An Empowerment Program to Reduce Parental Distress and Neonatal Length of Stay

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Abstract

Over 400,000 preterm infants are born each year and taken to the neonatal intensive care unit which presents a caustic and intimidating environment for parents who struggle to adapt to the parenting role in a roller coaster ride of unknowns. The purpose of this DNP project was to provide an evidence-based standardized educational-behavioral intervention that empowered parents of the neonatal intensive care resulting in the primary outcome of decreased parental distress and the secondary outcome of shortened neonatal length of stay (LOS). The study was a quasi-experimental pre/posttest design. The project intervention was administered to parents of all infants less than 32 weeks' gestation admitted to a neonatal intensive care unit in Illinois. There was one cohort for both pre- and post-measures of the Parent Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU). The total number of subjects was 38 parents and 25 infants. Parents of infants who met the inclusion criteria received the Creating Opportunities for Parent Empowerment (COPE) program specifically designed for use in the neonatal intensive care unit. The program was a multi-phase educational-behavioral intervention in an audiovisual format that provided detailed information on preterm infant behavioral cues and promoted parent-infant interaction in neonatal intensive care. Results of the project include statistically significant pre- and post-measure PSS: NICU in 4 out of 5 categories and a trend toward a shorter LOS. With the rising cost of healthcare and potential lack of reimbursement for care complications, decreasing the LOS is an essential part of the quality of care continuum. The COPE program has the potential to save the United States up to 2 billion dollars per year.

Keywords: preterm infant, parenting in the neonatal intensive care, COPE program, parent empowerment, infant bonding, parental involvement in the neonatal intensive care unit, parental stress, parental distress, neonatal length of stay, and discharge readiness

An Empowerment Program to Reduce Parental Distress and Neonatal Length of Stay

Care in the neonatal intensive care (NICU) encompasses both the parents and the neonates. A major component in exceptional nursing care is improving outcomes. In the NICU, the primary focus is on the neonates. Over the last decade, however, multiple family-centered care models have suggested that parents play a key role in the care of their infants in the NICU and that their involvement can lead to improved neonatal outcomes. The purpose of this evidence-based practice (EBP) project paper is to elaborate on a parental empowerment program with goals to reduce parental stress and anxiety and subsequently reduce neonatal length of stay (LOS). Details regarding the EBP project are provided in the following paragraphs including significance, problem and purpose, facilitators and barriers, review of evidence, theoretical framework, methods, results, discussion, and interpretation.

Significance

The unexpected birth of a preterm infant can cause significant distress for mothers and fathers (Forcada-Guex, Borghini, Pierrehumbert, Ansermet, Muller-Nix, 2011). The natural adaptation of a mother into motherhood is altered by the complex NICU environment (Shin & White-Traut, 2010). Multiple stressors lead to impaired parent-infant bonding causing a strain on the parent-infant relationship (Baía et al., 2016). In addition, parental stress has been proven to contribute to developmental and behavioral problems in an already at-risk premature population (Zelkowitz, Na, Wang, Bardin, & Papageorgiou, 2011). Surviving low birth weight infants are at significant risk for preventable morbidities that not only increase NICU costs, but lead to substantial life-long chronic illness as well (Johnson, Patel, Jegier, Engstrom, & Meier, 2013). These morbidities have a long-lasting economic impact for the community (Forcada-Guex, et al., 2011). Care of the very low birthweight (VLBW) infant is complex requiring multiple follow-up

visits and at home monitoring (Verma, Sridhar, & Spitzer, 2003). It is unlikely that one or even both parents can maintain a full-time job while caring for a VLBW infant, leading to financial hardship and societal burden (Purdy, Craig, & Zeanah, 2015). Preterm infants are typically mainstreamed to a primary care pediatrician after discharge (Verma et al., 2003). Primary care offices are extremely busy with limited time and resources, making quality care of the complex neonatal graduate very difficult (Newnam & Parrott, 2013).

Economics, Policy, & Health System

In 2013, 447,361 infants were born prematurely and taken to the neonatal intensive care unit (NICU) for care of their complex medical issues (National Center for Health Statistics, 2013). The impact of premature birth is costly. The average cost of a NICU admission for a VLBW infant is $280,811(March of Dimes, 2011). Utilizing the 2014 Vermont Oxford Network (VON) data, the total cost of admissions to the NICU for VLBW infants was 17 billion dollars per year for the United States. Increasing cost was directly related to birth weight and gestational age with infants less than 32 weeks or less than 1500 grams costing the most (March of Dimes, 2011).

Local Issue

The Vermont Oxford Network (VON) reported that 758 infants were admitted to a neonatal intensive care unit in IL in 2016. Of those admissions, 113 were considered very low birth weight (VLBW) infants. The average length of stay (LOS) for VLBW infants an IL NICU in 2016 was 60.4 days. The gestational age of the infant is inversely proportional to the LOS. For example, infants born at 24 weeks stay an average of 146.8 days while infants born at 30-32 weeks stay an average of 45.3 days (VON, 2016). The process to orient parents to the NICU and

provide psychological support and education is not standardized. Each nurse does it her own way and may provide little or no psychological support to parents.

Diversity Considerations

Located in IL, the NICU receives a diverse population of parents and infants. The hospital is a regional referral center; therefore, it encompasses a large area of Illinois. There is an increased risk of premature birth to teen mothers, mothers older than 40, those of lower socioeconomic status and African American race (March of Dimes, 2011). All ages, race, ethnic and cultural backgrounds, and socioeconomic status are present in the NICU. The lesbian/gay community is represented as well through surrogacy.

Problem & Purpose

Problem Statement

Even with advances in maternal/fetal medicine, premature birth continues to be a problem worldwide (March of Dimes, 2011). Despite a decade of evidence to support the family-centered, empowerment approach to reduce parental psychological distress and improve neonatal outcomes, it has yet to be implemented as the standard of care in most neonatal intensive care units across the United States (Melnyk, Feinstein, and Fairbanks, 2006).

Intended Improvement with Purpose

The trigger for change at the IL hospital was the development of the small baby unit in conjunction with VON's new metrics to increase parental involvement and improve neonatal outcomes (VON, 2016). The purpose of this DNP project was to provide an evidenced-based standardized educational-behavioral intervention that empowered parents of the neonatal intensive care unit, resulting in the primary outcome of decreased parental distress and the secondary outcome of shortened neonatal length of stay.

Facilitators and Barriers

Locally, providers were looking for improvements in parental participation and presence at the bedside. A leading NICU neonatologist, familiar with the evidence, urged implementation of the proposed changes. The student investigator and co-investigators are practicing neonatal nurse practitioners (NNP) in the NICU, facilitating a strategic position to propel the project forward and advocating for its success. Globally, quality and cost of care continues to be in the spotlight. The potential savings from this project was an impetus for administrative support from the hospital.

Barriers included a higher than usual census in the NICU and high existing workload demands for the NICU staff nurses. Nursing resistance to change was a problem as nursing staff were initially concerned that the education contradicted their work. Ethnic, cultural, and language barriers were considered, however minimal problems existed during implementation. In addition, preterm infants in this project were considered a vulnerable population and institutional review board approval was more difficult and time consuming than originally expected.

Economic Component

Securing the initial $13,260 financial investment for COPE program was a barrier to the project at first as funds had to be approved at several administrative levels. In addition, releasing the funds to the COPE program Vice President was a barrier as it took additional time and signatures. Looking at the investment as a $52 per patient cost, it was evident that the program was reasonable. The cost of the program will decrease after the first year of implementation to $26 per patient, making it affordable long-term. After successful implementation, a cost/benefit analysis was completed and shown to be a facilitator for sustainability of the program for the future.

Potential & Sustainability

Potential for successful implementation of the DNP project was significant. The neonatal intensive care unit (NICU) had recently revised a portion of the NICU dedicated to improving outcomes for very low birthweight infants. The revision in care now required two-person cares and active family involvement. The implementation of this project empowered parents to be more comfortable and involved in supportive, developmental care of their infant. The family advisor board of the NICU aspired to fund a project that showed benefit to both parents and infants. Nurses were already a key component in the education of families at the bedside. This standardized education provided by COPE mentors provided more consistent information to families and facilitated the bedside nurse's role in parent education. The project did not require the need of extra staff or excessive equipment. The final project timeline in Appendix A guided the project in an acceptable time frame.

Review of Evidence

PICOTS

As part of a Doctor of Nursing Practice (DNP) clinical inquiry, a PICOTS question was formulated to foster a potential evidence-based practice change, as follows: In infants born at less than 32 weeks' gestation, does administration of a multi-phase, family-centered empowerment program to parents decrease parental distress and result in a shorter length of stay for the infant in a four-month study period at a level three neonatal intensive care unit in Illinois?

Search Strategies

Five literature databases and one search engine were electronically searched to address the PICOT question. These included PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, PsychINFO, and Goggle Scholar. The evidence-based

literature review found 300 possible studies to support the clinical inquiry. A total of 74 studies were closely examined and included in the review. Search terms included preterm infant, low birthweight infant, premature infant, parenting in the neonatal intensive care, parenting in the NICU, family-centered care, COPE program, creating opportunities for parental empowerment, infant bonding, parental involvement in the NICU, parental stress, parental distress, parental anxiety, neonatal length of stay, and discharge readiness. Inclusion criteria for the search included relevancy to the neonatal population and application to the PICOT question. Exclusion criteria for the search included foreign language articles and research pre-dating the year 2001.

Evidence Subtopics

Close analysis of the evidence-based literature revealed three common themes: (a) The family-centered care approach increases parental empowerment by improving parental involvement, parent-infant bonding, and positive parent interactions; (b) Parents of infants in neonatal intensive care experience significant psychological distress in various forms that requires intervention; (c) Educational-behavioral interventions administered in neonatal intensive care significantly improve parental mental health outcomes leading to improved neonatal outcomes. Further delineation of these subtopics with supporting evidence is provided in the synthesis of evidence table in Appendix B and discussed in the following paragraphs.

Family-centered care. For decades, there has been a push in healthcare toward the family-centered care approach as evidence supports improved patient outcomes across the age spectrum (Obrien et al., 2013). In the neonatal intensive care unit, the family-centered care approach makes sense as parents are partners in caring for their fragile infants, which has benefits for the parents and infants (Cooper, Gooding, Gallagher, Sternesky, Ledsky, & Berns, 2007). Four research articles support the family-centered (FCC) approach as it relates to the

PICOT question. The highest level of evidence, level II, was provided by Örtenstrand et al. (2010) who published a large randomized controlled trial (RCT) of 366 infants in Stockholm. Parental presence and availability in the NICU was associated with a shortened length of stay; this was felt to be due to parental involvement and individual parental attention providing developmental supportive care to the infant (Örtenstrand et al., 2010). In addition, three other studies provided level IV evidence supporting FCC. The FCC approach encourages increased parental presence in the NICU which leads to less parental stress and improved neonatal weight-gain and less neonatal behavioral stress cues (Byers et al., 2006; O'Brien et al., 2013). In a level IV cohort analytic study by O'Brien et al. (2013.), weight gain, breastfeeding at discharge, and decreased maternal stress were all significantly higher in the family integrated care group than the standard care group in a cohort of 42 enrolled mothers. Reynolds et al. (2013) supports the evidence by adding that greater parental visitation and parental holding was associated with statistically significant infant neurobehavioral outcomes by discharge from the NICU. The intended intervention in the DNP project is a family-centered care approach called Creating Opportunities for Parent Empowerment (COPE). This educational intervention gives parents a better understanding of the NICU surrounding, explains neonatal behavioral cues, and provides support for parental involvement in care (Melnyk, Feinstein, Alpert-Gillis, et al., 2006). Despite evidence from RCTs that a family-centered care approach such as COPE is beneficial to both parents and infants, it remains poorly disseminated and under-utilized in the NICU (Örtenstrand et al., 2010).

Parental psychological distress. The neonatal intensive care is intimidating. Not only is the environment with lights, tubes, wires, ventilators, and monitors frightening, but also infants appear in somewhat of an alien-like form (Beheshtipour, Baharlu, Montaseri, & Razavinezhad

Ardakani, 2014). The change in parental role, from anticipation of a normal term birth, is indicated as one of the most stressful components in the NICU (Baía et al., 2016). The neonatal intensive care unit causes significant parental distress including anxiety and depression (Baía et al., 2016; Busse et al., 2013; Franck, Cox, Allen, & Winter, 2005; Varghese, 2015). Maternal anxiety and depression can continue for years after delivery; this distress impairs a mother's sensitivity and ability to react and respond to her infant appropriately (Zelkowitz et al., 2011).

Countless references discuss the caustic nature of the NICU, however, five references have been chosen to provide substantial evidence that parental distress is harmful for both parents and the infants, and that early intervention is the key to reducing the distress and improving outcomes. Maternal distress levels can be graded from low to severe in nature, and the level is predictive of both cognitive and behavioral development in the neonate (Santos, Yang, Docherty, White-Traut, & Holditch-Davis, 2016; Zelkowitz et al., 2011). In a second analysis of a previous longitudinal study, 229 mother-infant pairs were analyzed; infants of mothers with severe distress had lower cognitive development scores at 12 months than their counterparts (Santos et al., 2016). A cohort study of 57 families by Zelkowitz et al. (2011) further elaborates that preterm infants whose mothers had increased anxiety associated with the NICU have lower scores on the Mental Development Index (MDI).

Literature synthesis revealed interesting differences in how gender affects parental experience in the NICU. Like mothers, fathers also feel anxious about the NICU environment, infant appearance, and role alteration, however, fathers tend to be focused on monitors and equipment more than infant behavioral cues and are less likely to communicate with staff regarding their feelings (Arockiasamy, Holsti, & Albersheim, 2008). Literature suggests that interventions to reduce a father's anxiety are variable and provide inconsistent evidence. A study

by Lee, Wang, Lin, and Kao (2013) with 69 fathers in a NICU in Taiwan showed significant improvement in fathering ability and a reduction in paternal stress with an intervention program aimed specifically for fathers. Melnyk, Feinstein, Alpert-Gillis, et al. (2006), who utilized the COPE intervention for both parents, remark that while fathers did not report less stress in the COPE group versus the non-intervention group, the fathers in the COPE group were more likely to participate in their infant's care and were more sensitive to the infant's needs. In a systematic review analyzing RCTs and cohort studies indicating level III evidence, Brecht et al. (2012) summarizes crucial elements to effective behavioral interventions for parents of preterm infants. The therapeutic, behavioral intervention should (a) discuss infant's characteristics and care, (b) begin early in the NICU stay, (c) address parental anxiety and depression, (d) identify parents' beliefs that support intervention, and (e) be realistic and cost efficient (Brecht et al., 2012). The COPE program employs all five of these elements.

Educational-behavioral interventions. The largest subgroup of evidence has 12 studies, including a systematic review of RCTs, supporting that educational-behavioral interventions administered in neonatal intensive care, improve both parental and neonatal outcomes. The main educational-behavioral intervention studied is the COPE program although similar programs are included in the evidence. An educational-behavioral intervention such as the Creating Opportunities for Parent Empowerment (COPE) program improves parental mental health outcomes, the parent-infant relationship, and parental involvement as well as reduces the neonatal length of stay, decreases readmission rates, and improves neurodevelopmental outcomes (Borimnejad, Mehrnoosh, Fatemi, & Haghani, 2013; Gonya, Martin, McClead, Nelin, & Shepherd, 2014; Melnyk et al., 2001; Melnyk, Feinstein, & Fairbanks, 2006; Melnyk, Feinstein,

Alpert-Gillis, et al., 2006; Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014; Oswalt, McClain, & Melnyk, 2013). Each of these claims will be examined individually.

In a large RCT by Melnyk, Feinstein, Alpert-Gillis, et al. (2006) of 266 parents in two level III NICUs, parents in the COPE intervention group had improved interactions with their infants and stronger thoughts about the parenting role. Based on the Parent Stressor Scale: NICU (PSS: NICU), mothers of COPE had less anxiety and depression at 2 months after delivery than mothers in the non-intervention group (Borimnejad et al., 2013; Melnyk, Feinstein, Alpert-Gillis, et al., 2006; Mianaei et al., 2014). A systematic review of six combined RCT and cohort studies reinforced that parental education and activity can improve mood and lead to more parent-infant interactions (Melnyk, Feinstein, & Fairbanks, 2006). Supplemental data was published by Mianaei et al. (2014) in a RCT of 90 mothers in an Iranian NICU; mothers of the COPE program participated in care more often than other mothers. In addition, Oswalt et al. (2013) established that COPE was most successful in younger mothers in a secondary analysis of the 2006 RCT by Melnyk, Feinstein, Alpert-Gillis et al. Three additional studies of other similar educational-behavioral interventions conclude similar results of reduced stress and anxiety with the COPE intervention (Abdeyazdan, Shahkolahi, Mehrabi, & Hajiheidari, 2014; Beheshtipour, Baharlu, Montaseri, & Razavinezhad Ardakani, 2014; Cano Giménez & Sánchez‐Luna, 2015).

Infants of educational-behavioral interventions benefit as well. Infants of parents of the COPE intervention group had a statistically shorter length of stay (LOS) than their counterparts; differences in LOS ranged from 3.8 to 12.5 days in two large sample RCTs (Gonya et al., 2014; Melnyk, Feinstein, Alpert-Gillis, et al., 2006). In a cost analysis by Melnyk and Feinstein (2009), a shorter LOS would reduce cost per infant by a minimum of $4864, saving the United States around two billion dollars per year, exclusive of cost reductions associated with reduced

readmissions and neonatal morbidity attributable to improved neurodevelopmental outcomes. In a RCT of 303 parents by Gonya et al. (2014), infants of COPE parents had an approximately 10% reduction in 30-day readmission rates than the comparison group. Shorter LOS and decreased readmissions are likely due to parental involvement and discharge preparedness (Peyrovi, Mosayebi, Mohammad-Doost, Chehrzad, & Mehran, 2016). Lastly, in an original pilot RCT by Melnyk et al. (2001), preterm infants of parents who received the COPE intervention scored higher in the Mental Development Index (MDI) and the Bayley Scales of Infant Development (BSID-II) at three months and six months corrected age.

Theory

Mefford's theory of health promotion for preterm infants was the guiding theoretical frame work for the EBP project. The theory of health promotion for preterm infants was adapted from Levine's conservation model (Mefford, 2004). The goal of Levine's conservation model is to conserve health by adapting to maintain wholeness; similarly, the theory of health promotion for preterm infants proposes that infants and family members must go through a rapid adaptive process to survive environmental change (Mefford & Alligood, 2011). The theory of health promotion for preterm infants supported the parental empowerment nursing intervention, the resultant decrease in parental psychological distress, and the subsequently shortened length of stay for the preterm infant. To show the connection of a preterm infant, its mother, and the relationship to this student investigator's EBP project, the theory of health promotion for preterm infants by Mefford (2004) and the transition to motherhood conceptual diagram by Shin & White-Traut (2010) was combined to provide a visual diagram available in Appendix C.

Concepts

The theory of health promotion for preterm infants is formed by two core constructs or complex concepts (McEwen & Willis, 2014). The key constructs are preterm infant in the NICU and health. Preterm infant in the NICU encompasses the concepts of physiologic immaturity, structural immaturity, neurologic immaturity, and disruption in family system while health includes the concepts of physiologic stability and growth, absence of structural injury, neurologic competency, and integration into family (Mefford, 2004). These concepts are defined in Appendix D. Applying this theory to the EBP project, the *patient* is a preterm infant and the *environmen*t is the neonatal intensive care (NICU). The nursing intervention to promote adaptation addressed the concept of *disruption in family system* by providing an empowerment program proven to reduce parental psychological distress (Melnyk et al., 2006). The outcome variable that was measured as an indication of the concept of *health* was the preterm infant's length of stay. Data collected from the EBP project guided by the theory of health promotion for preterm infants was collected empirically and directly correlates with the concepts.

Application of the Theory

The theory of health promotion for preterm infants is a middle-range explanatory theory. It has been tested empirically in several studies authored by Mefford in 1999, 2004, and 2011. Additional authors have also referenced Mefford's work. For example, in a study to develop a framework demonstrating an association between the concepts of lifespan and setting with application to health promotion, Whitehead (2011) discussed Mefford's work as a health promotion model in the early lifespan setting. Zimmerman (2012) added that Mefford's theory offers holistic support for the family and the infant as an essential component of family-centered care.

Methods

IRB and Site Approval

This EBP project was considered evidence-based quality improvement (EBQI) because it used existing evidence to improve the delivery of healthcare (Moran, Burson, & Conrad, 2017). This student performed an extensive literature review and synthesis of evidence to support the EBP project. The goal of this EBP was to provide an educational-behavioral intervention to empower parents that resulted in decreased parental stress and a shortened length of stay for the infant. Because the intervention was provided to parents, this DNP project used human subjects. The risk to the parents and the infants was low as non-standardized education was already performed daily. Although this EBP project did not generate new knowledge, it did require an expedited Institutional Review Board (IRB) approval as it involved infant data collection and direct interaction with parents. An Illinois location was the primary IRB. The proposed project was approved first by the Pediatrics Research Committee and the hospital's senior leadership before it was passed to the IRB. A contract between the IL hospital and University of Missouri-Kansas City already existed. Site approval was obtained from the manager of the NICU, the director of neonatology, and the director of the hospital. The IRB approval letter can be found in Appendix E.

Ethical Issues

One of the major ethical dilemmas during the planning phase of the project was deciding between one or two cohorts. While it would be more practical for the results to have had an intervention group and a control group, the evidence suggested that not providing the intervention to everyone was unethical. This EBP project had many documented benefits with little risk of harm. A potential harm was additional parental distress from the requirement to

complete three educational components and the survey questions. The NICU already employs a parent liaison and a support group to help families if additional parental distress became apparent due to the survey questions and COPE program.

Privacy, protection, and confidentiality. The neonates are considered a vulnerable population (WMA, 2008). The IRB approved a waiver of consent for the parental surveys, however, written informed consent from the mother was required to collect data on the neonate. The IRB approved waiver of consent and written consent is available in Appendix F. The Health Insurance Portability and Accountability Act was maintained throughout this EBP project. Confidentiality and privacy was maintained with secure information gathered from retrospective chart reviews (Terry, 2015). Participant surveys were anonymous. Access to the medical record of previously hospitalized neonates was IRB approved and anonymity was maintained with no collection of identifying data.

Student investigator conflicts of interest. This student investigator worked in the NICU where the project was implemented. Since the COPE program was utilized on all the infants less than 32 weeks whether they qualified for the study or not, there was less risk of bias or influence from the student investigator. Due to the format of the COPE program, all participants received the same information.

Funding

The funding resource for this DNP project was the Family Advisory Board (FAB). The FAB is composed of graduate parents of the NICU. The goal of this group is to support the parents and neonates of the NICU through fundraising in the NICU. The rest of the funding was paid by the NICU, covering the COPE mentors' hourly rate during program training. The itemized cost table is available in Appendix G.

Setting and Participants

The DNP project took place in a neonatal intensive care unit in Illinois. The unit consisted of individual, private room design with the availability for parents to be present at the bedside 24 hours a day, seven days a week. A multi-disciplinary team including neonatologists, NNPs, registered nurses, respiratory therapists, dieticians, pharmacists, physical therapists, pediatric supportive care personnel, and other tertiary care providers were involved in the daily management of these very low birth weight infants.

Inclusion and Exclusion Criteria

Inclusion criteria included parents of infants born at less than 32 weeks' gestation. Infants were born at an Illinois hospital by day of life two. Parents were required to read and speak English to consent for participation in the study. Parents of any demographic, and socioeconomic status were included. If no father was involved, mother could identify one support person to participate in the program.

Exclusion criteria included infants with neither parent involved, anticipation of non-survival, multiple order birth, anticipation of inability to complete all three phases of the program, or any parents whose primary language was not English or who required an interpreter for communication. Fathers under the age of 18 were omitted from the study as they were considered minors even after the birth of a child. In cases where the father was a minor, the mother could designate a different support person 18 years of age or older to participate with her.

Sampling Method

A non-randomized, convenience sampling was used. One cohort completed the study due to ethical considerations. Parental distress was compared to the literature. Neonatal length of stay

was compared to that of a group of similar infants who were patients at the IL hospital prior to implementation of the COPE intervention.

EBP Intervention

The evidence-based intervention was the Creating Opportunities for Parent Empowerment (COPE) Program specifically designed for the NICU. The program is a four-phase educational-behavioral intervention in an audiovisual format. Parents received a 56-page handbook and audio CD. Three phases were administered by expert-trained COPE mentors for this DNP project. Parents were encouraged to self-administer phase IV after discharge. The first phase of COPE, given two to four days after admission, teaches parents about the behaviors and physical characteristics and alert states of premature infants; it also teaches parents how to best parent and interact with their premature infants. The second phase of COPE, given four to eight days after admission, introduces skill building activities that assist parents with (a) identifying the special characteristics of their infants, (b) describing their infants' stress cues, (c) identifying strategies to assist their infants when stressed, and (d) implementing behaviors that will help their infants to grow and develop. The third phase of the COPE program, given one to seven days before discharge, prepares the parent for discharge. A sample COPE flier is available in Appendix H.

The student investigator and designated assistants recruited NICU parents of infants that meet inclusion criteria upon the first few days after admission to the NICU using the scripted details found in Appendix I. Required consents requested by the IRB were obtained after recruitment scripting. Although the pre-intervention, intervention, and post-intervention encompassed a four-month time frame, it was a continuous process as not all infants were

admitted to the NICU at the same time. The flow chart in Appendix J further delineates the intervention process and time frame.

Change Process & EBP Model

Roger's Diffusion of Innovations theory was employed as the process for change for the DNP project. Roger's theory describes change in a five-step process: awareness, interest, evaluation, trial, and adaption (Mitchell, 2015; Rogers, 2003). With years of experience in the NICU, evidence alone is not enough to successfully implement a change that may affect the life of a fragile infant. Rogers (2003) describes diffusion as the "trickle-down" effect of innovators spreading the word over-time. Practice in the NICU is similar as changes are likely to be implemented if other NICUs have done it and were successful.

The EBP model chosen to propel the DNP project was the Model for Evidence-Based Practice Change, a revision of the Rosswurm and Larrabee version from 1999 (Melnyk & Fineout-Overholt, 2015). The EBP model was chosen because it aligns with the Diffusion of Innovation change model and the planned progressive steps for this student investigator's DNP project. The model includes six steps to implement the EBP change including: assessing the need for change, locating the evidence, analyzing the evidence, designing the practice change, implementing and evaluating the practice change, and integrating and maintaining that change in practice (Melnyk & Fineout-Overholt, 2015). The COPE EBP change is easily sustainable. The COPE program will be demonstrated and implemented as the new standard of care in the NICU. After initial demonstration by COPE mentors, additional staff can be educated on the COPE process. In addition, a parent pathfinder position, funded by the FAB to potentially champion this program, will be available in the next six months.

Study Design

The study design was a quasi-experimental pre/posttest design. The project intervention was administered to all infants admitted to the NICU at less than 32 weeks' gestation who met inclusion criteria. There was one cohort for the pre-measure and post measure of the Parent Stressor Scale: NICU to ensure adequate sample size. Results of the pre/post measure were compared to evidence-based literature. Length of stay of the cohort were compared to retrospective data collected on infants of similar demographics and developmental characteristics.

Validity

Internal validity of the project was maintained by using the same educational intervention throughout the project. Since there was no control group, there was less risk of contamination between two cohorts. The risk of a small sample size was low due to limited exclusion criteria, however, due to the shortened intervention time frame, fewer subjects were available than originally anticipated. To address concerns of maturation when comparing pre-post intervention results, the results from this DNP project were benchmarked with the results of the large randomized controlled trial (RCT) by Melnyk et.al (2006). If results from the EBP project reflect similar results to other RCTs, the results will be generalizable supporting external validity.

Outcomes

The first project outcome, decreasing parental distress, was considered a patient driven outcome. Although parents are not the direct patients in the NICU, the integration of the preterm infant into the family system is a key component of care. The second project outcome, shortening the neonatal length of stay, was considered a healthcare system outcome. Shortening the neonatal length of stay will have a significant economic impact.

Measurement Instruments

The tool used to measure parental distress was the Parent Stressor Scale: NICU (PSS: NICU). PSS: NICU was designed with input from previous NICU families and was intended to measure parental response to environmental stressors in the NICU (Miles, Funk, & Carlson, 1993). The PSS: NICU has three metrics available for use in clinical research: (a) stress occurrence level, (b) overall stress level, and (c) number of stressors experienced (Miles et. al, 1993). A portion of the PSS: NICU measurement tool is available in Appendix K.

Validity and Reliability

To assess construct validity of the PSS: NICU, Miles et.al (1993) used Pearson's correlational coefficients to compare the PSS: NICU scores to the already established State-Trait Anxiety Inventory scores. As hypothesized, perceived level of environmental stress correlated positively with measured anxiety (Miles et. al, 1993). Validity of content was also established with comparison to a theoretical framework: Magnussen's stress theory as well as content experts (Miles et. al, 1993).

The PSS: NICU was initially evaluated in a pilot study of 58 parents of NICU infants hospitalized in two different NICUs. Cronbach's Alpha was examined for each item and revisions to the tool were made if the items lowered the coefficient alpha (Miles et.al, 1993). Finally, the PSS: NICU was evaluated in a study of 190 parents in three NICUs. In this study Miles et.al examined internal consistency for each subscale and the entire instrument using Cronbach's alpha coefficients. Alpha coefficients were >.70 for all scales, which is considered acceptable, .94 for metric one, and .89 for metric two (Miles et. al, 1993, p. 151).

Procedure & Permission

The student investigator and co-investigators were responsible for the administration of the anonymously completed surveys. Parents completed one survey pre-intervention and one survey post phase I intervention. Prior to using the tool, permission to use the PSS: NICU tool was obtained from its originator, Margaret Miles, and is included in this proposal as Appendix L.

Quality of Data & Analysis Plan

Descriptive demographic information was collected to assure similar characteristics of the neonate study group and the previously hospitalized group of neonates. Infants of similar gestation and illness were compared to determine if the shortened LOS was significant. As stated previously, data from pre/post PSS: NICU survey was compared to previous evidence from RCTs. Data was collected via REDCap and analyzed with SPSS. A sample of the SPSS data collection tool is found in Appendix M. A priori power analysis for t-test using G-Power software with medium effect, power of 0.8, alpha of .05 revealed a required sample size of 102. For comparison of LOS, a minimum of 51 infant chart reviews from 2016 will be compared to minimum of 51 post intervention infants. The anticipated number of intervention participants was 60. Due to the unanticipated short time frame of this EBP, only 9 infants were discharged at the time of data analysis. Confirmation of the power analysis is available in Appendix N.

To compare the PSS: NICU before and after intervention, the paired t-test was utilized then compared to the benchmark. Demographic data of the infants was collected and recorded in the same format as the retrospective comparison infants found in the Vermont Oxford Nightingale Database. The t-test was used to compare the means between the retrospective cohort's LOS and the intervention group's LOS. Pearson's Chi-Squared test compared nominal demographic characteristics of the two groups. The faculty advisor for this DNP Project from

UMKC reviewed the analysis to ensure accuracy. A logic model detailing the methods described in the previous paragraphs is available in Appendix O.

Results

Setting & Participants

The study was conducted over a three-month time frame from January 2018 to April 2018 in the neonatal intensive care unit at an Illinois hospital. A total of 38 parents participated in the PSS: NICU surveys. Twenty-five mothers and 13 fathers took the PSS: NICU pre-intervention and demographic survey that met the inclusion criteria. Two mothers and three fathers were unable to complete the post intervention survey due to infant loss or lack of presence in an appropriate time frame.

Mothers. The mean age of mothers was 28.16 years. Most of the mothers were Caucasian (64%), had never been married (48%), had graduated high school or greater (80%), and had public aid (68%). Melnyk's comparison COPE group was statistically similar in all categories except payer type, as 64.5% of Melnyk's COPE mothers had private insurance (Melnyk et. al, 2006). Parent Comparative data can be found in Table 1.1 and 1.2.

Fathers. The mean age of fathers was 27.88 years. Most of the fathers were Caucasian (76.9%), were married (61.5%), had graduated high school or greater (84.6%), and had private insurance (46.2%). Melnyk's comparison COPE group was statistically similar in all categories except payer type, as 92% of Melnyk's COPE fathers had private insurance. Fathers in Melynk's COPE group were more racially diverse as well (Melnyk et. al, 2006).

Infants. While 25 infants were enrolled in a three-month time frame, two infants expired, two additional infants were back transferred to referring facilities, and only nine infants were discharged when data collection ended. Infants in the COPE group were compared to a

historical cohort of infants from the same NICU. The infants were statistically similar in all categories except intraventricular hemorrhage (IVH). The intervention group had statistically more grade I IVH than the comparison group (p=.0013) meaning the COPE group was potentially more ill. Most likely this is due to the small number of COPE infants at the time of analysis. The comparison statistical analysis of infants can be found in Table 2.

Intervention Course

Typically, two to four days after admission to the NICU, parents were approached by the student primary investigator or co-investigators regarding the newly implemented COPE program. Parents were asked to participate in two surveys and to allow for data collection on their infant. A letter of informed consent regarding the surveys was explained and a full written consent was obtained from the mother for data collection on her infant. While phase I of the COPE program was intended to be administered on day of life (DOL) two to four, there were circumstances that required the timeline to be fluid, such as maternal illness or infant decompensation. The pre-intervention survey was completed electronically by all agreeing participants at the infant's bedside in the NICU. COPE phase I was then administered via ipad/MP3 player for all participants. Twenty-five mothers and thirteen fathers completed phase I.

COPE Phase II was intended to be administered four to eight days after admission. While the timeline of phase II was fluid as well, phase II was given no sooner than two days after completion of phase I. Prior to administering COPE phase II, the post-intervention survey was given again electronically at the infant's bedside. Twenty-three mothers and ten fathers completed the post intervention survey and phase II. While it seems illogical to get the post intervention survey after phase II instead of phase III, previous research by Melynk et. al (2006)

emphasized that COPE makes its largest impact after phase I. Since Melynk's 2006 RCT was used for comparison, her methodology was followed.

COPE phase III was given one to seven days before discharge. Interestingly, only mothers were present at the time COPE phase III was given. No surveys were administered at that time and mothers were encouraged to complete phase IV after they were settled at home one to two weeks after discharge.

Outcome Data

Parental distress. The PSS: NICU administered both pre- and post-intervention contained 48 questions using a 5-point Likert scale with (1) meaning not all stressful and (5) meaning extremely stressful. An option for not applicable (0) was also given. The questions were divided into five categories: (a) sights and sounds, (b) infant behavior, (c) relationship with infant, (d) staff behavior, and (e) general stress.

Mothers. There were statistically significant improvements in parental distress post intervention for mothers in all categories except general stress. The three most significant categories were a) infant behavior, (b) infant relationship, and (c) staff behavior with all three $p<0.001$. Statistically significant improvement occurred with the following content questions: (a) the sudden noises of the monitor alarms ($p=0.18$), (b) the small size of my baby ($p=.035$), (c) seeing needles and tubes in my baby ($p=.05$), (d) my baby being fed with an intravenous line or tube ($p=.04$), (e) when my baby seems to be in pain ($p=.038$), (f) clapping on baby's chest for chest drainage ($p=.038$), (g) not feeding the baby myself ($p=.028$), (h) not being able to hold the baby when I want ($p=.011$), and (i) feeling helpless and unable to protect my baby from pain or painful procedures ($p=.045$). The categorical results of the paired t-test pre-and post-measure are found in Table 3.

Fathers. While the fathers had less statistical improvements in parental distress than mothers, COPE still made a difference for them. There were statistically significant improvements in parental distress post intervention for fathers in all categories except sights and sounds and general stress. The two most significant categories were a) infant behavior (p=.0003) and, (b) infant relationship (p=.0008). Statistically significant improvement occurred with the following content questions: (a) the weak and limp appearance of my baby (p=.011), and (b) not feeding the baby myself (p=.013).

Significant others/support. While data was collected in this subgroup, only three pre-intervention surveys and one post invention survey were completed. A statistical analysis was unable to be completed at this time.

Neonatal length of stay. Data on 60 pre-intervention retrospective infants was collected from fiscal year 2017 from infants born into the newly established small baby unit but before implementation of the COPE program. The mean LOS pre-intervention was 60.57 days. The LOS in the nine post-intervention infants was 53.22 days (p=0.289). This seems to be trending toward a shorted LOS considering demographically the intervention group had more IVH than the retrospective group. Data analysis will be repeated after a full 60 post-intervention infants have been discharged. Data analysis regarding LOS is found in Table 4.

Discussion

Most Important Successes

Regardless of the statistical results, the most important success regarding outcomes is the movement toward improvement in neonatal care geared towards parental empowerment. These parents were excited about the COPE program and usually looking forward to the next phase. Parents are a key component in the care of the neonate. Helping them feel more confident in the

knowledge and care for their infant is invaluable. The COPE program was successful in reducing parental distress associated with the NICU experience.

Study Strength

The education and training of the COPE Program was relatively simple and will be easy to replicate if additional COPE mentors are required. The nursing staff was on-board with this project so little resistance to the student investigator or the COPE mentors was noted. In fact, nursing went out of their way to be helpful with its implementation. After study completion, the COPE program will be easier to sustain as the COPE mentors will not have to wait on the consenting process before talking with families. Implementation was successful overall. Every parent that was approached was consented and a majority completed all three phases of the COPE program.

Results Compared to Literature

The results from this DNP project were benchmarked with the results of the large randomized controlled trial (RCT) by Melnyk et.al (2006). (Table 1.1, 1.2 & 3). Demographically, Melnyk's COPE group and the student investigator's (SI) COPE group were similar, except in payer type, with the SI's COPE group utilizing more public aid. Comparing the post intervention scores to the benchmark post intervention scores, a majority were statistically different. The idea would be for them to not be statistically different for the results to be more generalizable. One reason for the difference is number of subjects, the SI had 23 mothers and Melnyk had 136 mothers. The SI had 10 fathers and Melnyk had 73 fathers. Another reason is that Melnyk's pre-intervention scores for the same group were not available. Since the SI's post intervention scores varied with some higher and some lower than Melnyk's post intervention scores, it is difficult to interpret. Ideally, if the pre-intervention scores would have been available,

the percentage of change from pre-measure to post-measure could have been compared and analyzed instead. Infants of parents of the COPE intervention group had a statistically shorter length of stay (LOS) than their counterparts; differences in LOS ranged from 3.8 to 12.5 days in two large sample RCTs (Gonya et al., 2014; Melnyk, Feinstein, Alpert-Gillis, et al., 2006). Although the sample size is small (thus the difference is not statistically significant) the LOS for this SI's COPE group is 7.35 days sooner than the retrospective cohort comparison.

Limitations

Internal Validity Effects

One confounding factor would be the natural decrease or maturation in parental distress over time without the presence of the COPE program. Without a control group, the evidence is not as strong and the results may be less valid to a degree. Due to the required consents, the parents were aware that the COPE program could reduce parental distress; therefore, some degree of Hawthorne effect may be involved. Length of neonatal stay, however, would not be affected by the Hawthorne effect. While the anonymity of the electronic surveying allowed for more parental honesty, the option for *not applicable* was chosen more often than required leaving missing data and affecting results.

External Validity Effects

Threats to external validity include the small sample size and convenience sampling. Although the sample size was small for this study, the demographics are comparable to Melnyk's study, making the results more generalizable. The plan is to continue the study until the initially desired sample size of 60 is obtained. The effects from the small sample size will then be diminished, but convenience sampling could remain an issue.

Sustainability of Effects

Sustainability of the effects should be no issue as the population in the NICU is constantly changing. The short-term effects of decreased parental distress and shortened neonatal LOS should continue to be evident as long as the program continues to be implemented as intended. Long term effects are not being measured by this study although phase IV was encouraged to family members after discharge for lasting effects.

Minimizing Study Limitations

The major study limitation is inadequate sample size, specifically when analyzing the neonatal length of stay. The circumstances regarding sample size are beyond anyone's control as new subjects are limited by the preterm birth rate. All subjects approached for the study did consent for participation. Death, back transfers, and discharges are all based on the infant's severity of illness that also cannot be controlled.

Interpretation

Expected and Actual Outcomes

The actual outcomes match the expected outcomes for the most part. Parental distress was decreased in four of five categories for mothers and three out of five categories for fathers as previously described in the results section. The one category that was not significantly improved in either group was *general stress*. This is a contradiction to Melynk's 2006 RCT. A potential explanation for this was that the SI's COPE group had twice as much public aid. General stress could be increased or sustained by financial burden and lack of employment, none of which are addressed or resolved by the COPE program implementation. Neonatal length of stay is trending toward the expected outcome. Continuation of the study after UMKC graduation will

demonstrate more accurate results than the current sample size of nine, 85% below the anticipated sample size.

Intervention Effectiveness

The ability to provide the intervention in the infant's room is valuable. The parents can see the infant and the NICU environment to process the information being provided in the intervention. Drawbacks to providing COPE in the infant's room are the potential for other distractions such as visitors, monitor alarms, and personal cell phone use. The COPE packet given to the families is kept by the family and can be used for consistent reference as well as encourages thought in the parent activities section. Parents may listen or read again to already administered COPE phases with the use of the book and audio compact disc. The intervention is simple by design as not to be exhausting to the COPE mentor administering the program or to the parents receiving the program. Parents seemed excited to listen to additional phases when the time was appropriate.

Intervention Revision

There are two suggested revisions to the intervention. The first would be to provide a phase in between phase II and phase III. Phase II is done after DOL 4-8 and phase III is done 1-7 days before discharge. A month or more frequently passes between these two phases. Parents tend to get a little stir crazy after 45 days and infants at that time are making slow progress toward discharge which can be very frustrating. It would be nice to provide reinforcement that these feelings and experiences are normal. Since this is a copyrighted program, this will not be possible to alter. Instead, the second revision would be for the COPE mentors to provide additional reinforcement and follow-up in between phases, particularly phase II and III.

Expected and Actual Impact to Health System

The expected impact to the health system based on shortened length of stay alone is significant. The anticipated yearly national savings assuming 200,000 plus preterm births per year is two billion dollars. On top of that number, savings related to maternal/paternal depression diagnosis, treatment, and follow-up would be reduced. Improved parental bonding and involvement would reduce costs associated with infant neglect. The cost to the US per year would be less than 38 million for use of the COPE program nationwide. For this DNP project, the actual project costs were approximately $34,000. To date, the total cost savings for the IL hospital due to LOS reduction is at least $10,576.96 since implementation in January of 2018 (Appendix G).

The current funding source for this project is through the Family Advisory Board (FAB) at the IL hospital. The FAB generates funds through extensive fundraising earning close to $100,000 per year. Additional COPE packets cost $26.00 per patient and will cost around $6500 per year to sustain. They plan to continue funding the COPE program along with a dedicated staff member for parent support.

Conclusions

The COPE intervention has the potential to produce important and significant cost-saving outcomes in the neonatal intensive care that can become a standard care in the NICUs across the United States. With a relatively low per patient cost and with minimal supplies, it empowers parents to play an active role in their infant's progression through the NICU, ideally resulting in improved outcomes for all.

The COPE program implementation was successful and results strongly suggest that parents have significantly reduced stress and a trend toward a shorter neonatal length of stay.

This DNP project will be completed when adequate sample size (60 subjects) for medium effect and power of 0.8 is reached. In addition, studies by future student investigators could include additional neonatal outcomes such as readmission rates, weight gain, and breastfeeding by discharge. Parental outcomes such as parent involvement, parent satisfaction, and parental distress after discharge could be measured as well.

The EBP project was disseminated at the 2017 Health Sciences Student Research Summit (HSSRS) at the University of Missouri-Kansas City (UMKC) and the Advanced Practice Nurses of the Ozarks (APNO) annual conference in 2017. The student investigator's intention is to publish the EBP project in a neonatal/pediatric nursing journal regardless of findings after completion of the project when adequate subjects are obtained for an appropriate statistical analysis. Findings are planned to be presented to the IL hospital's executive committee in August 2018.

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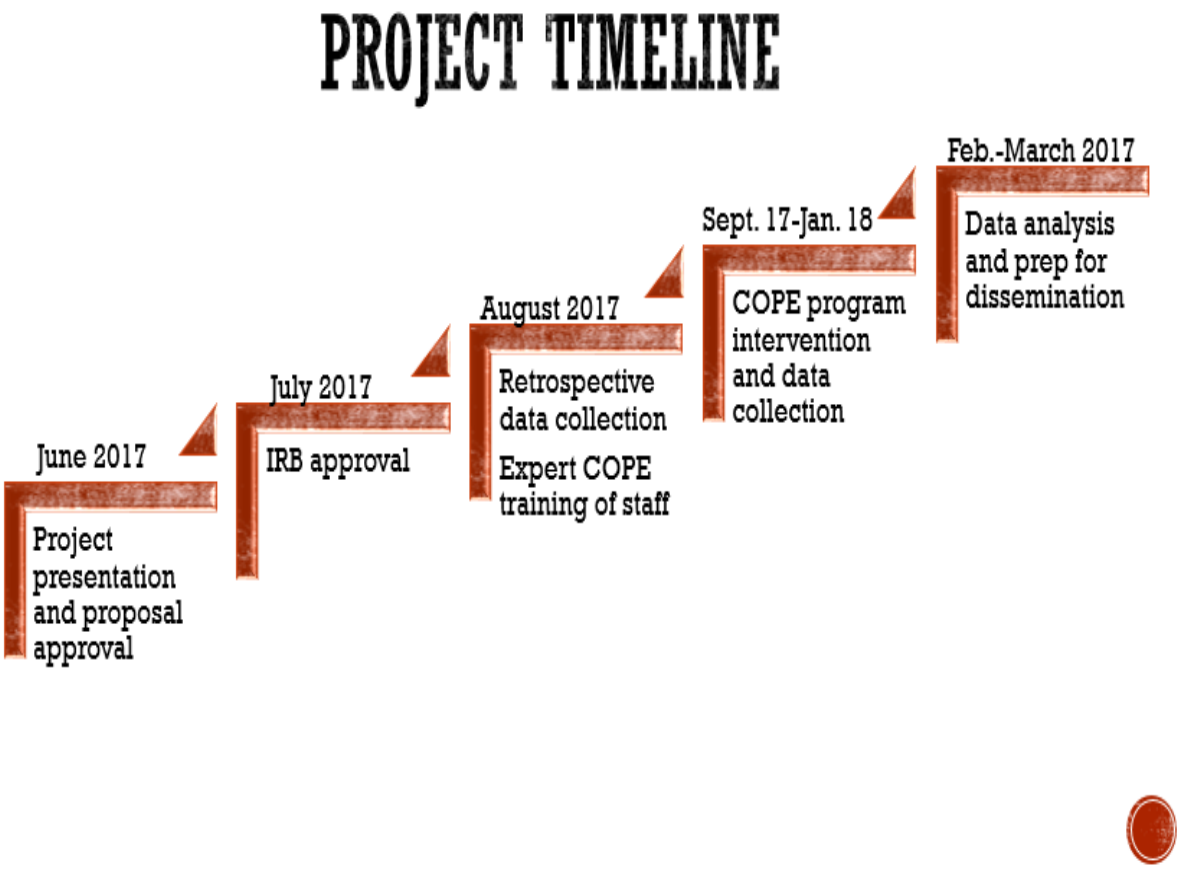
Appendix A


PROJECT TIMELINE
June 2017
Project presentation and proposal approval
July 2017
IRB approval
August 2017
Retrospective data collection
Expert COPE training of staff
Sept. 17-Jan. 18
COPE program intervention and data collection
Feb.-March 2017
Data analysis and prep for dissemination

Appendix B
Synthesis of Evidence Table

PICOTS: In infants born at less than 32 weeks gestation, does administration of a multi-phase, family-centered empowerment program decrease parental distress and result in a shorter length of stay for the infant in a six-month study period at a level three neonatal intensive care unit in Illinois?						
First author, Year, Title, Journal	**Purpose**	**Research Design[1], Evidence Level[2] & Variables**	**Sample & Sampling, Setting**	**Measures & Reliability (if reported)**	**Results**	**Limitations & Usefulness**
Educational-Behavioral Interventions						
Peyrovi et.al (2015). The effect of empowerment program on "perceived readiness for discharge" of mothers of premature infants. *Journal of Maternal & Fetal Neonatal Medicine*	Empowerment program effect on discharge	quasi-experimental before–after study design Level III Variables: a 3-stage training plan	40 pairs of mother–infant in the experimental group and 40 pairs of mother–infant in the control group	Readiness discharge questionnaire done by mothers and nurses	Mothers have more technical readiness and emotional readiness for discharge than control group.	Limitations: Not blinded so bias potential from RNs Useful: shows feasibility of shorten LOS due to discharged preparedness
Cano Gimenez et. al (2015). Providing parents with individualised support in a neonatal intensive care unit reduced stress, anxiety and depression. *Acta Paediatrica*	Individual intervention and parental distress in a neonatal intensive care unit (NICU)	Prospective cohort study with control Level IV Variables: 5 phase intervention vs. standard of care	40 mothers and 25 fathers in the intervention group and 40 mothers and 29 fathers in the control group Madrid, Spain	Parental Stressor Scale-NICU (PSS-NICU), the Inventory of Situations and Responses of Anxiety (ISRA), the Beck Depression Inventory (BDI), the Edinburgh Postnatal Depression Scale (EPDS)	No anxiety in mother and father in the intervention group per analysis.	Limitations: Outside US, not COPE but same concept. Small group. Useful: An intervention program in NICU reduces anxiety and depression compared to the standard care

Gonya (2014). Empowerment programme for parents of extremely premature infants significantly reduced length of stay and readmission rates *Acta Paediatrica*	Effects of the COPE program on ELBW infants	Quantitative-controlled, descriptive design Level III Variables: GA, BW, sepsis, mortality, NEC, PPV days, IVH, insurance, COPE, LOS, Readmission	303 (168 COPE, 135 control) in a level 4 referral NICU.	Gestational age and acuity measures, LOS and readmission rates Only objective data no tools	Length of stay and decrease readmissions for the COPE group.	Not randomized, one setting, infants born outside hospital. Useful: ELBW infant population. Parent report COPE phase 1 and 2 most useful. Similar to DNP proposed
Beheshtipour (2014). The effect of the educational program on Iranian premature infants' parental stress in a neonatal intensive care unit: a double-blind randomized controlled trial. *International Journal of Community Based Nursing and Midwifery*	educational program and the premature infants' parental stress in NICU.	Quantitative-double blinded RCT Level II Variables: Independent-education program Dependent-parental stress	60 (30 education/30 routine care) Hazrat Zainab hospital in Iran	Parental stress at different intervals Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU)	Maternal and paternal stress scores were less in intervention group.	Small sample size, outside of the US Useful: refers to the COPE programs similar results
Abdeyazdan et. al (2014). A family support intervention to reduce stress among parents of preterm infants in neonatal intensive care unit. *Iranian journal of nursing and midwifery research*	family support intervention and the stress levels of parents of preterm infants in NICU.	quasi-experimental Level IV (small sample) Variables: two stage support vs. standard	two groups intervention and control (n = 25 pairs in each) NICU of Behashti Hospital (Isfahan, Iran)	Parental Stressor Scale-NICU (PSS-NICU)	intervention group showed significant reduction following the intervention	Limitation: Outside US. Small sample Useful: showed the efficacy of the intervention in decreasing stress among both mothers and fathers of infants in the NICU

Mianaei et. al (2014). The effect of COPE program on maternal stress, anxiety, and participation in NICU wards in Iran *Iranian journal of nursing and midwifery research*	COPE, parental distress, and participation in the NICU	Quantitative RCT Level II Variables: Independent- COPE program Dependent- maternal stress, anxiety, and participation	90 (45 COPE and 45 comparison) 20-bed NICU and 14-bed NICU in Iran	State-Trait Anxiety Inventory, the Parental Stressor Scale: Neonatal Intensive Care, and The Index of Parental Participation/Hospitalized Infant	COPE- significantly less anxiety and less stress in the NICU after performing each phase of the COPE program. COPE mothers participated in their infants' care	Limitations: Outside US, smaller RCT, no neonatal outcomes measured. Useful: Received first 2 phases of COPE. First to show measure maternal participation in care
Borimnejad (2013). Impacts of creating opportunities for parent empowerment on maternal stress Iranian Journal of Nursing and Midwifery Research	COPE program and maternal stress	Quantitative Quasi-experimental design with control group Level III	140 mothers of preterm newborns NICU of Iran	Maternal stress scores related to: NICU environment, appearance and behavior, relation with neonate, and total tension.	less stress in mothers in all measures.	Outside of US, study not as detailed as others Useful: delineates what the major stressors are. Used COPE
Oswalt et. al (2013). Reducing Anxiety Among Children Born Preterm and Their Young Mothers. *The American Journal of Maternal/Child Nursing*	COPE program & maternal and child anxiety based on maternal age	comparative descriptive design conducted on data obtained from a RCT Level II Variables: Maternal age, maternal and child anxiety	260 (147 COPE, 113 control) in 2 different level 3 NICUs	Child Behavior Checklist for Ages 2–3 and the State-Trait Anxiety Inventory	COPE works best on younger mothers. Lower levels of child anxiety at 24 months for younger mothers (18–21 years old).	Limitations: secondary data analyses, Additional variables that were not assessed may also have an impact on maternal and child outcomes Useful: COPE was associated with more favorable mental health outcomes for younger mothers

Melnyk (2009). Reducing hospital expenditures with the COPE program for parents and premature infants. *Nursing Administration Quarterly*	cost of the COPE program as compared to healthcare costs	Expert Opinion Level VII	n/a	Data were collected from (1) billing receipts related to the production of the COPE intervention (the cost of the audiotapes and written materials for all phases of the intervention), (2) infants' birth-related hospital records, and (3) adjusted NICU charges.	direct healthcare cost savings per infant through NICU discharge Infants weighing less than 1500 g who went home an average of 8 days earlier resulted in an even greater net savings.	Limit: not a study Useful: Provides financial justification of the COPE program
Melnyk (2006). Reducing Premature Infants' Length of Stay and Improving Parents' Mental Health Outcomes w/ COPE Neonatal Intensive Care Unit Program *Pediatrics*	efficacy of COPE on parents and infants	Quantitative-RCT Level II Variables: Independent: COPE Dependent: Neonatal LOS and parental mental health	260 (147 COPE, 113 control) in 2 different level 3 NICUs	Parental stress, depression, anxiety, and beliefs; parent-infant Inter., NICU LOS; and total hospitalization State-Trait Anxiety Inventory, (BDI-II), (PSS-NICU), Index of Parental Behavior in the NICU, Parental Belief Scale-NICU, Clinical Risk Index for Babies	Mothers of COPE with significantly less anxiety and stress, but fathers not affected. LOS shorter for those in the COPE group; more positive parental interactions	Author is creator of program (bias), less effect on fathers. Useful: Describes multiple reliable tools for proposed project. Same intended outcomes as project
Melnyk et al. (2006) Evidence-based practice. Two decades of evidence to support implementation of the COPE program as standard practice with parents of young unexpectedly hospitalized/critically ill children and premature infants *Pediatric Nursing*	Appraise evidence related to COPE	SR-quantitative Level I	6 studies- 5 of 6 RCTs in both NICU and PICU	Maternal and neonatal outcomes, only one included paternal outcomes	Providing parents with educational information and parenting activities resulted in less negative mood (e.g., stress, depressive and anxiety symptoms and enhanced functioning/ involvement	Review performed by author of most evidence. No Meta-analysis Useful: Discusses COPE as a standard

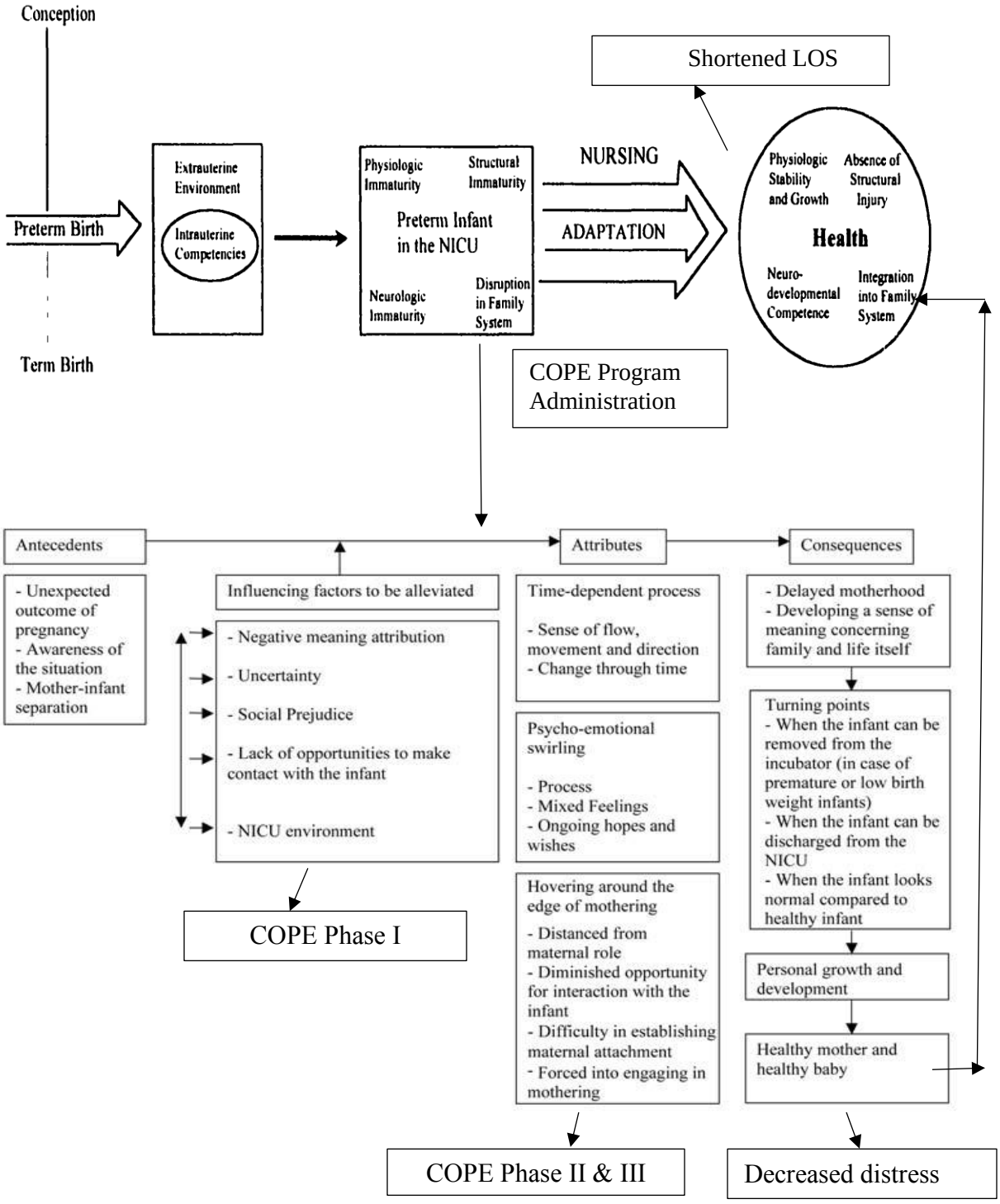
Melnyk et. al (2001). Improving cognitive development of low-birth-weight premature infants with the COPE program: a pilot study of the benefit of early NICU intervention with mothers. *Research in Nursing & Health*	COPE on infant cognitive development and maternal coping.	Pilot study: RCT Level: II Variables: COPE vs. different audiotape	42 mothers 52-bed Level III NICU in New York	Mental Development Index (MDI); State-Trait Anxiety Inventory; Profile of Mood States (POMS); PSS:NICU; Maternal Infant Interaction Scale; The Nursing Child Assess Feeding Scale; Home observation for Measurement of the Environment; Parental Belief Scale: NICU (PBS)	COPE infants had significantly higher scores on the BSID-II MDI at 3 & 6 months; COPE mothers reported significantly less stress.	Limitations: small sample size used in this pilot study limited the power to detect significant differences between the study groups Useful: Supports use of COPE to improve outcomes for neonates and mothers
Parent Psychological Distress						
Santos et.al (2016). Relationship of maternal psychological distress classes to later mother–infant interaction, home environment, and infant development in preterm infants. Research in Nursing & Health	psychological distress classes in predicting multiple outcomes	longitudinal multisite-repeated measures study Level: IV Variables: Psychological distress classes; interaction, quality of the environment, and infant development	229 mother-preterm infant pairs two hospitals in North Carolina and two hospitals in Illinois	Center for Epidemiologic Studies Depression Scale (CESD), State-Trait Anxiety Inventory, Perinatal Post-Traumatic Stress Symptom Questionnaire, PSS: NICU, video recording of mother infant interactions, HOME inventory, Z-scores for each variable, Bayley Scales of Infant & Toddler Development; Neurobiologic Risk Scale (NBRS)	infants of mothers in the extreme distress class had significantly lower cognitive development scores at 12 months corrected age	Limitations: Many confounding variables like neurologic insult. Useful: Importance of maternal distress in relation to neonatal cognitive development
Baia (2016). Parenting very preterm infants and stress in Neonatal Intensive Care Units. *Early human development*	Identify sources of stress in mothers and fathers of very preterm infants hospitalized in NICU	Observational & cross-sectional study Level: IV Variables: stress source, demographics	120 mothers and 91 fathers NICU in Portugal	Portuguese version of Parent Stressor Scale: NICU	Change in parental role" was classified as the most stressful subscale by mothers and fathers. Being ⩾30 years old was found to be a significant predictor for decreased fathers' stress	Limitations: Outside US. Useful: shows that father's experience stress but differently the mothers. Role change significant

Lee et.al (2013). The effectiveness of early intervention on paternal stress for fathers of premature infants admitted to a neonatal intensive care unit. *Journal of Advanced Nursing*	an intervention on fathering ability, perceived nurse's support and paternal stress in the NICU	Historical comparison study Level IV Variables: father education and stress, fathering ability	35 fathers in the comparison group; 34 fathers in the intervention group NICU in Taiwan	PSS: NICU; Fathering ability in the NICU (FA: NICU) nurse-parent support tool (NPST).	intervention group less stress, higher fathering ability, and perceived higher nurse's support.	Limitations: Outside US practice is different, non-random assignment but different time periods Useful: Father's as important component in early intervention
Brecht (2012). Effectiveness of therapeutic and behavioral interventions for parents of low-birth- weight premature infants: A review *Infant Mental Health Journal*	long and short-term interventions & treatments targets parental coping, parent-infant interaction, and PTSD	SR Quantitative-includes RCT and cohort design Level III	18 studies with interventions including maternal and neonatal outcomes	Maternal and neonatal outcomes. Measures varied per study.	Provide detailed information to parents as early as possible. Assess symptoms of stress and anxiety and provide intervention. Cost effective and timely.	Limitations- no meta-analysis Provides recommendations and Evidence Table
Zelkowitz et. al (2011). Early maternal anxiety predicts cognitive and behavioural outcomes of VLBW children at 24 months corrected age. *Acta Paediatrica*	maternal anxiety in NICU on the child's cognitive and behavioral development at two.	Cohort study Level IV Variables: Maternal anxiety and child cognitive development	57 families of 88 originally recruited. Loss explained in detail	Emotional Availability Scales, Bayley Scales of Infant Development (II) and the Child Behavior Checklist for Ages 1.5–5, State-Trait Anxiety Inventory (STAI), Revised Nursery Neurobiological Score	maternal anxiety during the infant's NICU hospitalization is a significant predictor of both cognitive and behavioral outcomes of VLBW children.	Small sample size, only used mothers, loss of recruitment Useful: Shows importance of early maternal anxiety intervention in the NICU

Family-Centered Care Approach						
Reynolds et. al (2013). Parental presence and holding in the neonatal intensive care unit and associations with early neurobehavior. *Journal of perinatology*	parental presence and infant holding in the neonatal intensive care unit (NICU)	Prospective cohort Level IV Variables: parent visitation, holding and skin-to-skin care, early neurobehavior	81 infants born at less than 30 weeks gestation 76-bed Level III unit	patterns of visitation and holding (hours, days, first time), NICU Network Neurobehavioral Assessment Scale (NNNS), Neonatal Infant Stressor Scale1	parent visitation and holding in the NICU associated with early neurobehavior in the preterm infant by NICU discharge; greater visitation & holding improved neurodevelopment outcomes.	Limitations: confounding variables Useful: support the need for parents to be present in the NICU and to engage in the care which is promoted by COPE
Obrien et. al (2013). A pilot cohort analytic study of Family Integrated Care in a Canadian neonatal intensive care unit *BMC pregnancy and childbirth*	explore the feasibility, safety, and potential outcomes of implementing family-integrated care model	Cohort analytic study Level IV Variables: FIC, weight gain, breastfeeding at discharge, parent stress, other morbidities	FIC 31 infants Matched control 62 infants NICU in Canada	Infant demographic and treatment characteristics, parent demographics and stress- PSS: NICU FIC program evaluated qualitatively	Improved weight gain and breastfeeding at discharge in the intervention group.	Limitations: Outside the US although similar NICU. Pilot so small groups Useful: References COPE, provides a possible additional measure to project, proves FIC
Örtenstrand et al. (2010). The Stockholm Neonatal Family Centered Care Study: effects on length of stay and infant morbidity. *Pediatrics*	evaluate the effect of a new model of family care (FC)	RCT Level II Variables: 24/7 availability of family involvement	366 infants (188 in each) 2 Level 2 NICUs in Stockholm	Total length of stay in the hospital was defined as number of days from birth to discharge	reduction total hospital stay in preterm neonates admitted to a level 2 NICU where parents could stay from admission to discharge	Limitation: Outside US, Level II NICU, not same intervention as project Useful: Shows the connection between parent involvement and decreased LOS

Byers (2006). Quasi Experimental Trial on Individualized, Developmentally Supportive Family-Centered Care. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*	individualized, developmentally supportive family-centered care on infant physiological variables, resource utilization, parental perception of the NICU experience	Quasi-experimental, repeated measures Design Level III Variables: Routine care vs. routine care plus the addition of individualized, family-centered interventions.	114 premature infants and their parents. southeastern quaternary medical center' s 78-bed NICU	satisfaction and perception survey; Length of stay and direct cost/case were obtained from the institution financial database; infants' behaviors by developmental specialists certified in the Newborn Individualized Developmental Care and Assessment Program (NIDCAP)	Fewer behavioral stress cues but comparable resources use and short-term outcomes	Limitations: not randomized, outcomes not statistically significant Useful: shows neonatal benefit to FCC approach

Appendix C
Theory to Application Diagram



Adapted from Theory of Health Promotion for Preterm Infants and Transition to Motherhood in the Neonatal Intensive Care Unit Conceptual Diagram (Mefford, 1999; Shin & White-Traut, 2010).

Appendix D

Definition of Terms

Family-centered care: an approach that perceives the infant's family as the key primary component in support and care (Cooper et. al, 2007)

Education-behavioral intervention: learning that is reinforced with activities to improve outcomes (Melnyk, 2006).

Empowerment: the ability of an individual to take control of issues he/she feels are important (Castro, Van Regenmortel, Vanhaecht, Sermeus, & Van Hecke, 2016)

Psychological distress: a constellation of symptoms including stress, anxiety, depression, and fatigue (Busse et.al, 2013).

Length of stay: total number of days a premature infant remains in the NICU (Melnyk, 2006)

Physiologic immaturity: premature infant's physical inadequacies making survival difficult (Mefford, 2004)

Structural immaturity: premature infant's major organs are underdeveloped (Mefford, 2004).

Neurologic immaturity: the central nervous system of the premature infant lacks organization (Mefford, 2004).

Disruption in family system: difficulties that arise in the family due to preterm birth and its consequences (Mefford, 2004).

Appendix E

IRB Approval Letter is confidential.

Appendix F

Letter of Informed Consent and Informed Consent are confidential.

Appendix G

Direct Expenses	Anticipated Cost	Actual Cost
COPE Parent Packets #250*	$12,000	$12,500 including shipping
Airfare from New York to Illinois for expert trainer	$500	$428.60
1-night hotel stay for expert trainer	$200	$321.16 (2 nights)
Snacks/Drinks during education	$300	$100 full meal
RN salary**	$34.08/hr X 122 RNs= $4147.76	$34.08 x 11 staff x 6hrs= $2249.28
Paper & Ink, Dissemination Costs	$1200	$100
Student Investigator	.5 FTE x 6 months $25, 000	.5FTE x 3months $17,500
Total Direct Cost	$43,357.76	$33199.04
Revenue	**Anticipated**	**Actual**
Shortened LOS	$4864 x 250 infants = $1,141,000 (Estimate per 250 infants***)	$4864 x 9 infants = $43,776
Total Program Benefit/Loss	**Anticipated Long Term**	**Actual Short Term**
	~ +2 billion/year	**+$10,576.96 thus far**

* Subsequent year cost for parent packets is $6500 for 250 packets ($26 per patient)
** Nursing salary from the Bureau of Labor Statistics-Illinois
*** Based on Melnyk & Feinstein (2009).

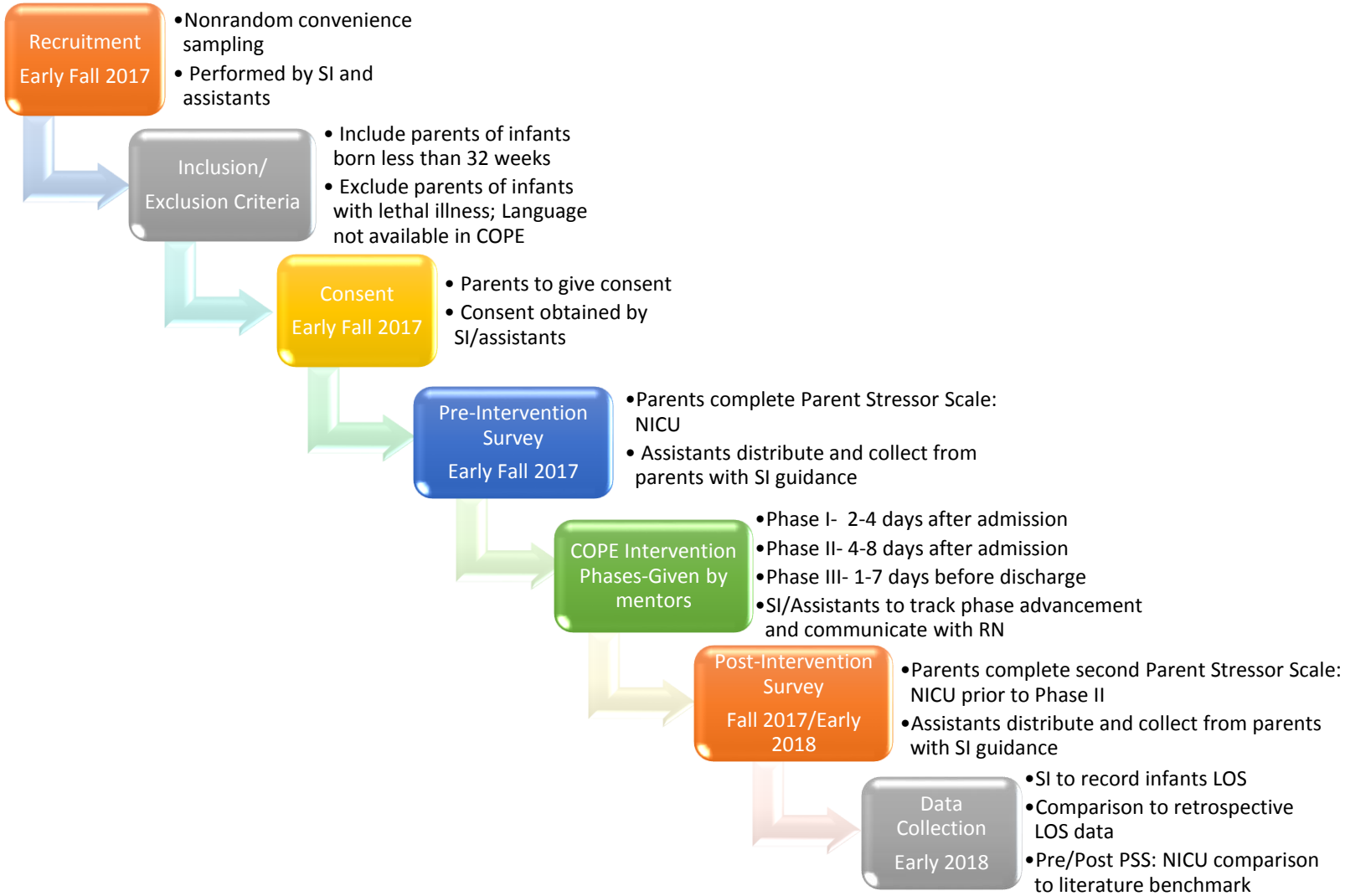
Appendix H

Intervention Sample Flier is copyrighted.

Appendix I

Recruitment Script is confidential.

Appendix J
Intervention Flow Diagram



Appendix K

PSS: NICU Measurement Tool is copyrighted.

Appendix L

Tool Permission Letter is confidential.

Appendix M
SPSS Data Collection Sample

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	TYPEOFPE...	Numeric	8	2	Person Data B...	{1.00, Moth...	None	9	Right	Nominal	Target
2	AGE	Numeric	8	2	Parent Age	None	None	8	Right	Ordinal	Target
3	RACE	Numeric	8	2	Parents Race	{1.00, Cauc...	None	8	Right	Nominal	Target
4	EDUCATION	Numeric	8	2	Highest Educat...	{1.00, High ...	None	11	Right	Nominal	Target
5	MARITAL	Numeric	8	2	Marital Status	{1.00, Marri...	None	10	Right	Nominal	Target
6	PAYER	Numeric	8	2	Payer Source	{1.00, privat...	None	10	Right	Nominal	Target
7	GESTATION	Numeric	8	2	Gestational Ag...	None	None	8	Right	Ordinal	Target
8	BIRTHWT	Numeric	8	2	Infant Birthweight	None	None	8	Right	Ordinal	Target
9	INRACE	Numeric	8	2	Infant Race	{1.00, Cauc...	None	8	Right	Nominal	Target
10	INGENDER	Numeric	8	2	Infant Gender	{1.00, Male}...	None	8	Right	Nominal	Target
11	CLD	Numeric	8	2	Chronic Lung D...	{1.00, Yes}...	None	8	Right	Nominal	Target
12	IVH	Numeric	8	2	Intraventricular ...	{1.00, Grag...	None	8	Right	Nominal	Target
13	PVL	Numeric	8	2	Periventricular ...	{1.00, Yes}...	None	8	Right	Nominal	Target
14	NEC	Numeric	8	2	Necrotizing Ent...	{1.00, yes}...	None	8	Right	Nominal	Target
15	OPERATIO...	Numeric	8	2	Any Operation	{1.00, Yes}...	None	8	Right	Nominal	Target
16	EOS	Numeric	8	2	Sepsis before 3d	{1.00, Yes}...	None	8	Right	Nominal	Target
17	LOS	Numeric	8	2	Sepsis after 3d	{1.00, Yes}...	None	8	Right	Nominal	Target
18	PREMOMT...	Numeric	8	2	PSS Pre mom ...	None	None	8	Right	Scale	Input
19	PREMOMSI...	Numeric	8	2	PSS Pre Mom ...	None	None	8	Right	Scale	Input
20	PREMOMB...	Numeric	8	2	PSS Pre Mom I...	None	None	8	Right	Scale	Input
21	PREMOMR...	Numeric	8	2	PSS Pre Mom ...	None	None	8	Right	Scale	Input
22	PREMOMS...	Numeric	8	2	PSS Pre Mom ...	None	None	8	Right	Scale	Input
23	PREMOMS...	Numeric	8	2	PSS Pre Mom ...	None	None	8	Right	Scale	Input
24	POSTMOM...	Numeric	8	2	PSS Post Mom...	None	None	8	Right	Scale	Input
25	POSTMOM...	Numeric	8	2	PSS Post Mom...	None	None	8	Right	Scale	Input
26	POSTMOM...	Numeric	8	2	PSS Post Mom...	None	None	8	Right	Scale	Input
27	POSTMOM...	Numeric	8	2	PSS Post Mom...	None	None	8	Right	Scale	Input
28	POSTMOM...	Numeric	8	2	PSS Post Mom...	None	None	8	Right	Scale	Input
29	POSTMOM...	Numeric	8	2	PSS Post Mom...	None	None	8	Right	Scale	Input
30	PREOTHER...	Numeric	8	2	PSS Pre Signifi...	None	None	8	Right	Scale	Input
31	PREOTHER...	Numeric	8	2	PSS Pre Signifi...	None	None	8	Right	Scale	Input
32	PREOTHER...	Numeric	8	2	PSS Pre Signfi...	None	None	8	Right	Scale	Input
33	PREOTHER...	Numeric	8	2	PSS Pre Signifi...	None	None	8	Right	Scale	Input
34	PREOTHER...	Numeric	8	2	PSS Pre Signifi...	None	None	8	Right	Scale	Input
35	PREOTHER...	Numeric	8	2	PSS Pre Signifi...	None	None	8	Right	Scale	Input
36	POSTOTHE...	Numeric	8	2	PSS Post Signi...	None	None	8	Right	Scale	Input
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39	POSTOTHE...	Numeric	8	2	PSS Post Signi...	None	None	8	Right	Scale	Input
40	POSTOTHE...	Numeric	8	2	PSS Post Signi...	None	None	8	Right	Scale	Input
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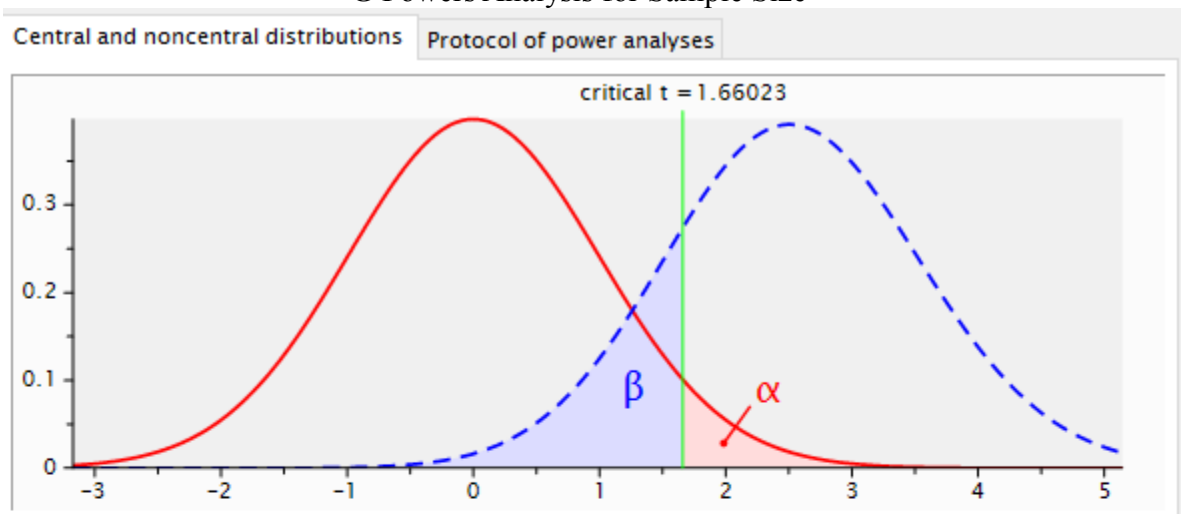
* May be converted to REDCap

Appendix N
G Powers Analysis for Sample Size



Test family: t tests

Statistical test: Means: Difference between two independent means (two groups)

Type of power analysis: A priori: Compute required sample size – given α, power, and effect size

Input Parameters

Tail(s)	One
Determine => Effect size d	0.5
α err prob	0.05
Power (1-β err prob)	0.8
Allocation ratio N2/N1	1

Output Parameters

Noncentrality parameter δ	2.5248762
Critical t	1.6602343
Df	100
Sample size group 1	51
Sample size group 2	51
Total sample size	102
Actual power	0.8058986

Appendix O

Logic Model for DNP Project					
Student: Laura Bowers, DNP-C, APRN, NNP-BC					
Inquiry, PICOTS: In infants born at less than 32 weeks' gestation, does administration of a multi-phase, family-centered empowerment program decrease parental distress and result in a shorter length of stay for the infant in a four-month study period at a level three neonatal intensive care unit in Illinois?					
Inputs	**Intervention(s)** *Activities*	**Outputs** *Participation*	**Outcomes -- Impact** *Short*	*Medium*	*Long*
Evidence, sub-topics 1. The family-centered care approach increases parental empowerment by improving parental involvement, parent-infant bonding, and positive parent interactions. 2. Parents of infants in the neonatal intensive care experience significant psychological distress in various forms that requires intervention. 3. Educational-behavioral interventions administered in the neonatal intensive care, significantly improves parental mental health outcomes leading to improved neonatal outcomes.	**EBP intervention** Educational-behavioral intervention-Creating Opportunities for Parent Empowerment **Major steps of the intervention (brief phrases)** 1.Pre-measure PSS:NICU 2. Administer COPE phase I 3. Post- measure PSS NICU 4.Administer COPE phase II 5. Administer COPE Phase III 6. Collect LOS data on all subjects	**The participants (subjects)** Infants born <32 weeks gestation and their parents **Site** Level III NICU in IL **Time Frame** 4 months **Consent or assent Needed** Waiver of consent (survey) Written Consent from parents for infant data, IRB **Other person(s) collecting data** Two predesignated research assistants.	**Outcome(s) to be measured** Primary: Parental Stress; Neonatal length of stay Secondary, if applies: None **Measurement tool(s)** 1.Parent Stressor Scale: NICU 2. LOS in days- current and retrospective **Statistical analysis to be used** **1.** t-Test **2.** Chi-squared test **3**. Paired t-test	**Outcomes to be measured** 1) Parental involvement in care 2) Cost benefit analysis 3) Infant readmission rates 4) Parent satisfaction 5) Infant rate of growth 6) Breastfeeding at discharge	**Outcomes that are potentials** 1) Infant Neurodevelopmental outcomes 2) Parent stress 3 mo. and 6 mo. months after discharge

Major Facilitators or Contributors 1. DNP student 2. DNP advisor 3. Family Advisory Board 4. Pediatric supportive care **Major Barriers or Challenges** 1. Resistance to change 2. Lack of time/staff 3. Cultural/language barriers 4. Vulnerable population		**Others directly involved in consent or data collection (yes/no)** Yes, designated assistants only			

Table 1.1
Maternal Demographic Comparison

	COPE Group	Comparison*	Significance (*p*)
Mothers			
Age, mean (SD)	28.16 (6.3)	27.88 (6.84)	0.67
Race, *n* (%)			
White	16 (64)	90 (70.1)	0.5449
Black	6 (24)	31 (22.6)	0.879
Other	3 (12)	10 (7.3)	0.428
Not reported	0	0	
Education level, *n* (%)			
High school or greater	20 (80)	114 (83.2)	0.70
Less than 12 years	4 (16)	22 (16.1)	0.99
Not reported	1 (4)	1 (0.7)	
Marital Status, *n* (%)			
Married	10 (40)	64 (46.4)	0.556
Never been married	12 (48)	61 (44.5)	0.747
Other	3 (12)	9 (6.6)	0.345
Not reported	0	3 (2.2)	
Payer Type, *n* (%)			
Public insurance	17 (68)	48 (38)	0.0019
Private insurance	7 (28)	89 (64.5)	0.0007
Not reported	1 (4)	1 (0.7)	

* Melnyk, B. M., Feinstein, N. F., Alpert-Gillis, L., Fairbanks, E., Crean, H. F., Sinkin, R. A., . . . Gross, S. J. (2006). Reducing premature infants' length of stay and improving parents' mental health outcomes with the creating opportunities for parent empowerment (COPE) neonatal intensive care unit program: A randomized, controlled trial. *Pediatrics*, 118(5), e1414-e1427. doi:10.1542/peds.2005-2580

Table 1.2

Paternal Demographic Comparison

	COPE Group	Comparison *	Significance (*p*)
	Fathers		
Age, mean (SD)	28.69 (6.24)	30.76 (7.7)	0.363
Race, *n* (%)			
White	10 (76.9)	57 (76.9)	1
Black	2 (15.4)	13 (17.3)	0.867
Other	1 (7.7)	0	0.016
Not reported	0	2 (2.7)	
Education level, *n* (%)			
High school or greater	11 (84.6)	62 (82.7)	0.867
Less than 12 years	2 (15.4)	11 (14.7)	0.948
Not reported	0	2 (2.7)	
Marital Status, *n* (%)			
Married	8 (61.5)	42 (56)	0.713
Never been married	3 (23.1)	21 (28)	0.716
Other	1 (7.7)	1 (1.3)	0.152
Not reported	1 (7.7)	2 (2.7)	
Payer Type, *n* (%)			
Public insurance	5 (38.5)	3(4)	0.0001
Private insurance	6 (46.2)	69 (92)	<0.0001
Not reported	2 (15.4)	3 (4)	

* Melnyk, B. M., Feinstein, N. F., Alpert-Gillis, L., Fairbanks, E., Crean, H. F., Sinkin, R. A., . . . Gross, S. J. (2006). Reducing premature infants' length of stay and improving parents' mental health outcomes with the creating opportunities for parent empowerment (COPE) neonatal intensive care unit program: A randomized, controlled trial. *Pediatrics*, 118(5), e1414-e1427. doi:10.1542/peds.2005-2580

Table 2

Infant Demographic Comparison

	COPE Group	Retrospective Comparison	Significance (*p*)
Infants			
Gestation, mean (SD)	28.84 (1.86)	28.54 (2.20)	0.677
Race, *n* (%)			
White	7 (77.8)	43 (71.7)	0.704
Black	2 (22.2)	14 (23.3)	0.942
Others	0	3 (5)	0.496
Gender, *n* (%)			
Male	6 (66.7)	27 (45)	0.227
Female	3 (33.3)	33 (55)	0.227
Unknown	0	0	
Chronic Lung Disease, *n* (%)	1 (11)	12 (20)	0.525
Any Intraventricular Hemorrhage, *n* (%)	3 (33)	5 (8.3)	0.029
Grade I	3 (33)	2 (3.3)	0.0013
Grade II	0	1 (1.7)	0.696
Grade III	0	2 (3.3)	0.583
Grade IV	0	0	1
Periventricular Leukomalacia, *n* (%)	0	0	n/a
Necrotizing Enterocolitis, *n* (%)	1 (11)	1 (1.7)	0.115
Any Operations, *n* (%)	1 (11.1)	12 (20%)	0.525
Early Onset Sepsis, *n* (%)	0	0	n/a
Late Onset Sepsis, *n* (%)	0	2 (3.3)	0.578

Table 3

PSS: NICU Pre/Post Intervention and Comparison to Benchmark

	Pre- Intervention		Post- Intervention		Significance Pre-Post	Benchmark Comparison*		Significance of Post to Benchmark
	n	**Mean (CI 95%)**	***n***	**Mean (CI 95%)**	***p***	***n***	**Mean (CI 95%)**	***p***
PSS: NICU		***Mothers***						
Sights and sounds	25	1.99 (1.58-2.40)	23	1.68 (1.51-1.86)	0.005	136	2.07 (1.94-2.15)	<0.0001
Infant behavior	25	2.51 (2.31-2.71)	23	1.92 (1.78-2.06)	<0.0001	136	1.66 (1.50-1.81)	0.0002
Relationship with infant	25	3.08 (2.79-3.36)	23	2.37 (2.11-2.63)	<0.0001	136	2.80 (2.64-2.97)	<0.0001
Staff behavior	25	2.21 (2.02-2.40)	23	1.83 (1.68-1.97)	<0.0001	136	0.93 (0.78-1.09)	<0.0001
General stress	21	3.38 (3.11-4.7)	21	2.86 (2.59-4.20)	0.185	136	3.29 (3.09-3.49)	0.0056
		Fathers						
Sights and sounds	13	1.97 (1.41-2.54)	10	1.63 (1.38-1.87)	0.09	73	1.90 (1.74-2.05)	0.0043
Infant behavior	13	2.94 (2.65-3.23)	10	2.05 (1.86-2.23)	0.0003	73	1.88 (1.70-2.07)	0.1368
Relationship with infant	13	2.79 (2.44-3.13)	10	2.10 (1.89-2.30)	0.0008	73	2.28 (2.07-2.48)	0.1383
Staff behavior	13	1.79 (1.48-2.10)	10	1.26 (1.11-1.41)	0.003	73	1.50 (1.35-1.65)	0.0082
General stress	10	3.30 (2.77-5.0)	10	2.70 (2.17-4.43)	0.260	73	2.69 (2.40-2.97)	0.9686

* Melnyk, B. M., Feinstein, N. F., Alpert-Gillis, L., Fairbanks, E., Crean, H. F., Sinkin, R. A., . . . Gross, S. J. (2006). Reducing premature infants' length of stay and improving parents' mental health outcomes with the creating opportunities for parent empowerment (COPE) neonatal intensive care unit program: A randomized, controlled trial. *Pediatrics*, 118(5), e1414-e1427. doi:10.1542/peds.2005-2580

Table 4

Neonatal Length of Stay Comparison to Retrospective Cohort

	Pre- Intervention		Post- Intervention		Significance
	n	Mean (CI 95%)	***n***	Mean (CI 95%)	***p***
		Infants			
Length of stay	60	60.57 (38.98-67.48)	9	53.22 (31.63-60.13)	0.289

UMKC School of Nursing and Health Studies

June 8, 2017

Illinois IRB

IRB,

This letter serves to provide documentation regarding Laura Bowers' Doctor of Nursing Practice (DNP) Project proposal. Ms. Bowers obtained approval for her project proposal, An Empowerment Program to Reduce Parental Distress and Neonatal Length of Stay from the School of Nursing DNP faculty committee on June 8, 2017.

If I can provide any further information, please feel free to contact me.

Sincerely,

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