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Evaluation of an Evidence-Based Breastfeeding Education Program for Pediatric and Women's Health Care Providers, Family Practice Residents, Medical Students, and Physician Assistant Students

Alissa Terry Parker

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Evaluation of a Practice Change Using COPE (Creating Opportunities for Parent Empowerment)
to Address Maternal Anxiety, Depression and Expectations Related to Preterm Birth and
Subsequent Neonatal Intensive Care Unit (NICU) Admission

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Doctoral Capstone Project submitted to the
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at West Virginia University
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Abstract

Evaluation of a Practice Change Using COPE (Creating Opportunities for Parent Empowerment) to Address Maternal Anxiety, Depression and Expectations Related to Preterm Birth and Subsequent Neonatal Intensive Care Unit (NICU) Admission

Dennelle Parker

Background

Nearly half a million premature infants are born in the United States each year. The majority of infants born prematurely are admitted to neonatal intensive care units (NICUs) for specialized care. Clinical problems related to parental stress due to preterm birth and NICU admission extend beyond feelings of simple stress by parents to that of helplessness, insufficient knowledge, decreased bonding, depression, and the potential development of Post Partum-Post Traumatic Stress Disorder. Furthermore, these clinical problems can extend to the child. Decreased bonding can cause the child to have clinical and subclinical anxiety disorders; and may further equate to future chronic illness, adult psychopathology, and even impact their child's role as a caregiver. The literature supports the effectiveness of educational interventions, including the COPE (Creating Opportunities for Parent Empowerment) program in decreasing the level of maternal stress of mothers of preterm/NICU infants.

Objectives

The overall objective was to evaluate the effectiveness of a practice change using an adapted version of COPE phase one in decreasing stress in gravid women aged 18 years and older at who were at risk of preterm delivery and admitted to an inpatient high-risk obstetrical unit. Patients who received the adapted COPE phase 1 written materials were evaluated for anxiety, depression, and expectations of preterm infants.

Design

The study used a quasi-experimental prospective before and after design with a convenience sample of gravid women admitted to a high-risk inpatient obstetrics unit. Data was collected pre and post intervention using the State Trait Anxiety Inventory (STAI), Edinburgh Postnatal Depression Scale (EPDS), and the NICU Parental Beliefs Scale (NICU PBS).

Subjects

Thirty women were enrolled in the study and all thirty completed both pre and post testing. The mean age was 26, with a range of 18 to 38 years. The majority was Caucasian (93%) with an average gestational age of 31^{1/7} weeks, and a gestational range of 28^{0/7} to 34^{5/7} weeks. The length of stay or hospital admission of the women varied from 2 days to 70 with the average being 15 days, and about 50% of the woman revealed experiencing some type of financial strain due to their hospitalization.

Results

In regard to the STAI, there was a significant difference in the scores for pre state (M=42.73, SD=13.444) to post state (M=33.90, SD=10.532) STAI scores; $t(29)=5.794$, $p=.000$. The pre trait scores had a mean of 36.80, and a SD of 9.936.

These results demonstrate that the adapted phase one COPE intervention did have a significant effect on maternal anxiety. Only four participants scored 13 or greater on the EPDS pre test, indicating depression. Two of these women already had a preexisting diagnosis of depression prior to admission. On the post test only two participants scored 13 or greater. Although the majority of participants (26 pre/28 post) did not meet a score for diagnosis of depression, there was a significant difference in the scores from pre (M=7.30, SD=5.167) to post EPDS (M=5.43, SD=4.337) scores; $t(29)=2.937$, $p=.006$. These results suggest that the adapted phase one COPE intervention did have a significant effect on factors that can contribute to maternal depression. The NICU PBS demonstrated a statistically significant difference in the scores from pre (M=64.77, SD=15.206) to post intervention (M=75.27, SD=8.839) scores; $t(29)=-3.846$, $p=.001$. These results suggest that the adapted phase one COPE intervention did have a significant effect on maternal beliefs and expectations.

Conclusion

This capstone demonstrated that an existing program (NICU COPE) could be easily adapted to the obstetric inpatient setting, instead of waiting until the point of premature birth and actual NICU admission. As the length of stay of the participants in this capstone averaged 15 days, it shows that there is a missed opportunity for mothers to not only be educated, but to also decrease their anxiety and contributors to depression during this stressful time in their lives.

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Evaluation of a Practice Change Using COPE (Creating Opportunities for Parent Empowerment)
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Introduction

Approximately one of every nine infants born in the United States each year is premature (Centers for Disease Control [CDC], 2014). This equates to nearly half a million premature infants born each year. Not only is prematurity the leading cause of mortality among newborns, it is also a cause of lifelong morbidity as well. The majority of infants born prematurely are admitted to neonatal intensive care units (NICU) for specialized care. This NICU hospitalization can last anywhere from days to months (CDC, 2009).

Premature birth also equates to premature parenting (Lubbe & Bornman, 2005). When a woman is expecting a baby, she also expects a normal birth and a normal infant. The 40-week pregnancy allows time for emotional adaptation. Premature birth and subsequent NICU admission is a situational adaptation for the parents and a “nerve-racking experience” as well (Lubbe & Bornman, p. 74). This crisis of premature parenting is a time of intense and confusing emotions that can cause emotional/psychological impact such as guilt, stress, and difficulty for the parents (Holditch-Davis & Miles, 2000; Carter, Mulder, Bartram, & Darlow 2005; Shellabarger & Thompson, 1993). In addition to high stress levels, these parents experience feelings of helplessness and often lack the sufficient knowledge of how to parent and interact with their child in the NICU (Melnyk et al. 2006). Additionally, Beck (2004) found premature birth to be a risk factor for post-partum posttraumatic stress disorder (PP-PTSD). Women with PP-PTSD have increased stress, anxiety and depression (Onoye, Goebert, Morland, Matsu & Wright, 2009). These symptoms may have a direct effect on the parent-baby bond (Lubbe &

Bornman). Although this topic of PP-PTSD and maternal attachment with infants has not been extensively studied, Holditch-Davis, Bartlett, Blickman & Miles (2003) found that mothers of premature infants appeared to experience emotional responses similar to PTSD at 6 months after their child's expected birth date. Whereas, Evans (2005) found that mothers with anxiety disorders have insecure attachments with their children, which are also linked to both clinical and subclinical anxiety in children of various ages. Enns, Cox and Lara (2002) found that parenting experiences, particularly lack of care, are potentially causally related in a non-specific manner to a wide variety of forms of adult psychopathology in both men and women. Agostini et al. (2010) further contend that damage to this parental bond may even cause chronic physical illness such as inflammatory bowel disease. A negative birthing experience, common with premature birth, interferes with the mother's adaptation to the mothering role and her future relationship with her infant (Anderson, n.d.). Daire (2002) suggests that the parental bond developed during childhood may play a role in predicting the extent to which care-giving sons will attribute distress to their care giving role.

Significance of the Problem

Statement of the Problem

Clinical problems related to parental stress due to preterm birth and NICU admission extend beyond feelings of simple stress by parents to that of helplessness, insufficient knowledge, decreased bonding, depression, and the potential development of PP-PTSD.

Furthermore, these clinical problems can extend to the child. Decreased bonding can cause the

child to have clinical and subclinical anxiety disorders; and may further equate to future chronic illness, adult psychopathology, and even impact their child's role as a caregiver.

Description of the Problem of Preterm Birth

Preterm birth is defined as a birth of an infant prior to completion of 37 weeks gestation (CDC, 2009). Goldberg, Culhane, Iams, and Romero (2008) define it as a syndrome that is started by multiple mechanisms, including infection or inflammation, uteroplacental ischemia or hemorrhage, over-distension of the uterus, stress, and other immunologically mediated processes. The majority of these preterm births are caused by spontaneous preterm labor, either by itself or following spontaneous premature rupture of the membranes (PROM). Nearly one-fourth of all preterm births are a direct result of an early induction of labor or Cesarean section (C-section) as related to pregnancy complications or health problems in the mother or the fetus (March of Dimes [MOD], 2010).

Risk factors.

Maternal demographic characteristics for risk of preterm birth include risk factors such as black race, low educational and socioeconomic status, low and high maternal age and not being married (Goldenberg et al., 2008). The exact mechanism between maternal demographic characteristics and preterm birth is poorly understood. Pregnancy history and characteristics that increase risk of preterm birth include: previous birth less than six months ago, low pre-pregnancy body mass index, low iron, folate, and zinc serum levels, previous history of preterm deliveries, multiple gestation, vaginal bleeding in pregnancy, extremes in amniotic fluid volume, uterine anomalies, high maternal stress, intrauterine infection, genital infections, non-genital tract

infections, and cervical shortening (Goldenberg et al., 2008). Maternal disease and surgeries such as abdominal surgery during the second and/or third trimester, history of cervical surgery, and medical disease (thyroid, asthma, diabetes, hypertension) have also been associated with preterm birth. The following drugs have shown a causal relationship also: tobacco use (smoking), heavy alcohol consumption, and cocaine and/or heroin use (Goldenberg et al., 2008).

Obesity itself does not increase the risk of preterm delivery, but it does increase the risk of fetal congenital anomalies, and these infants are more likely to be born prematurely.

Additionally, obesity increases the risk of preeclampsia and diabetes and these disorders are associated with preterm birth. Genetics is also thought to play a part in preterm birth, although further research is needed in this area. Thus far, the research indicates that there is a gene-environment interaction involved in spontaneous preterm birth (Goldenberg et al., 2008).

Preterm Birth Data

National level.

The incidence of preterm birth in the U.S. in 2012 was one out of every nine births or 11.5%, which equates to more than 450,000 preterm births (CDC, 2014). The preliminary data for 2013 suggests a preterm birth rate of 11.4%, giving the U.S. its lowest preterm birth rate in 17 years, and meeting its Healthy People 2020 goal seven years early. The rate of preterm birth decreased 5% from 2002-2012. Although this initially sounds like cause for celebration, the U.S. is still well above meeting its initial Healthy People 2010 objective of preterm birth rate no greater than 7.6%, and we continue to fall below the March of Dimes goal of 9.6%. (March of Dimes 2015; NCHS, 2015).

Statistically (2010-2012), preterm birth rates were highest for women over age 40 (16.6%). This rate was then followed by women less than 20 years old (13.5%), those 30-39 years old (11.8%) and those 20-29 years old (11.2%). During this same time period, rates were highest among blacks (16.8%), followed by Native Americans (13.6%), Hispanics (11.7%), Caucasians (10.5%) and Asians (10.3%) respectively. Distribution of the preterm birth rate in the U.S. in 2012 was generally highest among the southern states at 12.9%, but several mid-Atlantic states/districts were also in this category including Maryland, Delaware, District of Columbia, and West Virginia (NCHS, 2015).

State level.

In 2013, the preliminary preterm birth rate was 12.5%. While the national rate was decreasing, the preterm rate in WV had remained relatively the same in the 12%'s for the last four years. The preterm birth rates (2010-2012) were highest among women 40 and older (17.8%). The second highest rate of WV preterm birth by maternal age were women age 30-39 years (13.6%), followed by women less than age 20 (13%) and then 20-29 years old (11.6%) respectively. In terms of race, WV's preterm birth rates were highest for Native Americans (20.7%), followed by blacks (15.6%), Hispanics (12.5%), whites (12.3%) and Asians (9.1% [NCHS, 2015]); yet the population of WV (2013) was 93.8 % white, 3.6% black, 0.2% Native Americans, 0.8% Asian, and 1.4% Hispanic (NCHS, 2015; U.S. Census, 2015). Thus, 57.9% of the preterm births in WV are from only 6% of the population.

Unfortunately, other demographic characteristics associated with preterm birth were not readily available from the state, as WV natality data demographics only include characteristics

associated with low birth weight (< 2500g), not preterm birth. However, WV did release a statistical brief in 2009 in which the state Department of Health and Human Resources (DHHR) tracked statistics on late preterm birth (births from 34 through 36 weeks) from 1993-2007. According to this report, in 2005, WV ranked 5th in the U.S. in the percentage of total singleton births born in the late-preterm period. The WVDHHR (2009) found that in relation to delivery method (1993-1997/2003-2007), the overall C-section rate among late-preterm births increased 45.5% (27.5% to 40.0%); primary C-sections increased 29.0% (19.3% to 24.9%) and repeat C-sections escalated 84.1% (8.2% to 15.1%). In regards to education, late-preterm deliveries were least likely to occur among college-educated women and more likely to occur among women with less than a high school education. WVDHHR (2009) reported that the rate of late-preterm birth increased among all levels of education over the study period. Women with more education (13-15 and 16+ years) showed the greatest rise in proportion of births occurring from 34 through 36 weeks (44.9%: 4.9% to 7.1%). In regards to prenatal care, an elevation in the number of late-preterm births (from 1993-2007) was found without regard to the trimester in which a woman began prenatal care. Information on maternal income was not available through the WVDHHR (WVDHHR, 2009, 2015).

Local level.

The West Virginia University Hospital (WVUH) Maternal Infant Care Center (MICC) receives patients and transports (average of 350 admitted transports a year) from Monongalia county and surrounding counties and states. On average, MICC delivers around 1500 infants a year and 70% of those are considered to be high risk (of which preterm labor/birth would be

considered [WVUCH, 2011]). For 2014, there were 1,735 adult inpatient discharges from MICC (data is discharged based as cases are not coded until post-discharge) with 263 or 15% of these attributed to preterm labor. During this same time frame, 400 infants (defined as only infants that lived at least 24 hours post admission) were prematurely born on MICC and admitted into the NICU. These premature infants' gestational diagnoses ranged from less than 24 weeks to 37+ weeks, with 128 infants not coded for gestational age, and at least 87 infants part of multiple births. This is in comparison to 177 infants that were transports to the NICU. Thus, the majority of premature infants (69%) were born on MICC (K. Evans [Lead Decision Support Analyst, WVUCH]), personal communication, April 6, 2015).

Characteristics of mothers who delivered at WVUH and whose infants were admitted into NICU include: the majority were between 21 and 30 years old (58%), were covered under Medicaid/Medicare (51%), were white (93%), and lived in Monongalia County (21%). One percent currently smoked and 12% had a history of smoking during their pregnancy. However, 87% did not list any status related to smoking (K. Evans, personal communication, April 6, 2015).

Population culture.

Monongalia County, WV, and WVUH MICC transport areas (surrounding counties and states) all lie within Appalachia and share some similar values and demographics. Shared values include: familism (an emphasis on family), neighborliness, love of home place, individualism, personalism, modesty and being one's self, sense of humor, traditionalism, and religion. As things have vastly changed since the 1960s when the Appalachian Regional Commission was

established because of the lack of education and poverty, there could now be more variation within key demographic data. There still remain in this region the challenges of economic distress, concentrated areas of high poverty, high unemployment rates, educational disparities, and high rates of disease (Marcum, 2008). For instance, in Monongalia county 38.1% of the population has a bachelor's degree or higher. This is higher than the U.S. average of 28.8%, and more than triple the 12.6% of the neighboring Preston County (U.S. Census, 2015).

Behringer and Friedell (2006) found several challenges in addressing health issues and cancer education in Appalachia, which are also relevant to mothers experiencing preterm birth. First is tobacco use, which, although it has a causal relationship with preterm birth, should not be an issue in providing adapted Creating Opportunities for Parent Empowerment (COPE) phase one materials. COPE addresses what to expect of a preterm infant and not prevention of preterm labor/birth. Second is the role of religion. There exists debate on whether religion poses a fatalistic aspect versus a comforting aspect for a person. Individuals who demonstrate fatalism may be more reluctant to be involved in the COPE program. Third is Appalachia's low population density and availability of services. As these patients are patients in the hospital, this should not be an issue. Lastly, the importance of communication is stressed. The authors stress that personal trust is vital to education in Appalachia (Behringer & Friedell, 2006). This could present a concern for this project, in that the limited amount of time spent with each patient may not be long enough to foster a personal trusting relationship. Additional cultural considerations may exist due to the cultural diversity that exists within the WVU community that may be part of this population when a preterm birth is imminent. The ability of patients to understand/read

English may also be an issue, and needs to be taken into consideration. As literacy is also assessed upon admission to WVUH MICC, this information is available in the patients' charts, and for the purpose of this project, those women who do not speak/read English as their primary language will be excluded from the project.

Financial Implications

In examining the financial burden of premature birth, Muraskas and Parsi (2008) found the cost of one day in the NICU for one infant is in excess of \$3,500 and it is not considered unusual for prolonged stays to cost over \$1 million. The majority of these NICU admissions were due to prematurity. According to the Institute of Medicine (IOM) the economic burden placed on society because of prematurity is at least \$26.2 billion annually (in excess of costs for term infants). This equates to about \$51,600 per preterm infant. Approximately \$33,200 was associated with medical services needed between birth and age five. Maternal delivery costs were \$3,800 per infant, early intervention programs (e.g. Birth to Three) were \$1,200 annually, and special education services were an additional \$2,200 annually per person. Indirect costs (i.e. future lost productivity in the household and the labor force associated with disabling conditions of the children) were \$11,200 per every preterm child (Behrman & Butler, 2007; Hodek, von der Schulenburg & Mittendorf, 2011). Hodek et al. (2011) found families of preterm infants had significant economic burdens beyond the obvious medical and financial burden to the health insurance system. These parents had substantial out of pocket expenditures as well as emotional distress. The authors found that the largest part of the parental burden occurred after infants were discharged from the NICUs. However, they also noted that the parent's emotional stress was

very high during the initial hospitalization and significantly increased with decreasing gestational age. This area of intangible costs (emotional distress/stress, reduced quality of life) was one area that Hodek, von der Schulenburg and Mittendorf recommended for future research.

Proposed Intervention for the Problem

As part of the Doctorate in Nursing Practice (DNP) work at West Virginia University (WVU), and because no current program is in place at the local level (WVUH MICC) the practicality of an evaluation of a practice change was proposed to address this problem of maternal stress related to preterm birth and subsequent newborn NICU admission.

PICOT Question

Does early initiation of an adapted version of COPE (Creating Opportunities for Parent Empowerment) phase one for gravid women aged 18 years and older who are admitted to WVUH MICC at risk of preterm delivery and subsequent infant NICU admission, decrease maternal stress? The Creating Opportunities for Parent Empowerment (COPE) program (Melnyk et al., 2001 & 2006) is made up of four interventional phases (one through four) sessions of audiotaped and written materials that provide information and behavioral activities about the appearance and behavioral characteristics of preterm infants and how best to parent them. With permission of the author, Dr. Bernadette Melnyk, COPE phase one written materials were adapted to future tense and various pictures of NICU equipment and neonates at various stages of gestation were added.

Proposed Project

In 2010, WV received a grade of ‘F’ in terms of its preterm birth rate by the March of Dimes 2010 Premature Birth Report Card (March of Dimes, 2010). Within two years WV was able to increase this grade to a “C” by decreasing its incidence of preterm birth from 13.9% to 12.7%. Unfortunately, we have remained at a “C”. This is still far below The March of Dimes goal of 9.6% (March of Dimes, 2012, 2015). Because of the problem of maternal stress related to preterm birth and subsequent NICU admission and WV’s continued struggle at addressing this problem, early initiation of the COPE program was proposed.

As previously mentioned, COPE (Melnyk et al., 2001 & 2006) is made up of four interventional phases (one through four) sessions of audiotaped and written materials that provide information and behavioral activities about the appearance and behavioral characteristics of preterm infants and how best to parent them. COPE has been identified as a way to effectively decrease maternal stress when initiated two to four days post NICU admission (Melnyk et al., 2001 & 2006). As part of this proposed project the first phase (written materials) of COPE were initiated for mothers whose infants were at risk of NICU admission, but were still gravid.

Overall Objective

The overall objective for this practice change was to evaluate the effectiveness of early initiation of an adapted version of COPE phase one in decreasing stress in gravid women aged 18 years and older at WVUHC MICC who were at risk of preterm delivery.

Population

The population of interest for this project consisted of gravid women aged 18 years and older, who were between 28^{0/7} and 35^{6/7} weeks gestation, at risk for preterm delivery, with no known fetal anomalies, and who were admitted for at least two days to WVUH MICC.

For the purposes of this project, mothers who were greater than 36^{0/7} weeks gestation were excluded. Although these infants would be still considered preterm, these 'late preterm' infants were less likely to be admitted into the NICU setting.

Theoretical Framework

According to Melnyk, Crean, Feinstein and Fairbanks (2008) COPE was developed based upon Leventhal and Johnson's self-regulation theory, and Carver and Scheier's control theory. Although both of these theories (self-regulation theory and control theory) as defined by Melnyk et al. could have been utilized in this project, Carver and Scheier's control theory encompasses self-regulation, thus making it a more useful theory.

Key Elements of Framework

Control theory is a model of self-regulation for the analysis of human behavior. It is a discrepancy-reducing feedback loop. Although the main ideas of control theory date to the 1930's, Carver and Scheier (1982) date its birth to the publication of Wiener's (1948) book, *Cybernetics: Control and communication in the animal and the machine*. This feedback loop is considered to be a fundamental building block of action. According to Carver and Scheier (1982), the basic unit of this cybernetic control is the negative feedback loop. It is called 'negative' because its function is to negate sensed deviations from a comparison value. The

‘input function’ is considered the sensing of a present condition. That perception is then compared against a point of reference via a mechanism known as a ‘comparator’. If a discrepancy is perceived between the present state and the reference value, a behavior known as the ‘output function’ is performed. The goal of the ‘output function’ is to reduce the discrepancy between the present state and the reference value. The behavior does not resist the discrepancy directly, but through its impact on the system's environment (anything external to the system). This impact actualizes a change in the present condition, causing a different perception, which is thus compared anew with the reference value. According to the authors, this layout is considered a closed loop of control, for the overall purpose of minimizing deviations from the standard of comparison.

Klein (1989) simplifies the feedback loop by breaking it down into its basic four elements: a referent standard or goal, a sensor or input function, a comparator, and an effector or output function. He believes this feedback loop can best be illustrated through the example of a thermostat controlling the temperature of a room. Although Lord and Hanges (1987) would identify that in humans feedback is more complicated than just mechanical sensing of the environment; goals are not predetermined, nor are they in the form of inflexible standards; and there is more than one alternative to reduce a discrepancy. However, Klein would argue that although human control systems may be more complex, they basically operate in the same way as a thermostat, ‘utilizing feedback to attain goals’. This according to Carver and Scheier (1982) is the basic definition of control theory -- a contradiction between a goal and a current state that stimulates behaviors that will empower an individual to reach his or her goal.

Carver and Scheier (1981) further discuss discrepancy reduction in that if a behavioral standard has been elicited in a person, self-directed attention causes a process of comparison between that standard and the person's current state. The result of this process is self-regulation or more specifically engagement of the self-regulating function of the feedback loop. Carver and Scheier (1981) stated

This description of self-regulation is quite simple, but it is the essence of the control-theory approach to human behavior. When a behavioral standard is salient, self-attention leads to a comparison between the standard and one's present behavior. This comparison, in turn, leads to a tendency to alter behavior so that it conforms more closely to the standard (p.144).

This is compared to self-regulation theory, which is defined as the belief that the provision of concrete objective information (or a salient behavioral standard) to one experiencing a stressful event (present behavior) enables the development of a 'cognitive schema' (termed as 'attention') that is similar to the real life event (Johnson, Fieler, Jones, Wlasowicz & Mitchell, 1997). Thus, this awareness brought on by the cognitive schema allows the person to cope more efficiently with the stressor through an increase in "understanding, predictability, and confidence in the ability to deal with the stressful event" (Melnik et al., 2008, p. 284). Thus control theory overlaps and uses self-regulation as well as attention (awareness or development of a cognitive schema) to meet its goal.

Application of Framework to Proposed Project

Melnyk et al. (2008) used control theory to guide the parental information and developmentally sensitive parent role activities within the COPE program. Melnyk believed that when an infant is born prematurely, the mother experiences a contradiction between what she expected (care to a healthy term infant) and the reality of the NICU setting. This contradiction should motivate the mother to want to engage in the care of her infant in the NICU, but barriers due to hospitalization within the NICU setting can block developmentally important parenting behaviors that one might normally experience with a healthy newborn (Melnyk et al.). According to Melnyk et al., COPE's parent role information and activities are expected to remove these barriers thus reducing maternal anxiety and creating less stress. As such, Melnyk et al. provide an example of self-regulation theory in the COPE program as the audio taped and matching written information (concrete objective information) the parents receive concerning their premature infant's physical and behavioral characteristics (stressful event). The expectations for these materials are that they will strengthen the mother's belief (cognitive schema) about her ability to understand and predict her infant's cues and behaviors in the NICU. This strengthened belief held by the mother then leads to less stress (Melnyk et al.).

Framework Articulates With Clinical Problem

Premature birth also equates to premature parenting (Lubbe & Bornman, 2005). According to Lubbe and Bornman when a woman is expecting a baby she is also expecting a normal birth and a normal infant, and the 40-week pregnancy allows time for emotional adaptation. Just as these women are expecting a normal birth and infant, they are also expecting a

normal pregnancy to be carried to term. In comparison to Melnyk et al.'s (2008) control theory example, when a mother experiences preterm labor, the mother experiences a contradiction between what she expected (carrying to term, going home and caring for a healthy term infant) and the reality of being hospitalized during pregnancy, preterm birth, and then the admission of the baby into the NICU. This contradiction should motivate the mother to want to engage in learning about what to expect in the NICU as well as how to care for her infant in the NICU. Normally this education is not provided thus contributing to maternal stress. Early initiation of COPE's phase one parent role information and activities should mitigate these barriers thus reducing maternal anxiety and creating less stress.

Literature Review and Synthesis

Search Strategy

The search strategy to identify the best evidence related to an educational intervention to decrease the level of stress for parents of infants admitted into a NICU included an in-depth search of the National Guideline Clearinghouse, CINAHL, PubMed, Health Source: Nursing/Academic Edition, and the Cochrane Library. Key words used for the search were: NICU, NICU parents, stress, nurse intervention, COPE, and parental stress. An updated search included the words: COPE, maternal stress, stress in pregnancy, high-risk pregnancy, and hospitalization.

Limitations included years searched which initially was 2000-2010. Specific limitations for Health Source: Nursing/Academic Edition were full text and peer reviewed; and for PubMed were humans, clinical trial, meta-analysis, practice guideline, randomized controlled trial,

review, and English. The initial search of all databases yielded 2,494 hits, which were eventually narrowed to 49 through the addition of the aforementioned search terms. These 49 hits were further narrowed to include only clinical practice guidelines (CPG), randomized controlled trials (RCTs), meta-analyses, and systematic reviews (SR). The technique of snowballing was used to locate two additional articles, including a quasi-experimental trial. Articles were excluded if they did not contain the key words (or some variation). A total of one CPG (Davidson et al., 2007), six RCTs (Melnyk et al., 2006; Melnyk et al., 2001; Turan, Basbakkal, & Özbek, 2008; Kaaresen, Ronning, Ulvund, & Dahl, 2006; Browne & Talmi, 2005; Glazebrook et al., 2007) and one quasi-experimental study (Cooper et al., 2007) met inclusion criteria. The updated search using the same limitations, except expansions of years to 2014 and the additional search terms: antepartum stress and antepartum hospitalization, added two additional RCTs (Chang, Chen & Huang, 2008; Bauer, Victorson, Rosenbloom, Barocas & Silver, 2010). An additional search as part of a research interest group for a proposed manuscript was conducted in late 2012 (Chertok, I., McCrone, S., Parker, D. & Leslie, N., 2013). The National Guideline Clearinghouse, PubMed, CINAHL, and EBSCOhost were searched. Keywords used for the search included the following terms: NICU, preterm, infant, mother, parent, stress, and intervention. The search was limited to completed experimental intervention studies aimed at reducing stress of mothers of preterm infants in the NICU that were published in English from 1998 to 2012. This expanded search identified six RCTs (van der Pal, Maguire, le Cessie, Wit, Walther, & Bruil, 2007; Newnham, Milgrom, & Skouteris, 2009; Meijssen, Wolf, Koldewijn, van Wassenaer, Tronick, Kok, & van Baar, 2010; Ravn, et al., 2012; Silverstein, et al., 2011; Matricardi, Agostino, Fedeli, &

Montirosso, 2012), two quasi-experimental studies (Preyde & Ardal, 2003; Jotzo & Poets, 2005), one repeated measures design study (Morey & Gregory, 2012), and one pilot feasibility study using pretest-posttest design (Feeley, et al., 2008 [See Table 1]). A last review of the literature prior to presentation of this capstone in early Spring 2015 added 1 RCT (Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014).

Critical Appraisal

A critical appraisal was conducted on each document. The CPG was appraised using the Appraisal of Guidelines for Research and Evaluation (AGREE) instrument (The AGREE Collaboration, 2001). The eight RCTs were appraised using the Scottish Intercollegiate Guideline Network (SIGN) Methodology Checklist 2: Randomized Controlled Trials instrument (SIGN, 2010). The quasi-experimental study was appraised using the Quantitative Literature Review Worksheet (Larrabee, 2009). An evidence table of the RCTs was created with the findings of the critical analysis (See Table 1).

One CPG (Davidson et al., 2007), eight RCTs (Melnik et al., 2001; Browne & Talmi, 2005; Melnyk et al., 2006; Kaaresen, Ronning, Ulvund, & Dahl, 2006; Turan, Basbakkal, & Özbek, 2008; Newnham, Milgrom, & Skouteris, 2009; Matricardi, Agostino, Fedeli, & Montirosso, 2012; Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014), three quasi-experimental studies (Preyde & Ardal, 2003; Jotzo & Poets, 2005; Cooper et al., 2007), and one repeated measures design study (Morey & Gregory, 2012) support the effectiveness of an educational intervention in decreasing the level of maternal stress of mothers of preterm/NICU infants. Two RCTs (Bauer et al., 2010; Chang et al., 2008) support the effectiveness of an intervention in

decreasing stress in still gravid women. One RCT (Silverstein et al., 2011) and one pilot feasibility study using a pretest-posttest design (Feeley, et al., 2008) found the intervention to be feasible and acceptable.

The *Clinical practice guidelines for support of the family in the patient-centered intensive care unit: American College of Critical Care Medicine Task Force 2004–2005* by Davidson et al. (2007) was critically appraised to have strong internal validity with its overall objective to define best evidence based practices for support of families in the intensive care unit setting, including the NICU. The authors developed the guidelines after a literature review using Cochrane methodology to evaluate SRs, RCTs, and CPGs. The authors found the level of evidence in most cases to be at a Cochrane level four or five, indicating the need for further research. However, they did make 43 recommendations, including the sanctioning of a shared decision-making model, early and repeated care conferencing to reduce family stress and improve consistency in communication, honoring culturally appropriate requests for truth-telling and informed refusal, spiritual support, staff education and debriefing to minimize the impact of family interactions on staff health, family presence at both rounds and resuscitation, open flexible visitation, way-finding and family-friendly signage, and family support before, during, and after a death (Davidson et al., 2007).

Of the eight RCTs (Melnyk et al., 2001; Browne & Talmi, 2005; Melnyk et al., 2006; Kaaresen, Ronning, Ulvund, & Dahl, 2006; Turan, Basbakkal, & Özbek, 2008; Newnham, Milgrom, & Skouteris, 2009; Matricardi, Agostino, Fedeli, & Montiroso, 2012; Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014), three quasi-experimental studies (Preyde & Ardal,

2003; Jotzo & Poets, 2005; Cooper et al., 2007), and one repeated measures design study (Morey & Gregory, 2012), 11 different intervention programs or 12 different studies (two studies used the same intervention) were all effective in some manner of achieving the desired outcome of decreasing the maternal stress of NICU mothers. Five RCTs (Glazebrook et al., 2007; Van der Pal et al., 2007; Meijssen et al., 2010; Ravn et al., 2011; Silverstein et al., 2011) did not find significant improvements in maternal stress levels.

The 11 different effective intervention programs included:

- COPE (Melnik et al., 2001 & 2006). COPE was made up of four intervention sessions of audiotaped and written materials that provided information and behavioral activities about the appearance and behavioral characteristics of preterm infants and how best to parent them.
- COPE –Two Phases (Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014). Used Phase I and II of the original four interventions consisting of audiotaped and written information and behavioral activities about the characteristics of premature infants.
- Parent-to-Parent Peer Support (Preyde & Ardal, 2003). Using mainly telephone support, new mothers were paired with trained mothers who had previously had a very preterm infant (less than 30 weeks gestation) in the NICU.
- Education program using Assessment of Preterm Infant Behavior (APIB)/Mother's Assessment of the Behavior of her Infant (MABI) (Browne & Talmi, 2005). APIB/MABI mothers received a demonstration of their infant's reflexes, attention–interaction, motor capabilities and sleep-wake states; the mothers were also given the MABI instrument and

told that it would help them to become more familiar with their infant. Mothers were instructed to try to see how their infant performed according to the questions.

- The Prematurely Yours and To Have and Not to Hold slides/tapes program (Browne & Talmi, 2005). This program focuses on the strengths and skills of premature infants, describing signs of overstress, consoling an unhappy baby, bringing a baby to an alert state, and understanding the importance of sleep and self-comforting skills. Additionally, the slides and tape presentation describes typical thoughts and feelings of parents during pregnancy, early delivery, the intensive care experience, and coping with stressful interpersonal relationships. Mothers were also given copies of *The Premature Baby Book and Developmental Steps*.
- Trauma Preventive Psychological Intervention Program (Jotzo and Poets, 2005). Trauma intervention was composed of a one-time crisis intervention with added psychological aid throughout the NICU stay. The intervention was conducted by the departmental psychologist who approached parents within 5 days after their infant's birth. The intervention involved general trauma preventive measures and components specifically geared toward premature birth.
- March of Dimes NICU Family Support (NFS) program (Cooper et al., 2007). NFS provides direct, face-to-face support to NICU families through the use of an NFS specialist.
- One-on-one education (Turan, Basbakkal, & Özbek, 2008). This intervention included a 30-minute educational program about the infant and the NICU within the first week after their

infant was admitted. Parents were introduced to the unit and personnel and given any information they requested and questions were answered.

- The modified version of the Mother-Infant Transaction Program (MITP [Kaaresen, Ronning, Ulvund, & Dahl, 2006; Newnham, Milgrom, & Skouteris, 2009]). MITP emphasizes the transactional nature of development and tries to enable the parents to appreciate their infant's unique characteristics, temperament, and developmental potential.
- Observation and Infant Massage (Matricardi et al., 2012). The intervention included joint observation methods and infant massage that was provided by both parents. Each couple in the intervention group met the unit's physical therapist eight times in sessions lasting one hour, from 31 to 36 weeks post- menstrual age of their infant.
- Nurse-Led Education (Morey & Gregory, 2012). A nurse-led intervention of three major components and several teaching strategies including: an educational video developed by the hospital NICU team, a detailed description of the clinical aspects of prematurity, the care requirements of premature infants, and the family involvement in the NICU, and a tour of the NICU.

Of the two additional RCTs (Chang et al., 2008 and Bauer et al., 2010) three different interventions were all effective in achieving the desired outcome of decreasing gravid stress.

These three different interventions included:

- One-Hour Music Therapy (Bauer et al., 2010). Pregnant women who were on hospitalized bed rest received 1 hour of music therapy. Available music therapy interventions included:

Music-Facilitated Relaxation, Active Music, Song Writing, and Music for Bonding or Clinical Improvisation.

- One-Hour Recreational Therapy (Bauer et al., 2010). Pregnant women who were on hospitalized bed rest received 1 hour of recreational therapy. Available recreational therapy interventions included: Adaptive Leisure Activities, Creative Arts, Relaxation/Stress Management Exercises, Community Resource Education or Leisure Awareness Activities.
- Two Week Music Intervention (Chang et al., 2008) Pregnant women were given a prerecorded CD and asked to listen to at least one disc (30 minutes) a day for two weeks. Each CD contained 30 minutes of music consisting of lullabies, classical music, nature sounds or crystal music performing Chinese children's rhymes and songs.

One Hour Music Therapy (Bauer et al., 2010), One Hour Recreational Therapy (Bauer et al., 2010) and Two Week Music Intervention (Chang et al., 2008) all decreased stress among gravid women.

The RCTs (Melnyk et al., 2001; Browne & Talmi, 2005; Melnyk et al., 2006; Kaaresen, Ronning, Ulvund, & Dahl, 2006; Turan, Basbakkal, & Özbek, 2008; Newnham, Milgrom, & Skouteris, 2009; Matricardi, Agostino, Fedeli, & Montiroso, 2012; Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014) that support the effectiveness of an educational intervention in decreasing the level of maternal stress of mothers of infants admitted into the NICU and the RCTs (Bauer et al., 2010 and Chang et al., 2008) that support the effectiveness of an intervention to decrease stress in pregnancy were all assessed for threats to internal validity. All nine RCTs

utilized instruments that were both valid and reliable and listed a purpose of study. They also analyzed the subjects in the assigned groups.

The quasi-experimental studies (Preyde & Ardal, 2003; Jotzo & Poets, 2005; Cooper et al., 2007) also support an educational intervention to decrease maternal stress. Cooper et al. (2007) sampled NICU families (n=216), but they never specifically defined who made up the families. Cooper et al. found that the March of Dimes NFS had a positive impact on the stress level of NICU families. Notable threats to internal validity include no pretest, variation in number of family responses obtained, and awareness of NFS specialist. A threat to the external validity was the implementation process of NFS that varied from site to site, as well as variable timing of implementation.

In the Preyde & Ardal study (2003) threats to internal validity included differential maturation and statistical regression, different settings (they experienced staff shortages at one setting), lack of blinding of researchers and selection bias. Threats to external validity included their small sample size (n=24 for parent-buddy group).

In the Jotzo & Poets study (2005) internal validity was jeopardized in that they were unable to determine if the effect seen was intervention specific or related to the presence and emotional support of the psychologist. They also lacked ethical/cultural heterogeneity contributing to a threat to their external validity and generalizability.

Synthesis

Strong evidence from one CPG (Davidson et al., 2007), eight RCTs (Melnyk et al., 2001; Browne & Talmi, 2005; Melnyk et al., 2006; Kaaresen, Ronning, Ulvund, & Dahl, 2006; Turan, Basbakkal, & Özbek, 2008; Newnham, Milgrom, & Skouteris, 2009; Matricardi, Agostino, Fedeli, & Montirosso, 2012; Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014), three quasi-experimental studies (Preyde & Ardal, 2003; Jotzo & Poets, 2005; Cooper et al., 2007), and one repeated measures design study (Morey & Gregory, 2012) support the effectiveness of an educational intervention in decreasing the level of maternal stress of mothers of preterm/NICU infants. Two additional RCTs (Bauer et al., 2010; Chang et al., 2008) demonstrated that interventions initiated for still gravid mothers could be effective at decreasing stress in pregnancy. One RCT (Silverstein et al., 2011) and one pilot feasibility study using a pretest-posttest design (Feeley, et al., 2008) found the intervention to decrease maternal stress to be feasible and acceptable.

However, the total evidence was not consistent (heterogeneous) with five RCTs (Glazebrook et al., 2007; Van der Pal et al., 2007; Meijssen et al., 2010; Ravn et al., 2011; Silverstein et al., 2011) not finding significant improvements in maternal stress levels. Glazebrook et al. (2007) showed no effect on parental stress in the NICU. Plausible explanations for this inconsistency as related to the Parent Baby Interaction Programme (PBIP) include factors such as a possibility of recruitment bias due to its cluster-randomized design in that recruitment happened after randomization and program content. Van der Pal et al., (2007) using the Newborn Individualized Developmental Care and Assessment Program (NIDCAP) did show that a

difference in parental stress between mother and father was less for NIDCAP, but it was not statistically significant. Meijssen et al. (2010) found their Infant Behavioural Assessment and Intervention Program (IBAIP) made mothers more satisfied about their infants' mood and distractibility, but is believed to have made them also feel more isolated and as such contributed to their stress. Ravn et al. (2011) using the Mother-Infant Transaction program (MITP) showed a positive effect in reducing postpartum depression and extending breastfeeding. However maternal stress was not reduced and paternal stress actually increased. Further research is needed to determine why maternal stress was not affected, although depression and breastfeeding were positively affected. Plausible explanations for paternal increased stress include a normally higher level of stress in fathers of preterm versus term infants.

Project Hypotheses

Hypotheses

- 1) Patients who receive the adapted COPE phase 1 written materials will demonstrate reduced anxiety as measured by the State Trait Anxiety Inventory (STAI) from pre-test to post-test.
- 2) Patients who receive the adapted COPE phase 1 written materials will demonstrate stronger beliefs about what to expect in their preterm infant characteristics/ behaviors and how to parent them as measured by the NICU Parental Beliefs Scale from pre-test to post-test.

are: phase one, two to four days after NICU admission; phase two, four to eight days after NICU admission; phase three, one to seven days before discharge from the NICU; and phase four, one to two weeks after discharge from the NICU.

In addition to the use of COPE phase one; the STAI, EPDS, and the NICU Parental Beliefs Scale were used. Both the STAI (Melnik et al., 2006; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) and NICU Parental Beliefs Scale, which was developed by Melnik (Melnik et al., 2001), were used in the piloting and evaluation of the NICU COPE program. Pre and posttest data from each of the aforementioned scales was analyzed using a paired t-test.

Instruments

STAI

According to the American Psychological Association (2012), the STAI is a commonly used measure of trait and state anxiety (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) that can be used in clinical settings to diagnose anxiety and to distinguish it from depressive syndromes.

Its adult version Y contains 20 items for assessing trait anxiety and 20 items for state anxiety. State anxiety items include: “I am tense; I am worried” and “I feel calm; I feel secure.” Trait anxiety items include: “I worry too much over something that really doesn’t matter” and “I am content; I am a steady person.” All items are rated on a 4-point scale (e.g., from “Almost Never” to “Almost Always”). The STAI is appropriate for those who have at least a sixth-grade

reading level (American Psychological Association, 2012). State and trait anxiety will be assessed in the pre-test, whereas post intervention only state anxiety will be assessed.

The STAI is considered both valid and reliable. According to Spielberger et al. (1983) and Spielberger (1989) the internal consistency coefficients for the STAI have ranged from .86 to .95, with test-retest reliability coefficients ranging from .65 to .75 over a two-month interval. Test-retest coefficients for this measure in the study ranged from .69 to .89.

This tool is available from Mind Garden Inc. and has two options available in regards to purchasing a license to reproduce/administer the tool, either through online purchase or mail. The license to reproduce allows one to either conduct a paper and pencil survey, or re-type and reformat for use online. The license to reproduce is \$100.00 for 50 administrations (Mind Garden, 2012). The investigator purchased the license.

EPDS

The EPDS is a screening tool used to identify patients at risk for perinatal depression. It is a 10-item self-report questionnaire in which women are asked to rate how they have felt in the previous seven days. Each question is scored 0–3 (resulting range 0–30) (Cox, Holden & Sagovsky, 1987). Although the EPDS is considered the most widely used screening questionnaire for postpartum depression, it has also been validated as a screening tool for antepartum depression in pregnant women. Murray & Cox (1990) validated the EPDS in the antepartum setting with a cut-off point of 14/15 as ‘probable depression’ (Murray & Cox, 1990). Rubertsson, Borjesson, Berglund, Josefsson, and Sydsjo (2011) identified the optimal cut-off score on the EPDS scale for detecting depression as ≥ 13 (standard error coefficient of

1.09 and c-statistics of 0.84) giving a sensitivity of 77% and specificity of 94%. They also found that the EPDS scores correlated strongly with the Hospital Anxiety and Depression Scale (HADS), with a Pearson's correlation of 0.83 ($P < 0.0001$), thus validating the EPDS as both a valid and reliable screening instrument for detection of depressive symptoms during pregnancy. For the purposes of this project a score of 14 or greater will be used to indicate depression, as suggested by the systematic review by Gibson, McKenzie-McHarg, Shakespeare, Price and Gray (2009) as being the value found to be most predictive of probable depression during pregnancy.

The EPDS is available for use in the public domain without charge or permission providing the user respects copyright by quoting the names of the authors, the title and the source of the paper in all reproduced copies (Cox, Holden & Sagovsky, 1987).

NICU Parental Beliefs Scale

The NICU Parental Beliefs Scale (PBS) measures parents' beliefs about their hospitalized infant using a 5-point Likert-type scale ranging from strongly disagree to strongly agree, with higher scores indicating stronger beliefs. Eight items operationalize parent beliefs through questions such as "I know how premature babies differ in their characteristics and behaviors from full-term babies." Ten items operationalize parental beliefs about their knowledge of and confidence in their role during NICU hospitalization, such as "I am clear about the things that I can do to best help my baby while she is in the NICU." According to Melnyk et al. (2001) the content validity of the scale was established by eight neonatal clinical experts. Cronbach's alpha for the infant subscale was .60 and for the parent role subscale was .81. The total scale reliability with this sample was .78. Reported alphas in prior studies using the NICU Parental Beliefs Scale

for parents of hospitalized children have ranged from .76 to .86 for the subscales and total scale (Melnyk, et al., 2001).

Intervention Protocol

- Sample identified through frequent visits to MICC and communication with the charge nurse.
 - Inclusion criteria: English speaking gravid women aged 18 years and older, who are between 28^{0/7} and 35^{6/7} weeks gestation, at risk for preterm delivery, with no known fetal anomalies, and who are admitted for at least two days to WVUH MICC.
- Met with each potential sample individually privately in their hospital room. Given intervention information letter, and brief verbal explanation of intervention.
- If patient verbally consented, patient asked to review IRB consent form and sign and date. Copy of IRB consent provided to participant.
- Participant given demographic data information sheet to complete and be collected once participant finished.
- Verbal instructions given to participant for completion of EPDS. Participant handed coded pre EPDS and ink pen. Once completed, form collected.
- Verbal instructions given to participant for completion of STAI state and trait. Participant handed coded pre STAI state and trait, and ink pen. Once completed, form collected.
- Verbal instructions given to participant for completion of NICU PBS. Participant handed coded pre NICU PBS and ink pen. Once completed, form collected.

- Each participant was given a copy of the intervention (See Appendix A) to keep. The information contained in the intervention was verbally reviewed with each participant. This averaged 15-20 minutes. Any questions were answered and the participant was asked to review the intervention (Appendix A) on their own. Participants were reminded that I would be returning in one to two days to have them complete the post tests.
- 36-48 hours later, I would revisit participants in their room. I would reintroduce myself and remind them why I was there. Participants were also reminded that participation was voluntary, and would not affect their care or the care of their baby.
- Verbal instructions given to participant for completion of EPDS. Participant handed coded post EPDS and ink pen. Once completed, form collected.
- Verbal instructions given to participant for completion of STAI state. Participant handed coded post STAI state and ink pen. Once completed, form collected.
- Verbal instructions given to participant for completion of NICU PBS. Participant handed coded post NICU PBS and ink pen. Once completed, form collected.
- Participant thanked.

These steps were completed with each individual participant, until n=30. Each participant was allowed as much time as they needed to complete the pre and post tests.

Health Literacy

Given the higher literacy rate in Monongalia County, health literacy may or may not be an issue for potential participants. However if literacy is an issue, the STAI is written at a sixth grade reading level (Mind Garden, 2012) and the COPE NICU program is written at an eighth

grade reading level (N. Feinstein, personal communication, February 2012). Additionally, patients on MICC are interviewed as to literacy/education level upon admission.

Resources

Project Site / Organization.

WVUH MICC is a 21-bed inpatient high-risk obstetrical unit as part of a Level 1 trauma center and academic facility. It is housed within a children's hospital along with a pediatric unit, NICU and pediatric intensive care unit (PICU). MICC receives patients and transports on average of 350 patients annually, who are admitted from Monongalia county and surrounding counties and states. On average, MICC delivers over 1600 infants a year and 48% of those are considered to be high risk of which preterm labor/birth would be considered [WVUCH, 2009]. Both the nurse manager of MICC and the Director of WVU Children's Hospital are supportive of this project. (M. Merkel, Personal communication, February 2012; C. Jones, personal communication, February 2012; see Appendix).

Additionally, there exist no organizational/unit policies with which this project would interfere. Currently, preterm patients are generally ordered a NICU consult in which a NNP briefly meets with them and discusses such topics as survivability, delivery room management, what to expect in the first few hours, and expected length of NICU admission (J. Polak, personal communication, October, 2012). All patients admitted to MICC now receive the EPDS for self-completion upon admission. The EPDS score is recorded in the electronic charting system (Merlin) by the admission nurse. Merlin generates a referral to psychiatry if the EPDS score is 13

or greater. For the purposes of this project, the EPDS will be re-administered because the tool's explanation and administration are not always seen as a priority during the often-rushed admission process (Anonymous MICC Nurses, personal communication, Spring 2013).

Personnel.

Only one person (myself) will conduct this project. This person also works per diem on this unit as a staff nurse and has a good working relationship with both staff and management, as well as compliance with all unit requirements (HIPAA, electronic records training, vaccinations, etc.)

Budget.

Thus far, the proposed budget entails:

- Available funds:
 - \$3000.00 (if needed)
 - Available through WVU School of Nursing Dean's Fund (G. Narsavage, personal communication, March, 25, 2012)
- Projected use of funds:
 - Phase one COPE NICU program.
 - No charge (B. Melnyk, personal communication, June, 2012).
 - STAI
 - \$100.00 for 50 administrations (Mind garden, 2012).

- EPDS
 - No charge (Cox, J., Holden, J., & Sagovsky, R., 1987).
- NICU Parental Beliefs Scale
 - No charge (B. Melnyk, personal communication, June, 2012).
- 50 Photocopies of adapted COPE phase one materials
 - \$5.79 Office Depot® Brand Copy Paper, 8 1/2" x 11", 20 Lb., Ream Of 500 Sheets
 - No charge, use of personal laser printer

Site Support

There is excellent support for this project on MICC. Because COPE NICU has never been implemented in this format (phase one to gravid mothers), the sustainability of this project cannot be determined. However, in a previous personal conversation with the developer of COPE, Dr. Melnyk, verbalized excitement with the proposed project and COPE's contribution to this project's feasibility.

Proposed Evaluation

The proposed evaluation of this project includes the collection of pre and posttest data from the Parental Beliefs Scale, the EPDS, and the STAI to equal at least 30 subjects. This data will be analyzed using a paired t-test (Polit and Beck, 2013). If the number of participants would equal less than 30, a nonparametric test will be used. A value of $p < 0.05$ between the pre-intervention and the post-intervention data will be considered statistically significant. The Microsoft EXCEL computer program and the Statistical Package for the Social Sciences (SPSS)

computer program will be utilized for statistical analysis of the project.

Results

Introduction

The goal of this capstone was to evaluate a practice change using COPE to address maternal anxiety, depression and expectations related to preterm birth and subsequent NICU admission. This study was conducted with 30 English speaking, gravid females between 28^{0/7} and 35^{6/7} weeks, over age 18 and admitted to an inpatient obstetrics unit at risk for preterm labor for at least 2 days in North Central West Virginia. The primary outcomes that were measured were maternal anxiety, maternal depression, and maternal expectations of having a preterm child in the NICU.

Thirty-two women meeting the study criteria were approached. The total number of participants recruited into the study was 30, as two declined participation. All 30 participants completed all parts of the pre and posttests for the STAI, EPDS, and NICU PBS. The data was analyzed using a paired t-test. A value of $p < 0.05$ between the pre-intervention and the post-intervention data is considered statistically significant.

Demographics

The women ranged in age from 18 to 38. Statistically, they had a median age of 24, a mean of 26.73, and a standard deviation of 7.206. Two participants were from Western Maryland (7%), four from Southwestern Pennsylvania (13%), and 24 from West Virginia (80%), with the majority of those from Monongalia, County (30%). The majority identified themselves as Caucasian at 93% (28), with 3% Asian/Caucasian (1), and 3% Native American (1).

Gestation of the pregnancy ranged from 28^{0/7} to 34^{5/7} weeks. The largest percentage (29%) of women was 30^{0/7} weeks gestation with the average gestation being 31^{1/7} weeks, and a standard deviation of 1.49. For the majority (68%) of these woman this was their first baby, 29% had one previous pregnancy, with one patient being a multipara with a current gravida of seven. Of these woman who had previous deliveries, five had preterm births, with only two having previous NICU admissions.

In terms of education, 70% (21) had either attended or completed college, with the remaining 30% (9) graduating from high school or having received their GED.

In regards to employment, the majority had been employed either full (37%) or part time (17%) prior to admission, with the next largest group at 30% having been unemployed. Only 13 % chose to identify themselves as a homemaker, and one person left this data set blank. As the length of stay or hospital admission of the women varied from 2 days to 70 with the average being 15 days (standard deviation 15.7), about 50% of the woman revealed experiencing some type of financial strain due to their hospitalization.

Hypotheses One

Patients who receive the adapted COPE phase 1 written materials will demonstrate reduced anxiety as measured by the State Trait Anxiety Inventory (STAI) from pre-test to post-test.

Anxiety.

Maternal anxiety was evaluated using the STAI adult version Y containing 20 items for assessing trait anxiety and 20 items for state anxiety. Pre and post state anxiety; and pre trait/ pre state anxiety were analyzed. A paired-samples t-test was conducted to compare the pre state and

post state STAI scores for maternal anxiety. There was a significant difference in the scores for pre state (M=42.73, SD=13.444) to post state (M=33.90, SD=10.532) STAI scores; $t(29)=5.794$, $p=.000$. The pre trait scores had a mean of 36.80, and a SD of 9.936.

These results suggest that the adapted phase one COPE intervention did have an effect on maternal anxiety. Both pre and post state anxiety had high Cronbach's alpha at .935 and .927 respectively, indicating an excellent level of reliability for this test. Pre trait anxiety had a high Cronbach's alpha of .891, indicative of good reliability. There was no correlation found between state pre test and trait pre test scores ($r=0.77$, $n=30$, $p=.688$).

Hypothesis Two

Patients who receive the adapted COPE phase 1 written materials will demonstrate reduced depression as measured by the EPDS from pre-test to post-test.

Depression.

Maternal depression was evaluated using the EPDS pre and post test. A paired-samples t-test was conducted to compare the pre and post EPDS scores for maternal depression. Only four participants scored 13 or greater on the EPDS pre test, indicating depression. Two of these women already had a preexisting diagnosis of depression prior to admission. Post test only two participants scored 13 or greater. Although the majority of participants (26 pre/28 post) did not meet a score for diagnosis of depression there was a significant difference in the scores for pre (M=7.30, SD=5.167) and post EPDS (M=5.43, SD=4.337) scores; $t(29)=2.937$, $p=.006$.

These results suggest that the adapted phase one COPE intervention did have an effect on factors that can contribute to maternal depression. The EPDS Cronbach's alpha of .861(pre) and .854 (post) is also indicative of a good level of test reliability.

Hypothesis Three

Patients who receive the adapted COPE phase 1 written materials will demonstrate stronger beliefs about what to expect in their preterm infant characteristics/ behaviors and how to parent them as measured by the NICU PBS from pre-test to post-test.

Maternal Beliefs.

Maternal parental beliefs of expectations related to preterm birth and subsequent NICU admission was evaluated using the NICU PBS pre and post intervention a paired-samples t-test was conducted to compare the pre and post NICU PBS scores for maternal expectations. There was a significant difference in the scores from pre (M=64.77, SD=15.206) and post intervention (M=75.27, SD=8.839) scores; $t(29)=-3.846, p=.001$.

These results suggest that the adapted phase one COPE intervention did have an effect on maternal beliefs and expectations. The NICU Parental Beliefs Scale had excellent test reliability at .957 (pre) and .943 (post).

Table 1					
<i>Paired Samples Statistics</i>					
		<i>Mean</i>	<i>N</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>
Pair 1	TotalPreEPDS	7.30	30	5.167	.943
	TotalPostEPDS	5.43	30	4.337	.792
Pair 2	PBSscorePre	64.77	30	15.206	2.776
	PBSscorePost	75.27	30	8.839	1.614
Pair 3	STATEpreTOTAL	42.73	30	13.444	2.455
	STATEpostTOTAL	33.90	30	10.532	1.923

Table 2									
<i>Paired Samples Test</i>									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	TotalPreEPDS TotalPostEPDS	1.867	3.481	.636	.567	3.167	2.937	29	.006
Pair 2	PBSscorePre PBSscorePost	-10.500	14.952	2.730	-16.083	-4.917	-3.846	29	.001
Pair 3	STATEpreTOTAS TATEpostTOTAL	8.833	8.350	1.525	5.715	11.951	5.794	29	.000

Summary

Discussion

At least 13 different effective interventions can be used to address the problem of maternal anxiety related to newborn infant NICU admission. Interventions found and supported in the literature include Parent-to-Parent Peer Support (Preyde & Ardal, 2003), Education program using Assessment of Preterm Infant Behavior (APIB)/Mother's Assessment of the Behavior of her Infant (MABI) (Browne & Talmi, 2005), The Prematurely Yours and To Have and Not to Hold slides/tapes program (Browne & Talmi, 2005), Trauma Preventive Psychological Intervention Program (Jotzo and Poets, 2005), March of Dimes NICU Family Support (NFS) program (Cooper et al., 2007), One-on-one education (Turan, Basbakkal, & Özbek, 2008), The modified version of the Mother-Infant Transaction Program (MITP [Kaaresen, Ronning, Ulvund, & Dahl, 2006; Newnham, Milgrom, & Skouteris, 2009]), Observation and Infant Massage (Matricardi et al., 2012), Nurse-Led Education (Morey & Gregory, 2012), One-Hour Music Therapy (Bauer et al., 2010), One-Hour Recreational Therapy (Bauer et al., 2010), Two Week Music Intervention (Chang et al., 2008), and NICU COPE (Melnyk et al., 2001 & 2006).

The COPE program was not only supported by RCTs (Melnyk et al., 2001 & 2006), but it also demonstrated both ease of adaptation and effectiveness for adaption (COPE –Two Phases; Mianaei, Karahroudy, Rassouli, & Tafreshi, 2014). Thus, with permission of the author, the COPE program was adapted.

Adapted COPE Phase One Intervention.

The COPE program for the purposes of this intervention used only the first phase (See Appendix A), versus the normal four phases. It was used for the first time in an antepartum inpatient setting with mothers who were at high risk of preterm delivery. Thirty women participated in the intervention. The majority of the participants were educated Caucasian women from WV. Their median age was 24 years old, their average gestation was 31 weeks and for the majority this was their first pregnancy. As 70% had either a college degree or attended college and the other 30% had graduated high school/GED, there were no issues in relation to literacy.

In regards to the proposed hypotheses, patients who receive the adapted COPE phase one written materials demonstrated reduced anxiety as measured by the STAI from pre-test state to post-test state. The participants also demonstrated stronger beliefs about what to expect in their preterm infant characteristics/ behaviors and how to parent them as measured by the NICU Parental Beliefs Scale from pre-test to post-test. And lastly, although participants who received the adapted COPE phase one written materials did not have reduced depression as measured by the Edinburgh Postnatal Depression Scale (EPDS) from pre-test to post-test, their score did decrease significantly. Only four actual participants scored high enough on the EPDS pre test for the diagnosis of depression, and this was reduced to two after post testing. The proposed directional hypothesis was supported in that there was a statistical significance between the pre and post tests. Thus, it can be extrapolated that COPE phase one decreases factors that contribute to maternal depression.

Although statistically this evaluation of a practice change was significant for decreasing maternal anxiety and factors for depression, and increasing expectations of maternal knowledge in caring for an infant in the NICU, it does have its limitations. Specifically, these limitations include a limited number of participants who were quite homogenous in their ethnicity, education and culture. Other limitations include the use of a convenience sample, from one unit in only one hospital; and concerns in regard to response shift bias as related the act of pre and post testing. Strengths of the program include the use of quantitative data, the measurement at two different time intervals, the numbers were large enough to undergo statistical evaluation, with good to excellent Cronbach's alpha scores.

If the results of this study could be repeated on a larger scale with a more varied race and cultural background, it could be used as evidence for the expansion of the NICU COPE program to include still gravid mothers at risk for preterm delivery and infant NICU admission.

Feasibility of program sustainability.

At this time this program has limited sustainability for several reasons. First, it's an adapted program that was used in this manner with special permission from the author. Secondly, although successful it does have numerous weaknesses that at this point out weigh its positives. That's not to say that this program could not have future success and sustainability. Additional studies also showing statistical significance and adaptation or at least permission from the author would enhance both its future feasibility and sustainability.

Articulation with the theoretical framework.

This program and intervention are based upon Control Theory. It's known that premature birth also equates to premature parenting (Lubbe & Bornman, 2005). Lubbe and Bornman believe that when a woman is expecting a baby she is also expecting a normal birth and a normal infant, and that this 40-week pregnancy allows time for emotional adaptation. In comparison to this study (and this is where Control Theory becomes relevant) a mother experiences preterm labor. This mother then experiences a contradiction between what she expected (carrying to term, going home and caring for a healthy term infant) and the reality of being hospitalized during pregnancy, preterm birth, and then the admission of the baby into the NICU (contributors to maternal anxiety and depression). This contradiction should motivate the mother to want to engage in learning about what to expect in the NICU as well as how to care for her infant in the NICU. Normally this education is not provided thus contributing to maternal stress. The initiation of the program intervention mitigates these barriers thus reducing maternal anxiety and creating less stress, while increasing education.

Practice recommendations/Implications

This capstone supports the use of an education program, specifically adapted phase one of NICU COPE, with those gravid inpatients at risk for preterm delivery and possible NICU admission. The results of this capstone suggest that this program can decrease maternal anxiety and contributors to depression, while increasing maternal knowledge. Once, further tested and approved by the author, this adapted program can easily be instituted as a practice change on the

inpatient obstetrics unit. It would require minimal time and resources for the staff to institute, while additionally meeting standards for patient education.

Conclusions

Both the literature and the results of this capstone support the use of an intervention to decrease maternal anxiety. This capstone demonstrated that an existing program (NICU COPE) could be easily adapted to the obstetric inpatient setting, instead of waiting until the point of premature birth and actual NICU admission. As the length of stay of the participants in this capstone averaged 15 days, it shows that there is a missed opportunity for mothers to not only be educated, but to also decrease their anxiety and contributors to depression during this stressful time in their life. And, although statistically this evaluation of a practice change was significant for decreasing maternal anxiety and contributors of depression, and increasing expectations of maternal knowledge in caring for an infant in the NICU, it does have its limitations. If the results of this study could be repeated on a larger scale with a more varied race and cultural background, it could be used as evidence for the overall expansion of the NICU COPE program to include still gravid mothers at risk for preterm delivery and infant NICU admission.

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Table 1: Evidence Table (adapted from Chertok et al., 2013)

Citation	Aims, Research Questions or Hypotheses	Methodology: Design, Site, Sample	Variables and Instruments	Results	Strengths and Limitations
Bauer, C., Victorson, D., Rosenbloom, S., Barocas, J., & Silver, R. (2010)	Examine the efficacy of a single session music or recreation therapy intervention in alleviating antepartum-related distress experienced by women with high-risk pregnancies on extended hospital bed rest	RCT of large, Midwestern, suburban teaching hospital 61 pregnant women hospitalized with high-risk obstetric health issues	<p>Music therapy: Music-Facilitated Relaxation, Active Music Listening, Song Writing, Music for Bonding or Clinical Improvisation</p> <p>Recreation therapy: Adaptive Leisure Activities, Creative Arts, Relaxation Stress Management Exercises, Community Resource Education or Leisure Awareness Activities</p> <p>Antepartum Bed rest Emotional Impact Inventory (ABEII)</p>	Single session of music or recreation therapy participants experienced significantly less antepartum distress [p = 0.00 (music) and 0.02 (recreation)]	Strengths: RCT, eval over three time points Limitations: ABEII tool has not been sufficiently validated
Browne, J. & Talmi, A. (2005)	To examine how family-based interventions in the	RCT of Eighty-four high-risk mother-infant	Group 1: Demonstration and Interaction Group 2: Education	MANOVA revealed a significant effect	Strengths: RCT, no statistical difference between

	neonatal intensive care unit (NICU) may change parental knowledge and behaviors (interaction with infant) and decrease stress.	dyads assigned to two intervention and one-control groups at Oklahoma University Medical Center.	Group 3: Control Outcome Measures: Knowledge of Preterm Infant Behavior Nursing Child Assessment Feeding Scale Parenting Stress Index (PSI) was mailed to the mother at 1 month after discharge	for group, multivariate $F(2, 76) = 1.71, p < .05$. Planned contrasts, using the Student Newman Keuls correction, indicated a marginally significant difference between groups in the child acceptability subscale, $F(2, 76) = 2.86, p = .056$, with control group mothers scoring higher, which indicated more perceived stress with parenting their infant at 1 month after discharge, than mothers in Groups 1 and 2.	groups Weaknesses: Small sample size, treatment was not blinded, only mothers included.
Chang, M. , Chen, C. & Huang, K. (2008)	Examine the effects of music therapy on stress,	RCT with prospective pretest–posttest	Music therapy group received two weeks of investigator selected	Paired <i>t</i> -test: music therapy group showed significant	Strengths: RCT Limitations: generalizability,

	anxiety and depression in Taiwanese pregnant women	experimental design of 236 pregnant women in Taiwan	music intervention Control group received only general prenatal care Perceived Stress Scale (PSS), State Scale of the State-Trait Anxiety Inventory (S-STAI) and Edinburgh Postnatal Depression Scale (EPDS)	decrease in PSS, S-STAI and EPDS after two weeks Control group only showed a significant decrease in PSS after two weeks	not assessed long term, no diary record for control-limited comparisons of the amount of time and type of music, effects of self-selected music vs. investigator-selected music were not compared
Feeley, Zelkowitz, Charbonneau, Corniet, Lacroix, Marie, & Papagerogiou. (2008)	Feasibility study using one group pretest posttest design	20 mothers of infants weighing < 1500 grams Canada	Promoting Mother's Ability to Communicate (PMAC) cognitive-behavioral intervention to reduce maternal anxiety with 6 1-hour personal teaching sessions	Preintervention: State-Trait Anxiety Inventory (STAI), Revised Parental Stress Scale: Neonatal Intensive Care Unit (PSS: NICU), perinatal posttraumatic stress disorder (PTSD) Questionnaires, Parental Belief Scale (PBS) and Index of Parental Behavior (IPBN) observation of	Program was feasible and acceptable (there was no report on specific outcome variables).

				maternal-infant interaction. Postintervention at either or both 1.5 and 6 months: STAI, PSS: NICU, perinatal PTSD Questionnaire, PBS, and Emotional Availability Scale (EAS) observation of maternal-infant interaction.	
Glazebrook, C., Marlow, N., Israel, C., Croudace, T., Johnson, S., White, I.R., & Whitelaw, A. (2007).	Evaluate the influence of parenting intervention on maternal responsiveness and infant neurobehavioral development following a very premature birth.	Cluster-randomized controlled trial, with a crossover design and three-month washout period of 496 infants in six NICU in the South West and Trent regions of the United Kingdom.	Parent Baby Interaction Program (PBIP) intervention Outcome: Parenting stress index Parenting Stress Index short form (PSI-SF)	At three months, adjusted age mean PSI scores for the PBIP group were 71.9 compared with 67.1 for controls (adjusted mean difference 3.8, 95% CI 24.7 to 12.4), which equated to no measurable effect.	Strengths: RCT, no difference between groups Limitations: No concealment or blinding, large dropout rate, crossover design
Jotzo & Poets (2005)	Quasi-experimental	50 mothers of infants <37 weeks:	Trauma-preventive psychological	Impact of Event Scale (IES) and	Intervention group had significantly

		Intervention group n=25, Control group n=25 Germany	intervention conducted by the department psychologist in the early postpartum days	Peritraumatic Dissociative Experience Questionnaire (PDEQ) at discharge	lower overall traumatic impact (p=0.01), lower symptoms of intrusion (p=0.055), avoidance (p=0.02), and hyperarousal (p=0.02). Lower rates of clinically significant psychological trauma among intervention group (36%) compared to control group (76%).
Kaaresen, P., Ronning, J., Ulvund, S., & Dahl, L. (2006)	To examine if an early-intervention program could reduce parenting stress in both mothers and fathers during the first year after a premature birth.	RCT of 203 infants with a birth weight less than 2000 g treated at the University Hospital of North Norway Trust, which serves the 2 northern-most counties in	Preterm Intervention Outcomes: Parenting Stress Index (PSI) Child-domain (parental stress associated with the child's individual characteristics), PSI parent-domain (parental stress associated with the	Compared with the preterm controls, both the mothers and fathers in the preterm intervention group reported significant lower scores in child domain, parent domain, and	Strengths: RCT, concealment, Term control for comparison, mothers and fathers included. Limitations: Small sample size, loss from preterm control group at 12

		Norway, to examine the effects of a modified version of the Mother-Infant Transaction Program on parenting stress. mothers at 6 and 12 months corrected age and to the fathers at 12 months corrected age	parental role), and total stress scores (combination of the domain scores) PSI was administered to the mothers at 6 and 12 months corrected age and to the fathers at 12 months corrected age	total stress on all occasions except the mother-reported child domain at 12 mo. Reduction of parenting stress in both mothers and fathers to the same level as found in term parents.	months, limited generalizability: gestational age used as the inclusion criterion resulting in an increase in inclusion of more mature growth-restricted infants, limited very preterm infants.
Matricardi, Agostino, Fedeli, & Montisrosso. (2012)	Randomized controlled trial	Parents of 42 preterm infants born ≤ 32 weeks gestation: Intervention group n=21, Standard support group n=21 Italy	Physical therapist taught parents NICU Network Neurobehavioral Scale (NNNS 13) observation method and infant massage	PSS: NICU After one week of NICU admission and at discharge	Compared to control group, the intervention group had significantly lower stress levels related to infants' appearance and behavior, and parental role alteration. Mothers had higher stress levels compared to the fathers and had lower post-intervention role

					alteration scores compared to pre-intervention (p<0.05).
Meijssen, Wolf, Koldwijn, Wassenaer, Kok, & van Baar. (2010)	Randomized controlled trial	176 preterm infants (gestational age <32 weeks and/or birth weight of <1500 grams) and their parents Intervention n=86 Control n=90 Italy	Post-discharge Infant Behavioral Assessment and Intervention Program (IBAIP) provided 6-8 home visits by pediatric physical therapists	PSI and the Dutch Nijmeegse Ouderlijke Stress Index (NOSI) at 12 and 24 months	Difference in PSI stress scores between groups of mothers was not significant. Intervention group mothers assessed their infants as happier (p=0.03) and less distractible (p=0.02) than control group mothers, although they reported higher rates of feeling social isolation (p=0.03).
Melnyk et al. (2006).	Strengthen parents' knowledge and beliefs about their preterm infants and their own parenting role and remove barriers	RCT 260 families with preterm infants from 2001 to 2004 in 2 NICUs in the northeast US	COPE Intervention Group Comparison Group Maternal outcome: Parent Stress to NICU (Staff behavior) w/ COPE,	Mothers in the COPE program reported significantly less stress in the NICU and less depression and anxiety at 2	Melnyk et al. (2006).

	that would inhibit them from participating in their infants' care	Parents completed self-administered instruments during hospitalization, within 7 days after infant discharge, and at 2 months' corrected age	<p>Parent Stress to NICU (<i>General stress</i>)w/ COPE</p> <p>Parent Stress to NICU (Infant behavior) w COPE,</p> <p>Parent Stress to NICU (Overall)</p>	<p>months' corrected infant age than did comparison mothers.</p> <p>Maternal outcome:</p> <p>Parent Stress to NICU (Staff behavior) w/ COPE</p> <p>Value: 3.52</p> <p>P value: 0.3</p> <p>95% CI 1.09 to 0.78</p> <p>Parent Stress to NICU (<i>General stress</i>)w/ COPE</p> <p>Value: 3.6</p> <p>P value: 0.5</p> <p>95% CI 3.49 to 3.09</p> <p>Parent Stress to NICU (Infant behavior) w COPE</p> <p>Value: 7.02</p>	
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				<p>P value: .009</p> <p>95% CI: 1.81 to 1.50</p> <p>Parent Stress to NICU (Overall)</p> <p>Value: 4.99</p> <p>P value: 0.3</p> <p>95% CI: 1.90 to 1.66</p>	
Melnyk, et al. (2001)	Evaluate the effects of COPE on the process and outcomes of maternal coping	<p>RCT</p> <p>42 mothers of low-birth-weight (LBW) premature infants</p> <p>52-bed Level III NICU within a 720-bed academic medical center in upstate New York</p> <p>Follow-up at 3 months and 6 months corrected</p>	<p>COPE Intervention Group</p> <p>Mothers' emotional coping outcome</p> <p>State-Trait Anxiety Inventory (STAI)</p>	<p>COPE mothers reported significantly less stress on the sights and sounds subscale of the PSS:NICU than did mothers in the comparison program, $t(40) 2.0$, $p < .05$, at the first observational follow-up</p>	<p>Strengths: RCT, Follow-up testing at 3 & 6 months</p> <p>Limitations: Small sample size, large variances and limited statistical power, no blinding possible</p>

		ages			
Mianaei, Karahroudy, Rassouli, & Tafreshi. (2014).	Perform the COPE program for Iranian mothers and evaluate its effectiveness	RCT 90 mothers of premature infants hospitalized in NICUs of Iranian state hospitals	STAI, Parental Stressor Scale: Neonatal Intensive Care, and The Index of Parental Participation/Hospitalized Infant Intervention group received two phases of COPE	Intervention group reported significantly less anxiety and less stress $P < 0.001$	Strength: RCT Weakness: Cultural exchange, only 2 phases
Morey & Gregory 2012	Repeated measures design	42 pregnant women in a high-risk antenatal unit in US	NICU Educational Intervention with videos and weekly classes and discussion led by NICU nurses along with tour of NICU	PSS: NICU and maternal knowledge assessed prior to the intervention and immediately post-intervention and again following infant NICU admission.	Mother's knowledge significantly increased about who would be taking care of their infant ($p=0.008$), their infant's body ($p=0.002$), their infant's physical needs ($p<0.001$) and the NICU equipment ($p=0.001$). Maternal stress was significantly decreased in the areas of NICU sights and sounds

					(p=0.01) and infant behavior and appearance (p=0.04).
Newnham, Milgrom, & Skouteris, 2009,	Randomized controlled trial	63 mothers of preterm infants born < 37 weeks gestation: Intervention group n=32, Control group n=31 Australia	MITP with 7 sessions pre-discharge and 2 session post-discharge	Edinburgh Postnatal Depression Scale (EPDS) at baseline, 3 and 6 months; Neonatal Medical Index (NMI) at discharge; Short Temperament Scale for Infants (STSI) at 3 and 6 months; Synchrony Scale videotaped at 3 and 6 months; PSI at 3 and 6 months; Ages and Stages Questionnaire (ASQ) at 2 years	There were no significant differences in EPDS depression scores between the groups. PSI child domain scores were improved in the intervention group (p<0.01). Compared to control group mothers, intervention group mothers were more responsive to their infants (p<. 05), and intervention infants were more attentive than control infants (p<. 01). Intervention group dyads showed between mutual interaction

					at 3 and 6 months (p<. 01).
Preyde & Ardal, 2003	Quasi-experimental cohort study	49 mothers of very preterm infants (< 30 weeks' gestation or < 1500 grams) Canada	Educational parental-support group meetings and the parent buddy program	PSS: NICU at baseline and 4 weeks after enrollment; State Anxiety Inventory (SAI), BDI, and Multidimensional Scale of Perceived Social Support at baseline and 16 weeks after enrollment. The Trait Anxiety Inventory was assessed at 16 weeks.	Compared to the control group, the intervention group reported less stress (p<0.001) at 4 weeks, and less state anxiety (p< 0.05), less depression (p<0.01) and greater perceived social support (p<0.01) at 16 weeks. 88% of the intervention group indicated that the program was helpful or very helpful.
Ravn, Smith, Smeby, Kynoe, Sanvik, Bunch, & Lindermann 2011,	Randomized controlled trial	83 mother-infant dyad of preterm infants 30-36 weeks gestation: Intervention dyads n=42, Control dyads N=41	MITP with 7 sessions pre-discharge and 4 sessions post-discharge.	Center for Epidemiological Studies Depression Scale (CES-D) at 1, 6 and 12 months; PSI at 6 months; WHO	Compared to control group, at one month, intervention group had a lower CES-D depression score (p=0.04) and fewer somatic symptoms

		Norway		breastfeeding categories at 6, 9 and 12 months; Infant Behavior Questionnaire (IBQ) at 6 and 12 months; Pictorial Infant Communication Scales (PICS) at 12 months	(p=0.05). Higher breastfeeding rate at 9 months among intervention group (p=0.02). No significant difference in PSI stress scores between groups.
Silverstein, Feinberg, Cabral, Sauder, et al., 2011,	Randomized controlled pilot trial	49 WIC or Medicaid mothers of infants \leq 33 weeks: Intervention group n=24, Control group n=25 US	Problem Solving Education (PSE) delivered in 4 one-on-one sessions during hospitalization, then weekly or biweekly post-discharge at home or in the hospital.	Quick Inventory of Depressive Symptoms (QIDS); Perceived Stress Scale; Social Adjustment Scale; Modified PTSD Symptom Scale	PSE delivery was feasible among high-risk mothers. No significant differences in stress or depressive scales. There was a trend toward improved social adjustment among the mothers in the intervention group.
Turan, T., Basbakkal, Z., & Özbek, S. (2008).	Effect of stress-reducing nursing interventions on the stress levels of mothers and	RCT of 40 mothers and 38 fathers in a 15-bed NICU of Pamukkale University	Maternal Intervention Paternal intervention	Difference between the intervention group and the control group mothers?	Strengths: RCT, both maternal and paternal testing Limitations: Small

	fathers of premature infants in an NICU.	Hospital in Denizli with the mothers and fathers' stress scores measured after their infants' 10th day in the NICU	Parental Stress Scale: NICU (PSS:NICU).	mean stress score was found to be statistically significant. The stress scores for the fathers in the treatment group were lower, but the difference was not statistically significant.	sample size, no blinding or concealment, 5% paternal control (One father in the control group) and 15% paternal intervention (three fathers in the experimental group) were not able to be reached during the first interview
Van der Pal, Maguire, le Cessie, Wit, Walther, & Bruil 2007,	2 consecutive randomized controlled trials Netherlands	283 parents of premature infants (<32 weeks): First study: Intervention group n= 67, Control group n=66; Second study: Intervention group n=75, Control group n=75	First study: Standard care versus basic developmental care; Second study: Basic developmental care versus Newborn Developmental Care and Assessment Program (NIDCAP)	After the first week of admission, parents were sent the Confidence in Caregiving and Global Confidence scales from the Mothers and Baby Scale (MABS), the Nurse Parent Support Tool, and the PSS: NICU	No significant differences noted between the groups.

Appendix A

Your hospitalization and potential birth of a premature baby is a stressful experience. During your pregnancy, you probably had thoughts about how your pregnancy would progress, your delivery and what your baby would look like after he or she was born. Since your actual experience was probably not what you expected, you may be feeling loss and sadness about not having a “normal” pregnancy. Although you did nothing wrong, it is common for parents to feel guilty because they think they should have been able to prevent these things from happening. In addition, parents may feel guilty when they are angry and disappointed about potentially having a baby who is small and weak. However, feelings of guilt will only add to your stress and make it difficult for you to begin to develop a special relationship once your baby is born. Therefore, it is important for you to talk about your feelings with the staff in the Maternal Infant Care Center (MICC) and in the Neonatal Intensive Care Unit (NICU) as well as other important people in your life who can reassure you that these feelings are normal and that many other parents feel the same way. This booklet is to help you to prepare for this NICU experience.

If your baby is born premature, seeing your small baby with tubes and in a highly technical environment can be overwhelming at times for you. Your baby may be connected to machines that monitor his or her breathing and heart rate among other things. The sounds you hear when these alarms go off may be stressful. It is important for you to know that every time your baby’s alarms sound, it does not mean that something is wrong with your baby. Sometimes, your baby’s movements may trigger the sounding of an alarm. Hopefully, it will reassure you to know that your baby’s nurses react quickly anytime they hear an alarm. As time goes on, you will begin to learn the meaning of some of these alarms. However, know that looking at your baby to see how he or she is doing is more important than trying to figure out what the different alarm sounds mean.



Because of the highly technical environment in the NICU, you may find it difficult to hold and touch your baby. In addition, because the staff mainly takes care of your baby while he or she is in NICU, it could take you a while before you begin to feel like a mother to your baby. Although all of the medical equipment is necessary for your baby's physical recovery, your love and attention is what is most important for helping your baby to deal with this experience. Although you can't prevent your baby from having necessary medical procedures, there are many things that you can do to comfort your baby and begin to establish a special bond with him or her.



If you are unsure about touching or holding your baby because of tubes and equipment, you can start to develop a special relationship with your baby by talking or singing to him or her in a soft, soothing voice. It also is helpful to call your baby by name and to say, “Mommy’s here.” Or “Daddy’s here.” Even if it seems as if your baby is not paying attention to you, he or she will learn your voice and it will become soothing for him or her. As time goes on, you will get more comfortable with touching and holding your baby. Just because you weren’t with your baby in the hours right after birth doesn’t mean that you won’t have a great relationship with him or her. The special relationship that you will develop with your baby forms over time and is always ongoing.

If you would like to hold your baby, tell his or her nurse you would like to do so. Many times this can be arranged, even if your baby has tubes and monitoring equipment. Holding your baby using skin-to-skin contact also may be possible. This type of contact has been shown to be very helpful for both parents and babies.

How a premature baby looks and behaves will be different from a full-term baby. Knowing some of these differences will help you to know what to expect and that they are normal. For example:

- Premature babies have wrinkled and thin skin, which will become dry and flaky as it matures.



- Your baby's hands and feet will appear blue at times. This "blueness" of the hands and feet does not mean that your baby needs more oxygen. It is a common response in premature babies and sometimes means that your baby's hands and feet are cold. This "blueness" of the hands and feet is different from a bluish color around the mouth or a bluish color of the entire body, which usually means that a baby needs more oxygen.



- Your baby's skin may become slightly yellow. This is called "jaundice" and is from bilirubin, which is given off when the body breaks down red blood cells. Because a premature baby's liver is still immature (not damaged), he or she may have difficulty in

breaking down bilirubin. As a result, some babies need a few days under special lights, which help them break down and get rid of bilirubin from the body.



- Your baby might have irregular breathing at times, which may include pauses between breaths. This is due to an immature nervous system and may last for several weeks after birth. Most of the time, the pauses will be short and your baby will start breathing again on his or her own. Sometimes, if the pause is longer, you can stimulate breathing by gently stroking your baby's side or foot.
- Your baby's sucking and swallowing reflexes are weak, especially if he or she is less than thirty-four weeks of age. This makes feeding difficult and, therefore, your baby may need to be fed through a special tube. These reflexes will grow stronger with each passing week and make it possible for you to begin bottle or breastfeeding. If you plan to breastfeed, but your baby's sucking and swallowing reflexes are still weak, you may begin pumping after delivery. Your milk can then be given to the baby through the special tube. If you are interested in pumping, let the staff on MICC know and they will show you what to do after you deliver.



- The behaviors and movements of your baby will probably be immature and disorganized. At times, you may see that your baby does not respond to you when you talk or stroke him or her. This is normal because premature babies tend to be less alert, active, and responsive to people and things in their surroundings. They also have more high-pitched cries and are more difficult to comfort than full-term babies. Therefore, try not to take it personally as if you are doing something wrong. It will take time for you to get to know your baby and to learn how best to meet his or her needs.



Even though your baby may have tubes and monitoring equipment, try to see the characteristics that will be special about him or her. As you have heard from this information, premature babies are similar in many ways. However, your baby will have his or her own special features and personality. For example, will he or she have your hair color?

Because this whole experience can be draining, it is very important for you to rest, eat well-balanced meals, and take your pain medications (if needed). Situations always seem worse when you do not get enough sleep, are in pain or do not take care of yourself. Getting support from others also is important in helping you deal with this experience. You can be assured that, if you are taking a break to get some food and rest or need to go back to your room on MICC, the NICU staff will keep you informed of any major changes in your baby's condition. Therefore, it is important to let the NICU staff know how to contact you once you are discharged from MICC and to give them the name of another family member or friend if you cannot be reached at your home telephone.

Even though you may be feeling uncomfortable with being in the hospital right now, and at the thought of your baby going to the NICU after his or her birth you will become more at ease in this NICU setting. Remember, even now, there are many things that you can plan to do to get to know your baby and to be able to help him or her through this experience. It won't be long until you will know how to care for your baby and what works best in comforting him or her. As your baby's parent, you will be the best person to reassure him or her by your presence, your voice, and your gentle touch.

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Appendix B

Edinburgh Postnatal Depression Scale¹ (EPDS)

Name: _____ Your Date of Birth: _____
 Baby's Date of Birth: _____

Address: _____

Phone: _____ As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check

the answer that comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

Here is an example, already completed.

I have felt happy: Yes, all the time Yes, most of the time

No, not very often No, not at all

In the past 7 days:

1. I have been able to laugh and see the funny side of things As much as I always could Not quite so much now Definitely not so much now Not at all

2. I have looked forward with enjoyment to things As much as I ever did Rather less than I used to Definitely less than I used to Hardly at all

*3. I have blamed myself unnecessarily when things went wrong

Yes, most of the time Yes, some of the time Not very often No, never

4. I have been anxious or worried for no good reason No, not at all

Hardly ever Yes, sometimes Yes, very often

*5 I have felt scared or panicky for no very good reason Yes, quite a lot

Yes, sometimes No, not much No, not at all

1

Edinburgh Postnatal Depression Scale (EPDS)

Postpartum depression is the most common complication of childbearing.² The 10-question Edinburgh Postnatal Depression Scale (EPDS) is a valuable and efficient way of identifying patients at risk for “perinatal” depression. The EPDS is easy to administer and has proven to be an effective screening tool.

Mothers who score above 13 are likely to be suffering from a depressive illness of varying severity. The EPDS score should not override clinical judgment. A careful clinical assessment should be carried out to confirm the diagnosis. The scale indicates how the mother has felt during the previous week. In doubtful cases it may be useful to repeat the tool after 2 weeks. The scale will not detect mothers with anxiety neuroses, phobias or personality disorders.

Women with postpartum depression need not feel alone. They may find useful information on the web sites of the National Women’s Health Information Center <www.4women.gov> and from groups such as Postpartum Support International <www.chss.iup.edu/postpartum> and Depression after Delivery <www.depressionafterdelivery.com>.

SCORING

QUESTIONS 1, 2, & 4 (without an *)

Are scored 0, 1, 2 or 3 with top box scored as 0 and the bottom box scored as 3.

QUESTIONS 3, 5-10 (marked with an *)

Are reverse scored, with the top box scored as a 3 and the bottom box scored as 0.

Maximum score: 30 Possible Depression: 10 or greater Always look at item 10 (suicidal thoughts)

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Instructions for using the Edinburgh Postnatal Depression Scale:

1. The mother is asked to check the response that comes closest to how she has been feeling in the previous 7 days.
2. All the items must be completed.

3. Care should be taken to avoid the possibility of the mother discussing her answers with others.
(Answers come from the mother or pregnant woman.)
4. The mother should complete the scale herself, unless she has limited English or has difficulty with reading.

¹Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786.

²Source: K. L. Wisner, B. L. Parry, C. M. Piontek, Postpartum Depression *N Engl J Med* vol. 347, No 3, July 18, 2002, 194-199

Appendix C

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State-Trait Anxiety Inventory for Adults

Instrument and Scoring Key

Developed by Charles D. Spielberger

in collaboration with R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs

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SELF-EVALUATION QUESTIONNAIRE STAI Form Y-1

Please provide the following information:

Name _____ Date _____

Age _____ Gender(Circle) M F

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

1. I feel calm..... 1 2. I feel secure

1 3. I am tense

1 4. I feel strained

1 5. I feel at ease

1 6. I feel upset

1 7. I am presently worrying over possible misfortunes.....

1 8. I feel satisfied..... 1 9. I feel frightened

110. I feel comfortable

1 11. I feel self-confident.....

1 12. I feel nervous

1 13. I am jittery..... 1 14. I feel indecisive..... 1 15. I am relaxed

1 16. I feel content

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SELF-EVALUATION QUESTIONNAIRE STAI Form Y-2

Name _____ Date _____

DIRECTIONS

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel.

- 21. I feel pleasant..... 1 22. I feel nervous and restless 1 23. I feel satisfied with myself 1 24. I wish I could be as happy as others seem to be 1 25. I feel like a failure 1 26. I feel rested..... 1 27. I am “calm, cool, and collected” 1 28. I feel that difficulties are piling up so that I cannot overcome them 1 29. I worry too much over something that really doesn’t matter 1 30. I am happy 1 31. I have disturbing thoughts 1 32. I lack self-confidence 1 33. I feel secure 1 34. I make decisions easily..... 1 35. I feel inadequate 1 36. I am content 1 37. Some unimportant thought runs through my mind and bothers me 1 38. I take disappointments so keenly that I can’t put them out of my mind 1 39. I am a steady person..... 1 40. I get in a state of tension or turmoil as I think over my recent concerns and interests 1

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- 2 3 4
- 2 3 4
- 2 3 4
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State-Trait Anxiety Inventory for Adults

Scoring Key

Developed by Charles D. Spielberger

in collaboration with R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs

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State-Trait Anxiety Inventory for Adults Scoring Key (Form Y-1, Y-2) Developed by Charles D. Spielberger in collaboration with R.L. Gorsuch, R. Lushene, P.R. Vagg, and G.A. Jacobs

To use this stencil, fold this sheet in half and line up with the appropriate test side, either Form Y-1 or Form Y-2. Simply total the scoring weights shown on the stencil for each response category. For example, for question # 1, if the respondent marked 3, then the weight would be 2. Refer to the manual for appropriate normative data.

Form Y-1 Form Y-2

1. 4321 21. 4321 2. 4321 22. 1234 3. 1234 23. 4321 4. 1234 24. 1234 5. 4321 25. 1234 6. 1234
26. 4321 7. 1234 27. 4321 8. 4321 28. 1234 9. 1234 29. 1234

10. 4321 30. 4321

11. 4321 31. 1234

12. 1234 32. 1234

13. 1234 33. 4321

14. 1234 34. 4321

15. 4321 35. 1234

16. 4321 36. 4321

17. 1234 37. 1234

18. 1234 38. 1234

19. 4321 39. 4321

20. 4321 40. 1234

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Appendix D

Subject Number _____
Date _____

NICU Parental Beliefs Scale

Bernadette Mazurek Melnyk, PhD, RN, CPNP/PMHNP, FAAN
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Below are *18 statements* that relate to you and your baby's hospitalization. Hospital experiences differ for every parent. There are some parents who are not so sure about their baby's needs and how they can best meet them while they are in the neonatal intensive care unit (NICU), while other parents are more sure about how to help their baby through this experience. There are no right or wrong answers to the following statements. Please circle the number that best describes your agreement or disagreement with each statement.

1. I know what characteristics and behaviors are common in premature babies hospitalized in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

2. I am sure that what I do for my baby will be what is best to help him/her deal with being in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

3. I feel comfortable in caring for my baby in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

4. I know what characteristics and behaviors to expect in my baby while he/she is in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree	Agree	Strongly agree

or disagree

5. I am sure about what things I can do to best help my baby get through the NICU experience.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

6. I am sure that I can meet my baby's emotional needs while he/she is in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

7. I know why my baby has the characteristics and behaviors that he/she does in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

8. I feel confident in telling the nurses and doctors about what will best help my baby while he/she is in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

9. I am clear about how to help take care of my baby in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

10. I know how my baby will probably respond to me while he/she is in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

11. I am sure about how my emotions will affect my baby while he/she is in the

hospital.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

12. I am clear about how my baby will react when he or she is getting too much stimulation in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

13. I am sure about the things that I can do to make my baby feel most secure while he/she is in the NICU.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

14. I know how my baby's appearance and behaviors are different from a full-term baby's appearance and behaviors.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

15. I know the best times to communicate with or interact with my baby.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

16. I am confident in asking the doctors and nurses questions about my baby's medical condition.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

17. I know what my baby will do when he or she is stressed.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

18. I am clear about what my baby will look or act like when he or she is ready to communicate with me.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

Parental Belief Scale
8/16/01

Appendix E

July 17, 2013

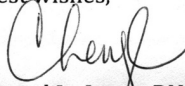
RE: Dennelle Parker

This letter grants Dennelle Parker, as part of her Doctorate in Nursing Practice Capstone at West Virginia University, permission and support to conduct the following study: *Evaluation of a Practice Change Policy to Address the Problem of Maternal Stress Related to Preterm Birth and Subsequent Neonatal Intensive Care Unit Admission.*

As Director of WVU Children's Hospital, I am extremely interested in the outcome of this study. This study has the potential to change how nursing staff work with ante-partum patients and can help address ways in which we can be more supportive of the family through their NICU journey.

I look forward to working with Dennelle as she completes her Capstone.

Best wishes,



Cheryl L. Jones, RN, MSN, NEA-BC
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Date: July 10, 2013

This letter grants Dennelle Parker, as part of her Doctorate in Nursing Practice Capstone at West Virginia University, permission and support to conduct the following study: Evaluation of a Practice Change Policy to Address the Problem of Maternal Stress Related to Preterm Birth and Subsequent Neonatal Intensive Care Unit Admission.

Overall Objective

The overall objective for this practice change problem is to evaluate the effectiveness of early initiation of an adapted version of Creating Opportunities for Parent Empowerment (COPE) phase one in decreasing stress in gravid women aged 18 years and older at WVUH MICC who are at risk of preterm delivery.

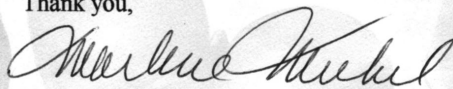
Population

The population of interest for this project consists of gravid women aged 18 years and older, who are between 28^{0/7} and 35^{6/7} weeks gestation, at risk for preterm delivery, with no known fetal anomalies, and who are admitted for at least two days to WVUH MICC.

Project Design

A planned analysis of data gathered from a prospective, pretest-posttest design using the NICU Parental Beliefs Scale, the Edinburgh Postnatal Depression Scale (EPDS), and the State Trait Anxiety Inventory (STAI) tools will be performed.

Thank you,



Marlene Merkel, RNC-OB, BSN

Maternal Infant Care Center Manager


West Virginia University
Children's Hospital



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