit. The nursing staff presently receives 8 hours of breastfeeding training with initial hire. Limited classes are currently available for neonatal nurses and new mothers with one on one help, weekly as needed. Additionally, the project hospital provides breastfeeding educational classes in Neonatology yearly, with annual review. The breastfeeding support

program implements a quality improvement tool (Plan-Do-Study-Act) in-which neonatal nurses are provided opportunities to increase hands on interventions and breastfeeding support, to mothers and their infants in NICU.

Methods

Context

The project facility for this quality improvement breastfeeding support program was conducted at a 953 bed tertiary acute care hospital. The project hospital receives 50% of medical insurance from patients on Medicare and Medicaid. The project hospital currently remains a level 1 trauma center located on the east coast of the US. The settings for this project remain in a 34 bed NICU. This pilot project study consisted of a dyad of 7 full term or preemies in the NICU and their mothers, and 14 neonatal nurses aged 25-55 years of age with a minimal of 3 months employment within the project hospital's NICU. The data specific to the potential improvement in NICU nurses' knowledge, skills, and attitudes was collected, analyzed, evaluated, and measured by quantitative metrics, using survey questionnaires and unstructured observations. A total of 14 nurses were asked to improve their knowledge, skills, and training by participation in a 3-day breastfeeding training class per CDC guidelines. The class was facilitated with the assistance of a neonatal Lactation Consultant. The following exclusion criterion was established to engage participants in the project as such, infants greater than 38 weeks gestational age and mothers who were not breastfeeding was not considered as participants in the project.

Query

For NICU nurses, how does the implementation of CDC guidelines, Baby Friendly benchmarks, and Healthy People 2020 goals for breastfeeding support training, compared to present practice, improve the knowledge, skills, and attitudes of NICU nurses, to increase breastfeeding outcomes over an 8 week time frame?

Interventions

As a DNP Program Leader (PL), weekly quality improvement strategies were performed in the breastfeeding support interventions. These strategies included a quality improvement tool (Plan-Do-Study- Act-) for monitoring, and auditing program interventions. The Program Leader participated in a breastfeeding education and support program per CDC guidelines as follows: Week 1, a meeting with the NICU director was completed to review the breastfeeding support program and to develop a time frame to implement the breastfeeding support program. During week 2, a meeting was conducted with Lactation Consultants to discuss breastfeeding support educational tools such as: breastfeeding pumps, milk containers, milk labels, nipple shields, and a breastfeeding presentation (power point) for breastfeeding support training. The breastfeeding support class was scheduled with the neonatal director, neonatal RNs, and Lactation Consultants. During week 3, neonatal staffs were notified of the breastfeeding policy. Day one and two of the 3- day training class was implemented for neonatal nurses per NICU director's approval. The neonatal nurses were also provided day 3 of the training class which included pretest survey questionnaires prior to breastfeeding training. During week 4, unstructured 3- day audits were conducted by attending NICU shift huddles to observe, inform, and remind nursing staff the importance and benefits of breastfeeding support per Baby Friendly and the CDC guidelines.

During week 5, unstructured 3-day audits continued with observations by attending NICU shift huddles and with the charge nurse during patient care rounds. Data was also collected and gathered from the survey that provided measurements of mothers' milk supply, demand, and infants' consumption. During Week 6, unstructured 3-day audits and observations were performed during shift huddles and during patient care rounds. During week 7, unstructured 3-day audits and observations were performed during patient care rounds. During week 8, post survey questionnaires were given and collected from neonatal RNs and new mothers. The breastfeeding program provided NICU nurses opportunities to perform evidenced based interventions to improve breastfeeding outcomes by participating in a breast feeding inter-active policy, education, and support class. As such, NICU nurses were provided a Neonatal RN Assessment Tool which consisted of 33 survey questions that included demographics. Postpartum mothers were also given a breastfeeding questionnaire developed from Beginning Breastfeeding Questionnaire Cumulative and Bristol Breastfeeding tool which consists in a total of 15 questions.

Study of Program Interventions

Lactation consultation was conducted in establishing date and time for 3-day breastfeeding classes, and implementation of Breastfeeding Support Program policy per neonatal Director approval. Furthermore, RN participation was monitored weekly in breastfeeding interventions, standards, and evaluated performance measures to ensure compliance by using quality improvement tools from Plan-Do-Study-Act which consisted of planning, collecting, analyzing, improving, and action plans. The Breast-feeding Support Program was also implemented with a

3-day training class, breastfeeding interactive policy, and “hands on” breastfeeding interventions as follows:

Education. Breastfeeding support and education allowed NICU nurses to perform interventions that encouraged close proximity of mother with infant, and enabled new mothers to respond in a timely manner when the infant showed signs of readiness to feed. These are breastfeeding tools to promote and increase breastfeeding outcomes such as: infant’s suckling, mother infant bonding, kangaroo care, milk storage, and milk pumping. Breastfeeding support interventions are important essentials, which increase breast milk secretion (Bigelow, 2014). Bonding and close contact between infant and mother during kangaroo care is an intervention which provides necessary essentials and regulates breast milk production. Therefore, the Neonatal RN developed an increase in knowledge, skills, and positive attitudes by increased hands on breastfeeding support, to mothers and their infants (Lee, Ho, Jaafar, 2016). The Breastfeeding Policy interventions continue per Appendix H.

Compliance. Breastfeeding evaluation was performed using unstructured 3-day audits weekly by attending NICU shift huddles to observe NICU RNs and inform, as well as remind nursing staff the importance and benefits of breastfeeding support policy per Baby Friendly and the CDC guidelines. The interventions included evaluation of RN’s skills, knowledge, and attitude per data collection tools and unstructured observations by 3-day audits weekly according to CDC guidelines, Baby Friendly benchmarks, and Healthy People 2020 goals. As a DNP leader, data was collected and gathered from the surveys, by observation and using electronic data that provides measurement of mothers supply, demand, and infants’ consumption. However, this project was not initiated without an IRB approval.

A 3-day training breastfeeding support program (Appendix J) per CDC recommendations was conducted which included an interactive breastfeeding policy that focused on knowledge, skills, and attitudes. Please see Appendix I, interventions were performed per interactive policy.

Data Collection Tools. A quantitative design was used as data collection tools that measured and examined the effectiveness of breastfeeding training and support. The data was collected in both pre and post questionnaires. Quantitative descriptive research, as well as other research methodologies and designs, remain at the center fold, in developing new integrative, and interactive scientific knowledge, together interfacing the advancement for optimal quality of care at the bedside (Burns & Grove, 2013). Quantitative descriptive data was collected by using three survey questionnaires. The first one consists of 33 survey questions, according to Pound et al. (2014) which was modified and adapted from the Canadian Physician tool to develop the Neonatal RN Breastfeeding Assessment Tool. A total of 11 questions for mothers are used from Beginning Breastfeeding Survey- Cumulative (Mulder, 2013) and a total of 4 questions using Bristol Breastfeeding Assessment Tool (Ingram 2015). These tools are assessments instruments that analyze data collection from neonatal RNs while participating in a breastfeeding support class to improve their skills, attitude, and knowledge.

The following three survey tools were used in this project study to assess effectiveness:

- A. The Neonatal RN Breastfeeding Assessment Tool (Canadian Physician Tool) for RNs (Pound et al., 2014). This tool assessed the neonatal RN's attitude, knowledge skills, and belief regarding breastfeeding

- B. The Beginning Breastfeeding Survey- Cumulative (BBS-C) (Mulder, 2013) provided an assessment of mothers' experience in breastfeeding and
- C. The Bristol Breastfeeding Assessment Tool (BBAT) (Ingram et al., 2015) was used to examine the mother results in breastfeeding.

These tools were used in week one for pre-assessment data. The tools were given to Neonatal RNs and breastfeeding mothers with infants in the NICU. The tools were also used with a post assessment for neonatal RNs and mothers at week 8 which occurred after the completion of the 3 day breastfeeding support class.

The project design 3 instruments for validation and reliability was as follows:

The RN Breastfeeding Assessment Tool. The NICU nurses were given an RN Breastfeeding Assessment Survey questionnaire that examines the nurses' attitude, knowledge, and skills. This questionnaire was developed from the Breastfeeding, Knowledge Confidence, Belief, and Attitude Survey, which was originally developed by Pound et al. (2014). The original questionnaire had a total of 50 questions which was modified and adapted for the Neonatal RN Breastfeeding Assessment Tool. This questionnaire was originally reviewed by Lactation Consultants and developed from American Association Pediatrics (2012) statement on "Breastfeeding and Use of Human Milk" and Ontario Self- Learning module on Breastfeeding knowledge (Pound et al., 2014) that was adapted to the Neonatal RN Breastfeeding Assessment Tool. To access reliability internal consistency, co-efficiency alpha and total correlation coefficients was used to calculate in this tool. The RN Breastfeeding Assessment Tool (The Canadian Physician Tool) showed excellent reliability confidence (n=761), (Cronbach's alpha =

0.81), knowledge (n= 625, Cronbach's alpha = 0.62) attitudes (n=506, Cronbach's alpha = 0.60, and belief low reliability value (n= 755, Cronbach's alpha = 0.21), Pound et al. (2014).

The Beginning Breastfeeding Survey-Cumulative. The mother and infant feeding survey consists of questions from The Beginning Breastfeeding Survey-Cumulative (BBS-C) which was developed by Mulder (2013) to assess a mother's perception of how effectively she is breastfeeding. Beginning Breastfeeding Survey (BBSC) internal consistency reliability (ICC) was 0.90 well above the recommendation ICC of 0.70 (Mulder, 2013).

The Bristol Breastfeeding Assessment Tool (BBAT). The Bristol Breastfeeding Assessment Tool is used to assess breastfeeding consistency and enhance the breastfeeding mother's ability to latch and position her infant. This tool was based on evidence research from Baby Friendly Initiatives on breastfeeding practice principles which was developed by Ingram, Johnson, and Churchill (2014). Bristol Breastfeeding Assessment Tool (BBAT) final item 4 showed good internal reliability (Cronbach's=0.668) and high correlation of its use (ICC= 0.782), Ingram, Johnson, and Churchill, (2015).

For the purpose of these tools research and the project reliability for assessing breastfeeding knowledge, skills and attitude were determined by comparison of the test pre total mean, post total mean, and normality of the data.

Analysis

This study used a quantitative design to collect data and examine the effectiveness of breastfeeding training and support. Frequency tables were used to summarize demographics which included pre and posttest survey responses. Descriptive statistics were also used to

summarize the total mean scores for breastfeeding pretest and posttest responses, which compared the total, mean scores of BBS-C, and the total mean scores of BBAT.

Pretest and posttest responses for three domains of the Neonatal RN Breastfeeding Assessment Tool (Pound et al., 2014), was also used to summarize data using frequency tables. As such, the total mean scores of both pre and posttest were compared from the survey questionnaire.

Normality of the data was used with simple descriptive statistics (the total knowledge scores for breastfeeding, the total scores of BBS-C, and the total scores of BBAT, for pretest and posttest) was also assessed using normality measurements of data.

A descriptive analysis provides a comparison of the mean score of both pre and post survey test questionnaires' which is conducted in week 8. The total mean score of each test was taken before (pretest) and compared to the post mean score afterwards (posttest). For all analyses, a p-value less than 0.05 were considered significant.

Ethical Considerations

The IRB application was presented for project study review and approval to Capella and the institution. Study project participants received a clear explanation of class participation and type of data collected and reviews; all participants associated in the study project will not be identifiable according to legal and regulatory guidelines which include the HIPPA privacy act. Study project participants were given a written consent form with a clear explanation of consent and purpose. There were no patient treatments in this project, as this project will examine, and evaluate the effectiveness of breastfeeding knowledge, skills, and attitudes of neonatal nurses,

while participating in a breastfeeding support program facilitated by a Lactation Consultant, and guided by CDC guidelines. Participants' personal information was not identifiable, as all data will be de-identified. The Breastfeeding Support Program and project study design remains committed to the standards of ethical conduct.

Results

The neonatal nurses showed an eagerness to learn and demonstrate their breastfeeding skills. The results of this project showed that the neonatal nurses were knowledgeable, and demonstrated positive breastfeeding attitudes; however, they lacked the opportunity to receive consistent annual breastfeeding support training, which includes skills validation and hands on breastfeeding interventions. The project facility breastfeeding rate is currently at 32% for early breastfeeding initiation. As such, the key findings of this project study showed evidence that neonatal nurses were not given consistent interactive breastfeeding in-service. For this reason, neonatal nurses should be given an opportunity to implement a "hands on" breastfeeding support class and policy interventions annually per CDC guidelines, Baby Friendly Hospital initiatives, and Healthy People 2020 benchmarks which is recommended for future practice.

Survey Data Results

The survey results showed that the participants included fourteen RNs and seven breastfeeding new mothers who participated in a 3-day Breastfeeding Support Program Class, in which seven RNs participated in the pre-intervention survey and another seven RNs whom participated in the post-intervention survey. Please see Appendix A through G for the following survey results:

NICU Nurses Standard Demographics

Demographics. For both pre-intervention and post-intervention demographics in table 1 (Appendix A), all RNs were female (100%), and over half of the RNs were 43 and older (57.1% for pre-intervention and 66.7% for post-intervention) and had practiced in Neonatal Intensive Care Unit for over 15 years (57.1% for pre-intervention and 57.1% for post-intervention). Nearly half of the RNs (42.9%) in pre-intervention were White not Hispanic, and over half of the RNs in post-intervention were Black not Hispanic (57.1%). Over half of the RNs (57.1%) in pre-intervention had a bachelor's degree, while majority of the RNs (71.4%) in post-intervention had a bachelor's degree.

Neonatal RN Breastfeeding Assessment Tool

Learning Experience. The RNs breastfeeding learning experience is summarized in tables 2 and 3 (Appendix B). For both pre-intervention and post-intervention, majority of the RNs annual training for breastfeeding per hospital training (71.4% for pre-intervention and 85.7% for post-intervention), and all RNs had assisted with breastfeeding (100%). Majority of the RNs in pre-intervention did not assist with breastfeeding a week before the intervention, and nearly half of the RNs in post-intervention had assisted with breastfeeding twice a week before the intervention. The average years of employment with hospital was 19.43 ($SD = 16.40$) for RNs in pre-intervention and 22.14 ($SD = 13.97$) for RNs in post-intervention.

Breastfeeding Knowledge. The frequencies and percentages are shown of correct responses for breastfeeding knowledge of the Neonatal RN Breastfeeding Assessment Tool (Tables 4 and 5 of Appendix C) for the 7 RNs in pre-intervention and the 7 RNs in post-intervention. For pre-intervention, the % of corrected responses ranged from 42.9 (Q2) to 100

(Q6 and Q7); for post-intervention, the % of corrected responses ranged from 71.4 (Q2, Q4, and Q10) to 100 (Q3, Q5, and Q9).

Descriptive statistics demonstrate the total scores of breastfeeding knowledge. The mean total score of breastfeeding knowledge was 8.14 ($SD = 1.35$) and 8.57 ($SD = 2.15$) for pre-intervention and post-intervention, respectively. Normality of the data was examined via the z-scores of the variables. Since the absolute values of the z-scores were all less than 2.58, the data (total scores of breastfeeding knowledge for pre-intervention and post-intervention) were considered normally distributed.

Since the data were normally distributed, a 2-sample *t*-test was utilized to determine if there was statistically significant difference in total scores of breastfeeding knowledge between pre-intervention and post-intervention. The analysis results of the 2-sample *t*-test (Table 6 of Appendix D) suggested that there was no statistically significant difference in total scores of breastfeeding knowledge between pre-intervention and post-intervention ($t(12) = -0.447, p = 0.663$).

Beliefs Confidence Attitudes. The survey responses for the confidence, beliefs, and attitudes parts of the Neonatal RN Breastfeeding Assessment are summarized in table 7 (Appendix D). Regarding confidence, for both pre-intervention and post-intervention, majority of the RNs felt overall confidence in breastfeeding is the responsibility of the nurse (item 1, 85.7% pre-intervention and 100% post-intervention), were very comfortable in assessing baby's latch (item 2, 85.7% pre-intervention and 100% post-intervention), assessing milk transfer (item 3, 85.7% pre-intervention and 71.4% post-intervention), and teaching mothers breast-pump use (item 5, 85.7% pre-intervention and 100% post-intervention). Slightly more RNs post-intervention (71.4%) were very comfortable in teaching mothers milk transfer (item 4) than RNs

pre-intervention (57.1%). There was no statistically significant difference in the responses of any of the confidence items between pre-intervention and post-intervention ($p > 0.05$).

Regarding beliefs in breastfeeding, for both pre-intervention and post-intervention, majority of the RNs believed that evaluation of breastfeeding is the responsibility of the nurse (item 1, 85.7% pre-intervention and 85.7% post-intervention) and nurses have an influence on mother's decision to breastfeed (item 3, 100% pre-intervention and 100% post-intervention), and did not believe that formula is nutritionally equivalent to breastmilk (item 2, 14.3% pre-intervention and 0% post-intervention). Slightly more RNs pre-intervention (57.1%) believed the nursing training prepared them poorly or somewhat poorly, to support mothers to breastfeed (item 4) than RNs post-intervention (28.6%). There was no statistically significant difference in the responses of any of the beliefs items between pre-intervention and post-intervention ($p > 0.05$).

Regarding attitudes in breastfeeding, for both pre-intervention and post-intervention, majority of the RNs were very comfortable assisting mothers with breastfeeding (item 1, 71.4% pre-intervention and 85.7% post-intervention), directly observed breastfeeding at least once in every mother-baby feeding (item 2, 85.7% pre-intervention and 100% post-intervention), always or almost always asked mother about breastfeeding in the first 24 hours (item 3, 85.7% pre-intervention and 100% post-intervention), and always discussed breastfeeding options when meeting mothers before or after birth (item 4, 85.7% pre-intervention and 100% post-intervention). There was no statistically significant difference in the responses of any of the attitude's items between pre-intervention and post-intervention ($p > 0.05$).

The Beginning Breastfeeding Survey-Cumulative (BBS-C)

Mothers Breastfeeding Experience of BBS-C. The pre-intervention and post-intervention survey responses of 8 items regarding mother's breastfeeding experience of BBS-C were

summarized in table 8(Appendix E). The 8 items were as follows: 1. My baby eagerly opens his/her mouth wide; 2. My baby sucks eagerly; 3. My baby is fussy while breastfeeding; 4. My baby doesn't want to breastfeed; 5. I feel comfortable positioning to breastfeed; 6. I feel frustrated while trying to breastfeeding; 7. I am unhappy about breastfeeding; 8. I can hear my baby swallow when I am feeding. There was one missing response for items 3 and 4 post-intervention. After replacing the missing responses with mode of the items, the total scores of BBS-C regarding mother's breastfeeding experience pre-intervention and post-intervention were computed by summing the numerical values for each item (after reverse coding the negatively worded items).

The descriptive statistics (Table 9 of Appendix F) show total scores of mother's breastfeeding experience. The mean total score of mother's breastfeeding experience was 26.57 ($SD = 3.15$) and 32.14 ($SD = 1.95$) for pre-intervention and post-intervention, respectively. Normality of the data was examined via the z-scores of the variables. The absolute values of the z-scores for skewness and kurtosis were all less than 2.58, the data (total scores of mother's breastfeeding experience for pre-intervention and post-intervention) were considered normally distributed. The data were normally distributed, a paired *t*-test was utilized to determine if there was statistically significantly difference in total scores of mother's breastfeeding experience between pre-intervention and post-intervention.

The analysis results of the paired *t*-test in table 10 (Appendix F) suggested that there was a statistically significantly difference in total scores of mother's breastfeeding experience between pre-intervention and post-intervention ($t(6) = -4.324, p = 0.005$). In particular, mothers have statistically significantly greater breastfeeding effectiveness post-intervention ($M = 32.14, SD = 1.95$) than pre-intervention ($M = 26.57, SD = 3.15$).

Infant Feeding Survey of BBS-C. The survey responses for the infant feeding survey of BBS-C are summarized in table 11(Appendix F). For both pre-intervention and post-intervention, majority of the mothers had fed their infant directly from the breast (item 1, 100% pre-intervention and 100% post-intervention) and had fed the baby breastmilk from a bottle, cup, or other feeding devise (item 2, 85.7% pre-intervention and 85.7% post-intervention) in the past 24 hours. Much more mothers had the baby formula in the past 24 hours pre-intervention (71.4%) than post-intervention (14.3%). According to the results normality tests, there was no statistically significant difference in the responses of any of the items infant feeding survey of BBS-C between pre-intervention and post-intervention ($p > 0.05$).

Breastfeeding Assessment Tool (BBAT)

BBAT survey responses are summarized in table 12 (Appendix G). In pre-intervention, breastfeeding proficiency, in terms of positioning, attachment, sucking, and swallowing, was rated either poor or moderate by the mothers. On the other hand, in post-intervention, breastfeeding proficiency, in terms of positioning, attachment, sucking, and swallowing, was rated either moderate or good by the mothers. The total scores of BBAT pre-intervention and post-intervention were computed by summing the numerical responses of the 4 items. The mean total scores of BBAT was 1.86 (SD = 1.86) and 7.43 (SD = 0.53) for pre-intervention and post-intervention, respectively.

Normality of the data in table 13 (Appendix G) was examined via the z-scores of the skewness and kurtosis of the variables. Since the absolute values of the z-scores for skewness and kurtosis were all less than 2.58, the data (total scores of BBAT for pre-intervention and post-intervention) were considered normally distributed. Since the data were normally distributed, a

paired *t*-test was utilized to determine if there was statistically significantly difference in total scores of BBAT between pre-intervention and post-intervention.

The analysis results of the paired *t*-test in table 14 (Appendix G) suggested that there was a statistically significantly difference in total scores of BBAT between pre-intervention and post-intervention ($t(6) = -7.415, p < 0.001$). Mothers have statistically significantly greater breastfeeding proficiency post-intervention ($M = 7.43, SD = 0.53$) than pre-intervention ($M = 1.86, SD = 1.86$).

Discussion

Summary

A study assumption is an accepted statement or statements that are considered true, even though evidence does not exist to support those (Groves, et al. 2013) The main assumption of this Breastfeeding Support project is that study participants will respond truly on knowledge, skills, and attitudes during the breastfeeding survey questionnaire. Another assumption to consider is that breastfeeding training, and observations of breastfeeding support that is given by Neonatal RNs to breastfeeding mothers will remain unstructured observations to reduce bias.

Pretest and posttest survey questionnaires were given to Neonatal RNs and breastfeeding mothers, before and after the breastfeeding support program interventions. A statistical analysis was completed to determine results from breastfeeding support and policy interventions that were provided to increase knowledge, skills, and attitudes of Neonatal nurses to improve breastfeeding outcomes.

The specific aims of this project provided interventions and strategies from the CDC guidelines, Baby Friendly benchmarks and Healthy People 2020 goals to increase breastfeeding support among neonatal nurses for breastfeeding mothers and their infants in NICU. The findings of this quality Improvement project provided evidence based breastfeeding interventions for neonatal nurses, which improved breastfeeding outcomes for mothers and their infants in Neonatology.

The strength of this project proved self-reflection of breastfeeding outcomes among neonatal nurses at the project hospital. The RN questionnaire provided opportunities for the neonatal nurses to ask questions regarding breastfeeding skills and concerns regarding breastfeeding support. The key findings of this project study showed evidence that neonatal nurses were knowledgeable, and demonstrated positive breastfeeding attitudes; however, they lack the opportunity to receive consistent hands on interventions with annual training.

Interpretation

The project health care facility has approximately 32% of its neonatal infants who receive breast milk within 4 weeks of life and lack annual training (Project Hospital, 2017). According to Davis (2015), nurses are key advocates during breastfeeding support for mothers with infants in the NICU. This quality improvement project provided the project facility an opportunity to increase breastfeeding outcomes. The project results showed an increase of breastfeeding support interventions among NICU nurses. Moreover, the project study provided the project hospital an opportunity to conduct an innovative environmental change by implementing a policy with transparency that included mentoring, encouraging, and educating Neonatal RNs in the major benefits of breastfeeding interventions, for new mothers with infants in the NICU. The neonatal

nurses demonstrated eagerness to learn and a desire to implement breastfeeding policy and interventions, to mothers with infants in the NICU. The Breastfeeding Support Class provided neonatal nurses an opportunity to question breastfeeding interventions such as: 1). When is it appropriate to allow breastfeeding for infants of prematurity? 2). What are special considerations for breastfeeding mothers with infections? 3). How long does premature infants feed on the breast? 4). What is storage time for breastmilk kept in the freezer and refrigerator? The Breastfeeding class provided an opportunity for Neonatal nurses to increase their knowledge, improved their attitudes and skills with hands on interventions while supporting, and encouraged to work with breastfeeding mothers at the bedside. The project facility breastfeeding rate remains at 32%. However, the Neonatal nurses demonstrated positive attitudes while increased breastfeeding support was given to breastfeeding mothers at the bedside.

Limitations of the Project

A breastfeeding education and support program require motivation and mentorship implemented by nurse managers and the director of the NICU. The project hospital currently has one Lactation Consultant who makes rounds daily on the perinatal unit. However, the project NICU does not have a primary Lactation Consultant. Further research is required to motivate NICU RNs, which requires the project hospital to hire and retain Lactation Consultants who can deliver breastfeeding education, with 3-day training classes per CDC guidelines in order to increase NICU nurses' knowledge, skills, and attitudes in breastfeeding support. Limitations of this project also include small samples and mothers who are breastfeeding with infants in Neonatology in an 8week period; further research is needed with a larger sample.

Conclusion

Breastfeeding importance remains the cornerstone of disease prevention and health promotion throughout the life span. This quality improvement project provides a Breastfeeding Support Program that is designed to provide Neonatal RNs with opportunities in breastfeeding education, a breastfeeding policy, and breastfeeding support classes every 6 months, as well as on initial hire, in order to improve breastfeeding outcomes among new mothers and their infants.

The goal of Healthy People 2020 remains in improving breastfeeding outcomes. As a DNP leader, this quality improvement project provided an opportunity to implicate innovative patient focused care which assimilates proven scientific data, to the bedside by implementation of evidenced-based care. This project demonstrates sustainability and doctoral level rigor by implementing a pilot project that provides quality improvement tools that were developed and implemented through evidence based practice. The breastfeeding strategies within this program can be used throughout the project health system's perinatal department and remains generalizable to breastfeeding populations within in the United States and globally.

This project study provided a small sample included a total of 14 Neonatal nurses which consisted of seven Neonatal nurses' pre / post interventions and seven new breastfeeding mothers with infants in the NICU. However, this quality improvement breastfeeding program provides evidence based breastfeeding strategies that are proven interventions which are recommended by the CDC guidelines, Baby Friendly benchmarks, and Healthy People 2020 goals. As such, the project maintains sustainability for implementation locally, throughout the United States and globally for neonatal nurses, as well as, health care systems caring for mothers and their infants.

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Appendix A

Demographics

In the appendix, tables associated with analysis results are presented. Tables 1-7 were related to RNs' survey results and Tables 8-14 were related to mothers' survey results.

Table 1

Demographics

		Pre-intervention (<i>N</i> (%))	Post-intervention (<i>N</i> (%))
Gender	Female	7 (100.0)	7 (100.0)
Age	26-29	2 (28.6)	0
	30-33	1 (14.3)	2 (33.3)
	43 and older	4 (57.1)	4 (66.7)
Ethnicity	White not Hispanic	3 (42.9)	2 (28.6)
	Black not Hispanic	2 (28.6)	4 (57.1)
	Other	2 (28.6)	1 (14.3)
Years of practice in Neonatal Intensive Care Unit	0-5	2 (28.6)	1 (14.3)
	11-15	1 (14.3)	2 (28.6)
	> 15	4 (57.1)	4 (57.1)
Highest year of school completed	Baccalaureate	4 (57.1)	5 (71.4)
	Masters	2 (28.6)	1 (14.3)
	Doctoral level	1 (14.3)	1 (14.3)

Appendix B
Neonatal RN Breastfeeding Assessment

Table 2

Breastfeeding learning experience (part 1)

		Pre-intervention (N (%))	Post-intervention (N (%))
Breastfeeding per hospital training	Initial hire	1 (14.3)	0
	Initial hiring and annual training	0	1 (14.3)
	Annual training	5 (71.4)	6 (85.7)
	None	1 (14.3)	0
Ever assisted with breastfeeding	Yes	7 (100.0)	7 (100.0)
Number of times assisted with breastfeeding per last week	0	5 (71.4)	2 (28.6)
	1	0	2 (28.6)
	2	1 (14.3)	3 (42.9)
	4	1 (14.3)	0

Table 3

Breast learning experience (Number of years employed with hospital)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Pre-intervention	19.43	16.40	1	38
Post-intervention	22.14	13.97	1	38

Appendix C

Neonatal RN Breastfeeding Assessment

Table 4

N (%) of corrected responses for breastfeeding knowledge of the Neonatal RN Breastfeeding Assessment Tool

Item (Correct answer)	Pre-intervention	Post-intervention
Q1 (No)	5 (71.4)	6 (85.7)
Q2 (Yes)	3 (42.9)	5 (71.4)
Q3 (Yes)	6 (85.7)	7 (100.0)
Q4 (Yes)	5 (71.4)	5 (71.4)
Q5 (Ask mother and monitor's mothers ability to latch infant during breastfeeding or apply lanolin or breastmilk to breast)	6 (85.7)	7 (100.0)
Q6 (Yes)	7 (100.0)	6 (85.7)
Q7 (Yes)	7 (100.0)	6 (85.7)
Q8 (Yes)	6 (85.7)	6 (85.7)
Q9 (No)	6 (85.7)	7 (100.0)
Q10 (Yes)	6 (85.7)	5 (71.4)

Table 5

Descriptive statistics of total scores of breastfeeding knowledge

	<i>M (SD)</i>	<i>Skewness (SE)</i>	<i>Kurtosis (SE)</i>	<i>Z_{skewness}</i>	<i>Z_{kurtosis}</i>
Pre-intervention	8.14 (1.35)	-0.35 (0.79)	-0.30 (1.59)	-0.44	-0.19
Post-intervention	8.57 (2.15)	-1.19 (0.79)	-0.52 (1.59)	-1.50	0.33

Appendix D

Neonatal RN Breastfeeding Assessment

Table 6

Results of 2-sample t-test

	Mean difference	SE	t	df	p
Total scores of breastfeeding knowledge	-0.43	0.96	-0.447	12	0.663

Table 7

N (%) of “yes” responses for the items of confidence, beliefs, and attitudes of the Neonatal RN Breastfeeding Assessment Tool

	Item	Pre-intervention	Post-intervention	p
Confidence	1	6 (85.7)	7 (100.0)	1.000
	2	6 (85.7)	7 (100.0)	1.000
	3	6 (85.7)	5 (71.4)	1.000
	4	4 (57.1)	5 (71.4)	1.000
	5	6 (85.7)	7 (100.0)	1.000
Beliefs	1	6 (85.7)	6 (85.7)	1.000
	2	1 (14.3)	0	1.000
	3	7 (100.0)	7 (100.0)	NA
	4	4 (57.1)	2 (28.6)	0.592
Attitudes	1	5 (71.4)	6 (85.7)	1.000
	2	6 (85.7)	7 (100.0)	1.000
	3	6 (85.7)	6 (85.7)	1.000
	4	6 (85.7)	6 (85.7)	1.000

Note: p-values were based on Fisher’s exact tests. NA = not available

Appendix E

Beginning Breastfeeding Survey-Cumulative (BBS-C)

Mothers' Breastfeeding Experience

Table 8

Survey responses of 8 items regarding mother's breastfeeding experience of BBS-C

Intervention	Item	Frequency (%) of survey responses				
		1	2	3	4	5
Pre	1	0	2 (28.6)	3 (42.9)	2 (28.6)	0
	2	0	3 (42.9)	1 (14.3)	3 (42.9)	0
	3*	0	1 (14.3)	6 (85.7)	0	0
	4*	1 (14.3)	2 (28.6)	2 (28.6)	2 (28.6)	0
	5	0	1 (14.3)	2 (28.6)	2 (28.6)	2 (28.6)
	6*	1 (14.3)	3 (42.9)	3 (42.9)	0	0
	7*	5 (71.4)	1 (14.3)	0	0	1 (14.3)
	8	0	4 (57.1)	3 (42.9)	0	0
Post	1	0	0	1 (14.3)	5 (71.4)	1 (14.3)
	2	0	0	1 (14.3)	5 (71.4)	1 (14.3)
	3*	0	1 (16.7)	5 (83.3)	0	0
	4*	0	5 (83.3)	1 (16.7)	0	0
	5	0	0	0	4 (57.1)	3 (42.9)
	6*	0	7 (100.0)	0	0	0
	7*	5 (71.4)	2 (28.6)	0	0	0
	8	0	0	0	7 (100.0)	0

*Note: * indicates negatively worded items. 1 = never, 2 = rarely, 3 = sometimes, 4 = usually, and 5 = always. One missing value for item 3 and item 4 post-intervention.*

Appendix F

Beginning Breastfeeding Survey- Cumulative (BBS-C)

Mother’s Experience/ Infant Feeding Survey

Table 9

Descriptive statistics of total scores of mother’s breastfeeding experience

	<i>M (SD)</i>	<i>Skewness (SE)</i>	<i>Kurtosis (SE)</i>	<i>Z_{skewness}</i>	<i>Z_{kurtosis}</i>
Pre-intervention	26.57 (3.15)	-0.16 (0.79)	-1.64 (1.59)	-0.20	-1.03
Post-intervention	32.14 (1.95)	1.42 (0.79)	2.52 (1.59)	1.80	1.58

Table 10

Results of paired t-test

	Mean difference	<i>SE</i>	<i>t</i>	<i>df</i>	<i>p</i>
Total scores of mother’s breastfeeding experience	-5.57	1.29	-4.324	6	0.005

Table 11

N (%) of “yes” responses for the items of infant feeding survey in the BBS-C

Item	Pre-intervention	Post-intervention	<i>p</i>
1	7 (100.0)	7 (100.0)	NA
2	6 (85.7)	6 (85.7)	1.000
3	5 (71.4)	1 (14.3)	0.125

Note: p-values were based on McNemar’s tests. NA = not available.

Appendix G

Bristol Breastfeeding Assessment Tool (BBAT)

Table 12

Survey responses of BBAT

Intervention		Frequency (%) of survey responses		
		0	1	2
Pre	Positioning	3 (42.9)	4 (57.1)	0
	Attachment	3 (42.9)	4 (57.1)	0
	Sucking	4 (57.1)	3 (42.9)	0
	Swallowing	5 (71.4)	2 (28.6)	0
Post	Positioning	0	1 (14.3)	6 (85.7)
	Attachment	0	3 (42.9)	4 (57.1)
	Sucking	0	0	7 (100.0)
	Swallowing	0	0	7 (100.0)

Note: 0 = poor, 1 = moderate, and 2 = good.

Table 13

Descriptive statistics of total scores of BBAT

	<i>M (SD)</i>	<i>Skewness (SE)</i>	<i>Kurtosis (SE)</i>	<i>Z_{skewness}</i>	<i>Z_{kurtosis}</i>
Pre-intervention	1.86 (1.86)	0.07 (0.79)	-2.33 (1.59)	0.09	-1.46
Post-intervention	7.43 (0.53)	0.37 (0.79)	-2.80 (1.59)	0.47	-1.76

Table 14

Results of paired t-test

	Mean difference	<i>SE</i>	<i>t</i>	<i>df</i>	<i>p</i>
Total scores of BBAT	-5.57	0.75	-7.415	6	< 0.001

Appendix H

Inter-active Breastfeeding Policy

Breastfeeding Policy
1. Healthy People 2020, Baby Friendly Hospital Initiatives, and the CDC guidelines are as follows:
a. The project health system breastfeeding policy will follow the Ten Steps to Successful Breastfeeding (Project Facility, 2017).
b. The project hospital will continue a written breastfeeding policy and will routinely share it with all health care providers.
c. The project hospital will train NICU RNs and perinatal staff to follow this policy.
d. NICU RNs will educate mothers about the benefits of breastfeeding.
e. The NICU RNs will help all new mothers with infants in the NICU to start breastfeeding within an hour of birth.
f. The NICU RNs will educate mothers how to breastfeed and how to pump and store their milk if they are separated from their baby.
g. The NICU RNs will not give babies anything except breastmilk unless there is a medical indication.
h. The NICU RNs will encourage mothers to keep their infants with them 24 hours a day.
i. The NICU RNs will encourage breastfeeding when the baby wants to eat.
j. The NICU RNs and staff will not give pacifiers or other artificial nipples to breastfeeding babies.
k. The NICU RNs will refer our breastfeeding mothers for follow-up and support after discharge (Project Health System, 2017).

Appendix I

Policy Interventions

Increase Breastfeeding Knowledge
a. Educate all neonatal nurses and clinical technicians with annual competency testing regarding breast feeding education to demonstrate and teach mothers correct breastfeeding techniques.
b. Provide breastfeeding seminars for neonatal nurses, and mothers every 6 months per 3 day training, in Perinatology
Increase Skills
c. Increase breastfeeding support training among NICU RNs to 3 days per 6 months, and as needed per one on one training to new mothers.
d. Train all Neonatal health care staff in skills necessary to implement this program.
e. Provide 1 primary Lactation Consultant weekly for the NICU nurses
f. Provide neonatal RN opportunity to shadow lactation consultants during breastfeeding consulting for new mothers in NICU
Mentoring Breastfeeding Attitudes
g. Provide a mentoring sessions for NICU RNs and lactation support from Lactation Consultants to increase motivation, confidence, and conviction among neonatal nurses
h. Inform all pregnant women about the benefits and management of breastfeeding during perinatal admission.
i. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their infants

Appendix J

3 Day Breastfeeding Support Program Schedule

Day 1	Day 2	Day 3
Educational Presentation and Breastfeeding Handouts Four Good Signs of Breastfeeding	Education Presentation and Breastfeeding Handouts Four Good Signs of Breastfeeding	Neonatal RN Shadows Lactation 1 hour Consultant during Breastfeeding Support for new mothers
Breastmilk Positioning	Breastmilk Positioning	
Kangaroo Hold	Kangaroo Hold	
Expressing Breastmilk from Breast pump and Hand Expression	Expressing Breastmilk from Breast pump and Hand Expression	
Burping Techniques	Burping Techniques	
Milk Maintenance and Storage	Milk Maintenance and Storage	
Demonstration/ Return Demonstration	Demonstration/ Return Demonstration	